BRITISH CHEMICAL AND PHYSIOLOGICAL ABSTRACTS

Parasites: 2nd Edition. H. M. Canaran, D. H. no neutrophils. A water extract of its liver modured fragment, and T. HAVERS (Oxford University Press, a similar disease in 2 cut of 5 cats interred. B trace. A., III.—Physiology and Biochemistry

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increase and a being private and 01 th bendulari more fearlants a (a) HISTOLOGY. The restanting as

Intravital staining of cellular lipins in animals. I. Intestinal path. II. Parenteral path. A. HADJIOLOFF (Bull. Histol. Tech. micr., 1938, 15, 81–98, 113–129).—I. The Sudan group are the best. The food chosen was one that the animal ate spontaneously and that also dissolved the stain. No successful experiments were carried out on fish. Among reptiles, lizards and snakes gave slight positive results; in birds and mammals there was rapid and marked staining. The absorbed stain is present in solution in the intraprotoplasmic lipins, having entered the cells at least in part dissolved in the fatty particles. It is found in the blood either in solution in the minute lipin particles, or in colloidal or hydrotropic solution. There is no evidence of the method by which the stain leaves the blood, but it is eliminated by the sebaceous and mammary glands, by the kidney, and in the bile ; it may also collect in the histiocyte cells.

II. Subcutaneous injection of olive oil saturated with Sudan III gave negative results; injections of alcoholic and acetone solutions of Sudan III were successful. The lipins of adipose tissue are stained much more deeply than when the dye is introduced by the intestine; lipins of nervous tissue are not stained, but the histiocyte cells, particularly Kupffer cells, concentrate the dye in their protoplasm. Successful experiments were performed in frogs and batrachians; mammals usually succumbed during the injection. The other set of a set of a set of the E. H.

Number of chromocentres in the quiescent or interphasic nucleus. P. DANGEARD (Compt. rend., 1938, 206, 1752-1754).-Phaseolus vulgaris when fixed in Helly's, Bouin and Hollande's, or Nawaschin's fluid shows chromocentres near the periphery and against the nuclear membrane. One or two small spherical structures of chromatin are adjacent to, and probably a part of, the nucleolus. Often other chromatin granules are linked with the nucleolus. The chromocentres are neither const. in no. nor regularly arranged. In late prophase, the nuclei lose their chromocentres. Nuclei in the meristematic tissue contain 12-22 chromocentres which are irregular in shape and size. In Raphanus sativus, the centres are larger and 11-17 in no. As the no. of probably some disintegrate during mitosis. J. L. D. chromocentres exceeds the diploid chromosome no.,

Differential counterstain for the Gram technique. S. A. SOUDDER (Stain Tech., 1938, 13, 124).—The following counterstain can be prepared in

bulk and after ripening for several days stored in brown bottles in the dark : pyronin-yellowish 0.1 g., methyl-green 0.65 g., hot distilled water 99 c.c. Sperm-atozoa heads are stained clear blue. E. E. H.

Preparation of leuco-basic fuchsin for use in the Feulgen reaction. L. C. COLEMAN (Stain. Tech., 1938, 13, 123-124) .- To 200 c.c. of solution of basic fuchsin are added 2 g. of K metabisulphite and 10 c.c. of N-HCl. After bleaching for 24 hr., 0.5 g. of Norit (or other decolorising carbon) is added, the whole shaken for a min., and then filtered quickly. The resulting solution looks like water. E. E. H.

Protoplasmic films of the fat cell, the wall of the pulmonary alveolus, and the renal glomerulus. J. L. BREMER (Anat. Rec., 1938, 70, 263-286).-In fat cells, capillaries of the lung alveoli, and the renal glomeruli, thin protoplasmic films, usually invisible, can be demonstrated by their ability to store minute granules of vital stains and to absorb fluid from hypertonic solutions whereby they swell to visible dimensions. Trypan-blue and thionin are the best stains for this purpose. A state the H. A. HA.

Staining reactions of protoplasm and its formed components. K. R. JEFFERS (J. Morphol. Physiol., 1934, 56, 101-124).-Lipins in autolysed cat pancreas are demonstrated only qualitatively by histological methods. CH. ABS. (p)

Mechanism of the action of X-rays on cytoplasm. P. JOVET-LAVERGNE (Compt. rend., 1938, 206, 1758-1760).-The diminution in cellular respiration is probably due to the morphological changes in the chondriosomes and to the destruction of glutathione in them. J. L. D.

Cytoplasmic inclusion bodies in the engorging tick. J. D. GREGSON (J. Path. Bact., 1938, 47, 143-153).—Cytoplasmic inclusion bodies of the engorging gut cells of Dermacentor andersoni were globoid in shape; they grow in size from ultramicroscopic to 15 µ. in diameter and are exceedingly resistant to conc. salt solutions, acetic acid, and fat solvents. They react feebly with all stains except Mallory's triple stain, by which they are stained crimson; bodies appearing blue by this method are thought to be old and disintegrating. Similar in-clusion bodies were also found in tick hypodermal cells, ova, spermatozoa, and phagocytic cells and surrounding muscle fibres. These bodies have not been cultured but forms suggestive of binary fission have been noticed. C. J. C. B.

Histological Technique for Normal Tissues, Morbid Changes, and the Identification of BIBLIOTEL

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Parasites. 2nd Edition. H. M. CARLETON, E. H. LEACH, and F. HAYNES (Oxford University Press, 1938, pp. 383).

(b) BLOOD AND LYMPH.

Bone marrow and blood count in sensitised animals. H. HÖLDERLIN (Virchows Arch., 1938, 302, 118-139) .- Rabbits were sensitised with repeated small doses of caseosan, B. coli vaccine, horse serum, or histamine for several weeks and after an interval of 10-14 days injected with *B. coli* or staphylococci. The bone marrow may react in three different ways : (1) "irritated marrow": megakaryocytes increased, myeloblasts, myelocytes, neutrophil leucocytes very much increased, (2) "damaged marrow ": megakaryocytes not increased, white cells moderately increased with degenerative changes, many naked nuclei of red cells, (3) "exhausted marrow ": few damaged megakaryocytes and white cells, many naked nuclei of red cells, reticulo-endothelial cells partly necrotic. The severest reactions were observed in the animals sensitised with serum and the least severe ones in those sensitised with caseosan or histamine. A blood leucocytosis was always associated with an increase in the white cells of the marrow, but an increase in the marrow cells was not necessarily followed by a leucocytosis. With an "irritated marrow, the blood showed an increase in neutrophils and platelets; "damaged" or "exhausted" marrow was accompanied by a decrease in these cells. A particularly pronounced "shift to the left" in the differential count was found in animals with an "exhausted " marrow. H. W. K.

Quantitative examination of sternal puncture marrow. S. GREIF (Folia Haemat., Lpz., 1938, 59, 328—340).—The normal nucleated cell count is 45,000—150,000 per cu. mm. The first drop of fluid obtained gives the highest and most accurate count of nucleated cells, but well mixed quantities of fluid up to 0.1 c.c. although they give lower vals. are useful. Repeated examinations should be made near but not in the same area of bone marrow. C. J. C. B.

Sternal marrow findings in cases of eosinophilic infiltration of the lungs. R. STAHEL (Folia Haemat., Lpz., 1938, 59, 341—350).—In 6 cases of eosinophilic infiltration of the lungs, bone marrow puncture showed that the eosinophils have a very strong blue tint in the cytoplasm with immature granulation but relatively mature nuclei. Similar changes were also present in the peripheral blood stream. Similar changes are present, however, in other eosinophilias. C. J. C. B.

Protein content of normal and pathological bone marrow in man. H. KELLHACK (Dtsch. Arch. klin. Med., 1938, 182, 57—74).—Normal human bone marrow contains approx. 175 g. of proteins (4.5% of the marrow tissue). The amount of bone marrow proteins is altered in various pathological conditions. A. S.

Spontaneous agranulocytosis in the cat. J. S. LAWRENCE and J. T. SYVERTON (Proc. Soc. Exp. Biol. Med., 1938, 38, 914—918).—A cat was found by chance to have only 350 leucocytes per cu. mm. of blood and

no neutrophils. A water extract of its liver produced a similar disease in 2 out of 5 cats injected. 13 transmissions of the disease were carried out, the infective agent being present in a filtered, bacterium-free extract of either lungs or liver. V. J. W.

Autolysis of white blood corpuscles in buffer solutions of various $p_{\rm H}$. W. HAGEMANN (Virchow's Arch., 1938, 302, 140—161).—Dilutions of blood with approx. isotonic phosphate buffers of $p_{\rm H}$ 5—8 were incubated at 40° for varying periods. Microscopic examination showed that leucocytes autolysed more rapidly than lymphocytes. The autolytic activity of both types of cells was greatest at $p_{\rm H}$ 8 and decreased towards the acid side. Leucocytes showed liquefaction at $p_{\rm H}$ 7—8, coagulation at $p_{\rm H}$ 5, and a mixed type of autolysis at $p_{\rm H}$ 6. H. W. K.

Identity of blood monocytes and tissue macrophages; their growth rates in vitro. F. JACOBY (J. Physiol., 1938, 93, 48—50P).—Two cell populations (hen) of different origins, in regard to their growth rate when living in serum (Carrel flask technique) behave very much alike under comparable *in vitro* conditions; this adds a further common physiological character other, than morphological to these two sets of cells, increasing the evidence of their identity. (Cf. Physiol. Abs., 1937, 22, No. 3870.) J. A. C.

Phases in the life history of the polymorph leucocyte. C. J. BOND (Brit. Med. J., 1938, II, 281-282).—From a study of polymorph leucocytes after incubation and in phagocytosis it is suggested that amœboid movements may increase the no. of nuclear lobes, *i.e.*, produce a shift to the right.

C. A. K. The Sato-Sekiya copper peroxidase reaction for leucocytes. T. SUZUKI (Tohoku J. exp. Med., 1938, 33, 408-412).—Human blood smears air-dried and kept in the dark remain suitable for Sato-Sekiya Cu peroxidase reaction at least for 3 years. Preps. stained with this method tend to fade in a relatively short time. F. JA.

Eosinophilia in cases of pleuritic and nephritic affections. T. SUZUKI (Tohoku J. exp. Med., 1938, 33, 413—418).—The eosinophilia found in these conditions indicates the presence of an exudate or transudate and its resorption. F. JA.

Origin of leucocytosis and leucopenia. F. FALUDI (Folia Haemat., Lpz., 1938, 59, 357–406).— Experiments on rabbits with leucopenia caused by intravenous injection of *B. coli* and with leucocytosis caused by insulin showed that the latter was due to the hypoglycamic muscle cramps. Redistribution of leucocytes was not the cause of the findings. Injection of a rabbit with a leucocytic cream or its own leucocytes caused a temporary leucopenia. In *B. coli* leucopenia the plasma-catalase content is increased, suggesting that the cause of the reaction is direct destruction of the leucocytes: C. J. C. B.

Human blood-containing lymph nodes. O. CARERE-COMES (Folia Haemat., Lpz., 1938, 49, 407– 433).—The presence of blood in human lymph nodes is due to changes in the capillary walls which occur physiologically in the paravertebral and spleen nodes but can occur under pathological conditions in other lymph nodes, e.g., following inflammatory changes, or blood stagnation. C. J. C. B.

Variations in hæmoglobin and number of leucocytes in successive blood samples from the ear-lobe. K. HUMPERDINCK (Arch. Gewerbepath. Gewerbehyg., 1938, 8, 532—539.—In samples taken at 1-min. intervals during a period of 7 min. the variation in hæmoglobin vals. was generally not above 1-2%. Max. variations were : hæmoglobin 1 g., and leucocytes 1600. In 15 cases out of 22 the variation was within experimental error. Comparative hæmoglobin determinations by daylight and artificial light showed differences of 1-2%, there being no difference in samples from ear and finger. M. A. B.

Lactic acid content of the lymph of the leg after section of the sciatic nerve. Y. YOSHIDA (Arb. Abt. anat. Inst. Kyoto, 1937, **D**, **6**, 106—107).—In 6 out of 7 rabbits in which the sciatic nerve was cut on one side, the lymph from that side showed a lower lactic acid concn., dry substance, and ash than on the opposite side. C. J. C. B.

Carbon dioxide formation in the lymph glands with intact blood circulation. Y. YOSHIDA (Arb. Abt. anat. Inst. Kyoto, 1937, **D**, **6**, 108— 109).—In the popliteal glands of rabbits with an intact circulation the average difference in CO_2 content between the afferent and efferent lymph was 5.9 c.c. per 100 c.c. of lymph. C. J. C. B.

Amylase of the lymph. N. FUJIMOTO (Arb. Abt. anat. Inst. Kyoto, 1937, D, 6, 110–115).—The amylase content of the efferent lymph in rabbit's popliteal glands is greater than that of the afferent lymph. A certain % of NaCl is required for optimal amylase activity; the effects of other salts on its activity are described. C. J. C. B.

Cells of the lymph in pyogenic lymphadenitis. T. SAKAI (Arb. Abt. anat. Inst. Kyoto, 1937, D, 6, 116—122).—24 hr. after introduction of staphylococci into the popliteal lymph gland of the rabbit, the total cell count in the efferent lymph rises. Macrolymphocytes, polymorphs, and sometimes plasma cells appear in the efferent lymph and the no. of red cells rises. These abnormal cells diminish slowly and disappear by the 4th week. [1 plate.] C. J. C. B.

Amylase of lymph. N. FUJIMOTO (Arb. Abt. anat. Inst. Kyoto, 1937, D, 6, 123—131).—The action of various substances on amylase activity in lymphocytes is described. C. J. C. B.

Influence of peptone and sinomenine on cell picture of peripheral lymph. T. SAKAI (Arb. Abt. anat. Inst. Kyoto, 1937, D, 6, 132—135).— Following the injection of peptone or sinomenine into the skin of the toes of rabbits, the peripheral lymph showed a decrease in total cells with an increase after 24—48 hr. C. J. C. B.

Residual nitrogen of the lymph of the leg after injection of pilocarpine and diphtheria toxin. S. SAITO (Arb. Abt. anat. Inst. Kyoto, 1937, D, 6, 136-144).—The residual N decreased in the lymph after the injection of either of these substances. C. J. C. B. Absorption curve of peripheral lymph. G. MINOGUCHI and N. FUJIMOTO (Arb. Abt. anat. Inst. Kyoto, 1937, D, 6, 145—148).—The absorption curves of lymph serum and plasma and of a watery lymphocyte extract are described. C. J. C. B.

Influence of ligature of afferent arteries on carbon dioxide formation in popliteal lymph glands. Y. YOSHIDA (Arb. Abt. anat. Inst. Kyoto, 1937, D, 6, 149—161).—Following ligature the formation of CO₂ rapidly diminishes. C. J. C. B.

Damming effect of lymph glands. S. FUNAOKA, H. RIUZAN, and N. SAITO (Arb. Abt. anat. Inst. Kyoto, 1937, D, 6, 162—164).—With various pressures in the vas afferens of the popliteal glands of the rabbit, there was a loss of pressure of 70—80% in the efferent lymphatics. C. J. C. B.

Resistance and damming effect of lymph glands in retrograde movement of lymph. S. YOKOYAMA and N. SAITO (Arb. Abt. anat. Inst. Kyoto, 1937, D, 6, 165—169).—When the pressure in the vas efferens in the popliteal glands of the rabbit is raised, no change in pressure is found in the afferent lymphatics until the pressure reaches 59—89 cm. H_2O , when it suddenly rises but never to the same val., although the damming effect lessens as the pressure in the afferens rises. C. J. C. B.

Carbon dioxide formation in the popliteal gland of the rabbit when chloroform is present in the perfusion fluid. Y. YOSHIDA (Arb. Abt. anat. Inst. Kyoto, 1937, D, 6, 170–194).—CHCl₃ diminishes CO₂ formation. C. J. C. B.

Hydrogen-ion concentration in the lymph of the leg in experimental icterus and nephrectomy. M. ABAKI (Arb. Abt. anat. Inst. Kyoto, 1937, D, 6, 195—198).—The $p_{\rm H}$ of the blood decreases after ligature of the bile duct in rabbits while that of the leg lymph increases. After nephrectomy the $p_{\rm H}$ of both tends to increase. After splenectomy there was little change. C. J. C. B.

Influence of subcutaneous injection of pilocarpine and diastase on amylase of leg lymph of the rabbit. M. FUKUOKA (Arb. Abt. anat. Inst. Kyoto, 1937, D, 6, 199–203).—In both cases the amylase was increased. C. J. C. B.

Physiology of movement of lymph. S. FUN-AOKA (Arb. Abt. anat. Inst. Kyoto, 1937, D, 6, 204– 228).—A general review of the work done in this institute on lymphatology. C. J. C. B.

Normal blood values in children. P. FAERGE-MAN (Acta med. scand., 1938, 95, 566-596).--Statistical analysis of the data derived from a study of 300 "healthy" school children in Stockholm aged 8-14 years gave the following figures : erythrocytes 3·654-5·808 (mean 4·731) million per cu. mm.; hemoglobin 79·85-114·7% (mean 97·25) (Haldane); cell vol. 34·72-46·84% (mean 40·78). Corpuscular hemoglobin concen. and content and corpuscular vol. were measured. Agreement between the sexes was very close, except that males in the 14 year-old group had a slightly higher red-cell count than females. The figures were very similar to those for adults apart from a slightly greater corpuscular vol. in children. C. A. A.

Demonstration of reticulocytes with Wright's stain. S. F. KITCHEN (Stain. Tech., 1938, 13, 107— 109).—A 0.3% solution of Wright's stain in abs. acetone-free methyl alcohol is quite as effective as the usual brilliant-cresyl-blue stain for demonstrating reticulocytes, both in moist film and in dry press.

E. E. H.

Erythrocyte number in young pigeons. O. RIDDLE and G. E. CAUTHEN (Amer. J. Physiol., 1938, 122, 480-485).-4 racial groups of pigeons were studied 1-100 days after hatching during summer months. During the first 3 days of post-natal life the no. of red cells decreased from 1,275,000 to 1,080,000 per cu. mm.; about 27 days later the red cells attained a max. (3,400,000) which was maintained for 30-35 days. During the following month and coincident with the termination of notable body growth, the cell count was rapidly diminished by 10%. Only the first third of the period of erythrocyte increase is associated with a continuing increase of basal metabolic rate. The influence of heredity on erythrocyte no. in pigeons was evident. M. W. G.

Composition of blood in camels in relation to the working ability of these animals. H. F. KUSHNER (Compt. rend. Acad. Sci. U.R.S.S., 1938, 18, 681-684).—The working ability of the offspring of a crossing of *C. dromedarius* and *C. bactrianus* is higher than that of the parents. This is due to the higher % of hæmoglobin and no. of erythrocytes in the F_1 hybrid generation. A. S.

Blood picture, sedimentation rate, urobilin exchange, in periodic vomiting with ketosis. J. STRÖM (Acta paediatr. Stockh., 1937, 20, 131-174).— The blood of 11 children in 9 spontaneous and 4 dietetically-produced vomiting attacks was studied. In intervals between attacks no changes occur. In severe attacks there is leucocytosis (up to 20,000 per cu. mm.), lymphopenia, and diminution in monocytes. Myelocytes may appear. The sedimentation rate is sometimesraised. In 7 children urobilinuria occurred. A. J. B.

Blood and temperature changes following Bang bacilli infection. I. Blood picture in normal animals. II. Influence of splenectomy on blood picture. A. BER (Arch. int. Méd. exp., 1938, 13, 205—221, 223—236).—I. A complete blood examination was carried out on normal guinea-pigs and rabbits and the results are reported in detail.

II. Splenectomy in the guinea-pig causes little change in the red blood cell count and hæmoglobin content, though there is a large increase in young erythrocytes. Shortly after the operation the granulocytes increase and the mononuclears diminish but gradually return towards normal. The granulocyte count, however, always remains higher than it was before the operation. The effects of splenectomy on the rabbit blood picture are negligible. P. C. W.

Simple step-photometric determination of carboxyhæmoglobin for clinical and forensic use. H. OETTEL (Klin. Woch., 1938, 17, 1019).—Blood is diluted 10-fold with 0-1% NH₃, a trace of Na₂S₂O₃ added, and the extinction measured with filters S57 and S53 using 0.5 c.c. thickness. A formula for COHb % is given. E. M. J.

In-vivo fixation of arsenical compounds in erythrocytes. J. THURET (J. Pharm. Chim., 1938, [viii], 28, 60—68).—With inorg. and org. As^{TI} compounds, the As is retained in the erythrocytes (dog, rabbit), leaving the plasma free from As; with As^v compounds, fixation is much slower and the plasma contains As. Thus fixation of As^{TII} is the same *in vitro* and *in vivo*, but with As^v, fixation occurs only *in vivo* subsequent to the reduction of As^V to As^{III}.

F. O. H. Blood regeneration in *Galleria mellonella* after hæmorrhage. A. DAKHNOFF (Compt. rend. Soc. Biol., 1938, **128**, 520–523).—Regeneration following hæmorrhage in *G. mellonella* takes place not only by cell division but by transformation of lymphocytes into proleucocytes, thence into leucocytes, and finally into spherical cells. P. C. W.

Daily variations in the lead, calcium, and phosphorus content of plasma and erythrocytes. F. SCHMITT and W. BASSE (Dtsch. Arch. klin. Med., 1938, 182, 193—199).—The Pb content of blood of normal persons is highest in the fasting state. Intravenous injections of Ca increase blood-Pb, -Ca, and -P; plasma-Ca is more increased than erythrocyte-Ca. Ingestion of large quantities of water increases blood-Pb. The Pb content of bile is higher in cases of gall-bladder disease than in normal subjects; 18—200 µg.-% Pb were found. A. S.

Optical determination of hæmoglobin as oxyhæmoglobin, reduced hæmoglobin, and hæmatin. L. HEILMEYER and I. VON MUTIUS (Dtsch. Arch. klin. Med., 1938, **182**, 164—175).—Hæmoglobin in blood can be determined as oxyhæmoglobin by spectrophotometry. The determination in the form of reduced hæmoglobin is unreliable. Determination as hæmatin gives const. results only after 24 hr.; the experimental error is $\pm 11\%$. A. S.

Anæmia produced in experimental lead poisoning. M. LOUREAU, G. S. DE SACY, and A. ARTHUS (Compt. rend. Soc. Biol., 1938, 128, 512– 514).—The anæmia produced by intravenous injection of Pb acetate into rabbits varies in different individuals. By determining the temporary anæmia produced by a single injection of 5 mg., a dose can be calc. which given thrice a week will cause a prolonged and stable anæmia. P. C. W.

Changes in red blood cell count in hyperthyroidism. G. KLEINER and F. RÉNYI-VÁMOS (Dtsch. med. Wschr., 1938, 64, 1144).

Determination of hæmoglobin and number of red blood cells after carbon monoxide poisoning. K. HUMPERDINCK (Arch. Gewerbepath. Gewerbehyg., 1938, 8, 464–468).—A high red cell count is not characteristic of CO poisoning.

M. A. B. Effect of mineral waters on tissue [red cell] respiration. Rôle of potassium and ferric ions. Action of ferruginous mineral water. M. PIÉRY, J. ENSELME, and S. PETEL (Compt. rend., 1938, 206, 1685—1687; cf. A., 1938, III, 365).—The O₂ consumption of goose erythrocytes is increased by K^{*}, especially in presence of ascorbic acid, but is markedly diminished by Fe^{**}. Certain ferruginous mineral waters, rendered isotonic with NaCl, at first increase O_2 consumption but after being kept for some hr., diminish it. The activity of the ions is interpreted in terms of their effect on permeability. J. L. D.

Hæmocuprein, a copper-protein compound of red blood corpuscles.—See Å., 1938, II, 423.

Acetone-chlorohæmin in blood examination. A. F. RICHTER and M. HOFMAN (Z. anal. Chem., 1938, 113, 334—339).—The prep. of acetone-chlorohæmin (Wagenaar, A., 1936, 355) is described. The corresponding iodo- and perchlorate derivatives could not be prepared. The modifications occurring in derivatives of blood-pigments due to heating with mineral acids and the bearing of these changes on reactions and tests for blood are discussed.

F. O. H.

Hæmolysin in the urine in aplastic anæmia. J. C. ABELS and C. P. RHOADS (Proc. Soc. Exp. Biol. Med., 1938, 38, 849–853).—Urine of patients with aplastic anæmia is not hæmolytic but becomes so if boiled for 1 hr. at $p_{\rm H}$ 1. Urines of normal subjects which are not hæmolytic do not become so by this treatment. V. J. W.

Pathogenesis of chlorotic anæmia. L. HEIL-MEYER (Dtsch. Arch. klin. Med., 1938, 182, 150— 163).—Plasma-Fe was considerably diminished in 2 typical cases of chlorosis; there was, in both cases, a disturbance of Fe absorption from the gut, which responded to treatment. A. S.

Nutritional macrocytic anæmia in Macedonia. N. H. FAIRLEY, R. J. BROMFIELD, H. FOY, and A. KONDI (Trans. Roy. Soc. trop. Med. Hyg., 1938, 32, 132-182).-The findings in 37 cases of macrocytic anæmia in Macedonia in pregnant women are decribed. In most cases the spleen was enlarged and the anæmia was hæmolytic in type; in the nonhæmolytic cases splenomegaly was absent. The cause of the latter group appeared to be a very deficient diet. In the hæmolytic group malaria was responsible in addition to the poor diet, as the hypertrophied reticulo-endothelial system ingests nonparasitised abnormal cells in large nos. Very large doses of marmite or liver extract were required to obtain a good reticulocyte response. The sternal bone marrow showed a panmyelopathy, erythro-poiesis with megaloblastic degeneration, the production of pathological precursors of the white cell series, and an abnormal condition of the megakaryocytes. C. J. C. B.

Primary hypochromic anæmia. O. B. BODE and H. HEYRODT (Münch, med. Wschr., 1938, 85, 1306—1309),—200 cases of hypochromic anæmia are reported. These cases responded well to treatment with Fe preps. A. S.

Relation of tropical macrocytic anæmia to pernicious anæmia. L. WILLS and B. D. F. EVANS (Lancet, 1938, 235, 416-421).-Tropical macrocytic anæmia resembles pernicious anæmia in most respects but shows no response to parenteral administration of highly purified liver extract, although responding well to crude liver extract and to autolysed yeast extract. Experimentally produced animia in monkeys showed the same features. A new haemopoietic factor in crude liver and autolysed yeast extract (not vitamin- B_1 and $-B_4$, lactoflavin, or nicotinic acid) is suggested. C. A. K.

Anomalous hyperchromic anæmias. M. C. G. ISRAËLS and J. F. WILKINSON (Lancet, 1938, 235, 362—366).—Cases of hyperchromic anæmia resistant to treatment are described. They were classified as (1) aplastic type, (2) achrestic type, (3) aleukæmic leukæmia. The bone marrow changes and methods of treatment are described. C. A. K.

Chronic nutritional hypochromic anæmia. L. S. P. DAVIDSON and H. W. FULLERTON (Edinb. med. J., 1938, 45, 193—212).—The prophylactic and curative treatment of chronic nutritional hypochromic anæmia is described. The relative potency of different foodstuffs as promotors of hæmoglobin regeneration is discussed. Dietetic treatment is inadequate for the treatment of established anæmia, but is of particular val. in its prevention. Fe^{H} salts are equally efficacious in the treatment of anæmia and their % utilisation is at least 5 times as great as that of Fe NH₄ citrate. J. M. R.

Aplastic anæmia due to sensitivity to benzol derivatives. V. W. MILLER (Northw. Med., 1938, 37, 43—45).—A female patient of 31 who took a prep. containing an amytal compound developed aplastic anæmia confirmed at autopsy. A. J. B.

Iron-deficiency anæmias. R. B. Scott (Lancet, 1938, 235, 549--552).--A review. C. A. K.

Effect of feeding goose liver on number of red blood cells in rats. H. TANGL (Mezög. Kutat., 1938, 11, 69—73).—Daily ingestion of 2 g. of raw goose liver increased the no. of red cells in rat blood. Baking the liver lowered its activity. Sterilised (120°) liver had increased activity probably as a result of removal of fat. A. G. P.

Reticulocytogenic effects of liver extract and Congo-red in guinea-pigs under reduced oxygen tension. A. P. RICHARDSON and W. DOCK (Proc. Soc. Exp. Biol. Med., 1938, **38**, 866-869).—Neither liver extract nor Congo-red caused any modification of the reticulocyte increase which follows exposure to atm. of 380-400 mm. Hg: V. J. W.

Reduction of experimental polycythæmias by liver administration. J. E. DAVIS (Amer. J. Physiol., 1938, 122, 397-401).—The oral administration of whole raw beef or hog liver reduced the red corpuscle but not the leucocyte counts in all of 4 dogs in which polycythæmia had been induced by daily treadmill running exercise, and in 6 out of 7 Co-fed polycythæmic dogs. Reticulocyte percentages in Co-fed dogs was markedly reduced by liver feeding. The erythrocyte count in 3 polycythæmic exercise dogs was not reduced significantly by the daily oral administration of 5 g. of ventriculin and of anti-anæmic liver extract. It is assumed that a liver hormone exists which depresses the hæmatopoietic activity of red bone marrow. M. W. G. Effect of liver extract, injected parenterally into the mother, on erythrocytes of newborn rats. H. S. WIGODSKY and A. C. IVY (Proc. Soc. Exp. Biol. Med., 1938, 38, 787—790).—Injection of liver extract into a pregnant rat has no effect on the erythrocytes of the offspring. V. J. W.

Rôle of copper in iron deficiency anæmia of infancy. J. H. HUTCHISON (Quart. J. Med., 1938, 7, 397—419).—In 6 cases of Fe deficiency anæmia of infancy, FeSO₄ was given until the hæmoglobin level showed no further rise. Addition of Cu then produced a further increase. In 3 cases, FeSO₄ was given in small doses so as to produce Fe storage without increase of hæmoglobin. Again administration of Cu produced a rise. It is suggested that Cu acts as a catalyst enabling Fe to be converted into such a form that it can be transported from the storage depots to the bone marrow and there turned into hæmoglobin. H. P. H.

Ætiologic relationship of achylia gastrica to pernicious anæmia. VII. Resemblances between the proteolytic activity of normal human gastric juice on casein in neutral solution and the activity of the intrinsic factor. F. H. L. TAYLOR, W. B. CASTLE, R. W. HEINLE, and M. A. ADAMS (J. clin. Invest., 1938, 17, 335-345).—The proteolytic activity of normal human gastric secretion resembles that of intrinsic factor. It is (a) independent of the presence of saliva and of regurgitated duodenal contents; (b) absent or diminished in the gastric secretion of patients with pernicious anæmia; (c) not destroyed by Berkefeld filtration or exposure to alkali; destroyed by exposure to 40° for 72 hr., or to 70-80° for 30 min., or by boiling for 5 min., and (d) inhibited by an environment more acid than $p_{\rm H}$ 3.5. The in vitro activity of normal human gastric juice was entirely removed by treatment with Lloyd's reagent, which, however, only partly removes the intrinsic The proteolysis observed was considered not factor. to be due to pepsin because the activity was not significantly affected by exposure to alkali and thereafter was max. at about $p_{\rm H}$ 8 and absent at $p_{\rm H}$ 2.5. The proteolysis observed was not due to tryptic or ereptic-like enzymes because the activity was not significantly affected by exposure to alkali, because thereafter significant activity was observed at both $p_{\rm H}$ 5 and $p_{\rm H}$ 7.4, and because relatively little amino-N was produced within 24 hr. at 37.5°. C. J. C. B.

Restropic activity of blood. C. WETZLER-LIGETI and B. P. WIESNER (Brit. Med. J., 1938, II, 444–447; cf. A., 1938, III, 708).—The Congo-red index shows that the blood of rabbits, horses, and healthy human subjects contains a factor that stimulates the reticulo-endothelial system (positive restropic factor). In malignant disease a negative factor is found. C. A. K.

Prevention of anæmia in pigs reared indoors. A. S. Foor and S. T. THOMSON (J. Min. Agric., 1938, 45, 452—459).—Dosing of sows with Fe during the last few weeks of pregnancy has no effect on anæmia in piglings. Dosing of young pigs with Fe pyrophosphate and $CuSO_4$ is preferably begun within the second week. A. G. P.

Modification of the blood platelets in vivo. A. DREYFUS, S. JACOB, and J. JUGARD (Sang, 1938, 12, 795—799).—The changes in the morphology of the platelets (particularly with regard to platelet prolongations) following intravenous injection of fluids of differing $p_{\rm H}$ and after the oral administration of acid and alkaline salts are described.

C. J. C. B. Thrombopenia caused by benzene. B. KERN (Münch. med. Wschr., 1938, 85, 1062—1063).—A case of chronic benzene poisoning with extreme thrombopenia (complete absence of thrombocytes), normal white and red cell count, and normal hæmoglobin concn. is reported. A. S.

Oligolytic concentration of red cells in aqueous solutions of various sugars. H. NAKAMURA and K. KURODA (Keijo J. Med., 1938, 9, 53—63).—The phase of oligolytic conens., expressed as total conens. of dissociated and non-dissociated mols., is the same for electrolytes and non-electrolytes (sugars); in hyperoligolytic conens., however, monosaccharides differ from disaccharides as to the degree of hæmolysis produced. ["Oligolytic" = very hypertonic conens. in which slight hæmolysis occurs.] F. JA.

Extraordinary viscosity change of red cell suspensions in sugar solutions of oligolytic concentrations. Comparison between electrolytes and non-electrolytes. H. NAKAMURA and K. KURODA (Keijo J. Med., 1938, 9, 64—79).—A red cell suspension shows a characteristic change in a definite conen. which is the same for electrolytes and non-electrolytes and is identical with the oligolytic conen. The viscosity of a suspension of non-nucleated red cells has its max. in oligolytic conens. whilst that of nucleated red cells has there its min. F. JA.

Stability of red cell suspensions in sugar solutions of various concentrations. H. NAKA-MURA and K. KURODA (Keijo J. Med., 1938, 9, 80– 88).—In oligolytic sugar solutions (as with saline) a suspension of non-nucleated red cells shows greatest stability, that of nucleated red cells the least. F. JA.

Red cell hæmolysis of normal human blood in saline solutions of different concentrations. S. KIN (Keijo J. Med., 1938, 9, 89—106).—Red cells of men show a greater degree of hæmolysis than those of women. Individual figures over a wide range of saline concess. of 120 persons examined are given.

F. JA. Changes in viscosity of suspensions of blood cells of different species in oligolytic salt solutions. H. NAKAMURA and K. KURODA (Keijo J. Med., 1937, 8, 433—453).—The change in viscosity depends on whether the red cells are nucleated or not. With the latter there is an increase in viscosity in oligolytic concus. while with the former a decrease occurs. The viscosity changes follow the zoological relationship of the species. The viscosity of red cell suspensions in media of various concus. depends directly on the stability of the red cells in these media. F. JA.

Viscosity of blood cell suspensions in salt solutions and the factors which determine it. Y. EGAMI and S. KIN (Keijo J. Med., 1937, 8, 513— 527).—In hypo-oligolytic and oligolytic NaCl conens. the viscosity of red cell suspensions rises gradually with increase of cellular conen.; in hyper-oligolytic NaCl conens., the rise is sudden with 50% red cell conens. or higher. Red cell suspensions above 50% show greatest viscosity in 5% NaCl, below 50% in 2% NaCl. Increased viscosity after agitation of the red cell suspension is due to substances released from the cells owing to hæmolysis. The viscosity of the red cell suspension diminishes with rise in temp., this diminution depending directly on the NaCl conen. of the medium.

F. Ja. Rôle of anions and cations in the stability of red cell suspensions in electrolytic media. S. Tôcô (Keijo J. Med., 1937, 8, 528-562).—The stability of non-nucleated red cell suspensions is max. in oligolytic salt conens. in which that of nucleated cells is min. This change in stability is due to oligolytic ion conces. and does not depend on the type of salt. F. Ja.

Stability of red cell suspensions in solutions of NaNO₃, NaNO₂, Na₂SO₄, Na₂SO₃, and Na₂S₂O₃. T. SUZUKI (Keijo J. Med., 1937, 8, 563—577).—Solutions of varying concess. of NaNO₃ and NaNO₂ differ from those of Na₂SO₄ and Na₂S₂O₃ with respect to stability of red cell suspensions. The former react like salts with univalent anions, the latter like salts with bivalent anions. All these salts show the greatest stability of the red cell suspensions in oligolytic concess. NaCl concess. were used as controls.

F. Ja.

Variations in blood-glutathione and sedimentation rate in rheumatic patients treated by mud therapy. E. HURMUZACHE, E. GHELLER, and I. SPÂNU (Ann. Sci. Univ. Jassy, 1938, 24, 457-460).--In 24 patients with chronic polyarticular rheumatism, the average blood-glutathione was lower before, and higher after, treatment. In only $\frac{1}{3}$ of the cases was the sedimentation rate within normal limits, but after treatment there was some improvement.

J. N. A.

Electrophoretic mobility of human erythrocytes. W. H. BYLER and H. M. ROZENDAAL (J. Gen. Physiol., 1938, 22, 1—5).—The electrophoretic activity of human red-cell ghosts decreases in the presence of chicken serum. The decrease is not directly due to the presence of adsorbed material but to a chemical change catalysed by the foreign substance. Fragments of broken cells have the same mobility as whole cells at first, then decrease even when suspended in aq. solutions of inorg. salts, whilst the whole cells remain unchanged. D. M. N.

Trypanosomiasis. III. Red cell adhesion test. H. C. BROWN and J. C. BROOM (Trans. Roy. Soc. trop. Med. Hyg., 1938, 32, 209-222).—Standard concns. both of red cells and of trypanosomes are necessary to obtain const. results in the red cell adhesion test, and the character of adhesion can be altered at will by varying the relative proportions of the various agents or the time of incubation. Complement is essential and the absence of any single component of complement inhibits the reaction. Certain human red cells, from pathological or normal persons, will not adhere to sensitised trypanosomes, but such failure could not be correlated with any altered physical state of the red cell. Certain bacteria also fail to adhere and such failure could not be correlated with rough or smooth states of the culture. C. J. C. B.

Citrate solutions for preservation of fluid blood. J. COTTER and W. J. MACNEAL (Proc. Soc. Exp. Biol. Med., 1938, 38, 757-758).—Na citrate solutions have a $p_{\rm fl}$ of 8-8.7. The optimum $p_{\rm fl}$ for preserving red cells is 7.1-7.5, which can be attained by the addition of citric acid. V. J. W.

Isolation of the blood group A specific substance from commercial peptone. W. F. GOEBEL (J. Exp. Med., 1938, 68, 221–228).—A carbohydrate obtainable from commercial peptone has similar chemical properties to blood group A sp. substance. Serologically the material from neopeptone inhibited hæmolysis of sheep cells in a dilution of 1:4,000,000. The other prep. tested was effective up to 1:1,000,000dilution. A. C. F.

Determination of relative hæmolytic activity. M. Pärc and M. CHOROKHOFF (Bull. Soc. Chim. biol., 1938, 20, 947—952).—The method described is based on comparison of hæmolysis curves of sera.

P. G. M.

Unimolecular layer of lipins on the surface of erythrocytes. D. K. DERVICHIAN and M. MACHEBGUF (Compt. rend., 1938, 206, 1511-1514),... Free lipins of the red cells of the dog, sheep, and goat were determined by extraction with cold ether. The area occupied by 1 mg. of free lipin in the form of unimol. film on saline at 35-38° was also determined at the saturation point of the film. The area of a monolayer of lipin on the corpuscles was calc., and thence the diameter of the cells, giving vals. of 7.6, 4.8, and 4.0μ . for dog, sheep, and goat, respectively. Direct measurement gave 7.1-7.4, 5, and 3.4-3.7. J. L. C.

Effects of blood transfusions with copper ions on acute anæmia in women. G. SAI (Tohoku J. exp. Med., 1938, 33, 369—378).—In post-partum hæmorrhagic anæmia blood transfusions with Cu ions and saline infusions with Cu are more effective than transfusions without Cu. F. Ja.

Effects of blood transfusions with copper ions on chronic anæmia in women. G. SAI (Tohoku J. exp. Med., 1938, 33, 379—382).—Most of the women examined suffered from carcinoma uteri. The blood picture was followed for a fortnight. Blood transfusion with Cu ions is superior to that without Cu. F. Ja.

Effect of reticulo-endothelial blockade on natural antibodies and natural immunity reactions. S. THOMSON (Edinb. med. J., 1938, 45, 505-517).—Blockade of the reticulo-endothelial system with injections of Indian ink does not depress the activity of natural antibodies or affect natural immunity reactions. J. M. R.

Chemical nature of component involved in the reaction between iodine and complement. B. F. CHOW and S. H. ZIA (Proc. Soc. Exp. Biol. Med., 1938, 38, 690-692).--When pig serum is inactivated by I and dialysed, practically all the I is dialysable and

none remains attached to the serum protein, and, if the proteins are pptd. and filtered off instead of being dialysed, the I is found in the filtrate. Serum which had been inactivated by I restored to activity serum which had been inactivated by heat, NH2, or yeast, and such inactivated sera reduce I to the same extent as V. J. W. before inactivation.

Dialysable component of complement. B. F. CHOW and S. H. ZIA (Proc. Soc. Exp. Biol. Med., 1938, 38, 695-697).-When guinea-pig serum is dialysed with normal saline it loses its complementary activity, but this is restored if the serum and the dialysate are mixed. This dialysate does not reactivate serum which has been inactivated by yeast, NH₃, or I. V. J. W.

Complement fixation with insulin as antigen. R. RICHARDSON (Proc. Soc. Exp. Biol. Med., 1938, 38, 874-875).—There is present in the blood of certain people a substance which can combine with insulin and thus fix complement. Its presence could not be correlated with any of the pathological conditions V. J. W. examined.

Blood analysis in cancer patients treated by radiotherapy. F. BACLESSE and J. LOISELEUR (Compt. rend. Soc. Biol., 1938, 128, 692-694). An index of cell breakdown is obtained by analysing the blood for alkali reserve, Cl', dilution, $p_{\rm H}$, and peptide content. This "index" rises in all cases during the first week of radiotherapy and a second peak may occur in particularly radiosensitive tum-ours such as lymphosarcomata. A fall to normal levels is a good prognostic sign. P. C. W.

Variations in the index of refraction of plasma preserved in the refrigerator. G. JEANNENEY, C. WANGERMEZ, and E. LEYMARIE (Compt. rend. Soc. Biol., 1938, 128, 670-672).—A gradual rise in n, becoming more marked after 15 days, was observed. H. G. R.

Antialexic substances in fresh and heated serum. H. GOLDIE (Compt. rend. Soc. Biol., 1938, 128, 364-367).—The alexin content of horse serum is apparently increased four times when diluted with a slightly hypertonic solution of 0.45% NaCl and 5% sucrose instead of with normal saline. The sera of rabbit, guinea-pig, and man are rarely affected by this treatment. The effect is attributed to separation of antialexic euglobulins from the alexic proteins.

P. C. W.

Effect of fluids given intraperitoneally, intravenously, and by mouth on the volume of thoracic duct lymph in dogs. A. L. WATKINS and M. N. FULTON (Amer. J. Physiol., 1938, 122, 281–287).—Physiological saline, water, 6% acacia, horse serum, and blood were introduced into the peritoneal cavity of dogs in amounts varying from 400 to 1000 c.c. In only one instance out of 9 was there any increase in thoracic duct lymph flow vol. following the administration of intraperitoneal fluid. Saline and water given by stomach tube and intravenously produced a marked increase in lymph flow, as did the intravenous injection of pituitrin and pilocarpine. Diuresis induced by 1 c.c. of mercupurine was accompaned by a marked decrease in lymph flow.al I and Its villasitions the M. W. G. a

Thrombin, a proteolytic fibrinogenase. A. K. PRESNELL (Amer. J. Physiol., 1938, 122, 596-601).-Fibrinogen contains 9-10% more N than the fibrin formed from it by the action of thrombin. Fibrin, fibrinogen, and prothrombin-free fibrinogen all autolyse but at different rates. All yield the same products of autolysis as determined by heat-coagulation and fractional protein analysis with the exception of prothrombin-free fibringen which did not yield fractions smaller than peptones. It is suggested that thrombin acts as a proteolytic enzyme on fibrinogen, herr and to manage Dall and an M. W. G. m

Relationship of the clotting and anticlotting principles in blood coagulation. T. ASTRUP (Enzymologia, 1938, 2, 377-386).-The anticoagulant action of heparin, chlorazol-fast-pink and other dyes, CuSO₄, and CdSO₄ was investigated. These substances are bound to the clotting agents in a more or less dissociable form. Clotting agents are kinases which bind the anticlotting principles and directly activate coagulation. P. G. M. and directly activate coagulation.

Activation of plasma-fibrinogenase by hydrotropic substances. E. Wöhlisch and L. JÜHLING (Naturwiss., 1938, 26, 548).-In plasma or in fibrinogen solutions from which the prothrombin has not been removed by shaking with $Ca_3(PO_4)_2$, the addition of urea accelerates the destruction of the fibrinogen. The fibrinogenolysis is probably due to the presence of an enzyme, fibrinogenase, which is activated by urea, and also by Na hippurate, benzoate, salicylate, W. O. K. and thiocyanate.

Polarographic investigations on the bloodclotting system. L. JÜHLING, K. TROPP, and E. Wöhlisch (Naturwiss., 1938, 26, 548-549).-The application of polarographic analysis to several preps. of fibrinogen in presence of cobaltammine salts (Brdicka, A., 1934, 1093, 1241) and thrombin 18 W.O.K. described. and to 1

Time law in blood coagulation. T. ASTRUP (Enzymologia, 1938, 5, 119-128).-The formula of Astrup and Fischer relating coagulation time of blood plasma to amount of added coagulant is identical with those of Kugelmass and Barratt; other formulæ are only special cases of this general formula. The formula of Schütz (1885) is applicable to the process. When prothrombin is absent the chief reaction is the conversion of fibrinogen into fibrin by the action of thrombin, which is adsorbed by fibrin and partly thrown out of solution. When it is present an autocatalytic process results in production of new thrombin. W. McC.

Blood coagulation. III. Function of calcium. H. DYCKERHOFF, R. STEINER, and H. MIEHLEB (Biochem. Z., 1938, 297, 1-9; cf. A., 1937, III, 5).-Since all reactions between individual components of the enzyme system of blood coagulation and all phases of the process occur in the absence of Ca", it follows that Ca" acts by inactivating substances which retard or prevent coagulation. Ca" may be replaced by Sr", Mg", or Ba". Thrombin solutions, almost free from Ca but capable of causing coagulation of plasma which is also nearly Ca-free, contain sufficient Ca to satisfy the Ca requirement of thrombin with a mol. wt. exceeding 10,000. W. MoC.

Blood coagulation. I. Comparative action of substances accelerating coagulation. II. Coagulation curve for various coagulating substances. G. RAGNI (Boll. Soc. ital. Biol. sperim., 1938, 13, 23—25, 25—27).—I. Curves showing the coagulation time at various periods after injection of prothrombin, aq. extracts of lung, kephalin suspensions, and 1—3% solutions of pectin into dogs are given and discussed.

II. Injection of prothrombin 30 min. after the injection of a first dose has a cumulative effect on the coagulation time; a third dose after a further period of 30 min., however, merely maintains the coagulation time at the same level, whilst a fourth dose causes a return to normal vals. With 24-hr. periods of injection, the effect is at first const. but after 4 days, there is a smaller decrease and finally (at the 7th injection) an increase in the time of coagulation. F. O. H.

Fission of clupein heparinate. A. FISCHER (Enzymologia, 1938, 5, 34-36).—Trypsin decomposes the complex formed by clupein and heparin, the latter being liberated in a condition of normal activity. When injected into mice, the complex has a slower action (viz., detectable after 36 hr.) than has the corresponding dose of heparin. F. O. H.

Standardisation of heparin. T. ASTRUP (Enzymologia, 1938, 5, 12–16).—Coagulation-inhibiting substances (germanin, trypan-blue, $CdSO_4$, methyleneblue, etc.) show quant. and qual. differences in their action on hen plasma (activated by extracts of chick embryo) and hence differ with concn. Comparison of inhibitory substances therefore necessitates the determination of the concn.–coagulation time curve. The standardisation of heparin preps. is discussed.

F. O. H.

Experimental exchange transfusion using purified heparin. W. THALHIMER, D. Y. SOLANDT, and C. H. BEST (Lancet, 1938, 235, 554—556).— Using a special pump and purified heparin, longlasting exchange blood transfusions were performed between completely nephrectomised and normal "donor" dogs. The pumps were controlled so that equal amounts of blood passed from each animal to the other per unit time. The high blood-urea of the nephrectomised dog was rapidly reduced by excretion via the kidney of the normal dog, normal vals. being reached in 12—18 hr. The normal dog quickly recovered after such transfusions. Purified heparin is a very effective anticoagulant and is non-toxic. C. A. K.

A case with a remarkable prolongation of blood coagulation: pseudohæmophilia hepatica (Frank). T. SUZUKI and S. SATO (Tohoku J. exp. Med., 1938, 33, 398-407).—Report in detail of the case. On administration of Yakriton, the detoxicating hormone of the liver, all symptoms disappeared rapidly. F. JA.

Purpura hæmorrhagica (Werlhof) after taking sedormid. T. JOEKES (Lancet, 1938, 235, 305-306).—A man of 43 developed thrombocytopenic purpura after taking sedormid for a long period. Recovery followed discontinuance of the drug. C. A. K.

Isoelectric point of [serum-]proteins. G. SAN-DOR (Ann. Physiol. Physicochim. biol., 1938, 14, 618—620).—The isoelectric point of cryst. horseserum-globulin is $p_{\rm H}$ 5·8—6·0, of albumin $p_{\rm H}$ 5·1—5·3. Since the experimental error does not exceed 0·03— 0·04 $p_{\rm H}$ these results are ascribed to the fact that mixtures are being examined. C. C. N. V.

Osmotic pressure, mol. wt., and stability of serum-globulin. N. F. BURK (J. Biol. Chem., 1937, 121, 373-402).—Osmotic pressure measurements give a mean mol. wt. of 173,000 for serumglobulin at its isoelectric point in dil. aq. buffer at 0°, 178,000 at 25°, and 172,000 in conc. salt solns. at 0°; the val. is practically unchanged in urea solutions. In aq. (NH₄)₂SO₄ at $p_{\rm H}$ 4·2 the val. is 386,000. Pseudoglobulin gives a mean mol. wt. of 177,000. The proteins in serum-globulin are fairly stable, especially towards dissociative changes. J. L. C.

Effects of total plasmaphoresis and protein regeneration on the agglutination titre in dogs immunised against *B. typhosus*. S. N. ETTEL-DORF, T. B. MITCHELL, jun., and W. R. AMBERSON (Amer. J. Physiol., 1937, **120**, 451—457).—Demonstrable antibodies can be temporarily removed from the blood of dogs by complete plasmaphoresis. The antibody titre may return to its previous level after a first or even a second plasmaphoresis. In most animals, however, there is partial failure to return to the original level, which may be due to a slow disappearance of the immune state; this is also evident in controls. The regeneration of antibodies runs parallel to the regeneration of globulin. M. W. G.

Gelation of serum by alcohol. A. LEWIN (Proc. Soc. Exp. Biol. Med., 1938, 38, 859-860).—If human serum is mixed with an equal amount of 80% alcohol it undergoes after a variable time a more or less complete gelation. Observations are made at 5 min., 30 min., and 3 hr. The reaction is favoured by increasing the concn. of the alcohol, raising the temp., or by using serum which is old or has been kept at 55° for 30 min. It is rapid in various unrelated diseases. V. J. W.

Influence of injection of foreign proteins on normal bactericidal activity of serum. S. THOM-SON (J. Path. Bact., 1938, 47, 131—141).—Parenteral injection of foreign sera and egg-albumin produced in the rabbit complete depression of the *a*-lytic activity of the animal's serum. The effect was demonstrated with goose and ox sera, less easily with sheep and duck sera, and not at all with fowl and guinea-pig sera. There was no depression of the activity of haemolytic complement or of *b*-lysins. The depression of the *a*-lytic activity was considered due to depression of the antibody-like principle which is responsible for normal *a*-lytic activity. C. J. C. B.

Combination of denatured globin with hæmatin and with protoporphyrin. H. F. HOLDEN (Austral. J. Exp. Biol., 1938, 16, 153-157).—The ultra-violet spectrum of denatured globin parahæmatin resembles that of alkaline methæmoglobin. That of protoporphyrin-denatured globin does not resemble that of other known compounds of this D. M. N. porphyrin.

Optical-activity of serum-proteins. C. ACHARD, A. BOUTARIC, and M. ROY (Compt. rend., 1938, 206, 1937-1939).-In their usual solvents the optical activities of the proteins for the 5780, 5460, and 4360 A. lines of the Hg arc are in the (ascending) order myxoprotein (in NaCl), albumin (in water), globulin (in 0.1N-NaOH), whilst in 0.1N-NaOH the order is globulin, myxoprotein, albumin. No variation of [a] was observed when albumin was dissolved in NaCl. Biot's law is obeyed. and bilous() - ("1) W. R. A.O.

Comparative extractibility of lipins of serumalbumins and -globulins. B. DELAGE (Bull. Soc. Chim. biol., 1938, 20, 892-897).—The lipins of serumglobulins are more firmly bound than those of the -albumins, although a fraction of the latter remains inextractible by ether in presence of small amounts of alcohol by the technique described. P. G. M.

C. J. The alcohol nephelogram of serum. Keller (Z. ges. exp. Med., 1938, 103, 427-445).-Human serum was diluted with 0.9% NaCl and the proteins were pptd. with increasing concns. of alcohol; the opacity of the solution was determined nephelometrically. The max. opacity depends on the amounts of serum-proteins and the details of the graphs are determined by the relative amounts of albumin and globulin. The quickest pptn. of serumproteins is obtained with 65% alcohol. Max. opacity of sera diluted with low concns. of NaCl is obtained with lower concns. of alcohol than in sera diluted with higher concns. of NaCl (range examined : 0.003-1.0% NaCl). Variations of $p_{\rm H}$ of $\pm 0.1 - 0.5$ around neutrality have no influence on the alcohol nephelogram. The opacity obtained by addition of alcohol up to a concn. of 54% is caused by the pptn. of globulin; the further opacity by addition of higher concns. of alcohol is due to the pptn. of albumin. The alcohol nephelogram of the total serum is the resultant of the pptn. of the various protein fractions of the serum.

A. S. Changes of tissue-protein and its colloid osmotic pressure after infusions of gum solutions. S. YAMAMOTO (Tohoku J. exp. Med., 1938, 33, 473-482).-On infusion of gum solutions (6 and 12%) intravenously into rabbits the protein contents of the blood fall, but its colloid osmotic pressure rises; in liver, kidney, and brain tissue-proteins are broken down. F. JA.

Isoelectric point of animal tissues. VI. Erythrocytes of various animals. G. YASUZUMI and S. MATSUMOTO (Folia Anat. Japon., 1936, 14, 101-106; cf. A., 1937, III, 167).—The isoelectric point of human erythrocytes was 6.70, of guinea-pigs 6.68, of cats and rabbits 6.50. Сн. Авз. (р)

Serum-proteins in normal and pathological conditions. I. Serum of normal animals. II. Human serum and pathological body-fluids. III. Horse serum studied by means of the precipitin reaction. L. F. HEWITT (Biochem. J., 1938, 32, 1540-1553).-I. Evidence is presented for the existence of pseudoglobulin-A, globoglycoid,

crystalbumin, and seroglycoid in human, horse, ox, and rabbit sera. The globulin fractions of serum are described. Mixing human pseudoglobulin-A with globoglycoid from different animals or the main pseudoglobulin fraction of human sera in various proportions at $p_{\rm H}$ 6 produces a ppt. of euglobulin-II.

II. Protein fractions from serum, urine, ascitic fluid, or pleural effusion of a nephritic patient were similar and indistinguishable from normal. Considerable amounts of seroglycoid and crystalbumin were excreted in the urine of a nephritic patient and in the serum the crystalbumin fell to a low val., whilst the seroglycoid was uninfluenced. A different mechanism of regeneration of different serum-proteins is thus indicated.

III. Sp. pptg. sera were prepared for the four serum-proteins (horse), pseudoglobulin-A, globo-glycoid, crystalbumin, and seroglycoid. Crystalbumin is only feebly antigenic when injected intraperitoneally but enhanced activity is obtained when injected intravenously and especially when in the form of an alum suspension. The approx. composition of normal horse serum in terms of the four proteins determined by precipitin tests is pseudoglobulin-A 2.6, globoglycoid 0.5, crystalbumin 1.9, seroglycoid 0.5, and other proteins 1.9%. Horse serum immunised against diphtheria toxin showed a threefold increase in pseudoglobulin-A but a reduction to half normal of crystalbumin. The various serum-protein fractions were detected by precipitin tests in rabbit's blood 15 min. after intraperitoneal injection of horse serum, the max. concn. being detectable after 14 days. Traces of horse serum-pseudoglobulin-A and -crystalbumin were detected in the cerebrospinal fluid of patients injected with T. F. D. horse serum.

Iron. XV. Sulph-hæmoglobin. G. BARKAN and O. SCHALES (Z. physiol. Chem., 1938, 254, 241-249; cf. A., 1938, III, 551).-The light absorption curve of sulph-hæmoglobin, obtained from blood by the action of $H_2S + O_2$, exhibits a max. at approx. 632-633 mµ., shifted to 623-624 mµ. by reduction with Na₂S₂O₄. A 6- to 10-fold increase in the concn. of "easily eliminated " Fe occurs when hæmoglobin is treated with $H_2S + O_2$ and this concn. is not reduced by treatment with CO even when the solution is alkaline. Sulph-hæmoglobin made slightly alkaline with Na₂CO₃ and treated with a trace of pyridine exhibits the spectrum of hæmochromogen, showing that preformed hæmatin is present. In the absence of pyridine, this spectrum is not obtained and hence no appreciable amount of free globin is present. If sulph-hæmoglobin is made strongly alkaline and reduced, the colour becomes lighter and a hæmochromogen spectrum having two bands is obtained, the protein which is liberated combining with hæmatin. The bands are shifted towards the short λ by addition of pyridine. The results show that prolonged action of $O_2 + H_2S$ on hæmoglobin causes partial separation of the prosthetic group from globin, some of which is probably flocculated by colloidal S, and that the porphyrin skeleton is altered (ring cleavage) by treatment with conc. alkali and Na2S2O4.

inequipoducent subscelerab Sk to dsmW, McC.

Blood-pigment. XX. Equilibrium between hæmoglobin and oxygen. F. HAUROWITZ (Z. physiol. Chem., 1938, 254, 266-274; cf. A., 1935, 878; Pauling, A., 1935, 878).-Hæmoglobin mols. probably associate in groups of 4 arranged in tetrahedral form so that the 4 hæm groups mutually attract each other. The change in crystal form which occurs when hæmoglobin is converted into oxyhæmoglobin is attributed to the moving apart of the hæm groups which results from decrease in the power of the magnetic field of the Fe. There is no evidence that partly oxidised compounds intermediate between hæmoglobin and oxyhæmoglobin exist. The decrease in the state of aggregation of alkaline hæmin solutions which occurs when NaCN is added indicates that the association of hæmin mols. in aq. alkali is due to the field produced by Fe. No change in η occurs when hæmoglobin is converted into oxyhæmoglobin. Cryst. horse hæmoglobin is a mixtures of several components. W. McC.

Nephelometry of serum. Effect of hydrogen peroxide and heat. P. RONDONI (Z. physiol. Chem., 1938, 254, 207—222; cf. A., 1935, 1266).— Dil. H_2O_2 oxidises hydrophilic polar groups at the surface of the protein (e.g., of horse serum) mol., increasing the degree of aggregation and reducing the solubility and water-binding capacity but not otherwise affecting the mol. Conc. H_2O_2 causes rapid and extensive decomp. The denaturation caused by heat is also, at first, a surface phenomenon and decreases the water-binding power. Heat-denaturation has a more extensive action than has denaturation by H_2O_2 and effects a greater decomp. of the mol. W. McC.

Variations in total protein and albumin : globulin ratio [of the blood] due to sun-salt-water treatment combined with mud therapy. E. HURMUZACHE, S. MÜHLBERG, and E. GHELLER (Ann. Sci. Univ. Jassy, 1938, 24, II, 464—467).—In 8 cases of chronic polyarticular rheumatism and 36 of polyadenitis, there was an increase in total protein in 50%, and a decrease in the albumin : globulin ratio in 60%, of the cases after treatment. J. N. A.

Chemical nature of the ultramicroscopic particles of serum. R. N. CUNNINGHAM and B. A. PETERS (Biochem. J., 1938, 32, 1482—1495).—Pig serum contains ultramicroscopic particles of three kinds; (1) large, bright, (2) medium, dull, (3) small, dull. The first probably consists of lipin material, whilst the other two resemble proteins. An equilibrium probably exists between the ordinary hydrated serum-protein and the dehydrated protein which constitutes the particles. Similar results were obtained with sheep and cow serum and that of a patient suffering from paratyphoid fever.

W. O. K. Effect of fission products of nucleic and bile acids on blood-sugar. K. MAEDA (J. Biochem. Japan, 1938, 28, 85-93).—The fasting blood-sugar of normal rabbits is diminished (e.g., from 011 to 0.08—0.09%) by subcutaneous injection of guanylic acid, adenine, or guanine; the effect decreases in the order given, is max. after 3—4 hr., and, in all cases, is enhanced by simultaneous injection of cholic acid. F. O. H. Determination of high concentrations of bloodsugar by ferricyanide methods. M. WIERZU-CHOWSKI, F. DZISIÓW, J. SYSA, and Z. BORKOWSKI (Z. physiol. Chem., 1938, 253, 231-243).—Two modifications of the Hagedorn and Jensen method are described, one for blood-sugar concens. up to 1.7 g. (error $\pm 0.2\%$) and one for concens. up to 3.3 g. (error $\pm 0.4\%$) per 100 c.c. The amount of glucose corresponding with a fixed vol. of ferricyanide solution is greater for pure solutions of glucose than for bloodfiltrates. W. McC.

Effect of extracts of human tonsils. I. On blood-sugar and glycosuria. II. On the bloodsugar level due to action of nerve-poisons and hormones. III. Physico-chemical factors in the hypoglycæmic action. K. TOMINAGA (J. Biochem. Japan, 1938, 27, 433-443, 445-459, 461-467).—I. Extracts of human tonsils lower the fasting blood-sugar (Hagedorn-Jensen) and reduce hyperglycæmia and glycosuria due to administration of glucose in rabbits.

II. The extracts enhance the hypoglycæmic action of insulin in rabbits, sometimes inducing hypoglycæmic convulsions. The effect of tonsil extract + insulin is to produce a diphasic hypoglycæmia. The hyperglycæmic action of pilocarpine or atropine (with or without glucose) is diminished (especially with pilocarpine) by administration of tonsil extract. Adrenaline hyperglycæmia is also diminished, especially with prior administration of ergotamine. Ergotamine alone has no effect on the fasting or alimentary blood-sugar level but, with tonsil extract, considerably reduces the alimentary level.

III. The hypoglycamic principle in tonsil extracts is destroyed by tryptic action but not by heating at 100° for 1 hr. It is resistant to acid, but not alkali, attack and is readily adsorbed by C. F. O. H.

Determination of bound sugar in serum. R. MERTEN (Biochem. Z., 1938, 297, 304–314).—The total sugar content of serum is determined by the method of Fujita and Iwatake (A., 1932, 75) after hydrolysis with 2.5% H₂SO₄ in an atm. of CO₂ at 100° for 4 hr. and pptn. of proteins with Hg acetate, excess of Hg being removed with Zn dust. Free sugar is determined by the same method but without hydrolysis and the bound sugar val. is obtained by subtraction. Miller and Van Slyke's method (A., 1936, 1166) is not applicable to the determination of bound sugar. W. McC.

Variations in blood-glutathione and -sugar in rheumatic patients treated by mud therapy. E. HURMUZACHE and E. GHELLER (Ann. Sci. Univ. Jassy, 1938, 24, II, 461-463).—In 23 cases submitted to the treatment, there was a decrease in bloodsugar in 19 cases, and an increase in -glutathione in 16 cases. J. N. A.

Increased oxidised glutathione in the blood in Addison's disease. L. BINET and G. WELLER (Compt. rend. Soc. Biol., 1938, 128, 336—337).—A decrease in the reduced and an increase in the oxidised glutathione in the blood in Addison's disease was observed. H. G. R. Effect of the structure of amino-acids on the formation of ammonia [in the body]. M. POLO-NOVSKI and P. BOULANGER (Compt. rend., 1938, 207, 308—310).—Many amino-acids (listed) are injected into the renal artery of the dog and the renal arterial and venous blood-NH₃ are determined. Alanine produces a much increased (dl- much more than d-) venous blood-NH₃. The effect diminishes as the C chain lengthens and is nearly absent with value. Acids R•CMe(NH₂)•CO₂H do not show the effect. J. L. D.

Micro-determination of total soluble, urea-, and amino-nitrogen in blood. S. BAGLIONI (Atti R. Accad. Lincei, 1938, [vi], **27**, 429–433).—Blood (0·1 c.c.) is absorbed and dried on filter-paper, which is successively extracted with alcohol + ether and phosphomolybdic acid reagent. The two extracts and the residue are then separately digested with H_2SO_4 -CuSO₄ by the Kjeldahl method. The digests are made alkaline, distilled in the Parnas-Wagner apparatus, and the distillates are collected in standard H_2SO_4 -KIO₃ reagent which is subsequently treated with KI and titrated with 0·005N-Na₂S₂O₃. F. O. H.

Catabolism of purine nucleotides. I. Relation to glycolysis in the blood of the rabbit. J. J. ELLER and F. W. ALLEN (J. Biol. Chem., 1938, 123, 655—663).—During glycolysis of defibrinated whole rabbit blood the concn. of purine nucleotides remains const. At the end of glycolysis there is a rapid decrease accompanied by an increase in nucleoside-N and free purine-N. The nucleotide decomp. proceeds through phosphorylation. Pyrophosphate decreases to zero while inorg. P increases rapidly.

J. L. C.

Enzymic formation and destruction of uric acid in mammalian blood. M. B. BLAUCH and F. C. KOCH (Proc. Soc. Exp. Biol. Med., 1938, 38, 638-641) .- The uric acid of blood is determined colorimetrically before and after the blood has been acted on for 2 hr. by uricase made from ox kidney. In human and dog blood the uric acid remains const. on keeping, but in rat blood the uric acid increases on keeping. This increase does not occur if the blood-proteins are pptd. but a marked formation of uric acid takes place if rat blood is incubated with adenine, guanine, hypoxanthine, or xanthine. This formation is inhibited by KCN or by the quinoneimine form of *p*-aminophenol.

V. J. W.

Extraction and saponification of lipins from blood and serum. E. B. MAN and E. F. GILDEA (J. Biol. Chem., 1937, 122, 77-88).—Methods of saponification for determination of lipins in blood and serum are discussed. No significant differences in fatty acids were found when lipoid extracts were saponified with NaOH and KOH. The process of refluxing with alcohol-ether of Man and Gildea extracts more lipoid material than the Boyd modification of the Bloor method. J. L. C.

Cholesterol content of normal human plasma. VIII. Effect of coagulants. J. A. GARDNER, H. GAINSBOROUGH, and R. MURRAY (Biochem. J., 1938, 32, 1457–1459; cf. A., 1938, III, 252).—K oxalate, added to blood, causes slight shrinkage of the erythrocytes, slight dilution of the plasma, and a 4% diminution of the total cholesterol content of the plasma. This diminution is of the same order as the degree of shrinkage of the erythrocytes. W. McC.

Influence of lactic acid on the determination of acetone compounds in blood. G. W. SCHWARZ-BERG (Rev. Fac. Cienc. quim. La Plata, 1935, 10, 105—112; Chem. Zentr., 1936, ii, 3574).—Lactic acid has no effect in normal concn. The Friedemann-Shaffer-Cotonio determination of lactic acid is recommended, proteins pptd. by Pb acetate in aq. NH₃ having no effect. A. H. C.

Photometric determination of blood-bilirubin. L. JENDRASSIK and P. GRÓF (Biochem. Z., 1938, 297, 81—89; cf. A., 1937, III, 192).—A simplification of the method previously used and a new method (requiring only 0.25—0.50 c.c. of serum) in which the azobilirubin is dissolved in conc. alkali giving a blue modification, the absorption of which is measured photometrically, are described. In the new method, a standard solution need be used only when great accuracy is necessary. The new method can be applied spectrophotometrically and in the abs. colorimetric procedure but is not applicable to determination of bilirubin in urine or duodenal juice. W. McC.

Rôle of molecular diffusion in the absorbing power of serum for light of visible wave-length. A. BOUTARIO and M. ROY (Bull. Soc. Chim. biol., 1938, 20, 923—926).—Mol. diffusion is the principal cause of the absorption by horse serum, completely free from hæmoglobin, of light of λ above 530 mµ. P. G. M.

Shock disease in the snowshoe hare. R. G. GREEN and C. L. LARSON (Amer. J. Hyg., 1938, 28, 190-212).—Hypoglycæmic shock is responsible for a fatal disease of the snowshoe hare (*Lepus americanus*) population of the Northern hemisphere during periodic decimation. Hypoglycæmia is due to liver damage and resultant failure of glycogen storage.

B. C. H.

Action of dietetic salts [salt substitutes] on plasma and erythrocyte electrolytes in cardiac and renal diseases. F. SOHMITT (Dtsch. Arch. klin. Med., 1938, **182**, 246—255).—Glutamic acid does not influence the electrolytes of plasma or red corpuscles. "Citrofinal" is Cl-free, but contains Na; its action on electrolytes is negligible. "Diätosal" contains Na 5-6, Cl 8-7, K 23, Ca 3-7, and Mg 1-9%; it produces considerable ionic shifts between plasma and red cells. A. S.

Determination of chloride in blood. H. LESTRA; A. MASSOT, and ARBASSIER (Bull. Sci. pharmacol., 1936, 43, 85—93; Chem. Zentr., 1936, ii, 1396— 1397).—Details of an improved modification of Laudat's method (A., 1917, ii, 539) are given. L. S. T.

Relationship between tissue-chloride and plasma-chloride. L. R. AMBERSON, T. P. NASH, A. G. MULDER, and D. BINNS (Amer. J. Physiol., 1938, **122**, 224-235).—Plasma-Cl' in the cat can be reduced to 6% of normal by long perfusion with Ringer-Locke solution made up with sulphates of Na, Ca, and K instead of chlorides, and containing Cl'-free ox erythrocytes and gum acacia. All the Cl' of erythrocytes, skeletal muscle, kidney, and liver is diffusible; tissue-Cl' varies directly with plasma-Cl'. Stomach, spleen, and salivary glands contain an indiffusible Cl' fraction in addition to a diffusible fraction varying directly with plasma-Cl'. Cerebrum, cerebelum, and spinal cord hold all their Cl' even when plasma-Cl' is greatly reduced. A considerable proportion of the Cl' in some tissues is intracellular.

M. W. G.

Chloræmia in the normal rabbit. M. MEITÈS (Bull. Soc. Chim. biol., 1938, 20, 966—967).—The ratio erythrocyte-Cl': plasma-Cl' is similar to that in humans, *i.e.*, 0.50. P. G. M.

(A) Diffusible calcium of serum and transudates in vivo. (B) Ionised calcium of serum and transudates in vivo. M. MILLER (J. Biol. Chem., 1937, 122, 59—69, 71—76).—(A) Statistical analysis of 331 routine analyses for Ca and protein showed that the difference of [Ca] between serum and transudates was $\Delta Ca = 0.56 \Delta Pr$ (protein). Albumin- (A) and globulin- (G) -bound Ca are described by the equation $\Delta Ca = 0.637 \Delta A + 0.435 \Delta G$. The relative Ca-combining powers of albumin and globulin = 1.47, agreeing closely with the val. for their relative base-combining power = 1.44 as determined by Van Slyke *et al.* (A., 1928, 1390).

(B) The val. of $p_{K_{CAPr}}$ for Ca proteinate was calc. to be 2.05 ± 0.13 . J. L. C.

Calcium, magnesium, and phosphorus determination in chicken blood. J. W. PERISH, L. L. LACHAT, and H. A. HALVORSON (Minnesota Dept. Agric. Dairy Food Div. Bull., 1936, 14–15).— Analytical methods are described, and data for bones and blood of chicks at various ages up to 4 weeks old are recorded. CH. ABS. (p)

Calcium and sodium contents of blood-plasma and -serum. H. WAELSCH and S. KITTEL (Z. physiol. Chem., 1938, 255, 36—52; cf. A., 1937, III, 165, 166).—Determinations by the improved methods of the authors and Butler and Tuthill (A., 1931, 1342) of the Ca and Na contents show that, during the 2-hr. period following drawing of the blood (man, horse), interchange of Ca and Na between corpuscles and plasma occurs, the variations in the Ca content of the plasma being usually within physiological limits. If pyramidone is added to the blood when drawn changes in the Ca content of the plasma are largely prevented. W. McC.

Effect of intravenous injection of glucose and other substances on the concentration of potassium in dog serum. E. FLOCK, J. L. BOLLMAN, F. C. MANN, and E. C. KENDALL (J. Biol. Chem., 1938, 125, 57—64).—In normal dogs injection of glucose, fructose, adrenaline, or NaHCO₃ decreases the serum-K and inorg. $PO_4^{\prime\prime\prime}$. The decrease produced by Na lactate or pyruvate is due to the Na content. Serum-Cl' is scarcely affected and the Ai is increased only when the lactic or pyruvic acid is given as Na salt and when NaHCO₃ is given. Injection of glucose rapidly decreases (usually to nil) the $PO_4^{\prime\prime\prime}$ and Na contents of urine; the effect on the K 3 Q (A., III.) content is irregular. The serum-K of fasting dogs is decreased by injection of glucose but that of depancreatised dogs is irregularly affected (decreased or increased) and the $PO_4^{\prime\prime\prime}$ content is unchanged. W. McC.

Determining total sulphate in blood serum. N. C. DAS GUPTA (Indian J. Vet. Sci., 1938, 8, 119– 125).—5 ml. of serum were hydrolysed with <0.4 ml. of conc. HCl for at least 2 hr. Less acid and boiling for shorter times gave incomplete hydrolysis. Cl' interferes with both benzidine and BaSO₄ methods, so excess of HCl was removed by evaporation in vac. at 100°. Benzidine was used for pptn. in methyl ether solution and adding to neutral solutions but trichloroacetic acid could be added in small amounts to prevent interference by PO₄'''. By these methods, the recovery of added org. SO₄'' was quant.

W. L. D.

Measurement of blood- p_{H} . J. SENDROY, jun. (Trans. Electrochem. Soc., 1938, 74, Preprint 10, 145—158).—A lecture. T. F. D.

Carbon dioxide dissociation curve and the hydrogen-ion concentration of the blood of rabbits, the body temperature of which falls on conducting the "cold-puncture." Y. TANEITI (Tohoku J. exp. Med., 1938, 33, 430—441).—The CO_2 -combining power of the blood increases with decrease of body temp.; the $p_{\rm H}$ of the blood was unaltered. F. JA.

Therapeutic results obtained by slow intravenous injection of acidified physiological serum. R. HIRSCH (Compt. rend., 1938, 207, 259–260).— Slow intravenous injection (150 g. per hr.) of serum at $p_{\rm H}$ 4:5—5 over long periods, accompanied by oral administration of P-containing substances, improves painful conditions which are not affected by morphine. It is also useful in the arrest or prevention of hæmorrhage. J. L. D.

Iron-copper antagonism in plasma in infectious diseases. L. HEILMEYER and G. STÜWE (Klin. Woch., 1938, 17, 925-927).—The plasma-Cu is raised and the -Fe decreased in many infectious diseases. E. M. J.

Silicic acid content of blood. Micro-determination by Kraut's method of silicic acid in the ash of blood. H. FRANK and G. GERSTEL (Z. physiol. Chem., 1938, 253, 225—230).—The method of Kraut (A., 1931, 378) is untrustworthy. The SiO₂ content of the ash of healthy human blood is 0.0558—0.3627%, being less than was formerly supposed.

W. McC.

Syringe attachment [for blood analysis].—See A., 1938, I, 478.

(c) VASCULAR SYSTEM.

Excitability of myocardium of the frog following galvanic stimulation. I—III. M. POPESCO (Compt. rend. Soc. Biol., 1938, 128, 427—434).— Experiments on the isolated frog's ventricle show that the make stimulation of a galvanic current arises at the cathode while the excitability at the anode is diminished, and vice versa with break stimulation. Trauma may result in an inversion of these effects

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since the tissue surrounding the wound undergoes a short period of hypoexcitability followed by a long period of hyperexcitability. P. C. W.

Control of beating and of micro-fibrillation by means of potassium, calcium, and sodium in the chick embryo heart. Potassium fibrillation. P. D. F. MURRAY (Proc. Roy. Soc., 1938, B, 125, 478—490).—Hearts rendered K-poor are more susceptible than normal hearts to fibrillation by K in the medium. If treated with K-containing solution they regain normal ability to resist the fibrillating action of K in the medium. The conclusion is that K fibrillation occurs when the ratio of superficial K/intracellular K becomes abnormally and sufficiently high, and it is suggested that fibrillation may depend on a change in the electrical gradient across the cell membrane. F. B. P.

Inhibitor sympathetic nerve fibres to the dog's heart. H. HERMANN, F. JOURDAN, and R. FROMENT (Compt. rend. Soc. Biol., 1938, 128, 673-676).— Cardio-inhibitor fibres are present in the stellate ganglion of the dog; they leave the medulla by the vertebral nerve and the superior dorsal rami communicantes which reach the first thoracic ganglion.

J. H. T.

Summation of two stimuli applied to the vagus of the tortoise. H. FREDERICQ (Arch. int. Physiol., 1938, 46, 195–264; cf. A., 1938, III, 175).—An account is given of experiments in which two successive stimuli were applied either to a single or to each vagus nerve at various intervals. There was an initial abs. refractory period of 6.5-8.9 m-sec. and a secondary abs. refractory period between the 2nd and 5th sec., after which the curve reached full summation at 40-60 sec. Chronotrope curves show a secondary refractory period between the 2nd and 5th sec. after the first stimulus. If the stimuli are applied to different vagus nerves summation is perfect at all periods less than 150 m-sec. but there is a secondary refractory period from the 2nd to the 8th sec. Summation of the bilateral stimuli is always better than that of stimuli applied to the same nerve. The vagi do not unite in a single nerve element in the right auricle but liberate acetylcholine from distinct regions, whence the latter diffuses towards the same centre and to the fibres of the myocardium.

C. E. B.

Acetylcholine and choline-esterase in the mollusc heart. A. JULLIEN, D. VINCENT, M. BOUCHET, and M. VUILLET (Ann. Physiol. Physicochim. biol., 1938, 14, 567—574).—The acetylcholine content and choline-esterase activity of cardiac muscle of lamellibranch, cephalopod, and gasteropod opisthobranch were determined and in general are parallel. Cardiac extracts of *Murex*, *Limnæa*, and *Helix* exert an inhibitory action on the frogs heart, which is abolished by atropine. C. C. N. V.

Action of adrenaline and tyramine on cardiac muscle. V. KRUTA and R. ZADINA (Arch. int. Pharmacodyn., 1938, 59, 199-211).—Adrenaline and tyramine act similarly on heart muscle; the action of the former is more transient because of its oxidation. Both cause greater shortening in contraction, especially at low rates and higher temp. The duration of systole is diminished at low temp. and prolonged as the temp. rises. D. T. B.

Effect of asphyxia on heart rate of rabbits at different ages. D. J. BAUER (J. Physiol., 1938, 93, 90-103).-When the umbilical cord of a foetal rabbit is clamped a fall of heart rate is produced which is non-vagal. When a young rabbit is asphyxiated some hr. after birth a fall of heart rate occurs which is also non-vagal, but which appears only after 40-50 sec. Vagal inhibition first appears as an increased reduction of the heart rate in extreme asphyxia; by the 11th day it is so far developed as to be able to cause a profound fall of heart rate a few sec. after the beginning of asphyxia. A sympathetic effect, i.e., a rise of heart rate, occurs from the age of 11 days, attains a max. at 20 days, and appears after 40-60 sec. of asphyxia. A second vagal effect appears at 30 days, occurring earlier in asphyxia, and this masks the sympathetic effect. It blends with the first vagal effect. J. A. C.

Functional tests of heart and circulation. W. BORGARD (Klin. Woch., 1938, 17, 73–75).—In graded work tests in cases of myocardial involvement the O_2 intake was less than normal. F. W. L.

Changes in heart-volume during work. R. FABRE and J. LIARD (Ann. Physiol. Physicochim. biol., 1938, 14, 524—529).—Teleradiographic X-ray analysis, followed by orthodiagrammatic analysis, shows that during work a considerable diminution in the vol. of the heart occurs, proportional to the increased intrathoracic pressure. C. C. N. V.

Action of cardiazole and coramine in heart failure. J. SCHLÖSSER and H. SCHWARZ (Dtsch. Arch. klin. Med., 1938, 182, 176—182).—Intramuscular injections of coramine or cardiazole lower the venous pressure (determined by Moritz and Tabora's method) for approx. 40 min. in cases of cardiac decompensation. A. S.

Output of the heart in congestive cardiac failure. J. McMichael. (Quart. J. Med., 1938, 7, 331—353).—The normal postural increase in heart output and slowing of the pulse following the change from erect to supine diminishes as heart failure progresses. The total heart output behaves similarly save at the stage when venous congestion appears; then there is a temporary increase. It is suggested that in cardiac failure the heart shows a diminished ability to respond to venous pressure increments and that venous congestion is possibly a compensating mechanism. H. P. H.

Circulation in pericardial effusion. H. J. STEWART, N. F. CRANE, and J. E. DEITRICK (Amer. Heart J., 1938, 16, 189-197).—A case of pericardial effusion (a girl aged 14) showed marked decrease in cardiac output (per min. and per beat), increase in the arm-tongue circulation time, rise in venous pressure, increase in intrapericardial pressure, increase in heart rate, and decrease in vital capacity. Decrease of output is due mainly to interference with flow into the right heart. All these conditions improved on removing excess of pericardial fluid. C. A. K.

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Absorption from the pericardial cavity in man. H. J. STEWART, N. F. CRANE, and J. E. DEITRICK (Amer. Heart J., 1938, 16, 198-202) .--Absorption from the pericardial cavity was studied in a case of effusion (a girl aged 14). Phenolsulphonephthalein was readily absorbed, vital-red only very slightly. After intravenous injection neither dye appeared in the fluid. C. A. K.

Reaction of the coronary artery to histamine. W. BÄRTSCHI (Pflüger's Archiv, 1937, 238, 606-614). -Histamine in doses of 0.4-2 p.p.m. produces a contraction of the coronary artery rings, which is less than that produced by a concn. of acetylcholine $\frac{1}{10}$ as large. The reaction to histamine is unaffected by atropine in a concn. which completely inhibits the effect of acetylcholine. M. A. B.

Movements of the coronary arteries in man. F. KUHLMANN (Klin. Woch., 1938, 17, 973-976).-The movements of the calcified coronary artery as seen kymographically are described; pulsatory changes of position and lumen occur. Coronary dilatation occurs at the end of ventricular systole.

E. M. J.

Gradual occlusion of a coronary artery. L. BLUM, G. SCHAUER, and B. CALEF (Amer. Heart J., 1938, 16, 159-164).-The anterior descending branch of the left coronary artery was gradually occluded over a 5 weeks' period in 14 dogs, using a modified Goldblatt clamp. In only 4 cases were extensive myocardial lesions produced, the remainder showing slight or no changes; electrocardiograms showed evidence of coronary occlusion in all cases. Control experiments with acute occlusion in 25 dogs showed large infarcts in the anterior wall of the heart in all cases after 1 week. CAK.

Minute vessels of the auriculo-ventricular conducting tissue in various mammals. M. TONDO (Boll. Soc. ital. Biol. sperim., 1938, 13, 150-152).-The capillary network of the bundle of His and Tawara's node (horse, sheep, ox) is described.

F. O. H. Neurology and neurosurgery of angina pectoris. H. JESSEN (Münch. med. Wschr., 1938, 85, 1097-1100, 1149-1153, 1186-1189).-A review. A. S.

Angina pectoris in a pair of monovular twins. G. W. PARADE and W. LEHMANN (Klin. Woch., 1938, 17, 1036-1040). E. M. J.

Diagnostic and prognostic significance of electrocardiograms showing anomalous QRS in lead III. A. A. F. PEEL (Glasgow med. J., 1938, 11, 53-80).-In the absence of Q2, an electrocardiogram showing a large Q3 frequently occurs in obese patients and the prognosis is then good; when found in cases of pulmonary disease the prognosis is bad. In 83% of cases (excluding infants and young children) showing a Q2 of 1 mm. or more with a large Q3 coronary disease is present. Methods of recognising a coronary Q3 are discussed in detail (in the presence of right axis deviation, when it forms part of a "W-complex"). Most important prognostic feature of these electrocardiograms is the breadth of the QRS complex. Cases collected during 1928-1933 were followed up in 1937. Where the duration of

the QRS complex at the first examination was below 0.08 sec. the mortality in the interval was 23%. With a QRS duration of 0.08 sec. the mortality was 43%. When the QRS duration exceeded 0.08 sec. at 43%. When the QKS duration of the first examination, the mortality was 71%. J. M. R.

Electrocardiographic effect of traction on apex of ventricle. A. CLERC and A. QUINQUAUD (Compt. rend. Soc. Biol., 1938, 128, 256-261).-Traction applied to the apex of the ventricle in the dog causes a rise in the $S\hat{T}$ complex until the S wave is well above the isoelectric level and the T wave higher than the summit of the R wave: the ORSTcomplex merges into a single wave. The phenomenon also occurs in the denervated heart after ligature of the vena cava and azygos vein. If the traction is only momentary the QRS complex is increased, the summit R being higher and the base of S lower.

P. C. W.

Electrocardiogram after removal of tip of ventricle. A. CLERC and A. QUINQUAUD (Compt. rend. Soc. Biol., 1938, 128, 388-390).—Following the removal of the apex of the ventricle in the dog, the electrocardiogram shows a rise of the whole curve above the isoelectric level between the Q and Twaves. The rhythm of auricle and ventricle may become independent. P. C. W.

Electrocardiogram after removal of a ventricle and the apex of the remaining ventricle. A. CLERC and A. QUINQUAUD (Compt. rend. Soc. Biol., 1938, 128, 639-641).-Removal of the right ventricle causes inversion of the QRS complex. If the left apex is then excised P is also inverted and T exaggerated. Removal of the left ventricle results in a monophasic deviation, which is flattened and its amplitude decreased by removal of the right apex. J. Ĥ. T.

Right and left preponderance in the electrocardiogram. H. VON PEIN, P. PAPAGEORGIOU, and L. TÖLKEN (Münch. med. Wschr., 1938, 85, 1017-1019).-Left ventricular preponderance with negative $T_{\rm I}$ and positive $T_{\rm III}$ indicates a considerable enlargement of the left ventricle. The usual left or right preponderance tracings were obtained in cases with clinically and roentgenologically normal hearts.

A. S.

Electrocardiograms with main initial deflexions directed downwards in the standard leads. J. BERNSTEIN and L. ELLENBOGEN (Amer. Heart J., 1938, 16, 165-174) .- Downward deflexion of the main initial ventricular complexes in all limb leads was seen in 8 cases of recent coronary occlusion and 1 case of pericardial effusion. C. A. K.

Cardiac syncope due to paroxysms of ventricular flutter, fibrillation, and asystole. G. GERTZ, H. A. KAPLAN, L. KAPLAN, and W. WEINSTEIN (Amer. Heart J., 1938, 16, 225-234).-A woman, aged 59, with hypertension showed 2:1 auriculoventricular block with P-R intervals of two durations, one normal (0.15 sec.), the other prolonged (0.34 sec.). During an attack of cardiac syncope the electrocardiogram showed first ventricular flutter, then ventricular fibrillation (for 83 sec.), then complete

ventricular standstill (for 50 sec.), followed by complete heart block during recovery. C. A. K.

Results of sympathetic stimulation and extirpation on the human electrocardiogram. E. N. CHAMBERLAIN (Clin. Sci., 1938, 3, 267—271).—In man, resection of the cervical sympathetic ganglia has no effect on the electrocardiogram. Stimulation of the right sympathetic may change it conspicuously, decreasing R, or increasing T, or both. Stimulation of the left sympathetic produces no const. changes. B. McA.

Electrocardiograms in provoked attacks of bronchial asthma in guinea-pigs. B. EWERT and P. KALLÓS (Cardiologia, 1938, 2, 147—169).—In attacks of allergic, acetylcholine, and histamine asthma of guinea-pigs changes in rhythm and the T wave occurred without corresponding anatomical changes. G. SCH.

Alterations of the four-lead electrocardiogram after exercise in healthy and anginal subjects. V. PUDDU (Cardiologia, 1938, 2, 183—192).—The usual changes were observed. G. SCH.

Shortened auriculo-ventricular conduction and premature stimulation of right ventricle. I. VON ZARDAY (Z. Kreislaufforsch., 1938, 30, 569– 573).—A review. G. SCH.

Changes in T waves. G. SCHLOMKA and F. BÜREN (Z. Kreislaufforsch., 1938, **30**, 593—600).— The height and direction of the T wave change with respiration, but not always in the same sense as the QRS complex. Hæmodynamic factors are regarded as responsible. G. SCH.

Importance of heart block in infants. D. HEUBNER (Z. Kreislaufforsch., 1938, **30**, 600—602).— An infant born with auriculo-ventricular dissociation showed normal auriculo-ventricular conduction after the age of 11 months. G. SCH.

Electrocardiogram in uræmia and renal hypertension. B. MISSKE (Arch. Kreislaufforsch., 1938, 2, 267—326).—Various electrocardiographic disturbances were found in all of 53 cases of uræmia and in 40 of 50 cases of renal hypertension.

G. SCH. New views on cardiac automatism explaining the origin of auricular flutter and various blocks. A. K. J. KOUMANS (Arch. Kreislaufforsch., 1938, 2, 327—348).—A theoretical discussion. G. SCH.

Unipolar electrocardiography. P. ECKEY and R. FRÖHLICH (Arch. Kreislaufforsch., 1938, 2, 349— 356).—A const. electric potential for the indifferent electrode is secured in unipolar electrocardiography by completely submerging the subject in a wooden bath tub filled with distilled water and lined with a Cu wire mesh which also covered the water surface except for small holes for a breathing tube and the electrode wires Against this wire mesh, theoretically and practically an ideal indifferent electrode, were tested the usual clinical methods of applying the distant electrode in chest leads; only Wilson's zero potential electrode was found satisfactory.

G. SCH.

Deformation of ventricular complex of human electrocardiogram by abnormal conducting fibres. P. ECKEY and E. SCHÄFER (Arch. Kreislaufforsch., 1938, 2, 388—397).—A young healthy man gave an electrocardiogram with abnormally short P-R interval and wide QRS which in the lowpressure chamber once alternated with normal cycles. Abnormal conduction elements between auricle and ventricle might produce this type of record. G. SCH.

Auricular fibrillation. S. DE BOER (Dtsch. med. Wschr., 1938, 64, 1067).—Faradic stimulation of the cat's auricle produces auricular fibrillation which is abolished if a second faradic stimulation is applied to the same or the opposite auricle. A. S.

Systole in hypoglycæmic shock and diabetic coma. R. HEGGLIN (Cardiologia, 1938, 2, 170– 182).—Large doses of insulin given in shock therapy or the treatment of diabetic coma prolong the ventricular complex and shorten mechanical systole. G. SCH.

Effect of exercise on the heart in convalescent children. P. LAURENTIUS (Klin. Woch., 1938, 17, 1011—1014).—Exercise commonly produces disturbances of cardiac rhythm in children convalescent from diseases which affect the myocardium. E. M. J.

Intermittent complete heart block. A. W. DUBBS (Amer. Heart J., 1938, 16, 235-239).—A case is reported. C. A. K.

Arterial contractility and propulsion of the blood. F. MARCEAU (Ann. Physiol. Physicochim. biol., 1938, 14, 590—594).—The peristaltic wave which accompanies the pulsatile wave is partially suppressed by urethane anæsthesia, painting the artery with atropine or cocaine, small doses of adrenaline intravenously, and section of the artery followed by union with a cannula. C. C. N. V.

Cutaneous vascular reactions during asphyxia. J. MALMÉJAC and E. DESANTI (Ann. Physiol. Physicochim. biol., 1938, 14, 586–589).—In the skin of the dog asphyxia exerts a double vasoconstrictor action; the first is central in origin, the second humoral.

C. C. N. V.

Skin vascular reactions to the cold pressor test. A. B. HERTZMAN (Proc. Soc. Exp. Biol. Med., 1938, 38, 628—629).—When one hand is placed in cold water the vessels of the other hand are constricted, but the vessels of ear and forehead may be constricted, dilated, or unchanged. V. J. W.

Inhibition of carotid sinus reflexes by the cerebellum. G. MORUZZI (Compt. rend. Soc. Biol., 1938, 128, 533-538).—Faradic stimulation of the cortex of the anterior lobe of the cerebellum inhibits the hypertension and hyperpnœa caused by occlusion of the carotid arteries in the decerebrate cat. The effect is abolished by cocainisation of the cortex but not by curarisation or section of the vagi. The stimulation has no effect if the carotids open.

P. C. W. Intramedullary [intraosseous] pressure. R. M. LARSEN (Ann. Surg., 1938, 108, 127-141). —A tapered steel cannula was introduced into the lower third of the femur of anæsthetised dogs and the intramedullary pressure recorded with a Hg manometer. The pressure was 30—40 mm. Hg and normally varied directly with arterial pressure. Adrenaline produced an initial rise followed by a marked fall which recovered to normal as the systemic pressure fell; a similar fall was produced by pituitrin. Ephedrine, however, caused a rise in pressure synchronous with that of the systemic pressure and maintained for the same period.

G. C. K.

Dynamics of human circulation during effort and subsequent rest. B. DEPPE and H. BIERHAUS (Arch. Kreislaufforsch., 1938, 2, 357–375).—Determinations of cardiac output by Broemser and Ranke's and by Wezler and Böger's formula are compared.

G. SCH.

Oscillations in the activity of vasomotor and bulbar respiratory centres in chloralosed dogs. L. CIOGLIA and G. FRADÀ (Boll. Soc. ital. Biol. sperim., 1938, 13, 38—40).—Recordings of carotid pressure, respiratory rate, and vol. changes in the spleen show related, rhythmic activities. F. O. H.

Action of baths on circulation. W. HERKEL and P. D. PAPAGEORGIOU (Klin. Woch., 1938, 17, 1070—1074).—Stroke and minute vol. of the heart increase at the beginning of a fresh water or CO₂spring bath; the blood pressure falls or is unchanged. This is due partly to diminished peripheral resistance and partly to decreased elasticity of the large arteries. E. M. J.

Determination of volume of blood in peripheralvessels. II. G. VON REIS, B. SILFVERSKIÖLD, F. SJÖSTRAND, and T. SJÖSTRAND. III. F. SJÖST-RAND and T. SJÖSTRAND (Skand. Arch. Physiol., 1938, 79, 134—138, 156—163).—II. The no. of blood cells per cu. mm. of tissue was determined in various organs, using liver specimens containing 175,000— 2,800,000 cells per cu. mm. tissue as standard.

III. The animals are killed in liquid air and the organs dehydrated at -20° to -30° in vac. and then embedded in paraffin at room temp. This technique avoids shrinkage of the preps. A. S.

Effect of drugs on circulation in man. A. BÖGER, B. DEPPE, and K. WEZLEE (Arch. exp. Path. Pharm., 1938, 189, 480—508).—The effects of injection of adrenaline, Sympatol, ephedrine, Veritol, pitressin, caffeine, and strychnine on human blood pressure are recorded. H. BL.

Determination of circulation time. S. CANDEL (Ann. int. Med., 1938, 12, 236—243).—The circulation time (from the antecubital veins to the pulmonary capillaries) was measured by injecting 1.4 c.c. of paraldehyde intravenously and noting the time taken to produce coughing. The mean val. of this time in 100 normal adults was 6 sec. (range 3—9.5 sec.). A val. of over 11 sec. is considered abnormal.

Postoperative circulatory collapse accompanied by acidosis. A. I. RUBENSTONE (Pennsylvania med. J., 1938, 41, 673-675).-4 cases of acidosis following vascular collapse postoperatively are described. Acidosis and sugar intolerance were found. Hartman's buffer solution intravenously and insulin may be used in treatment. A. J. B. Use of ascitic fluid in the treatment of primary shock. R. M. CHOISSER and E. M. RAMSEY (Proc. Soc. Exp. Biol. Med., 1938, 38, 651-652).—Ascitic fluid from cases of hepatic cirrhosis was effective in restoring the blood pressure in dogs suffering from shock as a result of hæmorrhage or trauma. It was necessary to use a fluid which had been found to be free from agglutinins. V. J. W.

Blood-histamine in traumatic shock. A. D. MACDONALD and G. WOOLFE (J. Physiol., 1938, 93, 58—59P).—The histamine equivs. of the blood from normal and traumatised limbs in a series of cats are compared. Histamine is not liberated in significantly increased quantities from the damaged tissues. J. A. C.

Relationship between arterial hypotension and circulatory collapse. R. KLOTZ (Münch. med. Wschr., 1938, 85, 985–986).—A review. A. S.

Erythermalgia of the extremities. L. A. SMITH and E. V. ALLEN (Amer. Heart J., 1938, 16, 175—188).—The term "erythermalgia" is preferred to "erythromelalgia" as it denotes the importance of heat in the syndrome described by Weir Mitchell. The distress depends on the skin temp., reaching a crit. level (32—36° in different subjects).

C. A. K.

Blood pressure studies on infants. R. A. WOODBURY, M. ROBINSON, and W. F. HAMILTON (Amer. J. Physiol., 1938, 122, 472-479).—Arterial pressures were directly measured by inserting a hypodermic needle into an umbilical artery or the pressure pulses were recorded photographically. Systolic vals. were obtained by cuff and palpation with an arm-band 2.5 cm. wide. Observations were made on 37 babies, five prematurely born. In normal babies from normal mothers the pressure averaged 80-46 mm. Hg. The infant's pressure was affected slightly by the blood pressure level of the normal mother, toxæmia of pregnancy (+10 mm. Hg systolic; +3 mm. Hg diastolic), amyl nitrite (-8 mm. Hg systolic; -7 mm. Hg diastolic), and by adrenaline intravenously; it was markedly affected by crying (+10 to 45 mm. Hg systolic and diastolic), dehydration without collapse, administration of fluid to dehydrated babies, age of infant, and degree of prematurity. M. W. G.

Blood circulation in voluntary muscle in man. R. T. GRANT (Clin. Sci., 1938, **3**, 157—174).—The local vascular effects of exercise of the voluntary muscle of the human forearm have been studied. The resting blood flow is low and relatively const. A sustained contraction of the muscle controls the degree of increase of flow which develops while the contraction is maintained, but does not prevent it. After

C. A. K.

muscular exercise blood flow is greatly increased. The local vascular effects are independent of the sympathetic nerves. The metabolites responsible for hyperæmia of exercise are relatively stable.

A. N. D.

Unilateral loss of a blood-pressure raising, pulse-accelerating, reflex from voluntary muscle due to a lesion of the spinal cord. M. ALAM and F. H. SMIRK (Clin. Sci., 1938, 3, 247—252).—Observations on a patient with complete loss of sensation in one leg confirm the reflex origin of the increase in blood pressure and pulse rate which occurs when the metabolites of exercise accumulate in the muscles of a normal leg. B. McA.

Effects of different types of sensory stimulation on the blood pressure in man. M. ALAM and F. H. SMIRK (Clin. Sci., 1938, 3, 253-258).— The pain produced when the metabolites of exercise accumulate in voluntary muscles is not the main cause of the ensuing reflex rise of blood pressure.

B. McA.

Vascular responses of the human limb to body warming; evidence for sympathetic vasodilator nerves in the normal subject. R. T. GRANT and H. E. HOLLING (Clin. Sci., 1938, 3, 273-285).—Body warming in man when pushed to an unusual degree produces considerable vaso-dilatation in the proximal parts of the limbs, brought about by stimulation of cutaneous sympathetic nerves. These and previous investigations are interpreted as indicating two means of defence against a rise of body temp. B. McA.

Action of ultra-violet rays and mustard oil on skin on peripheral distribution of blood. G. von REIS and F. SJÖSTRAND (Skand. Arch. Physiol., 1938, 79, 139—155).—The skin of mice and guineapigs (under pernocton anæsthesia) was irritated by ultra-violet rays and application of mustard oil. The blood vol. in the vessels of liver and adrenal cortex was determined using Sjöstrand's method. Vessel vol. is increased after administration of mustard oil. Ultra-violet rays increase vessel vol. in guineapigs; the results in mice are doubtful; the effect is independent of the skin erythema. Ultra-violet rays and mustard oil have no effect on vessel vol. after denervation of the skin. A. S.

Culture of mammalian allantois with independent formation of blood vessels. J. JOLLX and C. LIEURE (Compt. rend. Soc. Biol., 1938, **128**, 342—345).—Blood vessels and blood are formed from the mesenchyme, when the newly-formed allantois is cut out of a rat embryo before the formation of either heart or aorta, and grown in a special culture medium. P. C. W.

Blood-pressure-raising reflexes in health, essential hypertension, and renal hypertension. M. ALAM and F. H. SMIRK (Clin. Sci., 1938, 3, 259-266).—The blood-pressure-raising effects of the application of cold to the skin and of exercise of an ischemic limb are usually greater in cases of essential hypertension than in normal controls of the same age. The effects in patients with renal hypertension are less than in normals. B. McA,

Effect of bilateral adrenalectomy on arterial blood pressure of dogs with experimental hypertension. I. H. PAGE (Amer. J. Physiol., 1938, 122, 352—358).—Adrenalectomy abolishes renal hypertension produced by Goldblatt's method. Treatment with NaCl and cortical extract restores the hypertension. Large doses of commercial cortical extract (6 c.c. daily) were no more effective than moderate maintenance doses (1 c.c.). Increasing the dosage of NaCl and Na citrate did not increase the response. M. W. G.

Pressor extracts from urine and tissues. W. VANWYNKLE and A. J. LEHMAN (Arch. int. Pharmacodyn., 1938, 59, 133—148).—Pressor effects were caused by injection of padutin and urine extract in birds, depressor effects in mammals. Pigeon urine caused pressor effects in cats, dogs, and rabbits and depressor effects in birds. The pressor action is due to peripheral vaso-constriction, which in birds is counterbalanced to some extent by splanchnic vaso-dilatation. The site of action of human urine and padutin in pigeons is the sympathetic ganglia; that of the depressor action of tissue extracts is peripheral.

D. T. B. Effect of destruction of spinal cord on hypertension. F. GLENN, C. G. CHILD, and I. PAGE (Amer. J. Physiol., 1938, 122, 506—510).—Hypertension was produced in dogs by the Goldblatt method. After 1—3 months the spinal cord was destroyed below the cervical region. This caused immediately a sharp fall in blood pressure below the previous normal level; this was followed by a rise to above the normal but never to the full hypertensive level. M. W. G.

Relationship between hypophysis and hypertension. W. BERGFELD (Dtsch. Arch. klin. Med., 1938, 182, 101—111).—Blood-sugar and -cholesterol and prolan A, corticotropic hormone, and Ca excretion in the urine were increased in 3 out of 15 cases of essential hypertension. A. S.

Experimental renal hypertension in the dog. E. DICKER (Arch. int. Méd. exp., 1938, 13, 27-175). -Hypertension is produced by ligature of one or both ureters or renal veins or by compression of one or both renal arteries. Ligature of the arteries or nephrectomy produces hypotension. In hypertension produced by a unilateral procedure renal function is normal. The hypertension produced by vein ligature is temporary. None of these effects is altered by denervation of the kidneys. Though autolysed kidney tissue contains a vasopressor substance, the kidneys from the hypertensive dogs show no histological abnormality. The hypertension is not due to, or augmented by, the retention of normal tissue metabolites. Unilaterally produced hypertension is cured by removal of the kidney from that side. The grafting of two kidneys into the neck of a dog rendered hypertensive by bilateral operation does not cure the condition. Uretero-venous anastomosis in the normal dog produces no rise in pressure. The hypertension is attributed to the presence of ischæmic kidney tissue since (i) removal of the clips from the arteries restores the blood pressure to normal and (ii) the condition produced by vein ligature is only temporary because a collateral venous outflow develops. The ischæmic kidney tissue has less methylene-blue-decolorising and invertase activity; it is suggested that some such derangement of its metabolic processes produces the pressor substance. Toxic substances are excreted in the urine from the ischæmic kidney. In a dog rendered hypertensive by compression of one renal artery, if the ureter from the ischæmic kidney is anastomosed to the iliac vein the dog dies in 24 hr. while anastomosis of the ureter from the normal kidney only causes death after 6-7 days.

P. C. W.

Acute arterial lesions in rabbits with experimental hypertension. C. WILSON and G. W. PICKERING (Clin. Sci., 1938, 3, 343—355).—Acute arterial lesions structurally identical with those of human malignant hypertension were found in rabbits with hypertension produced by renal artery constriction. The incidence of the lesions was related to the degree but not to the duration of the hypertension. They were most frequent and severe in the intestine, and were absent in the ischamic kidney. It is suggested that a greatly raised intra-arterial pressure is a chief factor determining these lesions in human and experimental hypertension. B. McA.

Pathological changes in the arteries supplying the fingers in warm-handed people and in cases of so-called Raynaud's disease. T. LEWIS (Clin. Sci., 1938, 3, 287-319).-The digital arteries of patients with mild Raynaud's disease were not abnormal when compared with those of warm-handed adults. In cases where necrosis was or had been present some degree of thrombotic obstruction was present even in fingers which had escaped necrosis. It is suggested that in a proportion of cases with necrosis of the fingers an initial thrombosis is the determining factor. Spasm does not appear to lead to thickening of the medial or intimal coats, although it may predispose to thrombosis. In diffuse sclero-derma with attacks of digital discoloration the arteries are extensively involved. B. McA.

Raynaud's disease and pre-ganglionic sympathectomy. T. LEWIS (Clin. Sci., 1938, 3, 321— 336).—Attacks of digital discoloration in cases of Raynaud's disease are not due primarily to excessive action of the vasomotor apparatus. They are due primarily to a local fault, which may or not be occlusive structural disease, but which persisted in six cases of Raynaud's disease following preganglionic sympathectomy. B. McA.

Effect of choline on atherosclerosis in the rabbit aorta. C. A. BAUMANN and H. P. RUSCH (Proc. Soc. Exp. Biol. Med., 1938, 38, 647-651).--Rabbits were given a diet containing 0.22% or 0.43% of cholesterol. The former caused no change in liverfat while the latter increased it. Both diets caused atheromatous lesions in the aorta and 300 mg. of choline daily failed to counteract the effects in aorta or liver. V. J. W.

Hypersensitiveness to tobacco and biopsy studies of skin reactions in vascular disease. J. HARKAVY (J. Allergy, 1938, 9, 475–488).—Biopsy studies of immediate and delayed skin reactions to tobacco and to saline control wheals were made in 10 patients with thromboangiitis obliterans, 1 of migrating phlebitis, and 1 with acute coronary thrombosis. Eosinophils were found in 6 of 8 cases of thromboangiitis and in the case of phlebitis, which developed immediate urticarial wheals; the other 3 cases developed delayed reactions and the sections showed acute dermatitis. All patients showed clinical improvement on stopping the tobacco. C. J. C. B.

Periarteritis nodosa. S. S. BERGER and M. A. WEIT (J. Allergy, 1938, 9, 489–496).—An extremely allergic asthmatic female, aged 23, developed bronchopneumonia which ran a prolonged course. The spleen later became enlarged and eosinophilia developed with clinical signs of periarteritis nodosa. [B.]

Č. J. C. B.

(d) RESPIRATION AND BLOOD GASES.

Histological investigation of the development and structure of the human lung. E. R. A. COOPER (J. Path. Bact., 1938, 47, 105-114).-Human lungs were studied, ranging from those of a 10-mm. embryo to those of a child of 5 years. Three generations of branches arise in succession from the main bronchus entering the pulmonary mesoderm. The primaries become the non-respiratory bronchi, bron-chioles, and terminal bronchioles. The secondaries mark the commencement of the respiratory portion of the lung and constitute the alveolar ducts. The initial tertiaries form the alveolar sacs and further generations become the alveoli. A change from columnar to cubical cells lining the bronchial branches demarcates the non-respiratory from the respiratory portion of the developing lung. In all pre- and postnatal lungs, free red blood corpuscles in addition to capillaries appeared to be in contact with the outer surface of the lining of the bronchial branches and alveoli, suggesting that a free circulation occurs between the arterial capillaries and the venous radicles. The cells lining the tertiary branchings or alveoli constitute the lining of the inter-alveolar spaces through which the blood passes from capillary to venule. [19 photomicrographs.] C. J. C. B.

Break between voice registers in singing : changes in voice produced by artificial lengthening of the vocal tube. W. TRENDELENBURG (S.B. preuss. Akad. Wiss., Phys.-math. Kl., 1938, 1, 3— 22).—Experiments were made on people singing scales through tubes of const. length, and notes of const. pitch through tubes of variable length, to test the theory of D. Wiess that a break in voice register is due to a resonance coupling effect of the upper air passages and the vocal cords.

P. M. T. K.

Determination of vital capacity on 100 men and 100 women. M. RESCH (Dtsch. Arch. klin. Med., 1938, 182, 39–46).—Vital capacity (V.C.) was determined according to the formula; V.C. = [Hb.(U.B.max)² + 50.(Diff. U.B. + Diff. Ba)³]/60 × Hb = oblique chest diameter (from spinous process of 1st thoracic to sternal-xiphoid joint); U.B. max. = lower chest circumference at max. inspiration; Diff. U.B. + Diff. Ba = difference between max. inspiration and expiration of chest and abdominal circumference. A. S.

Residual air. I. Clinical importance of the determination of the residual air, the middle and total capacity in chest diseases. T. KIKUTI (Tohoku J. exp. Med., 1938, 33, 442—453).—Cases of asthma, pleurisy, pulmonary tuberculosis, gangrene, and tumours were examined. Respiratory efficiency can be assessed if, apart from the vital capacity, the residual air, the middle and total capacity are also determined. F. JA.

Influence of venous congestion of the extremities on vital capacity of lungs. G. BUDELMANN (Klin. Woch., 1937, 17, 1009–1011).—The vital capacity can be increased by 300—850 c.c. by impeding the venous return from the extremities. E. M. J.

An improved pneumograph. F. ISHIYAMA and M. YOKOYAMA (Arb. Med. Univ. Okayama, 1938, 5, 468—488).—The apparatus records simultaneously the respiratory movements of various parts of both sides of the chest. A. S.

Atelectasis of the lungs in the newborn baby from lesions of the nervous centres. R. DEBRÉ, J. MARIE, M. LLAMY, and DE FONT-RÉAULX (J. Pediat., 1938, 13, 208—218).—Pulmonary atelectasis in the newborn infant may be caused by cerebral hæmorrhage and may be accompanied by disturbances of the respiratory rhythmn (fits of apnœa, phases of polypnœa, Cheyne–Stokes respiration, and paroxysmal coughing). Meningeal hæmorrhage in such cases may be latent and the spinal fluid remains normal. Puncture of the dura mater may produce a tinted fluid. Hyperpnœa produced by inhalation of carbogene is the most effective treatment. C. J. C. B.

Quantitative study of the variations in excitability of the respiratory centre. A. CHAUCHARD, B. CHAUCHARD, and P. CHAUCHARD (Compt. rend., 1938, 206, 1996-1998).-Acetylcholine, adrenaline, and yohimbine act directly on the respiratory centre and have almost no effect on the chronaxie of its nervous connections, but lessen the summation time. Atropine increases the summation time. Stimulation of the central end of the vagus or traction on the carotid sinus decreases, whereas occlusion of the carotid arteries increases, summation time. It is suggested that the effect of stimulation of the vagal afferents on the respiratory centre may be due to a liberation of acetylcholine at the central synapses (cf. A., 1936, 1146). J. L. D.

Respiratory effects from the passage of polarising currents through the medulla oblongata. H. C. NICHOLSON and S. SOBIN (Proc. Soc. Exp. Biol. Med., 1938, 38, 904—906).—An electrode was placed on the floor of the 4th ventricle in the calamus scriptorius and an indifferent electrode elsewhere. Passage of a current of a few ma. caused sometimes a depression of respiration and finally arrest in the expiratory position, and sometimes an increase in amplitude and in duration of inspiration. These differences are not related to the strength or direction of the current. V. J. W.

Recruitment of muscular activity and the central neurone after-discharge of hyperpnœa. R. GESELL and F. WHITE (Amer. J. Physiol., 1938, 122, 48-56).-Action potentials of important inspiratory and expiratory muscles of anæsthetised dogs were recorded. Records were made of tracheal pressure and tidal air. Respiratory distress and hyperpnœa were produced by intravenous injection of 0.01M-NaCN. In some animals the extra mechanical energy for hyperpnœa was supplied entirely by the inspiratory muscles but in most the expiratory muscles were also involved. Active expiration observed during eupnœa is sometimes abolished at the onset of hyperpnœa. There is no quant. coupling of the acts of inspiration and expiration. The abrupt cessation of firing of the inspiratory muscles at the end of each inspiration, common in eupnœa, often gives way during active hyperpnœa to a prolonged after-discharge extending into the phase of expiration. The significance of this after-discharge is discussed.

M. W. G.

Excitability of the respiratory centre. A. CHAUCHARD, B. CHAUCHARD, and P. CHAUCHARD (Compt. rend. Soc. Biol., 1938, 128, 524—526).— Summation time and chronaxie were measured in the central end of the cut vagus, the threshold stimulus being that sufficient to cause respiratory inhibition at the end of expiration. Chloralose augments the summation time whilst caffeine and anoxemia diminish it. Adrenaline, acetylcholine, and yohimbine act as respiratory stimulants since they also diminish the summation time, whilst the opposite applies to atropine. All substances that diminish the summation time also augment the respiratory effects of traction of the carotid sinus; those that augment summation time diminish the effects of carotid sinus traction.

P. C. W.

Effect on excitability of respiratory centre of reflex stimuli. A. CHAUCHARD, B. CHAUCHARD, and P. CHAUCHARD (Compt. rend. Soc. Biol., 1938, 128, 527—529).—The excitability of the respiratory centre as measured by summation time and chronaxie determinations on the centripetal fibres in the vagus is increased by faradic stimulation of the central end of the cut vagus, chemical stimulation of the carotid sinus by lobeline injection, or mechanical stimulation resulting in either apnœa or hypernœa. Occlusion of the carotids, however, diminishes excitability. The suppression of adrenaline apnœa by atropine is due to their antagonistic central effects.

P. C. W.

Dependence of activity of "apneustic centre" on carbon dioxide of arterial blood. G. STELLA (J. Physiol., 1938, 93, 263—275).—The degree of activity of the "apneustic centre," as judged from the rate of development and depth of the apneusis which ensues on blocking the vagi in a cat decerebrated below the "pneumotaxic centre," is influenced as greatly, and in the same direction, by very small changes of the CO₂ tension of the blood as is the respiratory activity itself. The apneustic centre is the inspiratory centre and its activity is not only rhythmically interrupted by the afferent inhibitory discharges of the pulmonary vagus, but also kept by these nerves under a continuous state of partial restraint. J. A. C. Respiratory response to excitation of sensory nerve. W. H. WILSON and M. HAMMOUDA (J. Physiol., 1938, 93, 39—40P).—The respiratory accelerator effects of exciting the vagus are not analogous to the respiratory response to excitation of a sensory nerve, either in their central origin or in their functional significance. J. A. C.

Effect of rate of heating and environmental temperature on panting threshold temperatures of normal dogs heated by diathermy. A. HEMINGWAY (Amer. J. Physiol., 1938, 122, 511— 519).—Trained dogs, after $2\frac{1}{2}$ hr. rest, were given measured doses of diathermy heat under various conditions. A low environmental temp. lowers the basal skin temp. and the threshold skin temp. for panting. The more obese is the dog the lower is its skin basal and skin panting temp. Diathermy heating in dogs is due more to peripheral than to central effects. Panting is preceded by a rapid rise in ear temp., whilst other skin areas show a sluggish temp. response to diathermy heat. The importance of ears as temp. regulators is stressed. M. W. G.

Respiratory disturbances due to craniocerebral trauma. S. GIOVANNINI (Boll. Soc. ital. Biol. sperim., 1938, 13, 133—134).—Graphical records (man) are given and discussed. F. O. H.

Respiratory concomitants in attentional adaptation. T. BURROW (Nature, 1938, 142, 156).— Thoracic and abdominal respiration were recorded during 2 types of attentional adaptation.

C. A. K.

Is there a peripheral regulation of respiration by carbon dioxide ? M. N. J. DIRKEN and H. A. E. VAN DISHOEOK (Pflüger's Archiv, 1937, 238, 713— 726).—A decrease in CO_2 content of the air below 6—7% increases frequency and decreases depth of respiration in lungs connected with the respiratory centre by nerve paths only. Increases in CO_2 content above 7—8% have no effect until vals. of 80— 100% are reached, when stimulation occurs.

M. A. B.

Tracheal pulsation in the flea. G. M. HERFORD (J. exp. Biol., 1938, **15**, 327—338).—Tracheal pulsation was demonstrated in three species of fleas; it is independent of other body rhythms (e.g., heart, gut). O_2 stimulates and CO_2 inhibits the pulsation. Destruction of, or cutting through, the mesothoracic ganglion stops the tracheal rhythm. J. M. R.

Respiration and circulation during body exercise. G. ZAEPER and H. BÖHME (Z. ges. exp. Med., 1938, 103, 479—502).—Respiratory minute vol. and O_2 consumption are kept const. if light exercise is continued over long periods. The subject fails very quickly to continue the exercise if the respiratory vol. reaches its max. A. S.

Action of short periods of oxygen inspiration on hæmoglobin content and red cell count of human blood. A. J. ANTHONY and H. BIEDEN-KOPF (Z. ges. exp. Med., 1938, 103, 451-457).— 28 normal subjects breathed O₂ for 15 min. The red blood count diminished by 7.8% and the hæmoglobin concn. by $3\cdot3\%$. A. S. Lungs and circulating blood-histamine. A. AHLMARK, T. G. KORNERUP, and B. TARRAS-WAHL-BERG (Skand. Arch. Physiol., 1938, **79**, 106—114).— Intravenously injected histamine is stored by the lungs in cats and rabbits. The histamine content of isolated lungs perfused with Ringer's solution decreases and histamine is found in the effluent.

. S.

Effect of yohimbine on respiration. R. HAZARD, J. CHEYMOL, and A. QUINQUAUD (Ann. Physiol. Physicochim. biol., 1938, 14, 539—543).— 2 mg. per kg. of yohimbine hydrochloride injected intravenously produce a polypnœa in rabbits (normal, chloralose or somniferol anæsthesia). In anæsthetised rabbits there is an initial phase of depression or apnœa. C. C. N. V.

Simple respirometer for small animals. E. G. BOETTIGER (Nature, 1938, 142, 151–152).—A simple const.-pressure respirometer suitable for O_2 consumption measurements in small animals (e.g., mice) is described. C. A. K.

Oxygen therapy of pneumonia. G. H. FAGET and W. B. MARTIN (Ann. int. Med., 1938, **12**, 32–38). -O₂ therapy lowered the mortality rate in lobar and broncho-pneumonia at the U.S. Marine Hospital, Norfolk. It should be started early in the disease. C. A. K.

Effect of oxygen and carbon dioxide mixtures in anoxic pulmonary diseases. C. HÉDERER and L. ANDRÉ (Ann. Physiol. Physicochim. biol., 1938, 14,544—547).—The results agreed with those obtained in normal subjects. C. C. N. V.

Treatment of emphysema of the skin with oxygen inhalation. A. J. ANTHONY and G. PERSCHMANN (Dtsch. med. Wschr., 1938, 64, 1105— 1107).—350—500 c.c. of air were injected subcutaneously in rabbits. The absorption of the air was 5—6 times faster if the animals breathed O_2 -rich air mixtures than with normal air. A. S.

Method for continual air-breathing in closed circuit apparatus. W. BJERKNES and P. F. SCHOLANDER (Skand. Arch. Physiol., 1938, 79, 164— 168).—Two air containers are connected so that each of them refills automatically with air (or O_2 mixtures) when the other is empty. The vol. of gas breathed by the subject is accurately measured and tracings are obtained as from a Krogh spirometer. A. S.

Ammonia mechanism in alkalosis due to overventilation. A. P. BRIGGS (Proc. Soc. Exp. Biol. Med., 1938, 38, 883—886).—Forced breathing, carried on to produce slight giddiness, caused a very slight increase in urinary NH₃ but a large increase in urinary fixed base. V. J. W.

Growth of tissue cultures in the presence of carbon monoxide or coal gas. E. RIX and L. EHRHARDT (Virchow's Arch., 1938, 302, 236—245).— No sp. influence of CO on tissue cultures of heart muscle of chicken, rat, or mouse was observed. Control experiments with low O_2 tension or N_2 demonstrated that the inhibition of growth in the presence of CO was solely due to O_2 lack. Very young embryonic tissue showed an inhibition of growth of about 50% in pure CO or N2, while tissue from 5-days old chicken did not grow at all in CO. H. W. K.

Oxygen dissociation curves of asphyxiated blood. D. CORDIER and J. FRANCAIS (Ann. Physiol. Physicochim. biol., 1938, 14, 504-509).-The O2 dissociation curves of arterial and splenic vein blood were determined in chloralosed dogs subjected to progressive anoxia. After an initial alkalosis, acidosis sets in due to an increase of ether-sol. acids. The curve of blood taken at the moment of death is flattened. The curve of splenic vein blood is flatter for the same O₂ tension and acidity, a phenomenon which is repeated in asphyxia. After splenectomy the curve no longer differs from that of acidified normal blood. C. C. N. V.

Elimination of carbon monoxide in cases of acute and chronic poisoning. E. KOHN-ABREST (Ann. Falsif., 1938, 31, 198—210).—Using the method described previously (A., 1938, III, 561) it is shown that CO is present in the blood in abnormal amounts (0.5-1.2 c.c. per 100 c.c.) for several months after long-continued exposure to the gas. Elimination after a short exposure is complete in 6-18 hr., varying with the treatment received. E. C. S.

Coupled oxidation of ascorbic acid and hæmochromogens. Mechanism of the oxidation of protohæmin to verdohæmatin.-See A., 1938, II. 382.

Complex chemistry of iron in a-hæmins.—See A., 1938, II, 339.

Oxyhæmoglobin method of measuring cell respiration. G. EMÖDI (Biochem. Z., 1938, 297, 147-152; cf. A., 1937, III, 222).-Under the conditions of the method, the spectrum of reduced hæmoglobin appears only when the O2 pressure is less than 1 mm. and hence the assumption that the appearance of this spectrum indicates almost complete disappearance of O2 is justified. Calculations show that the method cannot be applied to the measurement of the respiration of tissue slices. W. McC.

Sterilisation of the air in the operating room with bactericidal radiation. D. HART (J. thorac. Surg., 1938, 7, 525-535).-The results are reported of 132 thoracoplastics performed in a field of air sterilised by means of bactericidal radiant energy (for method see *ibid.*, 1936, 6, 45). The incidence of post-operative wound infection was halved, wound healing accelerated, and the post-operative temp. elevation was less severe and of shorter duration. The condition of the patient was improved, and convalescence hastened. F. J. S. G.

Dyspncea. R. V. CHRISTIE (Quart. J. Med., 1938, 7, 421-454) .- A review. Dyspnœa is usually of reflex origin; chemical dyspnœa is only of minor importance. carH.P.H. Honoxide or coal gas.

Physiological histology of the adductor muscle of Spondylus and Arca. J. A. VAN DIJK (Arch. Néerland. Physiol., 1938, 23, 126-135).-Whereas the clear part of Pecten adductor, which responds to faradic stimuli by phasic contraction without any

tonus component, is composed solely of phasic fibres, the corresponding regions in Spondylus and Arca are composed of a mixture of phasic and tonic fibres and so can give both responses. C. E. B.

(A) Texture of the muscle fibre. (B) Frequency of a vibrating muscle. J. W. LANGELAAN (Arch. Néerland. Physiol., 1938, 23, 1-6, 7-26).-(A) With a certain arrangement of the microscope, the fusiform nuclei of frog's muscle fibres show a spiral structure. It is possible, by means of a model, to illustrate the manner in which the microscopic images of the nucleus and of the I-granules originate from a spiral structure of the muscle. [Illustr.]

(B) The sartorius and gastrocnemius muscles of the frog contracting isometrically vibrate at an average frequency of 24 vibrations per sec. when the tension on them is 0 and their harmonic scale comprises 3 octaves: 24, 48, 96, and 192. Equations relating tension and vibration frequency are given. C. E. B.

Observations on contracting muscle with the polarising microscope. J. GICKLHORN (Proto-plasma, 1936, 26, 181-182).-By treatment with dil. NH₃ or KOH, muscular contraction in Corethra larvæ can be slowed down so as to permit the changes during contraction to be followed under the polarising microscope. Swelling and contraction are accompanied by disappearance of the double refraction of M. A. B. the anisotropic layer.

Birefringence of smooth muscle (Phascolosoma and Thyone) as related to muscle length, tension, and tone. E. FISCHER (J. Cell. Comp. Physiol., 1938, 12, 85-101).-Birefringence increases with length at a decreasing rate if the muscle is under tension and at an increasing rate if measured after the load has been removed. For an average length muscle under no tension, it amounts to 2.63×10^{-3} for *Phascolosoma* and 1.55×10^{-3} for *Thyone*. In muscles fixed with formaldehyde, form and micellar birefringence are equal in Phascolosoma and have a 3:2 ratio in Thyone. With increasing length at the moment of fixation, form birefringence increases more markedly than micellar. V. J. W.

Muscle sound in man. L. KAISER (Arch. Néer-land. Physiol., 1938, 23, 26-33).-With Einthoven's method for recording heart sounds the contraction sound of certain muscles was composed of 7-12 groups per sec. of oscillations at a rate of about 60-C. E. B. 80 per sec.

Muscle sound during voluntary isometric contractions. H. D. BOUMAN and G. VAN RIJN-BERK (Arch. Néerland. Physiol., 1938, 23, 34-55).-The subject was in a soundproof room, and the muscle sounds were recorded by a funnel over the muscle connected by pressure tubing with a brass cone which fitted over a pressure-operated ribbon microphone connected to an amplifying system. Precautions were taken against errors due to stray sounds, electrical currents, skin movements over the muscles, movements of funnel on skin, etc. The contraction wave had 4 components which were independent of the properties of contracting muscles. Their origin and variation with strength of contraction are discussed. C. E. B. ig [Illustr.]

Acetylcholine reaction of muscles in relation to training. G. KIRCHHOFF (Pflüger's Archiv, 1937, 238, 623-628).—Increased sensitivity of "tonic" muscles to acetylcholine is produced by training.

M. A. B.

Anomalous behaviour of isolated muscle fibres toward certain chemical stimuli. E. W. ASHKENAZ (Proc. Soc. Exp. Biol. Med., 1938, 38, 719-720).—Single striated muscle fibres of the frog do not contract in solutions of NaCl, KCl, K citrate or oxalate, Na salts of Ca-pptg. ions, or acetylcholine, although they respond normally to electric excitation. The presence or absence of the nerve ending makes no difference to these results. V. J. W.

Pharmacological investigation with frog muscle. J. RUTTINK (Rec. trav. chim., 1938, 57, 819—823).—Ethyl- closely resemble the methylxanthines in their action on the gastrocnemius muscle of *Rana temporaria* and *R. esculenta*, but may be more potent. The muscle fibrils show ageing effects in Ringer's solution after 0.5 hr., and these effects may have vitiated many recorded data. R. S. C.

Effect of caffeine on striated muscle. H. FREDERICQ and Z. M. BACQ (Compt. rend. Soc. Biol., 1938, 128, 555—556).—The isometric response of the striated muscle of the frog *in situ* with normal circulation to max. direct or indirect stimulation is not increased by the injection of caffeine; it is increased by 25% in the cat. The contraction produced by acetylcholine is transformed into a prolonged (10—25 sec.) contracture following which the muscle is unresponsive to motor nerve stimulation. P. C. W.

Basic nitrogenous extractives of Necturus muscle. D. W. WILSON and W. A. WOLFF (J. Biol. Chem., 1938, **124**, 103–106).—Creatine, carnosine, and trimethylamine oxide were isolated from the skeletal muscles of the amphibian Necturus. A. T.

Distribution of lactic acid between blood and muscle of rats. E. V. NEWMAN (Amer. J. Physiol., 1938, 122, 359—366).—Muscle- and blood-lactic acid determinations were obtained simultaneously from rats a few sec. after exercise on a motor-driven treadmill or after swimming in water at 40°. At the end of all grades of exercise lasting 6—73 min. the increment in lactic acid concn. in blood and in leg muscle are approx. equal, showing that there is free and rapid diffusion of lactate between blood and muscle in the intact, exercising animal. Moderate work involves little or no accumulation of lactie acid in muscle or blood. M. W. G.

Differences in content of ascorbic acid and in power to oxidise or reduce it in biologically different muscles. K. WACHHOLDER and H. H. PODESTÀ [with G. BRUSS] (Pflüger's Archiv, 1937, 238, 615-622).—In skeletal, cardiac, and stomach muscle half the ascorbic acid content is in the reversibly dehydrogenated form. In skeletal muscles the oxidising power for ascorbic acid is greater and more rapid and the reducing power smaller than in visceral muscle of internal organs. After strenuous work muscles contain much more of the dehydrogenated and less of the reduced acid than resting muscles. M. A; B. Comparative effects of iodoacetate and iodoacetamide on the oxygen consumption and glycolysis of frog muscle. J. N. STANNARD (Amer. J. Physiol., 1938, 122, 379—389).—Iodoacetate inhibits the anaërobic glycolysis of resting frog muscle, mash, or extract more readily than iodoacetamide; this is the reverse of the order of reaction with thiol groups in vitro. The amide inhibits respiration more quickly at physiological $p_{\rm H}$, but both compounds are equally effective at more acid $p_{\rm H}$ vals. M. W. G.

Respiratory quotient and excitability of frog muscle treated with iodoacetate and iodoacetamide. J. N. STANNARD (Amer. J. Physiol., 1938, 122, 390—396).—The R.Q. of resting frog muscle in which glycolysis was completely inhibited by 0.32×10^{-3} M-iodoacetate is 0.91; the R.Q. of muscle similarly poisoned with iodoacetamide is 1. The resting oxidative metabolism is thus altered by inhibition of glycolysis with iodoacetamide but not with iodoacetate. The two I-compounds have different gross effects on excitability but neither poison changes the rates of respiration nor interferes with the ability of the muscle to oxidise carbohydrates at the normal rate. M. W. G.

Enzymic transport of hydrogen in muscle. E. ADLER, H. VON EULER, and H. HELLSTRÖM (Arkiv Kemi, Min., Geol., 1938, 12, B, No. 38, 7 pp.).— Enzyme fractions' obtained from muscle extracts accelerate the reduction of methylene-blue by dihydrocozymase; comparison with the acceleration due to known amounts of yellow enzyme indicates that this is not the factor responsible in the muscle preps. The unknown enzyme specifically dehydrogenates dihydrocozymase; its function in transporting H in muscle is discussed. F. O. H.

Release of calcium from muscle on stimulation by ultra-violet radiation. E. W. ASHKENAZ (J. Cell. Comp. Physiol., 1938, 12, 139—147).—Frog muscle fibres were immersed in a "Ringer's" solution in which Ca was replaced by Mg. They were then irradiated from a Hg-vapour arc for 3—7 min. and the immersion fluid was tested for Ca by adding Na_2HPO_4 and alizarin. Increase of Ca was found in 9 out of 33 experiments. V. J. W.

Responses of muscles of the squid to repetitive stimulation of the giant nerve fibres. C. L. PROSSER and J. Z. YOUNG (Biol. Bull. Wood's Hole, 1937, 73, 237-241).—The circular muscle fibres of the mantle of *Loligo pealii* normally show no increase in tension in response to increased frequency of stimulation of the giant fibres of the stellar nerve. This absence of facilitation at the neuromuscular junction is correlated with the all-or-nothing nature of the function of the muscle. High-frequency stimulation easily fatigues the isolated muscle, which then responds by greater tension at the higher rates. A. D. H.

Origin of "tetanised twitch." I. J. HAXA-KAWA (Japan J. Med. Sci., 1938, III, 4, 373-387).---Using the gastrocnemius of the Japanese toad the "tetanised twitch" was not always immediately established. The site of stimulation was immaterial. Ca ions provoked and K ions were without effect on the twitch. The appearance of the "tetanised twitch" is associated with the subnormal phase of the nerve. T. F. D.

Action of eserine-like and curare-like substances on responses of frog's nerve-muscle preparations to repetitive stimulation. S. L. Cowan (J. Physiol., 1938, 93, 215-262).-Treatment of frog's isolated nerve with prostigmine, eserine, or another eserine-like substance produces practically no change in the action current elicited by max. repetitive stimulation at frequencies ranging from 5 to 200 per sec. The myograms given by frog's nerve-sartorius preps., when immersed in Ringer's solution containing glucose and buffered with bicarbonate, in response to max. (nerve) stimulation, at high and low frequencies exhibit good reproducibilities, even after considerable activity. When stimulation frequencies between 15 and 200 per sec. are used three main types of response are obtained: with 15-60 per sec. the tension rises to a max. and then falls slowly; with 100-180 per sec. the tension rises to a max., falls for a few sec., rises again (secondary rise), and afterwards falls very slowly; with about 200 per sec. the tension rises to a max. (smaller than with lower frequencies) and then falls rapidly almost to zero. The main action of eserine-like substances is to lower the frequency required to produce the above second and third types of response. The relative activities of prostigmine and other eserinelike substances on the nerve-sartorius prep. do not exhibit a simple parallel to Stedman's estimates of their inhibitory activities on his choline-esterase preps. Curarine-like substances little affect the initial part of the response to stimulation at a rate of 150 per sec., but reduce the secondary rise, which is augmented by eserine-like substances. The relative activities of the eserine-like compounds in reversing paralysis due to curarine-like substances are of the same order as their activities on the responses of Ringer-soaked preps. J. A. C.

After-effects of tetanisation on neuromuscular transmission in cat. T. P. FENG, L. Y. LEE, C. W. MENG, and S. C. WANG (Chinese J. Physiol., 1938, 13, 79-108).-Soleus (decerebrate cat) was stimulated in situ through its nerve with supramax. condenser discharges; at a sufficient frequency and duration Wedensky inhibition (W.I.) occurred during the tetanus followed by increase in size of twitches to single nerve stimuli ("facilitation"), reduction of W.I. during high-frequency tetanus, and spontaneous twitching. Curare intensified W.I. and abolished spontaneous twitching and facilitation before causing neuromuscular block; after the block occurred the post-tetanic twitches increased to normal size ("decurarisation ''). Eserine augmented "facilitation," and increased spontaneous twitching. "Facilitation" is attributed to increased responsiveness of the junctions resulting in a short tetanus in response to one stimulus, and spontaneous twitching to continued leakage of acetylcholine, both changes being due to liberation of K at the junctions by high-frequency impulses. The effects of intra-arterial injection of acetylcholine, Ca, K, and Ba are described, those of K being similar to the after effects of tetanus. N. H.

Inhibition and impulse summation at the mammalian neuromuscular junction. C. A. MAASKE, T. E. BOYD, and J. J. BROSNAN (J. Neurophysiol., 1938, 1, 332-341).--A comparison was made of the effects of Mg with those of curare in respect to facilitation and inhibition at the neuromuscular junction of a mammalian prep. The effects of eserine and of depressing doses of acetylcholine on facilitation were also studied. In a curarised prep., if the nerve is stimulated at any frequency between 6 and 600 a min. a Wedensky inhibition is set up; this effect is much less easily obtained with Mg. Two independent stimuli to the nerve during this inhibition show summation in the case of the Mg, but not in the curarised prep. Excessive doses of acetylcholine cause a depression of the neuromuscular transmission S. CR. similar to that obtained with curare.

Electric stimulation and conduction of excitation in smooth muscle. E. BozLER (Amer. J. Physiol., 1938, 122, 614-623).-The uterus and ureter of guinea-pigs, rabbits, and cats were used, the former being cut into strips 1 mm. wide and the mucous membrane and the submucous layer were removed. The prep. was mounted on a glass plate in a moist chamber at 32-38°. Stimulation was galvanic or by condenser discharges (7 μ F.). Electrodes were Zn-ZnSO₄ brushes; contact was produced by cotton pads soaked in saline. Slowly conducted contraction in uterine muscle followed weak stimuli; the best effects were produced during cestrus. During ancestrus the uterus is inexcitable or gives only weak contractions. The responses are not due to stimulation of motor nerves. The muscles studied must be considered as syncytia. The properties of visceral smooth muscle M. W. G. and nerve differ only quantitatively.

Pathogenesis and treatment of myotonia congenita. H. G. PONCHER and H. W. WADE (Amer. J. Dis. Child., 1938, 55, 945—965).—Myotonia congenita is associated with abnormal creatine-creatinine metabolism. The normal creatinuria of childhood is absent and abnormally high retention of exogenously administered creatine occurs in all cases. The effectiveness of thyroid treatment diminishes rapidly with age; no effect is obtained in adults. Relief of symptoms is associated with return of creatinuria in children. Quinine therapy is successful in adults as well as children. A. C. F.

Relation of potassium to family periodic paralysis. G. D. GAMMON (Proc. Soc. Exp. Biol. Med., 1938, 38, 922-924).—Administration of 4 g. of KCl to a 16-year old patient at 2.30 a.m. prevented the occurrence of the usual seizure at 3-4 a.m., and an attack already developed was cured by administration of 5 g. of KCl. No effect was produced by administration of K salts in the daytime when the serum-K was high so that immediate K excretion took place. V. J. W.

Ætiology of muscular dystrophies. K. Kurk and K. OHSHIMA (Klin. Woch., 1937, 17, 1003— 1006).—Extirpation of the 6th and 7th lumbar and 1st sacral spinal ganglia or the sympathetic trunk, or both, produces in the young cat or dog, after 30—52 days, the typical clinical and histological picture of a muscular dystrophy. E. M. J.

(f) NERVOUS SYSTEM.

Behaviour of Donaggio's neuro-fibrils following administration of dried thyroid preparations. G. OGGIONI (Boll. Soc. ital. Biol. sperim., 1938, 13, 127—129).—Application of Donaggio's staining methods in guinea-pigs and rabbits reveals changes in the fibrils of the lateral region of the anterior horn and the intermedio-lateral horn of grey matter in the spinal cord. F. O. H.

Size of nerve-cells in different spinal ganglia of the same individual (*Mus musculus*). G. LEVI (Boll. Soc. ital. Biol. sperim., 1938, **13**, 135— 137).—Measurements were made at the levels of the 7th cervical, 2nd and 5th thoracic, and 3rd lumbar vertebræ. Diameters vary from 6 to 25 μ . The frequency curves show a max. at 10—11 μ .

F. O. H.

Temperature necessary to cause death in fatigued neurones as compared with resting neurones. G. D. SHAFER and R. K. SKOW (Amer. J. Physiol., 1938, 122, 551-562).—The 8th or 9th pair of spinal nerves of the bullfrog were studied. Rapid fatigue (by max. stimuli of 40, 120, 180, or 240 shocks per sec.) of sensory neurones and motor fibres lowers the temp. at which irritability is lost compared with corresponding neurones or fibres. The lethal temp. for fatigued nerve is only slightly lower than for resting nerve. Both fatigued and resting neurones and fibres recover from temp. effects but the latter much more effectively.

M. W. G.

Direct observation of nerve-axon fibres. A. PEZARD (Compt. rend. Soc. Biol., 1938, 128, 499– 501).—By injecting the muscle of a frog with a 0.5%osmic acid solution and then fixing in a 0.25%solution for $1\frac{1}{2}$ hr. and finally washing in running water for 24 hr. the penetration and division of the nerve fibres can be observed directly. P. C. W.

Electrical impedance of nerve during activity. K. S. COLE and H. J. CURTIS (Nature, 1938, 142, 209—210).—Changes in transverse impedance during excitation were measured in the giant nerve fibre of the stellar nerve of the squid (*Loligo pealii*) and in the long single cell of *Nitella*. In both there were large decreases in resistance, but capacity changes were small and the phase angle was unchanged. It is concluded that excitation does not involve destruction of the membrane. C. A. K.

Time factor in inhibition of electric stimulation [of nerve] by inverse current. V. KRUTA (Compt. rend. Soc. Biol., 1938, 128, 395—397).— The stimulation of the sciatic nerve in the frog by a rectangular current is inhibited by the immediate passage of an inverse current if the duration of the first current is short enough. Curves are plotted showing the relation between % inhibition and intensity of current for 3 different current durations.

P. C. W.

Polarisation optical studies of the structure of nerve cells. P. CHINN (J. Cell. Comp. Physiol., 1938, 12, 1—21).—Unipolar cells of the lobster, crayfish, and leech, and of the dorsal root ganglia of the frog, are enclosed in a sheath consisting of alternate layers of protein and lipins. This sheath is continuous with the axon sheath and neurilemma. Anterior horn cells of the frog have no demonstrable sheath. The cytoplasm of unipolar cells shows a negative polarisation cross, indicating the presence of protein particles arranged tangentially. Multipolar cells show a positive birefringence with respect to the distinguishing direction of the cell. All nuclear membranes show a negative polarisation cross, indicating protein leaflets lying tangentially to the surface. V. J. W.

Relation of chemically induced activity in nerve to changes in demarcation potential. T. SJÖSTRAND, F. BRINK, and D. W. BRONK (Proc. Soc. Exp. Biol. Med., 1938, 38, 918—920).—Impulse discharges and demarcation potentials in a single fibre of the frog's sciatic were measured by the same pair of electrodes. Activity was caused by applying solutions of salts to the fibre at one electrode, and occurred with either a positive or negative change in demarcation potential or with no change.

V. J. W.

Relation between the frequency of stimulation and the total electrical response of nerve. T. P. FENG (Chinese J. Physiol., 1938, 13, 197-208) .--The toad's or frog's sciatic was stimulated at different frequencies for 0.9-4.5 sec. by supramaximal condenser charges or discharges only (one-way) or the two alternately (two-way). The electrical response showed several max, and min, at frequencies increasing in geometrical progression. At 22° there was a min. at 5-600 per sec. and no progressive decline with "two-way" stimuli till over 2000 per sec. At 15° the waves occurred at lower frequencies. With "two-way" shocks the first max. was lower than the second, and lower than the first max. with "oneway "shocks, owing to the impulses starting at different points on the nerve. At the min., half or more of the shocks fell in the refractory period. N. H.

Relation of threshold excitability of nerve to carbon dioxide tension. J. P. HETTWER (Amer. J. Physiol., 1938, 122, 275—280).—CO₂ tensions of $1\cdot5$ —180 mm. Hg in moist air depress the min. and max. action potential threshold of green frog sciatic nerve. CO₂ depresses excitability in tensions above that existing in the tissue due to its own production. Max. depression at any given CO₂ tension is attained in 4—8 min. Complete recovery on removal of the gas followed in about the same length of time for tensions below 35 mm. Hg; above that tension recovery was never complete and deterioration of the nerve was accelerated. M. W. G.

Action of strychnine on decalcified nerves. H. BOLLY and G. COPPÉE (Comp. rend. Soc. Biol., 1938, 127, 1461—1463).—The sciatic nerve and gastrocnemius of the frog were immersed in Ringer's solution to which 2—4% of Na citrate was added. After 15 min. irregular contractions of the muscle occurred. When strychnine was added to the solution (1 in 7500) muscular contractions ceased in $1-1\frac{1}{2}$ hr.

J. H. T.

Dorsal nerve cord in Lumbricus terrestris. J. TEN CATE (Arch. Néerland. Physiol., 1938, 23, 136-140).—After transection of the ventral nerve cord the dorsal cord can carry impulses in either direction between the two parts of the body at about the same speed, so as to produce the reflexes associated with the worm. C. E. B.

Numbers of fibres and cells in the dorsal roots and ganglia of the cat. D. DUNCAN and L. K. KEYSER (J. comp. Neurol., 1938, 68, 479—490).— The previous finding that the no. of fibres in the dorsal roots is approx. equal to the no. of cells in the posterior root ganglia was confirmed. J. D.

Adaptation of acid reflex in the frog. M. O. DE ALMEIDA, H. MOUSSATCHÉ, and M. V. DIAS (Compt. rend. Soc. Biol., 1938, 128, 923—925).— A prep. is made of the hind legs and isolated spinal cord of the frog so that the cord can be placed in any position relative to the legs. If a drop of acid is placed on the skin over the spinal cord but to one side of the mid-line the corresponding foot makes a perfectly co-ordinated movement to remove the irritation but makes it to the position normally occupied by the back relative to the legs and is not altered whatever the position of the cord.

P. C. W.

Function of the giant fibres of the central nervous system of the crayfish. C. A. G. WIERSMA (Proc. Soc. Exp. Biol. Med., 1938, 38, 661—662).— Stimulation of these fibres gave an all-or-none response consisting of a flexion of the whole tail. Stimulation of one of the four giant fibres is followed by a refractory period in all four. V. J. W.

Experimental nervous lesions caused by tetanus toxin. LHERMITTE, LEMÉTAYER, UHRY, and DE AJURIAGUERRA (Compt. rend. Soc. Biol., 1938, 128, 296-298).-The nervous lesions caused by the injection of tetanus toxin (treated with formol to remove most of its toxicity) into guinea-pigs are fully described. The leg into which the injection is made becomes paralysed after 4 days; this is succeeded by extension with hypertonia which gradually spreads over the whole body until death. The lesions are most pronounced in the anterior horn cells in the spinal cord and in the cranial nuclei. The changes may be of four types. There is little proliferation of neuroglial elements and the peripheral nerves are only irregularly degenerated. P. C. W.

Compression of spinal cord. N. CHRISTEAS and R. PALMER (Comp. rend. Soc. Biol., 1938, 127, 1058—1059).—In dogs, 1—1.5 c.c. H₂O pressure on the spinal cord produced motor and sensory paralysis. On lowering the pressure the symptoms disappeared in minutes or days. J. H. T.

Cremaster reflex. G. VAN RIJNBERK (Arch. Néerland. Physiol., 1938, 23, 62-78).—A review. C. E. B.

Reflex discharge from the spinal cord over the dorsal roots. J. F. TOENNIES (J. Neurophysiol., 1938, 1, 378—390).—A description is given of the properties of the reflex discharge which takes place over the spinal dorsal roots of the cat, following stimulation of sensory nerves. S. CR.

Neurological aspects of injuries to the spine. H. C. NAFFZIGER (J. Bone Jt. Surg., 1938, 20, 444–448).—Simple pressure on the brain, without trauma, even if continued, does not lead to permanent circulatory changes or cellular degeneration.

F. F. R.

Segmental distribution of certain visceral afferent neurones of pupillo-dilator reflex in cat. B. A. McSWINEY and S. F. SUFFOLK (J. Physiol., 1938, 93, 104—116).—Dilatation of the pupil and reflex changes of blood pressure in the cat anæsthetised with chloralose were used as indices of afferent impulses and evidence was obtained of the segmental distribution of the afferent neurones of the pupillodilator reflex in the right and left splanchnic nerves from the stomach and small intestine. The highest and lowest levels of entry into the spinal cord of the afferent neurones are set out. J. A. C.

Central pathway in man of vasomotor response to pain. D. G. MARQUIS and D. J. WILLIAMS (Brain, 1938, 61, 203—220).—In subjects with lesions below the region of the thalamus, the amount of vasoconstriction of the digital vessels in response to painful or cold stimuli varied in the same direction as the perception of the stimulus. In subjects with lesions of the sensory tracts above that level equal responses were obtained by stimulation of normal, hypoalgesic, and hyperalgesic areas. It was concluded that the ascending pathway for the vasomotor response is the spinothalamic tract, but the reflex arc is complete below the level of the sensory thalamus. J. D.

Central vagus transmission after hypophysectomy in the cat. H. C. CHANG, R. K. S. LIM, and Y. M. LÜ (Chinese J. Physiol., 1938, 13, 33— 48).—In cats prepared as described previously (Physiol. Abs., 1937, 22, No. 4135), central stimulation of the vagus causes a rise of arterial pressure, abolished by removal of the pituitary but restored by eserine and atropine and again abolished by clamping off the adrenals. Acetyl-choline injected after eserine and atropine causes a rise of arterial pressure, abolished by clamping off the adrenals. N. H.

Liberation of acetylcholine into the cerebrospinal fluid (by the afferent vagus. H. C. CHANG, W. M. HSIEH, T. H. LI, and R. K. S. LIM (Chinese J. Physiol., 1938, 13, 153—166).—C.S.F., collected from dogs under chloralosane and given atropine and intraspinal (but not intravenous) eserine, after central stimulation of the vagus (separated from the sympathetic) caused contraction of the eserinised leech (abolished by hot alkali but not by acid) and a fall of arterial pressure in the cat (abolished by atropine). N. H.

Attempts to demonstrate the liberation of acetylcholine from central terminations. T. H. LI (Chinese J. Physiol., 1938, 13, 173—186).— The isolated brain and spinal cord of the toad, immersed in eserine-saline, liberates acetylcholine on direct stimulation, as shown by the usual tests. The isolated medulla liberates acetylcholine on central stimulation of the vagi. The liberation is not due to heating. N. H.

A vagus-post-pituitary reflex. II. Glucogenic effect. W. M. HSIEH (Chinese J. Physiol., 1938, 13, 187—196).—The venous blood-sugar in cats under chloralosane rose temporarily after stimulating the vagus or sciatic centrally, or the cervical sympathetic peripherally. The vagus effect was abolished by hypophysectomy but not by crushing the neck or removing the superior cervical ganglion; the sympathetic effect was abolished by hypophysectomy but not by crushing the neck or cutting the splanchnics; the sciatic effect was not abolished by crushing the neck or hypophysectomy. Pituitrin and pitressin but not oxytocin raised the bloodsugar. N. H.

Experimental production of circulatory disturbances in the cerebellar blood vessels in rabbits. C. O. NYLÉN (Confinia neurol., 1938, 1, 157—161).—The superior cerebellar arteries were coagulated in rabbits, using a diathermy needle. The animals showed signs of Menière's disease (eye deviations, nystagmus, tendency to fall, disturbances of gait); the direction of the symptoms was the opposite to that which follows labyrinthectomy on the same side. A. S.

Relation between the paleocerebellum and vasomotor reflexes. G. MORUZZI (Ann. Physiol. Physicochim. biol., 1938, 14, 605—612).—In cats decerebrated at the precollicular level, bipolar faradic stimulation of the cerebellum inhibits vasopressor reflexes provoked by stimulation of a large sensory nerve and inhibits reflex vasodilatation and decerebrate rigidity. Curare leaves the cerebellar action on vasomotor reflexes untouched. Superficial cocainisation of the cerebellum annuls the effects of stimulation. C. C. N. V.

Electric activity of the cerebellar cortex in the cat. R. S. Dow (Compt. rend. Soc. Biol., 1938, 128, 538-544).-The frequency of the regular discharges from the vermis is rapid (150-250 per sec.). Fall of blood pressure and resultant ischæmia or anoxæmia diminishes the amplitude of the waves, which may completely disappear to be replaced by slow-frequency waves. Cocaine applied to the cortex abolishes the activity but strychnine has little action. The isolation of the cerebellum from all afferent nerve paths has little effect beyond that attributable to blood pressure changes. Faradic stimulation increases the frequency and amplitude of the waves. The magnitude of the wave activity varies inversely with that of postural P. C. W. tone throughout.

Cerebellum of the Petromyzontidæ. A. STE-FANELLI (Boll. Soc. ital. Biol. sperim., 1938, 13, 142—144).—The primitive morphological and histological characteristics of the brain of *P. marinus* and *P. fluvialis* are discussed and compared with the brain of higher vertebrates. F. O. H.

Experiments on the corpus striatum and rhinencephalon. D. M. RIOCH and C. BRENNER (J. comp. Neurol., 1938, 68, 491-507).---Unilateral cortical ablation was performed on guinea-pigs. When this was followed by ipsilateral destruction of the striatum no new abnormalities developed. Following bilateral removal of the cortex of cats the cut surface of the brain stem was stimulated. Various reactions such as head turning and running movements were obtained from different regions, but nothing definite was obtained from the corpus striatum. It was concluded that the ipsilateral striatum plays no rôle in the recovery from cortical ablation and it is suggested that the striatum has no autonomous function but acts only in conjunction with other systems. J. D.

Excitability of the hypothalamus after degeneration of corticifugal connexions from the frontal lobes. H. W. MAGOUN (Amer. J. Physiol., 1938, 122, 530-532).-The preoptic region and hypothalamus in each of 6 cats was electrically stimulated 4-6 weeks after bilateral removal of the frontal lobes. The respiratory inhibitory and vasodepressor responses were markedly depressed. Contractions of the urinary bladder, pupillary dilatation, retraction of the nictitating membrane, vasopressor responses, and respiratory excitatory effects, including facio-vocal activity, were elicited as in animals with intact brains. In part at least, respiratory inhibition and vasodepressor responses are dependent on the activation of descending pathways from the cerebral M. W. G. cortex.

Adiposity and diabetes mellitus in a monkey with hypothalamic lesions. S. W. RANSON, C. FISHER, and W. R. INGRAM (Endocrinol., 1938, 23, 175-181).—A monkey developed diabetes and obesity after certain electrical lesions had been made in its hypothalamus. In other monkeys with similar lesions this syndrome did not occur. V. J. W.

Familial dwarfism and epilepsy combined with disturbance of the diencephalon. O. BILLIG (Schweiz, Arch. Neurol. Psychiat., 1938, 41, 1--7).--A patient with chondrodystrophia, obesity, and hypogenitalism developed Alzheimer's disease and epileptic attacks at the age of 57. The same syndrome or parts of it were observed in several members of the same family in four generations. K. S.

Influence of hypothalamic stimulation on intestinal activity. J. H. MASSERMAN and E. W. HAERTIG (J. Neurophysiol., 1938, 1, 350-356).-The effects of electrical stimulation of the hypothalamus and of the injection of strychnine into the diencephalon on the motility and blood supply of the small intestine were examined by direct inspection in cats an esthetised with ether and by fluoroscopy in recovery preps. Weak stimuli to the hypothalamus caused rhythmic segmentation, peristalsis, and pendular movements in the quiescent intestine. These movements were inhibited by stronger stimuli which set up emotional disturbances. Strychnine tended to lower the thresholds for both these effects; large doses caused spasticity, diminished motility, and blanching of the small intestine. S. CR.

Thalamus of the chimpanzee. I. Terminations of the somatic afferent systems. A. E. WALKER (Confinia neurol., 1938, 1, 99—127).—The following operations were performed in chimpanzees: (1) right mid-cervical hemisection of the spinal cord, (2) lesions of right cuneate and left gracile nuclei, (3) partial transection of left superior cerebellar peduncle. 14 days were allowed for degeneration; cord, brain stem, and thalamus were examined in serial sections (Marchi technique). The spinothalamic tract terminates in the most posterior basal portion of the ventral thalamic nucleus, the medial lemniscus in the nucleus ventralis postero-lateralis, and the superior cerebellar peduncle anterior to these in the nucleus ventralis lateralis. The fibres from the nucleus cuneatus end medially to those of the nucleus gracilis. Different parts of the body are represented in the thalamus as follows : lower extremity laterally, the face medially, trunk and upper extremity in the intermediate zone. A. S.

Hemidecortication in chimpanzee, baboon, macaque, potto, cat, and coati. A. E. WALKER and J. F. FULTON (J. nerv. ment. Dis., 1938, 87, 677—700).—The effects of hemidecortication in this comparative series of animals showed that the spasticity and loss of function were greater in the higher animals. This was explained by the greater bilaterality of representation in the lower animals and more especially by the more extensive encephalisation of function in the anthropoid apes. J. D.

Origin of cortico-spinal tract in the monkey. P. M. LEVIN and F. K. BRADFORD (J. comp. Neurol., 1938; 68, 411—422).—Following hemisection of the spinal cord of monkeys at C4, retrograde degeneration was found in the pyramidal cells of the cortex. This was confined to area 4 except for about 20% of the degenerated cells, which were scattered in the parietal cortex. The fibres arising from these parietal cells were placed laterally in the pyramid as shown by their persistence after frontal lobectomy. About 85% of fibres crossed in the decussation. J. D.

Relationship of various electric discharges of the cerebral cortex. F. BREMER (Compt. rend. Soc. Biol., 1938, 128, 544-549).-The waves of large amplitude produced in the acoustic area (cat) by the stimulus of an intermittent sharp sound and the similar waves produced by application of strychnine are both suppressed by a continuous sound which provokes a discharge of high-frequency, low-amplitude waves. The same happens to the spontaneous discharges in the anæsthetised cat. In the nonanæsthetised cat the stimulus of a continuous sound produces an increase in amplitude and frequency of the low-amplitude, high-frequency discharges present. This suggests that all these various waves represent various degrees of synchronisation of the same nerve elements in the cortex. A high frequency is due to either a greater no. of active neurones or a higher frequency in each active neurone. The amplitude will depend on the degree of synchronisation.

P. C. W.

Electric discharge of the cerebral cortex and motor impulses. F. BREMER (Compt. rend. Soc. Biol., 1938, 128, 550—554).—In the isolated brain prep. of the cat simultaneous records were taken of the tone of the palpebral portion of the orbicularis oculi and the electric discharges from the corresponding area of the motor cortex. Spontaneous discharges from the cortex had no effect on the muscle. This may be due to their insufficient frequency or no. to transmit across the synapse at the motor nucleus. Occasional volleys of discharges, especially following visual stimuli, were, however, accompanied by rapid blinking without movement of any other facial muscle. P. C. W.

Placing of electrodes for recording brain potentials. A. E. KORNMÜLLER and J. A. SCHAEDER (J. Neurophysiol., 1938, 1, 287-300).—The position of the indifferent electrode in unipolar recording is varied, and the results from bipolar recording are compared with those from unipolar. S. CR.

Distribution of the alpha rhythm over the cerebral cortex of normal man. M. A. RUBIN (J. Neurophysiol., 1938, 1, 313–323).—Electroencephalograms were obtained from 17 subjects to determine the distribution of the α rhythm over the cerebral cortex and to evaluate the use of monopolar and bipolar recording for this purpose. S. CR.

Effects of blood pressure changes on cortical potentials during anæsthesia. H. K. BEECHER, F. K. MCDONOUGH, and A. FORBES (J. Neurophysiol., 1938, 1, 324—331).—Concentric electrodes are described which are useful in studying the electrical changes in the brains of experimental animals. At a const. level of anæsthesia in cats a fall of blood pressure is followed by cortical changes which are indistinguishable from those caused by an increase in the depth of anæsthesia. S. CR.

Autonomic activity and brain potentials associated with "voluntary" control of the pilomotors (MIM. arrectoris pilorum). D. B. LINDSLEY and W. S. SASSAMAN (J. Neurophysiol., 1938, 1, 342—349). —Experimental study of a subject who can control the body hairs shows that "voluntary" erection of the hairs is associated with changes indicating a generalised sympathetic discharge. Electrical potential changes are found over the premotor area of the brain. S. CR.

Sensorimotor cortex, nucleus caudatus, and thalamus opticus. J. G. DUSSER DE BARENNE and W. S. MCCULLOCH (J. Neurophysiol., 1938, 1, 364— 377).—The suppression of the electrical activity of the leg and arm portions of area 4 of the sensorimotor cortex in monkeys by local application of strychnine to areas L. 4-s and A. 4-s involves the nucleus caudatus and the thalamus opticus. S. CR.

Electrencephalogram in pathologic states. G. MARINESCO, O. SAGER, and A. KREINDLER (Presse méd., 1938, 46, 650—654).—Modifications of amplitude mainly of the α waves of the electrencephalogram were found in brain tumours (provided they involved the cortex), in hyperventilation and epilepsy, and in coma from various causes. G. SCH.

Tracts and centres for conjugate ocular movements. G. E. JAYLE (Arch. Ophtal., Paris, 1938, 2, 401—414).—It is questioned whether cortical ablation causes paralytic ocular deviation. The predominance of cortical control of ocular movements is doubtful. Distinctions may be drawn between the cortical control of ocular and somatic muscles, and between the different modes of ocular movement themselves. E. E. P.

Optically excitable cortex of the rabbit. J. L. O'LEARY and G. H. BISHOP (J. comp. Neurol., 1938, 68, 423—478).—A detailed account of work already noted (A., 1938, III, 187). J. D. Frontal lobe and ocular movement. G. E. JAYLE (Rev. Oto-Neuro-Ophtal., 1938, 16, 1-32).---A review of data from man and animals, emphasising that the frontal areas are not essential to ocular movements. E. E. P.

Eye movements in insulin coma. J. SILBER-PFENNIG (Confinia neurol., 1938, 1, 188—201).—Eye movements, induced by rotation of the head or body and stimulation of the labyrinth, are very slow during insulin coma. During the return to consciousness 3 different phases of unco-ordinated eye movements develop. The vestibular responses in the comatose state were mainly cycles of pendulous eye movements. A. S.

Excitable cortex in the monotremata. A. A. ABBIE (Austral. J. Exp. Biol., 1938, 16, 143-152).-The excitable cortex was determined in Ornithorhynchus and in Tachyglossus. In the former, movements were obtained of the eyelids, head, and forelimb; in the latter practically of the whole body. In both animals representation is predominantly contralateral. In Ornithorhynchus the excitable cortex occupies practically the whole dorso-lateral surface of the hemisphere and involves three cortical formations; in Tachyglossus it is restricted to the lower two thirds of the gyrus and includes only one cortical formation. The third cortical modification in Ornithorhynchus and the whole of the excitable cortex in Tachyglossus are six-layered and granular. Caudally both termin-ate abruptly, being replaced by intensely granular cortex. Most of the movements elicited in both animals were produced by contraction of the panni-D. M. N. culus carnosus.

Simultaneous facilitation and extinction in the motor cortex. J. G. DUSSER DE BARENNE (Confinia neurol., 1938, 1, 1-5).—Repetitive stimulation of a field in the motor cortex of Macaca mulatta may result in facilitation or extinction of the response depending on the time interval between the various stimuli. A. S.

Application of quantitative methods to certain problems in psychology. (Proc. Roy. Soc., 1938, B, 125, 415-434).—A discussion in which C. S. Myers, C. E. Spearman, G. H. Thomson, C. Burt, H. B. Heywood, J. O. Irwin, W. Stephenson, M. Greenwood, May Smith, M. Culpin, E. Farmer, F. Marquis, R. H. Stanbridge, W. G. Hiscock, and (Mrs.) W. Raphael took part. F. B. P.

Sebaceous secretion and nervous diseases. B. SERRATI (Boll. Soc. ital. Biol. sperim., 1938, 13, 173—175).—In 34 cases of encephalitis, the sebaceous excretion was increased, not only on the face and forehead, but on other parts of the body. A return to normal vals. accompanied successful therapeutic treatment. F. O. H.

Liberation of acetylcholine by cobra venom from the acetylcholine complex in mammalian brain. J. GAUTRELET and E. CORTEGGIANI (Compt. rend., 1938, 207, 465—466; cf. A., 1937, III, 8, 198, 390).—An eserinised suspension of the acetylcholine complex in the brain of the rat and guinea-pig is completely broken down, liberating acetylcholine, by 3 R (A., III.)

1 in 1000 cobra venom. Cobra venom, but not that of Vipera aspis, possesses choline-esterase activity. J. L. D.

Cerebral mechanisms in auditory localisation. E. GIRDEN (Proc. Soc. Exp. Biol. Med., 1938, 38, 766—767).—In the dog, paw flexion, as a conditioned motor response to correctly located sound, persisted after complete transection of the corpus callosum or removal of one temporal lobe. Simultaneous removal of both temporal lobes abolishes all auditory conditioned reflexes, but if the temporal lobes are removed at an interval of a month paw flexion occurs irrespective of the location of the stimulus. V. J. W.

Automaticity of central neurones after nicotine block of synapses. B. LIBET and R. W. GERARD (Proc. Soc. Exp. Biol. Med., 1938, 38, 886—888).— All central reflexes can be abolished by nicotine, but in this condition the phrenic nerves continue to show action potentials which are increased by asphyxia, although the bursts are no longer spaced at regular intervals. V. J. W.

Effect of electric shock on nervous system. I. BERTHAND, KOFFAS, LEROY, JONAUX, and DE LA GORCE (Compt. rend. Soc. Biol., 1938, **128**, 311—314). —An electric shock of 150 amp. and 70,000 v. applied for 6×10^{-3} sec. to guinea-pigs produces a state of stupor and temporary paralysis; none of the animals survives more than a few weeks. P. C. W.

Destructive action of electric shocks on cerebral neuroglia. I. BERTRAND, KOFFAS, and LEROY (Compt. rend. Soc. Biol., 1938, 128, 314—316). —Electric shocks of short duration and high voltage applied to guinea-pigs result in destructive lesions in the central nervous system chiefly confined to the neuroglial elements. P. C. W.

Chemical topography of brain. L. O. RANDALL (J. Biol. Chem., 1938, 124, 481-488).-Data are given for the amounts of water, total, acetone-sol.-, and phospho-lipin, total and free cholesterol, phospholipin-fatty acids and their I val., lipin-P, acid-sol. P, inorg. P, ester-P, creatine, total N, lipin-N, acid-sol. N, and protein-N in the corona radiata frontal and parietal white matter, brain stem, thalamus, caudate nucleus, frontal and parietal cortex from the brains of 7 normal, 10 schizophrenic, 2 mentally defective, and 4 arteriosclerotic subjects. The mean water content was higher in the grey than in the white areas, whilst the converse was true for the various lipin constituents. The I val. of the fatty acids was higher in grey than in white tissues. Acid-sol. N, creatine, inorg. P, and protein- and total N were higher in white than in grey tissues. Only acid-sol. and ester-P had a similar distribution over all the areas. Neither the various grey nor white areas could be differentiated from one another in any of the constituents.

J. N. A.

Neuroproteins. III. Sex differences in the amino-acid composition of primate brainproteins. R. J. BLOCK (J. Biol. Chem., 1937, 121, 411-416).—Neuroproteins from male primates (man, monkey) yielded more lysine than those from the females, the average lysine : arginine ratio being 100:83 for males and 100:93 for females. With

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this exception, the amino-acid composition was approx. the same for male and female. J. L. C.

Vasomotor control of cerebral vessels. H. S. FORBES and S. S. COBB (Brain, 1938, 61, 221–233).— A review. J. D.

Headache. D. W. C. NORTHFIELD (Brain, 1938, 61, 133-162).—The incidence and type of headache in 100 consecutive cases of brain tumour were studied. Headache could not be related to the abs. level of cerebrospinal fluid pressure, but was associated with sudden changes in this pressure. Since the dura mater and brain substance were relatively insensitive, the site of origin of the pain was thought to be in the blood vessels. The blood vessels of the dura were excluded because intravenous histamine caused headaches similar to those of intracranial tumour in subjects in whom the middle meningeal artery had been ligated. Furthermore, histamine caused headache when injected into the internal carotid artery, but not when injected into the external carotid artery. The sensation of headache therefore arises from the cerebral vessels even though clamping and endothermy of the cortical and arachnoidal vessels caused no sensation. Traction on the larger vessels, however, caused pain. The headache accompanying brain tumour may result from rapid changes in the relationship between intra- and extra-vascular pressure. The afferent pathway for the sensation was not determined, as out of 5 cases with unilateral section of the 5th nerve, 2 developed bilateral headache following injection of histamine. J. D.

Cerebral blood flow changes during insulin and metrazol (pentamethylenetetrazole) shock. B. S. LEIBEL and G. E. HALL (Proc. Soc. Exp. Biol. Med., 1938, 38, 894—896).—Thermostromuhr measurements were made on the carotid artery and meningeal vein of rabbits. Arterial blood flow decreased by 75% at the onset of convulsions. Venous flow showed a preliminary rise in the case of insulin only, and then fell to about the same rate as the arterial. Return to normal took about 1 hr. V. J. W.

Effects of insulin shock on behaviour and conditioned reflex action in well-trained sheep. J. A. ROSE, A. TAINTON-POTTBERG, and O. D. ANDER-SON (Proc. Soc. Exp. Biol. Med., 1938, 38, 653— 655).—In a sheep which had formerly shown foreleg movements and increased respiration as a conditioned response to an auditory stimulus, this response had been absent for 1 year. After insulin convulsions, followed by administration of glucose, symptoms of hyperexcitability occurred, followed by a reappearance of the conditioned response. V. J. W.

Insulin hypoglycæmia therapy of schizophrenia viewed as an induced growth process. D. E. SCHNEIDER (J. nerv. ment. Dis., 1938, 87, 711—714).—A marked gain in wt. in schizophrenic patients undergoing insulin shock therapy was noted. J. D.

Influence of hypoglycæmia on the sensitivity of the central nervous system to oxygen want. E. GELLHORN, R. C. INGRAHAM, and L. MOLDAVSKY (J. Neurophysiol., 1938, 1, 301—312).—A given degree of anoxia was produced in dogs by the inhalation of $6.2\% O_2$ and the blood pressure reaction was recorded. Insulin, by virtue of the hypoglycæmia produced, causes augmentation in the blood pressure rise due to this anoxia. S. CR.

Epileptiform attacks in insulin therapy of schizophrenia. G. GROSS-MAX (Nervenarzt, 1938, 11, 400-413).-37 out of 105 cases of schizophrenia treated with insulin showed epileptiform attacks, usually 1-3 hr. after injection. In these cases the prognosis was better than in those who had no fits. C. A. K.

Cardiazol therapy in stupor. J. S. HARRIS and C. R. BIRNIE (Brit. Med. J., 1938, II, 449-451).-Cardiazol was frequently successful in the treatment of stupor. C. A. K.

50 cases of schizophrenia treated with cardiazol. W. MEIER (Schweiz, Arch. Neurol. Psychiat., 1938, 41, 100—134).—In 14 cases there was a full recovery which lasted to the time of this report (average 6¹/₂ months). Of 10 cases in which the psychosis had lasted for less than 6 months 9 showed a complete recovery. In cases of more than 3—4 years' duration recovery cannot be expected. In almost every case the treatment had a transient symptomatic effect. K. STERN.

Action of pentamethylenetetrazole (metrazol) and insulin on brain potentials of the rabbit. J. E. GOODWIN, D. P. C. LLOYD, and G. E. HALL (Proc. Soc. Exp. Biol. Med., 1938, 38, 897—899).— Electrodes placed on either precentral or striate regions were led off to an oscillograph. Records are reproduced showing changes due to convulsive doses. 4 phases are shown, 1, 2, and 4 being phases of increased electric change, and 3 a postactivity depression. V. J. W.

Faulty detoxication in schizophrenia. J. H. QUASTEL and W. T. WALES (Lancet, 1938, 235, 301-305).—6.0 g. of Na benzoate were given to 45 cases of schizophrenia. In non-catatonic patients the average hippuric acid excretion in 4 hr. was $3.4\pm$ 0.4 g. In 18 catatonic patients the excretion was only 2.2 ± 0.5 g. This is attributed to a liver disturbance, although delayed absorption of benzoate or glycine from the gut has not been eliminated. C. A. K.

Case of "reflex" epilepsy. K. HEBEL (Nervenarzt., 1938, 11, 415-417).—A case of epilepsy is described in which the attacks started in the stump of an amputated arm. C. A. K.

Cerebral injury and schizophrenia. E. FEUCHTWANGER and W. MAYER-GROSS (Schweiz. Arch. Neurol. Psychiat., 1938, 41, 17—99).—In 1554 cases of cerebral injury the total % of schizophrenia and symptomatic psychoses of schizophrenic character was more than four times as high as in the average population. True schizophrenia was not more frequent than in the average population. There was no relation between localisation and severity of the cerebral lesion on one side and the psychosis on the other. K. STERN.

Pathogenesis of convulsive disorders. M. SPIEGEL-ADOLF and E. A. SPIEGEL (Pennsylvania med. J., 1938, 41, 802-803).—The effect of various

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epileptogenous agents on the permeability of the cellular surfaces of the brain was studied, using alternating currents of various frequencies and measuring polarisability. Anoxæmia increases and anæmia (produced by cerebral artery ligature) diminishes conductivity. Increase of intracranial pressure lowers conductivity; alkalosis increases permeability. Anæsthetics lower permeability and increase polarisability. A. J. B.

Early lesions of poliomyelitis after intranasal inoculation. H. K. FABER (J. Pediat., 1938, 13, 10-37).—Intravital staining with trypan-blue of monkeys intranasally inoculated with poliomyelitis virus gave selective staining in the central nervous system of areas of grey matter corresponding with those in which the virus had previously been found to be present, particularly in the olfactory bulb and olfactory areas in the cortex, the corpus striatum, brain stem, and spinal cord. The localisation of the dye was due largely to capillary dilatation and partly to staining of the endothelium, and, in the medulla and cord, to the staining of the nerve cells themselves. C. J. C. B.

Variations of muscular and nervous energy in man in mechanical work and in fatigue. V. RASCANU, M. KAPRI, and V. BUSILA (J. Physiol. Path. gén., 1938, 36, 470—484; cf. A., 1938, III, 101).—Experiments employing the electro-myogram in manual and in brain workers suggest that muscular fatigue may result : (i) when the motor centres tire before the muscle tissue as in the trained muscle (e.g., the manual workers), and (ii) when the muscle itself tires before the nervous centre as in the untrained brain workers. C. A. A.

Action of Spiraea ulmaria and Alisma plantago on the central nervous system. R. ADELHEIM, C. AMSLER, E. RENTZ, and V. NIKOLAIEV (Arch. Psychiat. Nervenkr., 1938, 108, 338—345).—The roots of S. ulmaria and A. plantago were used in Russia as remedy against rabies. White mice and guinea-pigs were injected with watery extracts of the roots of either plant. Ascending paralysis resulted immediately and led to death within one or two days. Histological examination of the brain showed shrinking of ganglion cells with or without proliferation of mesodermal or glial elements. K. STERN.

Mentality of infants relieved of hydrocephalus by coagulation of choroid plexus. T. J. PUTNAM (Amer. J. Dis. Child., 1938, 55, 990—999).—Treatment of infantile hydrocephalus by endoscopic coagulation of the choroid plexus should be reserved for cases that are mentally normal before operation in which reasonable results may be expected. A. C. F.

Acetylcholine in cerebrospinal fluid. H. M. ADAM, R. A. MCKAIL, S. OBRADOR, and W. C. WILSON (J. Physiol., 1938, 93, 45—46P).—Attempts were made to discover the source of acetylcholine which appears in the cerebrospinal fluid of dogs after intravenous injection of eserine (cf. Physiol. Abs., 1936, 21, No. 1363). In cats and dogs the ventricular system was perfused and various experiments (results mostly negative) were performed. It is possible that a small localised area in the hypothalamus must be stimulated in order to produce an increase in acetylcholine concn. J. A. C.

Occurrence of acetylcholine in nervous tissue of crustaceans and its effect on the crab heart. J. H. WELSH (Nature, 1938, 142, 151).—Low concns. of acetylcholine increase the rate of beat of the isolated crab heart (*Carcinus* and *Maia*). The active material in 0.1 mg. of ventral ganglion (or 0.5 mg. of leg nerve) of the crab doubles the heart rate.

C. A. K. Choline-esterase and the theory of chemical mediation of nerve impulses. D. GLICK (J. Gen. Physiol., 1938, 21, 431-438).-The max. cholineesterase activity of the superior cervical ganglion of the cat is equiv. to the splitting of 0.10 µg. of acetylcholine per mg. of fresh tissue per sec., at $p_{\rm H}$ 7.4 and 38°. The min. time required for the destruction of the acetylcholine liberated by a single nerve impulse is calc. to be 0.015 m-sec. The dissociation const. of the reaction between choline-esterase and acetylcholine was 0.001. From this it is cale. that 8 sec. are required for hydrolysis under conditions of min. activity of the enzyme. If, there is to be removal of acetylcholine during the 2 m-sec. refractory period of the ganglion, there must be some localisation (i.e., at the nerve endings) of enzyme and substrate in the ganglion. A. E. W.

Relation between the precursor of acetylcholine and the free acetylcholine of the blood and tissues. E. KAHANE and J. LEVY (Ann. Physiol. Physicochim. biol., 1938, 14, 575—581).—The anomalies of the extraction of acetylcholine are held to explain the intermediate state between the precursor of acetylcholine and free acetylcholine (cf. A., 1938, III, 320). C. C. N. V.

Choline-esterase in nerve fibres. D. NACH-MANSOHN (Compt. rend. Soc. Biol., 1938, 128, 516— 519).—Nerve fibres, both afferent and efferent, are rich in choline-esterase, the concn. being particularly high at the synapses. H. G. R.

Determination of choline esters in human sympathetic ganglia. D. VINCENT (Compt. rend. Soc. Biol., 1938, 128, 683-684).—The ganglia contain 1·3-2·1 µg. of acetylcholine per g. H. G. R.

Mechanism of the formation of chemical mediators of nerve impulses. C. S. KOSCHTO-JANZ (Compt. rend. Acad. Sci. U.R.S.S., 1938, **19**, 315—318).—The effects of blocking the carbohydrate metabolism of nervous tissue of frog-heart muscle by NaF on the response to vagus stimulation are recorded. The first phase of the action depends on inhibition of hydrolysis of acetylcholine by choline-esterase and its consequent accumulation. After removal of accumulated acetylcholine by saline, NaF exerts a secondphase action in inhibiting further synthesis of acetylcholine-like substances. A. G. P.

Visceral efferent nerves of the snail and chemical transmission. M. BEAUVALLET (Ann. Physiol. Physicochim. biol., 1938, 14, 480—481).— Adrenaline or ergotamine raises the tone of the edible snail's intestine; they are not mutually antagonistic. High concess. of atropine have no action on tone or movements, but delay the action of acetylcholine (cf. A. 1938, III, 45 and Physiol. Abs., 1936-37, 21, 422). C. C. N. V.

Liberation by lingual nerve stimulation of substance acting on isolated intestine. G. UNGAR and J. L. PARROT (Compt. rend. Soc. Biol., 1938, 128, 397—399).—The substance is demonstrated in blood from the lingual vein of the chloralosed dog, following stimulation of the peripheral end of the lingual nerve, by tests on isolated dog's intestine. It is heat-stable. P. C. W.

Excitability of postganglionic fibres following preganglionic nerve section. P. CHAUCHARD (Compt. rend. Soc. Biol., 1938, 128, 864—866).— After section of the preganglionic fibres to the dilator pupillæ (rabbit) the chronaxie of the postganglionic fibres increases rapidly, eventually to 10 times its normal val. Transmission of stimuli through the ganglion is soon impossible but can be re-established before the preganglionic fibres have completely degenerated by application of acetylcholine, which reduces the chronaxie of the postganglionic fibres. Nicotine augments the postganglionic chronaxie but neither of these drugs has any such effect before section of the preganglionic fibres. P. C. W.

Persistent discharge from sympathetic ganglion cells following preganglionic stimulation. M. G. LARRABEE and D. W. BRONK (Proc. Soc. Exp. Biol. Med., 1938, **38**, 921—922).—If the rate of preganglionic stimulation is raised to 40 or more per sec. the discharges of postganglionic impulses cease to be synchronised and may continue for as long as 15 sec. after stimulation has ceased. V. J. W.

Synaptic transmission in absence of nerve cell bodies. J. Z. YOUNG (J. Physiol., 1938, 93, 43—45P).—Employing the squid, *Loligo*, it is shown that (as Bethe claimed for *Carcinus* in 1897) synaptic excitation of one nerve fibre by another does not depend on the presence of the nucleus, Golgi bodies, Nissl substance, or any other substances in the nerve cell body. J. A. C.

Anatomico-physiologic scheme of the vegetative nervous system. DANIELOPOLU (Presse méd., 1938, 46, 657—662).—A review of the author's previous work. G. SCH.

Mechanism of local sweating in response to faradism. R. G. BICKFORD (Clin. Sci., 1938, 3, 335-341).—Sweating can be produced by direct stimulation of the sweat nerves in the skin. The impulses pass through axons of a local sympathetic plexus, and are apparently cholinergic in function. B. McA.

(g) SPECIAL SENSES.

Perception of Light. W. D. WRIGHT (London, 1938, 100 pp., 49 figs.).—A simple account of the relation between visual acuity, and illumination, the known facts of colour vision, dark adaptation, and recent work on the physiology of vision.

Measurement of brightness (visual methods). R. SEWIG (Arch. tech. Mess., 1936, 5, T60-T61, 4 pp.; Chem. Zentr., 1936, ü, 2176).—The physiological properties of the eye on which measurement of brightness depends are reviewed, and visual methods of brightness measurement, with the precautions to be taken to obtain accurate results, are described and discussed. A. J. E. W.

Colour vision. H. E. ROAF (Brit. Med. J., 1938, II, 440—442).—A review, in which methods of testing, and theoretical deductions from observations on colour vision, are discussed. C. A. K.

Intensity discrimination in the human eye. II. Relationship between $\Delta I/I$ and intensity for different parts of the spectrum. S. HECHT, J. C. PESKIN, and M. PATT (J. Gen. Physiol., 1938, 22, 7-19).—A new apparatus is described for measuring visual intensity discrimination over a large range of intensities with white light and with selected parts of the spectrum. With it measurements were made of the intensity (ΔI) which is just perceptible when added for a short time to a portion of a field of intensity I to which the eyes have been adapted. For white and for all colours, $\Delta I/I$ decreases as I increases, reaching an asymptotic min. val. With white light, the relationship between $\Delta I/I$ and I shows two sections, one at low, the other at high, intensities, the two being separated by an abrupt transition. The two sections may be attributed to the functions of the rods and cones, respectively. With extreme red light, the relationship between $\Delta I/I$ and I shows only a highintensity section, corresponding with cone function, whilst with other colours the low-intensity rod section appears and increases in extent as the light used moves towards the violet end of the spectrum. D. M. N.

Application of micro-incineration and histospectrography to study of cataract. R. G. BUSNEL, P. PILLET, and H. TILLE (Bull. Histol. Tech. micr., 1938, 15, 99—109).—The lens of the normal eye and in senile and amber cataract is devoid of Fe, Cu, and Zn; in cases of black cataract and traumatic cataract considerable amounts of Cu are present, and in black cataract Fe is also present. Zn was never found; melanin granules were found in cases of traumatic black cataract only. E. E. H.

Effect of potassium chloride on the normal and denervated iris. L. D. SEAGER (Proc. Soc. Exp. Biol. Med., 1938, 38, 629-630).—KCl solution injected intracardially in frogs or subconjunctivally in rabbits causes constriction of the pupil, which can be dilated by subsequent injection of adrenaline.

V. J. W. Reciprocal action of the constrictor and dilator pupillæ during light adaptation. J. E. GULLBERG, J. M. D. OLMSTED, and I. H. WAGMAN (Proc. Soc. Exp. Biol. Med., 1938, 38, 616—619).— In the dark-adapted eye of the rabbit, the pupil is smallest if the sympathetic alone is cut. It is slightly larger if both sympathetic and 3rd nerve are cut. It is larger still if both nerves are intact, and largest of all when the eye is atropinised. V. J. W.

Obliteration of the filtration angle by negative pressure. F. KUKÁN (Klin. Monatsbl. Augenheilk., 1938, 100, 68—73).—After compression of the human eye, the raised intra-ocular pressure falls at a rate indicating an escape of aqueous humour rather than blood from the eye; if the filtration angle is obliterated by pericorneal suction, this fall does not take place. E. E. P.

Shift of the second lens reflex in accommodation. G. KARPE (Acta ophthal., Kbn., 1938, 16, 125-156).—The eye is viewed through a binocular corneal microscope, and a distant light causes a reflex from the deep surface of the lens. A movable light is adjusted so that its image in the cornea coincides in depth to the lens reflex, this depth being then calc. from the curvature of the cornea and the distance of the movable light from the cornea. E. E. P.

Acetylcholine-esterase in aqueous humour and vitreous body. B. UVNÄS and H. WOLFF (Acta ophthal., Kbn., 1938, 16, 157—169).—Bovine aqueous humour has no acetylcholine-esterase activity, while vitreous humour has an esterase concn. $\frac{1}{8}$ that of human or bovine serum. The activity was determined by the colour reaction between FeCl₃ and liberated acetic acid. E. P.

Absorption of visible light by the refractive media of the human eye. E. LUDVIGH and E. F. McCARTHY (Arch. Ophthal. N.Y., 1938, 20, 37—51).— Four human eyes were obtained at enucleation (for small sarcomata of the choroid) from elderly subjects. A zone of retinal epithelium was removed, and the absorption of light estimated photo-electrically—within $\frac{1}{2}$ hr. of enucleation—both for the eye as a whole, and later for the lenses, which were thus compared with lenses in young subjects. Absorption increased rapidly below 5000 A., the mean absorption for visible light being about 50%. E. E. P.

Osmotic pressure of aqueous humour in epidemic dropsy glaucoma. E. O'G. KIRWAN and S. N. MUKERJEE (Brit. J. Ophthal., 1938, 22, 329— 336).—Cases of epidemic dropsy who showed glaucoma were investigated. The osmotic pressure of serum and of aqueous humour was determined in normals and in these patients by a modification of Hill's v.p. method. The mean osmotic pressure of the serum was decreased by 48 mm., that of the humour by 36 mm., the mean difference being 16 mm. in 11 patients, compared with 28 in 7 normals. E. E. P.

Lens-forming capacity of transplanted iris. A. MONROY (Boll. Soc. ital. Biol. sperim., 1938, 13, 35-36).—Partly successful results with *Discoglossus* are described. F. O. H.

Passage into the eye of lactoflavin introduced into the circulation. G. BIETTI (Boll. Soc. ital. Biol. sperim., 1938, 13, 154—156).—The nature of fluorescent substances in the eye is discussed. Intravenous injection of large doses of lactoflavin into rabbits is followed after 1 hr. by the presence of a green-fluorescing substance in the vitreous and aqueous humours. Injection into the anterior chamber is more effective and the possibility of its use in certain visual deficiencies is discussed. F. O. H.

Mode of action of visual purple. R. GRANIT, T. HOLMBERG, and M. ZEWI (Nature, 1938, 142, 397).— On exposure of the dark-adapted frog's eye to monochromatic light the electrical response may be greatly reduced without much change in the concn. of visual purple. It is suggested that less than 7% of the total pigment is active in mediating max. electrical responses, this fraction being distributed at the surface of the outer limb of the rod. C. A. K.

Dark-adaptation of the eye and vitamin-A storage in young adults. C. SCHUCK and W. O. MILLER (Arch. intern. Med., 1938, 61, 910).—Single biophotometric tests of 94 college freshman women showed poor dark-adaptation in 26%. Administration of vitamin-A (28,000 U.S.P. units daily) led to a return to normal readings. C. A. K.

Absorption spectrum of visual purple. A. M. CHASE and C. HAIG (J. Gen. Physiol., 1938, 21, 411—430).—Comparison of the classical absorption spectrum of visual purple with that of visual purple solutions prepared by various means and measured with a sensitive photo-electric colorimeter indicates that the classical spectrum is that of the light-sensitive group only, while the spectrum of the purest unbleached solution prepared by the authors may be that of the whole mol. In no instance was the spectrum of these solutions as symmetrical as the classical spectrum. The influence of pre-treatment with alum, of extraction with digitalin solution, of $p_{\rm H}$ and temp., and of drying on the absorption spectrum of visual purple is examined. A. E. W.

Electrical response of the grasshopper eye under conditions of light and dark adaptation. T. L. JAHN and F. CRESCITELLI (J. Cell. Comp. Physiol., 1938, 12, 39-55).-Electrodes were placed in contact, with each eye, and connected with an oscillograph. One eye could be illuminated while the other served as the indifferent electrode. The darkadapted eye responded to illumination by a simple wave with a rapid rising limb and a slow falling limb. The light-adapted eye has in addition a slower wave superposed on this descending limb, and, if illumination lasts more than 0.5 sec., a small and brief third wave, called the off-effect, follows the cessation of illumination. These three waves correspond in characteristics with the b, c, and d waves of the eye responses in the cat and frog. V. J. W.

Two cases of spontaneous transformation of tapetum into retina. S. SIGGIA (Boll. Soc. ital. Biol. sperim., 1938, 13, 36—37).—The possibility of transformation of transplanted retinal tapetum, without contact with other organs or epithelial tissue, into retina was demonstrated. F. O. H.

Formation of acid in the retina. G. VON STUDNITZ (Pflüger's Archiv, 1937, 238, 802—813).— The isolated guinea-pig retina, which contains rods but no cones, produces no acid on illumination; that of the cat, which contains rods and cones, produces considerable amounts of acid. In dark-adapted fish retina kept in the dark, acidification increases continuously, probably owing to disturbance of the adaptation equilibrium between the visual substance and its decomp. products. In the isolated retina, resynthesis but not decomp. of visual substance is retarded. Acidification is slowed down by a rise in temp. as a result of an accelerated re-synthesis of visual substance. Under continuous illumination acidification varies rhythmically, and is influenced by the λ of the light, being max. in yellow light. M. A. B. Heredity in ophthalmology. Hereditary eye diseases in Tasmania. J. B. HAMILTON (Brit. J. Ophthal., 1938, 22, 19–43, 83–108, 129–148).— Three pedigrees are given, and a no. quoted, of hereditary ophthalmological conditions. The pedigrees given refer to cataract, congenital cataract, and Leber's disease in a large pedigree, while a large no. of hereditary conditions are considered. E. E. P.

A melanosome-dispersing substance in the blood and urine of patients with retinitis pigmentosa. E. C. DAX (Brit. J. Ophthal., 1938, 22, 345—352).—In 8 cases of retinitis pigmentosa (in mental defectives) the blood and urine contained a substance which caused melanosome dispersal of variable degree in frogs. The cerebrospinal fluid had no such action. E. E. P.

Experiments on the establishment of auditory sensation. R. CHOCHOLLE and P. KUCHARSKI (Compt. rend. Soc. Biol., 1938, 128, 899-901).

P. C. W.

Electrical response of the auditory mechanism in cold-blooded vertebrates. E. D. ADRIAN, K. J. W. CRAIK, and R. S. STURDY (Proc. Roy. Soc., 1938, B, 125, 435-455).-Oscillations of electrical potential which are a close copy of the mechanical effect are produced by mechanical vibrations transmitted to the inner ear of fish and reptiles. They are detectable in the isolated prep. for several hr. after removal from the body, but are abolished by opening the saccule. These inner ear potentials, which are the equiv. of the Wever and Bray effect in the mammal, can be used to determine the effect of middle ear structures in transmitting sound waves. In the tortoise and alligator there is an inner ear response to sounds only slightly above the audibility threshold for the human ear, but at high frequencies the threshold rises steeply. Much louder sounds are needed to produce an effect in the frog and the fish (in the air). A rise of the surrounding temp. enlarges the range of nerve response but has little effect on the inner ear potentials. Results demonstrate the vals. of a const. high temp. for the nervous mechanism of the ear and for any group of receptors concerned in signalling frequencies of vibration.

F. B. P. **Recent advances in neurology of the ear.** E. A. SPIEGEL (Confinia neurol., 1938, 1, 59–84).—A review. [B.] A. S.

Function of the otoliths. Absence of straightening reactions of the body during falling in guinea-pigs deprived of otoliths. A. M. DI GIORGIO (Boll. Soc. ital. Biol. sperim., 1938, 13, 160— 161).—Guinea-pigs, in which the otolithic membrane has been ruptured (by centrifuging) but with the receptors of the maculæ and cristæ remaining intact, lose the ability to fall on their feet when dropped from a height. F. O. H.

Swimming by delabyrinthised guinea-pigs. Significance of the reflex of dorsal flexure of the head by (thermal) excitation of the nasal region. A. M. DI GIORGIO (Boll. Soc. ital. Biol. sperim., 1938, 13, 162-164; cf. A., 1938, III, 186).—The swimming movements of delabyrinthised guinea-pigs are principally governed by the reflexes of the dorsal flexure of the head, caused by contact of the nasal region with water. These movements, which compensate for the labyrinthine reflex actions, are described and their nervous paths discussed.

F. O. H.

Repeated stimulation of the vestibular apparatus in normal man. G. BOURGUIGNON and J. LEFEBVRE (Compt. rend. Soc. Biol., 1938, 128, 627-629).—Vestibular chronaxie is the same as that of the peripheral and not of the central system. The method involving repeated stimulation is unreliable.

J. H. T.

Function of the ampullæ of Lorenzini : effect of temperature on sensory rhythms. A. SAND (Proc. Roy. Soc., 1938, **B**, 125, 524-553).—Although the histological structure of the ampullæ of Lorenzini is still disputed, there is strong evidence that they are not neuromasts. The present oscillographic investigation shows that their functional activity is entirely distinct from that of lateral-line organs. They possess an autonomous rhythm. Their sensory sensitivity is entirely confined to thermal stimulation. They respond to cooling by an acceleration, to warming by an inhibition, of the rhythm of impulse discharge. After a response to temp. change, adaptation occurs and the initial regular slow rhythm of discharge is re-established. Similar paradoxical behaviour with respect to temp. changes is shown by lateral-line and stretch receptors of Raja, but on a different scale, larger stimuli being necessary to produce an effect, and max. responses being small. In ampullæ of Lorenzini the mechanism is apparently specialised and sensitised for the performance of a sp. thermosensory function. Cutaneous thermo-sensory endings have not been found in rays, and it is concluded that the ampullæ are the only temp. receptors of elasmobranch fishes. A hypothesis involving the assumption of underlying reactions with different time factors of kinetic equilibrium is suggested to account for the paradoxical temp. effect. F. B. P.

External canaliculi of the lateral line of fishes. D. K. TRETIAKOV (Compt. rend. Acad. Sci. U.R.S.S., 1938, 18, 483–485).—There is considerable variety in the arrangement of the external canaliculi of the lateral line in different species of fish. A. S.

Seismosensory canals in the flying fish. D. K. TRETIAKOV (Compt. rend. Acad. Sci. U.R.S.S., 1938, 18, 487–490).—A detailed morphological description is given of the seismosensory canals in the flying fish, the pike, and the garfish studied after injection of coloured Indian ink. A. S.

Measuring instrument for judging power of smell. M. WAGENAAR (Chem. Weekblad, 1938, 35, 618—621).—The instrument consists of a tube graduated in 10 divisions from the wide mouth, which is applied to the nose, and carries an adjustable carrier, for small cubes of pumice saturated with the test substances, which is moved along the tube from the far end towards the nose until the smell is detected; the no. of the graduation is a measure of the smell power. Tests carried out on a no. of persons of both sexes are discussed. S. C.

(h) DUCTLESS GLANDS, EXCLUDING GONADS.

Practical hormone therapy. S. MALLOW (Münch. med. Wschr., 1938, 85, 1313-1314).—A review.

A. S.

Demonstration of hormonal stimulation by the colchicine method. P. BASTENIE and S. ZYLBERSZAE (Arch. int. Méd. exp., 1938, 13, 183— 203).—The stimulating effect of anterior pituitary extracts on the thyroid and uterus (guinea-pig), of testosterone on the prostate, seminal vesicles, and epididymis (castrated male rat), and of cestrone and progesterone on the uterus of the ovariectomised or immature female rat, can be shown by the large no. of mitoses in the stimulated tissue following colchicine injection. The no. of mitoses in the parathyroid of the rat following colchicine injection is increased by injection of cestrone and progesterone and decreased by castration. P. C. W.

Action of homologous or heterologous pupation hormones in extracts. E. PLAGGE and E. BECKER (Naturwiss., 1938, 26, 430).—The lymph of larvæ, about to pupate, or suitable extracts made from acetone-fixed tissue when injected into the isolated posterior end of blow-fly (*Calliphora erythrocephala*) larvæ induce pupation in the latter, although untreated controls fail to metamorphose. The hormone responsible is heat-stable and dialysable and is not species-sp. W. O. K.

Abderhalden's reaction in endocrine diseases. G. LUCANDRI (Boll. Soc. ital. Biol. sperim., 1938, 13, 3-4).—With diseases of endocrine origin, one or more of the endocrine glands gave, in most of the cases examined, a faintly or definitely positive Abderhalden's reaction (defence enzymes); with normal subjects, the reaction was always negative.

F. O. H.

Abderhalden's reaction in experimental animals treated with excess of, or deficient in, vitamin-D. G. LUCANDRI (Boll. Soc. ital. Biol. sperim., 1938, 13, 5).—Application of the reaction to the urine of rabbits fed with excessive amounts of -D gave positive responses for the thymus, pancreas, and pituitary glands (in descending order of response); thyroid and parathyroid were negative. The reaction was greatly reduced in thymectomised rabbits. Positive responses were given by the pituitary and thymus glands of rachitic rats. F. O. H.

Endocrine organs, autonomic nervous system, and diurnal variations. (Dtsch. med. Wschr., 1938, 64, 989–990).—A review. A. S.

A nervous structure in the pineal body of the monkey. P. M. LEVIN (J. comp. Neurol., 1938, 68, 405-409).-11 pineal bodies of monkeys were examined in serial section. They contained a structure composed of ganglion cells and fine myelinated fibres which was connected to the posterior and habenular commissures. J. D.

Isolation and biological assay of an active fraction of the pineal gland. O. FISCHER (Arch. int. Pharmacodyn., 1938, 59, 340—344).—Extracts of pineal gland may potentiate or depress the gonadotropic action of anterior pituitary extracts.

D. T. B.

Intraparenchymatous myeloid foci formation during the regeneration of thymus grafts previously treated with X-rays. C. GRÉGOIRE and P. NOLF (Comp. rend. Soc. Biol., 1938, 127, 1481— 1484).—Thymic auto-grafts into the subcutaneous tissue of young adult guinea-pigs after previous irradiation with X-rays showed the presence of islands of myelocytes among the lymphoid cells. J. H. T.

Hyperplasia of the thymus in endocrine disturbances. R. WANSER (Virchow's Arch., 1938, 301, 657-667).—A case of Graves' disease in a girl of 17 is described. Death occurred after thyroidectomy following 7 days' I treatment. There was a hyperplasia (120 g.) of the thymus, particularly of the cortex, with an increase in the no. of Hassal's bodies, a hyperactive thyroid, a decrease in the basophil cells and an increase in the eosinophil cells of the pituitary, and cystic degeneration of the infantile ovaries. The changes in the pituitary and the ovaries are regarded as the cause of the thymus hyperplasia. H. W. K.

Relationship between tonsils and thyroid. G. BENETATO and C. OPRISIU (Dtsch. med. Wschr., 1938, 64, 1181—1183).—Injections of protein-free NaOH extracts of pig's or human tonsils into hyperthyroid rats lower the basal metabolic rate by approx. 40%. A. S.

Exophthalmos in Graves' disease. L. P. DANIELS (Acta med. scand., 1938, 95, 539—551).— Two cases are described in which hyperthyroidism turned to hypothyroidism with exophthalmos following operation. Injection of ephedrine into animals produced exophthalmos with dilatation of the pupils, which was annulled by thyroxine. Exophthalmos is produced via the hypophysis cerebri by stimulation of centres in the diencephalon. C. A. A.

Experimental exophthalmos in rabbits. J. H. SMITH (Arch. int. Pharmacodyn, 1938, 59, 217—226).— Extracts of normal calf thyroid and of human goitres cause exophthalmos in rabbits, with dilatation of the vessels in the fundus oculi and increased blood pressure in the carotid and the central retinal artery.

D. T. B.

Serum-cholesterol, gastric secretion, and carbohydrate metabolism in toxic goitre. J. S. MCELROY, E. B. SCHUMAN, and J. O. RITCHEY (Ann. int. Med., 1938, 12, 106—114).—In hyperthyroidism there is no direct relation between the degree of toxicity and the depression of serum-cholesterol level or the frequency of gastric anacidity. After operation the glucose-tolerance curve was nearer the normal, and the frequency of glycosuria was diminished. C. A. K.

Changes in skeletal muscle in Graves' disease. H. LIECHTI (Endokrinol., 1938, 20, 81-85).-Eppinger's findings of capillary thickening and peri-capillary œdema in skeletal muscles of patients with Graves' disease were not confirmed. A. S.

Thyroid glands from Turkish coastal regions. O. SAKA (Virchow's Arch., 1938, 302, 228—235).— The av. wt. of thyroids from the coastal regions corresponded with that found in other goitre-free regions (20—25 g.). Higher vals. were found in cases from high altitudes. The diameters of the follicles showed variations with age similar to those found elsewhere; there was a max. between 25 and 35 years and another at about 60. H. W. K.

Secretion of gastric juice and red blood cell count in hyperthyroidism. G. KLEINER and F. RÉNYI-VAMOS (Dtsch. med. Wschr., 1938, 64, 1006-1007). A. S.

Administration of thyroxine and experimental beriberi. V. CAPRARO (Atti R. Accad. Lincei, 1938, [vi], 27, 414).—Intramuscular injection of thyroxine (1 mg. daily) into pigeons has no effect on the val. of Q_b (A., 1934, 460). F. O. H.

Rôle of the central nervous system and the thyroid in temperature regulation. B. VON ISSEKUTZ, jun. (Pfluger's Archiv, 1937, 238, 787— 801).—Removal of the thyroid in dogs depresses the basal metabolism and prevents proper maintenance of the body temp. Thyroxine renders the animal normal again. M. A. B.

Thyroid-like activity of synthetic iodoproteins. I. ABELIN and A. NEFTEL (Arch. exp. Path. Pharm., 1938, 189, 473—479).—Physiologically active substances can only be obtained by treating naturallyoccurring proteins with I. Denatured proteins or degradation products yield iodoproteins that are devoid of physiological activity. H. BL.

Influence of heat stimulation of the skin on thyroid activity. B. HASAMA (Arch. int. Pharmacodyn., 1938, 59, 212—216).—"Moxibustion" or burning of little masses of dried weeds on certain parts of the skin is a popular remedy in Japan for different affections. The variations of electrical potential of the exposed thyroid when the stimulus is applied to the skin near the gland in rabbits point to increased output of the hormone. D. T. B.

Rôle of thyroid hormone in the feathering of hens and pigeons. A. A. VOITKEVITSCH (Compt. rend. Acad. Sci. U.R.S.S., 1938, 19, 553—556).— Histological examination of the thyroid gland shows that a parallelism exists between its development and feather formation in pigeons but not in hens.

Behaviour of the lipin-protein complex (masking and unmasking of fats). H. BULLIARD and I. GRUNDLAND (Compt. rend., 1938, 206, 1998— 1999).—Frozen sections of guinea-pig adrenals when stained with Sudan III and hæmatoxylin show considerable amounts of fat in the cortex. After treatment with 0.0019N-H₂SO₄ for 12 hr., there is much less fat. Rabbit adrenals give opposite results. J. L. D.

Dietary management of albino rats before and after thyroparathyroidectomy. M. C. PATRAS, E. A. GALAPEAUX, and R. D. TEMPLETON (Amer. J. Physiol., 1938, 122, 409—417).—Ca(OH)₂ is superior to CaCl₂ as an inorg. dietary salt for the prevention of parathyroid tetany in the albino rat during the first 48 hr. after thyroparathyroidectomy. The condition of the operated rats receiving CaCl₂ and Ca(OH)₂ as the source of inorg, salts is greatly improved by the injection of NH₄Cl; the injection of the latter into fasting rats following operation decreases

mortality and morbidity. Both these conditions are increased when young animals are deprived of adequate salt intake for only a few days prior to the operation, but the older is the rat the more resistant it is to a period of pre-operative salt deficiency.

M. W. G.

Protein content of the organs and tissues of the body after administration of thyroxine and dinitrophenol and after thyroidectomy. T. Addis, D. KARNOFSKY, W. LEW, and L. J. Poo (J. Biol. Chem., 1938, 124, 33-41).-The proportion of total body-protein found in the kidney and heart of normal rats is increased on administering thyroxine and decreased by thyroidectomy. Dinitrophenol has no effect. In fasting rats, thyroidectomy has a smaller and thyroxine a greater action; dinitrophenol again had no effect. The increase with thyroxine is explained as work hypertrophy. Dinitrophenol increases the metabolic rate, and causes a lowering of the blood-O... The proportion of total protein occurring in liver of fasting rats increases after thyroxine A. T. administration.

Metabolism in normal and thyroidectomised rats as influenced by thyroxine and thyroid globulin feeding. A. E. MEYER and A. WERTZ (Proc. Soc. Exp. Biol. Med., 1938, **38**, 847—849).— Thyroidectomised rats are about 30 times as sensitive to thyroid substances as normal rats, the most suitable range for comparison being 20—35% increase of O_2 consumption. Thyroglobulin containing 0.19— 0.25 µg. of thyroxine is as potent as 0.75 µg. of racemic thyroxine. V. J. W.

Hyperparathyroidism and Paget's disease. A. B. GUTMAN and W. B. PARSONS (Ann. int. Med., 1938, 12, 13—31).—3 cases of hyperparathyroidism associated with Paget's disease are described.

C. A. K. Hyperparathyroidism with rapid recalcification of bone following removal of an adenoma. T. P. SPRUNT (Ann. int. Med., 1938, **12**, 121–127).— A case in a woman aged 54 is described. C. A. K.

Effect of parathyroid extract on volume of parathyroid glands in normal and partially nephrectomised rats. A. M. PAPPENHEIMER and J. W. JOHNSON, jun. (Proc. Soc. Exp. Biol. Med., 1938, 38, 777—779).—Injection of 200—2150 Hansen units of Lilly parathyroid extract over 3—51 days has no effect on the size of the parathyroids in either normal or partly nephrectomised rats. V. J. W.

Pathogenesis of the tetany of parathyroidectomy. I. SPADOLINI (Boll. Soc. ital. Biol. sperim., 1938, 13, 18—20).—Parathyroid tetany is accompanied by the presence of acetylcholine in the venous blood. F. O. H.

Changes in nucleus of chromaffin cells. T. PAWLIKOWSKI (Bull. Histol. Tech. micr., 1938, 15, 149—164).—Fixation of adrenal glands (dog) in Helly-Maximow fluid was followed by treatment with $K_2Cr_2O_7$: paraffin sections were stained by Fehæmatoxylin, and by the methods of Altmann and Kull, of Dominici, of Böhmer, and of Henle and Kurkiewicz. Small basophil granules, both intranuclear and perinuclear, are demonstrated by all the

E. M. W.
methods in the adrenogenic cells that have already excreted their chromaffin secretion. This is supported by observations on glands after stimulation of the splanchnic nerve; the intranuclear granules migrate during prolonged secretion to the cytoplasm. The granules are regarded as indicating nuclear activity, representing either an excretory product additional to that of chromaffin or a renovation preparatory to a new phase of secretion.

E. E. H.

Response to cold following double adrenalectomy. S. M. HORVATH (Endocrinol., 1938, 23, 223-227).-Heat output of rats was measured at 29° before and after exposure for 1-2 hr. to a temp. of 4°. In normal rats there was an increase of 20% and in adrenalectomised rats a decrease of 10.6%. When they were kept at 4° heat production was increased by 79% in the adrenalectomised and by 176% in the normal animals. V. J. W.

Post-adrenalectomy diuresis. Effects of cortical extracts, salts, and estrone. R. GAUNT, H. E. POTTS, and E. LOOMIS (Endocrinol., 1938, 23, 216-222).-Rats which died within 2 weeks showed very slight diuresis. If they survived 3 weeks or longer a marked diuresis developed which persisted until death; this diuresis was not much affected by maintenance doses of cortical extract. 1% NaCl in the drinking water maintained life, and had about the same diuretic action as in the intact animal. 0.1% KCl in the water was highly toxic, and caused a much more profuse diuresis than in the intact animal. 100 units daily of theelin was toxic and caused profuse diuresis. V. J. W.

Metabolism and body temperature of normal and adrenalectomised rats. G. C. RING (Amer. J. Physiol., 1938, 122, 435-445).-Normal rats show a crit. thermal increment or µ val. of Arrhenius for O2 consumption, of 16,100. Adrenalectomised rats while their body temp. is rising after exposure to cold show the same μ val. During falling body temp. the μ val. is higher. Adrenaline stimulates the metabolism of adrenalectomised animals exposed to cold; partly adrenalectomised rats maintain body temp. in the cold and have a raised basal metabolism for some time after return to a warm en-M. W. G. vironment.

Carbohydrate and electrolyte changes in adrenal insufficiency in the dog. S. W. BRITTON, H. SILVETTE and R. KLINE (Amer. J. Physiol., 1938, 122, 446-454).-Serious glucose and glycogen losses occur in adrenal insufficiency in dogs. Blood-sugar levels were reduced 40%, liver-glycogen 85%, heart-glycogen 75%, and muscle-glycogen 45%. There were 15% decreases in both serum-Na and -Cl', 100% increase in serum-K, and 500% increase in blood-urea. Cortico-adrenal extract restored normal blood-sugar levels and markedly reduced the high blood-urea vals. Large amounts of NaCl caused the blood-sugar levels to decline while the serum-Na or blood-Cl' rose to normal. M. W. G.

Relation of the adrenal cortex to carbohydrate metabolism. A. GROLLMAN (Amer. J. Physiol., 1938, 122, 460-471).-Intraperitoneal injections of

adrenal cortical extracts failed to elicit hyperglycæmia in normal fasted rats or in normal dogs and rats with access to food and given relatively large doses of hormone. Oral administration of the hormone to adrenalectomised and adrenalectomiseddepancreatised rats maintained normal carbohydrate levels. No ketogenic effects were induced by highly purified extracts in fasted rats. Carbohydrate reserves of hypophysectomised rats fasted for 10 hr. and injected with the hormone differ little from those of the untreated controls. The deficiencies in carbohydrate levels observed in adrenal insufficiency are attributed to secondarily and pituitary. changes in the liver, muscles, and pituitary. M. W. G. are attributed to secondarily induced pathological

Blood-sugar and -chloride changes in adrenalectomised rats during adaptation to various stimuli. H. SELYE (Proc. Soc. Exp. Biol. Med., 1938, 38, 728-732).-When rats are subjected to a damaging stimulus they manifest an "alarm reaction" which is accompanied by (1) a fall in bloodsugar and -Cl', (2) a return to the normal levels, (3) a 2nd and lasting fall. In the adrenalectomised rat this 2nd fall begins on the 3rd day after the damaging stimulus, but in the normal rat the course of these V. J. W. changes is much more prolonged.

Weights of adrenal glands in rats fed different amounts of sodium and potassium. D. J. INGLE and E. C. KENDALL (Amer. J. Physiol., 1938, 122, 585–588).—One adrenal was removed from male Wistar rats on a basal diet. Four diets were used containing, respectively, 0.2% Na + 0.06% K, 1% K + 0.2% Na, 0.06% K + 0.6% Na, and 1% K + 0.6% Na. No significant differences in the wt. of the remaining adrenal resulted from the variations in dietary Na and K. If, however, the animals were given thyroxine subcutaneously (0.2 mg. daily) and made to work in revolving cages, the wts. of the adrenals were greatly increased. M. W. G.

Treatment of marasmus by extract of adrenal cortex. W. A. HISLOP (Lancet, 1938, 235, 308-310) .- Of 14 children with marasmus, 11 were successfully treated by injections of eucortone (extract of adrenal cortex). C. A. K.

Influence of adrenal cortex extract on compensatory hypertrophy of the adrenal cortex. E. M. MACKAY and L. L. MACKAY (Endocrinol., 1938, 23, 237-240).-Administration of cortical extract prevents the hypertrophy of cortex which usually takes place in one gland when the other is removed. V. J. W.

Fission and fractionation of "corticosterone." -See A., 1938, II, 415.

Use of synthetic deoxycorticosterone acetate in Addison's disease. S. L. SIMPSON (Lancet, 1938, 235, 557-558).-Deoxycorticosterone acetate (synthesised from stigmasterol) was successfully used in 2 cases of Addison's disease. 6 mg. of the substance was equiv. to 5-20 c.c. of cortin. C. A. K.

Chemistry of the adrenal cortical hormones : developments during the last four years. K. MIESCHER (Angew. Chem., 1938, 51, 551-557).-+ A review. denoting to term 500-0 to notice in 1-1008

Adrenal cortical hormone (cortin) in blood and urine of patients with Cushing's disease. E. ANDERSON and W. HAYMAKER (Proc. Soc. Exp. Biol. Med., 1938, 38, 610-613).-Extracts were made of the blood and urine by the same methods that are used to prepare cortin from the adrenal. These extracts prolonged the life of adrenalectomised rats as well as cortin. Controls from normal subjects were ineffective. V. J. W.

Effect of corticosterone and related compounds on renal excretion of electrolytes. G. W. THORN, L. L. ENGEL, and H. EISENBERG (J. Exp. Med., 1938, 68, 161-172).—Adrenal cortical extracts and cryst. derivatives, which effectively maintain health in adrenalectomised dogs, produce Na and Cl retention if injected into man or dogs. K diuresis also occurs, possibly in part due to adrenine. A. C. F.

Prevention of adrenaline lung œdema by the alarm reaction. H. SELGE (Amer. J. Physiol., 1938, 122, 347-351).-The "alarm reaction" can be produced by treatment with adrenaline or formalin, exposure to cold, forced exercise, or surgical trauma. This reaction increases the resistance of the rat to the subsequent intravenous injection of a lethal dose of adrenaline. Death following the intravenous injection of adrenaline is usually caused by lung ædema. An alarm reaction produced by forced exercise prevented the occurrence of acute pulmonary ædema which normally occurs in bilaterally nephrectomised rats given intravenous injections of 15 c.c. of 0.9% solution of NaCl. M. W. G.

Adrenaline secretion in the dog with a reduced temperature. A. TOURNADE, N. CHEVILLOT, and G. CHARDON (Compt. rend. Soc. Biol., 1938, 128, 563-565).-Cold stimulates adrenaline secretion and increases the excitability of the neuro-chromaffin system to acetylcholine. J. H. T.

Direct perfusion into the blood stream of adrenaline by dialysis. H. SCHEINER (Compt. rend. Soc. Biol., 1938, 128, 624-626).-Adrenaline dialysed directly into either the carotid or femoral arteries produces a rise of blood pressure which is transitory despite the continued perfusion.

J. H. T.

Reversal of adrenaline appœa by ergotamine in the rabbit. R. HAZARD, J. CHEYMOL, and A. QUINQUAUD (Compt. rend. Soc. Biol., 1938, 128, 631-634).-Ergotamine tartrate (1.5-3 mg. per kg.) in rabbits prevents adrenaline apnœa and causes a hyperpnœa following adrenaline in anæsthetised and unanæsthetised animals (as in dogs). J. H. T

Action of adrenaline on the Phillip-Vulpian syndrome. A. TOURNADE, M. CHEVILLOT, and G. CHARDON (Compt. rend. Soc. Biol., 1938, 127, 1397-1399).-Injection of adrenaline into the denervated part of the dog's tongue causes a pseudo-motor reaction combined with inhibition of the contracture resulting from excitation or local intra-arterial injection of acetylcholine. J. H. T.

Secondary vasodilator action of adrenaline. RAYMOND-HAMET (Compt. rend., 1938, 207, 304-306).-Injection of 0.005 mg. of adrenaline into a

branch of the femoral artery of the dog at first reduces the blood flow through the femoral vein to $\frac{1}{3}$ and then J. L. D. increases it to twice the initial val.

Inactivation of adrenaline by mammalian liver in vitro. W. A. BAIN and S. DICKINSON (J. Physiol., 1938, 93, 54-55r).-In the guinea-pig, rat, and man it is possible to establish a normal adrenal inactivation curve" of liver to which the curve for any given individual will approximate. J. A. C.

Amphomimetic action of adrenaline. D. DANIELOPOLU and J. MARCON (Compt. rend. Soc. Biol., 1938, 128, 384-386) .- Very small doses of adrenaline cause a fall in blood pressure in the cat, larger doses a rise. Atropine reverses the first effect and augments the second. A sympathetic inhibitor augments the hypotensive action. Thus adrenaline has both sympathomimetic and parasympathetomimetic action and can be termed amphomimetic.

Effectiveness of intravenous hypertonic sucrose and adrenaline in the treatment of status asthmaticus. E. L. KEENEY (J. Allergy, 1938, 9, 497-502).-In status asthmaticus 4 out of 6 patients experienced immediate relief after intravenous injection of 100 c.c. of 50% sucrose with 0.5 c.c. of C. J. C. B. 1/1000 adrenaline.

Controllable differential stain for the hypophysis by adaptation of the Mallory triple stain. T. MAXWELL (Stain. Tech., 1938, 13, 93-96).-Fixation for 6 hr. in Zenker neutral formol is followed by treatment with 30% alcohol + a few drops of saturated I in aq. KI overnight. The material is then dehydrated, cleared in cedar-wood oil, and infiltrated with a paraffin mixture. Sections $3-5 \mu$. are taken to distilled water, stained in 1% acid fuchsin for 30 min., rinsed, and differentiated in dil. aq. NH3. After rinsing in 0.1% HCl and then distilled water, sections are stained for 60 min. in a solution of aniline-blue, orange G, and phosphomolybdic acid (1:2:1) in 100 c.c. of water. After washing in distilled water, sections are differentiated in 95% alcohol, dehydrated, cleared in a mixture of cedarwood oil, thyme oil, abs. alcohol, and xylene (30:40:15:15), then in xylene, and mounted. E. E. H.

Differentiation of the secretory cells of the pars nervosa of the hypophysis cerebri. M. R. LEWIS and C. H. MILLER (Stain. Tech., 1938, 13, 111-114).-Material is fixed in 3% K₂Cr₂O₇ solution + half-saturated HgCl₂ solution (2:1) for 24 hr. Sections are prepared by the dioxan technique, and stained by Mallory's connective tissue stain, 30 min. in acid fuchsin, and 1-24 hr. in aniline-blue mixture. By this method two types of granular cells are differentiated in the pars nervosa, as well as the granular cells of the pars intermedia and pars anterior.

E. E. H. Pars intermedia of the human pituitary. G. HABERMANN (Beitr. pathol. Anat., 1938, 100, 560-581).-The foetal pituitary has between the anterior and posterior lobes a cavity lined anteriorly by a single layer and posteriorly by several layers of epithelial cells. In early infancy the cavity is trans-

P. C. W.

formed into a narrow fissure with multiple processes reaching into the substance of the anterior lobe and between the capsule and the anterior and posterior lobes. In later years, the cleft is subdivided into cysts filled with colloid. With increasing age, the cysts become smaller and more completely separated from each other. An intermediate lobe consisting of several layers of basophil cells posteriorly to the cavity is found in the focus and can still be recognised in infancy. In adults undifferentiated basophil cells lying between the cysts and the posterior lobe are considered to be residues of the intermediate lobe.

H. W. K.

Suppression of pars intermedia of pituitary body in *Hyla regilla* by operations on the gastrula. A. B. BURCH (Proc. Soc. Exp. Biol. Med., 1938, 38, 608—610).—If a panel of tissue is excised from the presumptive medullary region of the gastrula, and reimplanted back to front, the embryo develops into the "albino" form, shown by tadpoles which have been hypophysectomised, and due to absence of the pars intermedia. Similarly, if the pars buccalis anlage is excised and reimplanted away from the nervous elements, no development of the pars intermedia takes place. V. J. W.

Appearance of vacuolated cells in hypophysis of *Triturus torosus* following bilateral thyroidectomy. C. GROBSTEIN (Proc. Soc. Exp. Biol. Med., 1938, 38, 801-803).—Vacuoles appear in the cytoplasm of the basophilic cells of the anterior pituitary about 3 weeks after the operation. In a few cells degenerative changes can also be seen in the nucleus. V. J. W.

Drainage of hypophysis towards the hypothalamus. G. T. POPA (Presse méd., 1938, 46, 663-666).—The results of compression and section of the pituitary stalk, application of KCl, and microscopic evidence suggest the drainage of hypophyseal secretions towards the brain. A dense network of neuroglia surrounds each of the efferent vessels and may modify the secretions passing through.

G. SCH.

Histologic effects induced in the anterior pituitary of the rat by prolonged injection of cestrin with particular reference to the production of pituitary adenomata. J. M. WOLFE and A. W. WRIGHT (Endocrinol., 1938, 23, 200—210).—Rats received daily injections of 200 rat units of progynon-B for varying periods. Up to 80 days a generalised hypertrophy of the anterior pituitary was caused, but in those treated for 180—425 days the result was either a general hypertrophy or the appearance of adenomata. In the hypertrophied glands the chromophobe cells were increased in size and no. and the chromophil cells diminished. The adenomatous cells were all chromophobe. V. J. W.

Endogenous nitrogen and basal energy metabolism relationships in hypophysectomised rats. U. S. ASHWORTH and G. R. COWGILL (Amer. J. Physiol., 1938, 122, 373—378).—Male rats were fed a stock ration of calf meal and dried yeast *ad lib*. when not given diets low in or free from protein. Hypophysectomies were made when the rats weighed 100 g. Hypophysectomy lowers the basal metabolic rate to about 60% of normal but has no effect on the endogenous N excretion. M. W. G.

Calorigenic action of amino-acids in the hypophysectomised animal. H. M. EVANS, J. M. LUCK, R. I. PEUCHARZ, and H. C. STONER (Amer. J. Physiol., 1938, 122, 533—541):—After oral ingestion of glycine (1·33 and 2·66 mM.) an increase in heat production is obtained both in the normal and hypophysectomised rat; administered intraperitoneally (20 mM. per kg. body-wt. and 33·35 mM.) there is no increase in either type of rats. The metabolic rate of the hypophysectomised rat is 40 to 45% below that of the normal animal and can be increased promptly by moderate injections of NaCl. M. W. G.

Hypophysectomy in the mouse. F. THOMAS (Endocrinol., 1938, 23, 99—102).—A method is described in detail for use in mice of less than 20 g. in wt. The occipito-sphenoidal synchondrosis is separated with hooks and an oblong area of skullbase is removed so that the hypophysis may be removed by a suction tube. V. J. W.

Activity of blood serum-amylase in hypophysectomised dogs. O. COPE, A. HAGSTRÖMER, and H. BLATT (Amer. J. Physiol., 1938, 122, 428— 434).-Serum-amylase activity in dogs was measured by a modification of the Scharles and Salter method. Within the first 48 hr. postoperatively each animal was given 1-2 c.c. of pituitrin subcutaneously to diminish initial polydipsia. Foods, fasting, 1.5-4.5 g. of glucose per kg., or 2.6 units (per kg.) of intravenous insulin do not alter the serum-amylase activity in the normal dog. Following hypophysectomy serum-amylase activity is doubled ; this is sustained for 72 days and is not significantly altered by food, glucose, or spontaneous hypoglycæmia. In the normal and hypophysectomised dog the level of activity either rises or is maintained following 0.1 mg. of M. W. G. subcutaneous adrenaline per kg.

Hypophysectomy and water exchange in frogs. D. GRANAAT (Arch. Néerland. Physiol., 1938, 23, 97— 106).—After hypophysectomy there is first a fall of wt., then a retention of water in the tissues, though usually in frogs there is increase of wt. after operations. When tissue fluid increases the absorption of water by the skin decreases. After hypophysectomy urine excretion is about $\frac{1}{3}$ normal. If both the hypophysis and kidneys are removed the frogs remain responsive for 10 days, increasing in wt. and absorbing practically no water by the skin. Probably some other route of excretion must be available, possibly by the sublingual lymph spaces. C. E. B.

Work performance of hypophysectomised rats treated with cortin. D. J. INGLE (Amer. J. Physiol., 1938, 122, 302—305).—The work output of the faradically stimulated gastrocnemius was compared in hypophysectomised rats treated or untreated with cortin. The work output decreased in a few hr. following operation. The performance of the treated animals during periods of 4 and 7 days between the operation and the work tests was superior to that of untreated animals though very small compared with the performance of normal animals. M. W. G. Hypophysis and blood picture. A. QUERIDO and G. A. OVERBEEK (Arch. int. Pharmacodyn., 1938, 59, 370—381).—Extirpation of gonads, spleen, thyroid, and adrenals in rats causes no reticulopænia like that due to hypophysectomy. This latter is prevented by injection of crude acetone extracts of ox pituitary, and the effect is due to a hormone other than thyrotrope, gonadotrope, or growth principle. D. T. B.

Pituitary weight of rats inoculated with a transmissible tumour. J. M. TWORT and M. LASNITZKI (Endocrinol., 1938, 23, 87-90).—In rats inoculated with Jensen rat sarcoma, and killed 13—24 days later, the ratio of pituitary wt. to brain wt. was about 17% less where the inoculation was successful than where it had failed, the difference being somewhat more marked in the females.

Melanophores in Urodeles following removal of the pituitary. A. KLEINSCHMIDT (Verh. anat. Ges., 1938, 85, Suppl., 262—266).—Removal of the pituitary results in rapid loss of skin pigmentation and contraction of the melanophores; such contraction is not seen in the peritoneum. Two years after operation *A. tigrinum* is still almost clear white with the exception of the gills, which are dark. This is due to the persistence of melanophores in the region of blood vessels which are visible in the transparent and highly vascularised gill branches. R. J. O'C.

Hypophysis and tail growth in the rat. J. FREUD and L. H. LEVIE (Arch. int. Pharmacodyn., 1938, 59, 232—242).—Tail length, caudal vertebral development, and age are closely related in the rat. After hypophysectomy the tail growth and vertebral development cease. Radiography shows defective epiphyseal plates. Growth and development can be restored by growth hormone, the test proving a ready means of assay of an extract within 7 days. The results point to the existence of a special bone and cartilage factor in the anterior pituitary.

D. T. B.

Treatment of Simmonds' disease. G. STRAUBE (Klin. Woch., 1938, 17, 1016—1017).—2 female patients with Simmonds' cachexia did not improve on anterior pituitary treatment. Addition of a posterior pituitary prep. arrested the rapid loss of wt. Adrenal cortex together with whole pituitary extracts led to increase of wt. and improvement of the mental depression. E. M. J.

Effects of splenectomy on response to pituitary material and the question of the antihormone. A. S. GORDON and H. A. CHARIPPER (Proc. Soc. Exp. Biol. Med., 1938, 38, 773—777).—Removal of the spleen in the rat does not affect the ovarian and uterine response to injections of rat pituitary, but it increases the response to injections of pituitary from other species. V. J. W.

Effect of extract of anterior pituitary on the life-span of castrate-adrenalectomised cats. W. W. SWINGLE, W. M. PARKINS, A. R. TAYLOR, H. W. HAYS, and J. A. MORRELL (Proc. Soc. Exp. Biol. Med., 1938, 38, 876-879).—Daily administration of 1 c.c. per kg. of alkaline extract of cattle

pituitary to 17 such cats appeared to prolong their survival in 11 cases and failed in 6. V. J. W.

Effect of anterior pituitary growth-hormone on protein metabolism. O. H. GAEBLER and W. H. PRICE (J. Biol. Chem., 1937, 121, 497-506).—In female dogs on a const. diet, injections of anterior pituitary extract caused a temporary rise in S and N excretion during the first 24 hr., followed by a marked fall for several days, and a subsequent rise above control level. The N : S ratio rose sharply in each experimental period. There is a temporary gain in body-wt. Inorg. P excretion fell markedly after injection and subsequently rose above control level. These changes are similar to those observed in conditions when protein synthesis occurs. Excretion of salts falls after injection despite diuresis. J. L. C.

Gonadotropic effects of prolan-A and -B on immature rat's testes. C. MAXIA (Boll. Soc. ital. Biol. sperim., 1938, 13, 31—32).—When injected into immature rats, prolan-B produces hypertrophy of the interstitial, but not seminal, tissue of the testes whilst with -A, the effect on the interstitial tissue is slight but that on the seminal vesicles is marked. The action of -A resembles that of smaller doses of -B and the existence of only one anterior pituitary hormone is thus indicated. F. O. H.

Effect of gonadotropic hormone on serum anaphylaxis. L. CRUVEILHIER, J. HAGUENAU, G. THIEULIN, and C. VIALA (Compt. rend. Soc. Biol., 1938, **128**, 282–283).—Of 9 guinea-pigs injected with ox serum intracerebrally 3 weeks after a sensitising subcutaneous injection, 5 died and 4 suffered from shock. Of 9 guinea-pigs similarly treated but given 5 rabbit units of gonadotropic hormone in 5 doses between the two serum injections only one died and none suffered shock. P. C. W.

Effect of gonadotropic hormones on the persisting corpora lutea in hypophysectomised rats. R. O. GREEF (Endocrinol., 1938, 23, 154–163).—Adult rats were treated before and after hypophysectomy with anterior pituitary extract to produce a large no. of corpora lutea. Involution of these-was caused by 12 days' treatment with luteinising hormone or by 4 days' treatment with combined luteinising and follicle-stimulating hormones. They were not affected by the follicle-stimulating hormone alone or by œstrogen or pregnancy urine. V. J. W.

Gonadotropic action of normal male urine extract on the dog. J. H. LEATHEM and J. A. MORRELL (Endocrinol., 1938, 23, 164—170).—Extract of normal male urine caused vulval swelling, hæmorrhagic discharge, and æstrus in 11 out of 12 female dogs. It had a powerful follicle-stimulating action and caused resorption of embryos in pregnancy. V. J. W.

Gross and microscopic effects of folliclestimulating hormone and anterior pituitary sex hormone on the rat testis. H. S. RUBEN-STEIN and H. M. RADMAN (Amer. J. Physiol., 1938, 122, 319-324).—Albino rats 30—108 days old were treated with follicle-stimulating hormone from menopausal urine (intraperitoneal injections of 10 rat

V. J. W.

units for 10 days) and anterior pituitary sex hormone (10 rat units of a dil. aq. alcoholic extract of sheep anterior pituitaries for 4 days and 20 rat units for 6 days). Both hormones produce testicular descent in immature rats, Early testicular enlargement is produced by anterior pituitary hormone in mature animals and in both mature and immature animals by follicle-stimulating hormone. Testicular enlargement is due to increased interstitial tissue and tubular cell proliferation. Neither hormone produces general body growth. M. W. G.

Gonad-stimulating abilities of male and female rat pituitary glands. A. A. HELLBAUM and R. O. GREEP (Proc. Soc. Exp. Biol. Med., 1938, 38, 902— 904).—Acetone-dried and powdered glands were injected in various dosages. Male glands stimulated follicular development only, except in very large doses, while female glands induced luteinisation at all levels. V. J. W.

Composition of milk of rabbits after treatment with prolactin. A. P. JACOBSEN (Skand. Arch. Physiol., 1938, 79, 97–105).—Prolactin (from whale pituitaries) was injected into female rabbits. Lactation began 2—6 days later. The content of fat, total N, and lactose was the same as in milk of normally lactating rabbits. A. S.

Rôle of the anterior pituitary in lactation. S. J. FOLLEY (Lancet, 1938, 235, 389-390).—A review. C. A. K.

Precipitin tests and anti-prolactin serum. W. I. STRANGEWAYS (J. Physiol., 1938, 93, 47-48P). -Rabbit anti-prolactin serum is rich in non-sp. precipitins which are greatly reduced by pptn. of the antiserum with the optimum proportion of normal ox serum. This ox-adsorbed serum still contains precipitins to prolactin solution which are much reduced after pptn. of the serum with the optimum proportion of this solution. The anti-prolactin (pigeon crop gland test) activities of the "ox-adsorbed" and ox- and prolactin-adsorbed " sera were determined. The ppt. formed with ox serum does not remove any of the activity from an anti-prolactin serum; about of this activity is removed by further adsorption with the optimum amount of prolactin solution; no activity is lost when the serum is pptd. with 1/2 of this optimum amount. In vitro activities of different prolactin preps, parallel their pigeon crop gland activities. J. A. C.

Are the lactogenic and carbohydrate metabolism hormones identical? A. J. BERGMAN and C. W. TURNER (Endocrinol., 1938, 23, 228— 232).—From an alcoholic extract of pituitary it is possible to separate, by Na_2SO_4 and H_2SO_4 pptn., two fractions. Administration of both to pigeons and guinea-pigs shows that one contains much lactogenic and little carbohydrate hormone, while in the other the reverse is the case. V. J. W.

Identity and mechanism of action of the glycotropic (anti-insulin) substance of the anterior pituitary gland. F. G. YOUNG (Biochem. J., 1938, 32, 1521—1539).—The glycotropic principle is not identical with the pigeon crop gland stimulator (prolactin), the thyrotropic or gonadotropic hormones, or the oxytocic or vasopressor substances. Glycotropic and prolactin preps. have been obtained free from each other. Rabbits made insensitive to insulin by the glycotropic substance give increased hyperglycæmic responses to subcutaneous, but not to intravenous, adrenaline administration and show slightly diminished sugar tolerance. The glycotropic substance does not antagonise the hypoglycæmic action of insulin by facilitating the glycogenolytic action in the liver of adrenaline secreted by the adrenals. It may directly antagonise the action of insulin, both in the liver and in the peripheral tissues. T. F. D.

Fractionation of antithyrotropic and antigonadotropic sera. C. R. HARINGTON and I. W. RowLANDS (Biochem. J., 1937, 31, 2049-2054).-W. Antisera prepared by prolonged daily injection of ox anterior pituitary extract into rabbits showed antithyrotropic and antigonadotropic activity conc. in the globulin fraction and especially the pseudoglobulin fraction. The antithyrotropic substance is non-dialysable; its activity is destroyed by heating at 80-85° for 30 min., or by exposure to dil. acid in presence or absence of pepsin. Dried globulin preps. retained their activity for a year. Antigonadotropic activity was cone. in the globulin fraction of an antiserum to gonadotropic extract of human pregnancy urine prepared in a goat. J. L. C.

Presence of antithyrotropic substance in serum of rats injected chronically with rat pituitary extract. E. ANDERSON and H. M. EVANS (Proc. Soc. Exp. Biol. Med., 1938, 38, 797— 798).—Rats were injected daily for 18—122 days with alkaline extract of 1—2 rat pituitaries. When their serum, in 8-c.c. doses, was injected into guinea-pigs along with extract of ox pituitary, the increased O_2 consumption was about half that shown by controls injected with ox pituitary alone. V. J. W.

Pituitary and water metabolism. P. WERMER (Wien. Arch. inn. Med., 1938, 32, 189—214).— The anterior lobe of the pituitary contains a diuretic substance which is associated with the growth hormone. Diabetes insipidus is a disturbance of the balance between the diuretic principle of the anterior and the antidiuretic principle of the posterior pituitary. Excess of anterior pituitary hormone may be caused by basophil adenoma or pregnancy changes produced by the ovaries. Destruction of the anterior lobe of the pituitary produces oliguria. A. S.

Influence of induced variations in electrolyte and water exchanges with pitressin in bronchial asthma. M. M. COOK and A. V. STOESSER (Proc. Soc. Exp. Biol. Med., 1938, 38, 636-638).—Six asthmatic children were kept on a low-Na diet with a large quantity of water and 3-hourly injections of pitressin. Frequency of asthmatic attacks markedly decreased, while body-wt. increased 2-5% due to retained water. V. J. W.

Centro-acinous cells in pancreas and islet cell formation in bony fishes. G. PALLOT (Bull. Histol. Tech. micr., 1938, 15, 130—148).—In the Teleost pancreas the exocrine tissue can differentiate into islet tissue, particularly through the centroacinous cells found in the alveolar lumen. All stages of this differentiation into the fuchsinophil islet cell are described and figured. The rate of evolution of these cells depends on various factors such as local vascular conditions, hormonal and nutritional states, and varying metabolic states. E. E. H.

Insulin hypersensitivity. A. E. COHEN and F. SIMON (J. Allergy, 1938, 9, 503-508).—Two cases are described with review of the literature. C. J. C. B.

Effect of insulin on the experimental diabetes produced by pancreatectomy in dogs with a permanent biliary fistula. G. BALTACEANU and C. VASILIU (Compt. rend. Soc. Biol., 1938, 128, 423— 426).—Administration of insulin only partially reestablishes the biliary function which has been upset by pancreatectomy. Animals with biliary fistulæ are more susceptible to insulin. H. G. R.

Antiglycogenolytic action of insulin. Suppression of the antiglycogenolytic effect of insulin by anterior pituitary extract. L. KÉPINOV (Compt. rend. Soc. Biol., 1938, 128, 331—334).—The antiglycogenolytic effect of insulin (A., 1937, III, 402) which is observed after 30 min. perfusion in summer frogs requires 5 hr. in winter frogs but this time can be reduced to 30 min. if the animals are kept at 27— 28° for 36 hr. prior to the test. The effect is suppressed by an extract of pituitary anterior lobe.

Excretion of insulin by normal and pathologic rabbit kidney. M. BRUGER and B. FRIEDMAN (Proc. Soc. Exp. Biol. Med., 1938, **38**, 840—843).— 200 units of insulin were injected into rabbits which were either normal or rendered albuminuric by $UO_2(NO_3)_2$. Urine specimens were collected at intervals for 5—6 hr. afterwards and administered to other rabbits. Insulin was present in these urines for 3—3.5 hr. after the injection, but there was no difference between the normal and albuminuric rabbits. V. J. W.

Insulin absorption from the intestine in normal and depancreatised dogs. R. H. MAJOR (Proc. Soc. Exp. Biol. Med., 1938, **38**, 721-723).—Insulin was made up with tetramethyl glycol into tablets which were inserted by fistulæ into the small intestine. Administration of 50 units caused a fall of bloodsugar in 35% of experiments on normal dogs and 92% of experiments on depancreatised dogs. V. J. W.

Fatty atrophy following insulin injection in non-diabetic malnutrition. H. BLOTNER (Endocrinol., 1938, 23, 233—236).—A patient who received insulin for 3 weeks showed some atrophy of the subcutaneous fat at the site of injection. This atrophy began 4 months after the insulin administration had ceased. V. J. W.

Response of insulin-sensitive and insulintolerant patients to protamine-insulin. B. HOLCOMB and R. HOLCOMB (Northw. Med., 1938, 37, 36-39).-225 patients (47 insulin-sensitive, 125 insulin-tolerant) were studied in response to regular insulin and protamine-insulin. The latter respond satisfactorily to protamine-insulin; the former show increased glycosuria and hyperglycamia. Both are subjectively improved and allow reduction in total and frequency of dosage. A. J. B.

Results with "depot" insulin. F. UMBER (Dtsch. med. Wschr., 1938, **64**, 1025—1027).— Satisfactory results in the treatment of diabetes were obtained with a "depot" insulin ("Surfen-Insulin-Bayer"). It contains half the amount of Zn present in protamine–Zn–insulin (0.04 mg. per c.c.). I c.c. of surfen-insulin contains 40 units of insulin. A. S.

Hypoglycæmia during protamine-zinc-insulin treatment. R. BOLLER and W. PILGERSTORFER (Klin. Woch., 1938, 17, 1065—1068).—2 fatal cases of hypoglycæmia in the course of protamine-Zninsulin treatment are reported. In one there was complete bilateral destruction of the adrenals by carcinomatous metastases. Collapse occurred without prodromal signs. In both cases a pitting œdema of the legs and ankles occurred (a few days before the end) which disappeared again completely just before death ensued. E. M. J.

Treatment of varicose ulcers with insulin ointment. K. HEDÉN (Münch. med. Wschr., 1938, 85, 916—917).—Satisfactory results were obtained in the treatment of varicose ulcers with an ointment containing 5 units of insulin per g. A. S.

Changes in the hypoglycæmic action of insulin and the hyperglycæmic action of adrenaline produced by the addition of nickel, iron, or copper salts. H. SCHWAB (Compt. rend., 1938, 207, 409—411).—Ni (6·3 mg. as NiSO₄) diminishes and prolongs the hypoglycæmic action of insulin (1 unit) and gelatin (2 c.e. of 1%) in the rabbit; smaller amounts have no effect. 0·12—6·2 mg. of Ni inhibits the hyperglycæmic action of adrenaline (0·25 mg. per kg.); small doses increase and prolong the hyperglycæmia. Fe (10 mg.) as Fe^{•••} NH₄ alum and Cu (10—15 mg.) as CuSO₄ react similarly. Very large doses of Cu salts completely inhibit both the insulin hypoglycæmia and the adrenaline hyperglycæmia, probably due to a toxic effect on the cells concerned with carbohydrate metabolism.

J. L. D.

Hypoglycæmic activity of organic sulphur compounds and the rôle of sulphur in relation to the activity of insulin. C. E. BRAUN, M. B. MASON, and C. L. BROWN (J. Chem. Educ., 1938, 15, 261-267).—A review of recent work on S in insulin. No org. S compound of known structure approximates to the physiological behaviour of insulin; of numerous compounds of diverse types only a few possess hypoglycæmic activity. L. S. T.

Case of adenoma of islets of Langherans. A. JIRASEK and O. POSTRANECKI (Presse méd., 1938, 46, 671-672).—A case of adenoma of the islets of Langerhans suffering from hypoglycæmic attacks showed, after removal of the tumour, marked signs of diabetes for a few days. G. SCH.

Liver-lipin in the depancreatised dog and in the normal dog under insulin. P. CRISTOL and P. MONNER [with L. HÉDON and A. LOUBATIÈRES] (Ann. Physiol. Physicochim. biol., 1938, 14, 510-515).—If an injection of insulin provokes a deposition of liver-glycogen in depancreatised animals there is a

H. G. R.

marked fall of liver-lipins. In normal dogs in a postabsorptive state, insulin induces only slight modifications of lipin content. C. C. N. V.

Diabetes mellitus and heredity. F. STEINER (Dtsch. Arch. klin. Med., 1938, 182, 231-240).— $22\cdot4\%\pm5\cdot4\%$ out of 411 children of parents one of whom was diabetic were diabetic. In 4787 control cases $1\cdot14\%\pm0\cdot3\%$ of diabetics were found. A. S.

(j) REPRODUCTION, HEREDITY, AND EXPERIMENTAL EMBRYOLOGY.

Highly active esters of testosterone.—See A., 1938, II, 414.

Colorimetric determination of substances containing the grouping ·CH,·CO· in urine extracts as an indication of androgen content. N. H. CALLOW, R. K. CALLOW, and C. W. EMMENS (Biochem. J., 1938, 32, 1312-1331).-An improved method of determining androsterone and other 17-ketosteroids by a colour reaction with m-dinitrobenzene and KOH in alcohol is described; sources of error and factors influencing this determination are discussed. The absorption spectrum of the coloured solution produced and the rapidity of development of the colour vary according to the structure of the compound. Neutral fractions of extracts of hydrolysed urine give the colour reaction characteristic of 17-keto-steroids although with some indication of the presence of other chromogenic compounds. Biological activity is associated with the ketonic fraction, and the use of the reaction for determining the excretory transformation products of the male hormones is justified. Comparison of the chemical with the biological method of determining the excretory products by their activity in the capon comb-growth test is made with 59 urines from a variety of sources. A significant degree of correlation is found between the colorimetric assay expressed in chromogenic equivs. of androsterone ("sterone") per litre of urine and the biological assay expressed in international units of male hormone activity per litre. Colorimetric assay can probably replace biological assay provided that due regard is paid to the occasional presence of interfering substances which may be revealed when the approx. absorption spectrum is H. W. examined.

Maintenance of spermatogenesis in hypophysectomised mice with androgenic substances. W. O. NELSON and C. E. MERCKEL (Proc. Soc. Exp. Biol. Med., 1938, 38, 737-740).—In mice, as was previously known for the rat, injection of cryst. hormone maintained spermatogenesis after hypophysectomy. The most effective compound tried was androstanedione. V. J. W.

Effect of testosterone propionate on endometrial cycle of the human. J. A. GAINES, U. J. SALMON, and S. H. GEIST (Proc. Soc. Exp. Biol. Med., 1938, 38, 779—783).—6 women were given doses of 25—100 mg. of testosterone propionate every 2—3 days for 3 months. The endometrium became atrophied or hypoplasic in 5 cases, and in all 6 the last 1 or 2 menstrual periods were missed.

V. J. W.

Spermatogenesis in immature hypophysectomised rats injected with androgens. E. CUTULY, E. C. CUTULY, and D. R. MCCULLAGH (Proc. Soc. Exp. Biol. Med., 1938, 38, 818—823).— Rats were hypophysectomised at 27—30 days and received daily injections of androgens for 7—21 days thereafter. Spermatozoa were found in the testes of those animals which received daily doses of 2 mg. of testosterone propionate or dehydroandrosterone acetate. V. J. W.

Comb of baby chick as test for male sex hormone. R. T. FRANK, E. KLEMPNER, and F. HOLLANDER (Proc. Soc. Exp. Biol. Med., 1938, 38, 853-856).—Results of the method of applying oil solutions of androsterone to the comb have been made more uniform by beginning the test at 3 days, continuing it for 7 days, reducing the total androsterone to 50 µg. per chick, and the oil per dose to 0.05 c.c. V. J. W.

Precocious masculine behaviour following administration of synthetic male hormone substance. J. B. HAMILTON (Endocrinol., 1938, 23, 53-57).—Newly hatched chicks were given daily injections of 500 µg. of testosterone propionate. They began to crow at the age of 10 days.

V. J. W.

Effect of testosterone treatment of the guineapig embryo on procreation. V. DANTCHAKOFF (Compt. rend. Soc. Biol., 1938, **128**, 891-895).--Female guinea-pig embryos injected with testosterone develop male accessory sexual organs; if the injections are continued they copulate as males and are accepted as such by females in cestrus. The capacity for developing male organs is lost 30 days after the ovum is fertilised. Estrone injected into the embryo is lethal but injected into the peritoneum of the mother is ineffective. This is not so with testosterone, showing that it can permeate the placenta and presumably accounts for cases of intersexuality in genetically female mammals. In a small series of males injected both pre- and post-natally the testes developed normally but litters from these animals were entirely male. Females similarly treated developed cystic ovaries, ova developing and degenerating in the cysts and no corpora lutea being formed. Females treated later so that normal ovaries developed produced litters containing both sexes. P. C. W.

Relative effectiveness of testosterone propionate and dihydroandrosterone benzoate in the chick as indicated by comb growth. W. R. BRENEMAN (Endocrinol., 1938, 23, 44-52).—In the normal male chick, dihydroandrosterone benzoate is more effective than testosterone propionate in stimulating comb growth, and is as effective in a single injection as in divided doses which the latter is not. V. J. W.

Effect of testosterone propionate on the genitalia, prostate, secondary sex characters, and body-weight in eunuchoidism. A. T. KEN-YON (Endocrinol., 1938, 23, 121-134).—4 patients received 25 mg. 5—7 times weekly for 28—99 days. In all there was increase of body-wt. and enlargement of the prostate. In 3 cases there was enlargement of the penis and increase of pubic hair. Spermatozoa disappeared during treatment in one case but reappeared later. V. J. W.

Effect of testosterone propionate on nitrogen, electrolyte, water, and energy metabolism in eunuchoidism. A. T. KENYON, I. SANDIFORD, A. H. BRYAN, K. KNOWLTON, and F. C. KOCH (Endocrinol., 1938, 23, 135—153).—In the same 4 patients (see preceding abstract) there occurred during treatment a decrease in excretion of urea and NaCl and a gain in wt. due to water. Creatine was decreased in 2 out of the 4. The basal metabolic rate rose by 6—14% in 3 out of the 4 but the R.Q. was unaltered (cf. A., 1938, III, 295). V. J. W.

Effect of testosterone propionate on human female castrates. C. H. BIRNBERG, L. KURZROK, and S. LIVINGSTON (Endocrinol., 1938, 23, 243— 244).—10 mg. twice a week relieved severe menopausal symptoms in three patients whose ovaries had been destroyed by X-rays or Ra. There was no endometrial regeneration. V. J. W.

Effect of castrate urine hormone on the testis. H. S. RUBINSTEIN (Endocrinol., 1938, 23, 171— 174).—Immature male rats received 10 rat units daily for 10 days of a water extract of menopausal or castrate urine. In all cases it caused premature descent of the testis. In both mature and immature rats the wt. of the testis is increased, both interstitial cells and tubules being affected, and more mitoses are visible. V. J. W.

Effect of the anterior pituitary-like hormone on spermatogenesis in men. H. S. RUBINSTEIN (Endocrinol., 1938, 23, 75—78).—6 subjects who received dosages of 1000 rat units weekly showed after 4—7 weeks a marked increase in total spermatozoa count per ejaculation. The increase was maintained for 2—5 weeks after treatment ceased.

V. J. W.

Crystals of Reinke in hyperplasias and tumours of the interstitial tissue of the tests. A. PEYRON, G. POUMEAU-DELILLE, and L. SALOMON (Compt. rend. Soc. Biol., 1938, 128, 649-651).---Usually the crystals are found most easily in proliferating interstitial tissue and active tumours in which the pigment granules are depleted. They are rare or absent in the interstitial tissue of old animals in which the cells are loaded with pigment granules.

J. H. T. Neutralisation of ovarian follicular hormone in women by simultaneous administration of male sex hormone. E. SHORR, G. N. PAPA-NICOLAOU, and B. F. STIMMEL (Proc. Soc. Exp. Biol. Med., 1938, 38, 759-762).—Administration of œstradiol benzoate to three menopausal women caused the usual vaginal changes. When testosterone propionate was given in addition, the epithelium became again menopausal. V. J. W.

Hyperplasia of the male breast in malignant disease of the testis treated by X-rays. C. W. B. WOODHAM (Lancet., 1938, 235, 307-308).—In 3 cases transient enlargement of the breasts occurred following removal of one testis and irradiation of the other. C. A. K. Undescended testicle. N. NIXON (Amer. J. Dis. Child., 1938, 55, 1037-1057). A. C. F.

Histopathology of tumours of testis interstitial cells. A. PEYRON, L. BLANCHARD, G. POUMEAU-DELILLE, and L. SALOMON (Compt. rend. Soc. Biol., 1938, 128, 338—340).—The testes of 400 dogs were examined; 50 had tumours, 22 were simple cases of hyperplasia, 14 were encapsulated adenomata with cavities and large capillary supply, 15 were actively growing tumours in process of malignant transformation. 4 tumours from adult humans showed no malignant signs, but certain tumours removed from children with precocious puberty resembled closely those found in the dog. P. C. W.

Degeneration of seminal tubules. A. M. VASIUTOTSCHKIN (Compt. rend. Acad. Sci. U.R.S.S., 1938, 18, 499-501). A. S.

Case of hermaphroditism (Fem. ext.). J. CHARVÁT, E. KODÍČEK, and O. SCHUBERT (Endocrinol., 1938, 23, 91—98).—A girl of 22 had shown some masculine characters for 7 years. The urine contained an increased amount of male hormone and of cestrogenic hormone. She died after adrenalectomy, and was found to have a very small uterus with an atrophic endometrium and ovaries with no corpora lutea. V. J. W.

Presence of intermediary hormones capable of masculinising female, and feminising male, chicken embryos. E. WOLFF (Compt. rend. Soc. Biol., 1938, **128**, 420–422).—It is suggested that the paradoxical effects of some synthetic derivatives of androsterone are due to their being intermediary between the true male and female hormones.

H. G. R.

Hormonal sterilisation. A.I. KROUPSKI (Gynéc. Obstét., 1938, 38, 56—63).—In 10 rabbits and 1 dog one ovary with the corresponding Fallopian tube attached was brought through the posterior vaginal wall into the vagina. In one rabbit, which became pregnant, absorption of the transplanted ovary occurred. Two operated rabbits, which had remained sterile for 6 months, became pregnant after the transplanted ovaries were removed. The other 7 rabbits remained sterile following ovarian transplantation. The dog remained sterile for 1 year, when the transplanted ovary was found to be functional at operation. One or more of the hormones, produced by the vaginal ovary, may exert a strong positive chemistatic influence on spermatozoa, so that these do not enter the uterus. W. D'A. M.

Sex hormone and characters of partial monomorphism in *Perdix perdix*, L. B. NOVIKOV (Compt. rend. Acad. Sci. U.R.S.S., 1938, 18, 497– 498). A. S.

Validity of Allen-Doisy test in lizard embryos of both sexes. V. DANTCHAROFF (Compt. rend. Soc. Biol., 1938, 128, 895—899).—Treatment of the lizard embryo with æstrone causes nearly complete sexual inversion in the male, while both sexes show keratinisation and hypertrophy of the cloaca and surrounding sexual organs. P. C. W. Influence of diet on gonad activity of English sparrow, Passer domesticus. J. C. PERRY (Proc. Soc. Exp. Biol. Med., 1938, 38, 716—718).—Sparrows fed on wheat which had been irradiated with ultraviolet light for 250 hr. and upwards showed the same gonadal stimulation as birds which had been themselves irradiated. V. J. W.

The European bitterling as an experimental animal in endocrine research. A. I. WEISMAN and C. M. ROTHBURD (Endocrinol., 1938, 23, 104— 106).—Tank temp. should be $18-22^{\circ}$ and, unless the water is flowing, only 2 fish per gallon can be kept. Green plants and light should be used to maintain O₂ supply and live worms form the best food. Cryst. male hormones are insol. in water and must be supplied in solution in propylene glycol.

V. J. W.

Failure of atropine to prevent ovulation following coitus in the rabbit. A. W. MAREPEACE (Endocrinol., 1938, 23, 241-242).—In doses up to 6 mg. per kg. atropine sulphate intravenously does not inhibit ovulation after coitus, but the larger doses may stop cestrus and so prevent coitus.

V. J. W. Inhibitory hormonal influences on function of ovaries. E. COLOMBO (Dtsch. med. Wschr., 1938, 64, 1034—1035).—Prolan had no gonadotropic action in rabbits if follicular or corpus luteum hormone was injected simultaneously. A. S.

Time of human ovulation during lactation. P. M. LASS, J. SMELSER, and R. KURZROK (Endocrinol., 1938, 23, 39-43).—47 lactating women were observed through a total of 194 menstrual cycles, a specimen of endometrium being withdrawn by a syringe within 10 days before a menstrual flow. In 106 cycles this epithelium was postmenstrual (anovulatory) and in 82 cycles it was premenstrual (ovulatory). The first ovulation occurred at irregular intervals after parturition and might be succeeded by several anovulatory cycles. V. J. W.

Clitoris of rat after ovariectomy and injection of sex hormones. K. HALL (J. Path. Bact., 1938, 47, 19-26).-The clitoris of 48 normal ovariectomised adult rats, uninjected or injected with sex hormones, was investigated histologically and its structure compared with that of the penis of normal and castrated male rats. Development of the clitoris into an organ resembling the distal part of the penis occurred after the injection of testosterone propionate (most effect), testosterone, and Δ^4 -androstenedione (medium effect), whilst Δ^5 -androstenediol caused little increase in size but definite histological changes. The clitoris showing the greatest degree of hypertrophy still differed from a true penis by its smaller size and in the non-development of typical corpora cavernosa and in the overdevelopment of the "thorny" papillae on the surface of the organ. Estrone and progesterone had no definite effect on the clitoris and were unable to counteract the masculinising effects of the male hormones. After ovariectomy the "sex" skin of the introitus of the vagina is thinner and the sebaceous glands are smaller; the skin is thickened and the glands are more numerous and larger after

3 S (A., III.)

the injection of male sex hormones. [13 photomicrographs.] C. J. C. B.

Ratio of the amount of theelin producing uterine and vaginal œstrus. A. J. SZARKA and G. KURTZ (Endocrinol., 1938, 23, 64—70).—The uterus of the rat was examined by repeated laparotomies at intervals after theelin injections. To obtain a reaction equal to that of normal œstrus, about 4.8 μ g. of ketohydroxyœstrin is required, about 5—6 times as much as is needed to produce vaginal cornification, which comes on later when the uterine changes have disappeared. V. J. W.

Miscellaneous experiments on the œstrogenprogesterone induction of heat in the spayed guinea-pig. J. L. BOLING, W. C. YOUNG, and E. W. DEMPSEY (Endocrinol., 1938, 23, 182—187).—Œstrus caused by œstrogen alone, as compared with that caused by œstrogen with progesterone, is less certain, its onset is less well defined, but it usually lasts longer. When it is over, administration of progesterone causes a second œstrus, which does not happen after the œstrogen-progesterone œstrus.

V. J. W. Influence of progesterone on experimental tuberculosis in male guinea-pigs. M. R. GREENE and H. R. MORGAN (Proc. Soc. Exp. Biol. Med., 1938, **38**, 656-658).-0.5 unit of "Lipo-lutin" 3 times weekly had no effect on the course of tuberculous infections or on skin-sensitivity to tuberceulin.

V. J. W. Corpus luteum-stimulating substance in rat placenta. E. B. Astwood and R. O. GREEP (Proc. Soc. Exp. Biol. Med., 1938, 38, 713-716).-Endometrial trauma during pseudopregnancy causes the formation of deciduomata in the normal but not in the hypophysectomised rat, but in such rats deciduomata develop if the animals are injected with an alkaline extract of fresh rat placenta or with the isoelectric ppt. from such an extract. The extract is ineffective if the ovaries are removed at the time of the endometrial trauma. It has no gonadotropic action and causes no changes in the crop gland of the pigeon. It is inferred that in normal pregnancy the foetal placenta secretes a substance which is responsible for the maintenance and function of the corpora lutea during the second half of pregnancy.

V. J. W. Effect of progesterone on Fallopian tube contractility. S. H. GEIST, U. J. SALMON, and M. E. MINTZ (Proc. Soc. Exp. Biol. Med., 1938, 38, 783—785).—Records of tubal contractions were made from 5 post-menopause women, by means of an insufflation apparatus. No rhythmic contractions took place but were induced by injection of cestradiol benzoate. Later injection of 20 mg. of progesterone inhibited them. V. J. W.

Action of cestrin and progesterone on the anterior pituitary. J. B. BROOKSBY (Proc. Soc. Exp. Biol. Med., 1938, 38, 832-834).—0.5 mg. daily of progesterone prevents castration changes in the pituitary of 3-month old female rats, and also enhances the action of cestrin in causing enlargement of the pituitary. V. J. W.

Secretion of progesterone by the cat's ovary after injection of anterior pituitary extract or prolan. H. B. VAN DYKE and R. C. LI (Chinese J. Physiol., 1938, 13, 213-228).-300 rabbit units of anterior pituitary extract caused ovulation or luteinisation. Portions of the uterus were removed at intervals and tested in vitro; after injection it first became insensitive to adrenaline, then contracted to it, then insensitive again, and then relaxed with it. Contraction with adrenaline only lasted a few days after ovariectomy during pregnancy. Relaxation with adrenaline was not associated with proliferation of the uterine mucosa, but contraction generally was. The activity of the corpus luteum after the injections lasted about 20 days, as judged by the mucosa and the response to adrenaline. The response to post-pituitary extract varied independently of the corpus luteum. N. H.

Use of progestin in obstetrical complications. F. H. FALLS (Sth. med. J., 1938, **31**, 556–562).—8 cases of premature detachment of the placenta were treated with progestin (1 rabbit unit daily). Uterine cramps and bleeding were controlled, in 5 sufficiently to produce a live child. In 2 cases of placenta pravia, progestin stopped bleeding. A. J. B.

Isolation of æstranediols from human nonpregnancy urine. $3(\beta)$ -Hydroxysteroids in human pregnancy urine.—See A., 1938, II, 407.

Constitution of the "pregnanetriol" occurring in the urine of pregnant mares.—See A., 1938, II, 442.

Ketones from mares' pregnancy urine.—See A., 1938, II, 369.

Carbinols from stallions' urine. Uranediol from mares' pregnancy urine. Pregnenediol in mares' pregnancy urine and its conversion into progesterone.—See A., 1938, II, 362.

of female sex hormones. I. Activation Estrone and its esters. K. MIESCHER, C. SCHOLTZ, and E. TSCHOPP (Biochem. J., 1938, 32, 141-148).-The duration of action of œstrone (rat œstrus test) was increased from 5 to 7 days by addition of palmitic acid and to 13 days by that of stearyl alcohol. 12 cestrone esters were tested, including the n-octoate, m.p. 70-71°, and laurate, m.p. 69.5-70°. Duration of cestrus as compared with that caused by cestrone was increased by esters from the butyrate upwards, attaining a max. (14 days) with 50 μ g. of *n*-hexoate and *n*-octoate. The benzoate and valerate had similar effects. Palmitate and stearate were effective only in high doses. Similar relations were found by the uterus growth test. Calculation of the output of activity and efficiency coeff. as means of evaluating the activity of compounds is described. J. L. C.

Estrogenic activity of esters of diethylstilbcestrol. E. C. DODDS, L. GOLBERG, W. LAWSON, and R. ROBINSON (Nature, 1938, 142, 211—212).— The activities towards rats of several di-esters are tabulated. Esterification reduces activity but, in general, the duration of cestrus is prolonged. Max. prolongation without undue reduction in activity appears to occur with the dipropionate. With large doses of the dimethyl ether, cestrus appears to be prolonged almost indefinitely. L. S. T.

Biological properties of diethylstilbœstrol. S. J. FOLLEY and H. M. S. WATSON (Lancet, 1938, 235, 423—424).—Diethylstilbœstrol partially inhibits the response of the pigeon crop-gland to prolactin, inhibits lactation in the rat, and causes a temporary increase of the phosphatase content of cow's milk (also of fat and lactose). Diethylstilbœstrol closely resembles natural œstrogens in these reactions.

C. A. K. Production of feminised male rats by antenatal treatment with cestrogens. R. R. GREENE, M. W. BURRILL, and A. C. IVY (Science, 1938, 88, 130—131).—Œstradiol dipropionate was injected in single doses of 0.375—4.0 mg. into pregnant rats on the 13th, 14th, or 15th day. The males in all litters showed marked inhibition of development of male genital organs, and in many there were actual signs of feminisation, *e.g.*, presence of visible nipples and growth of vagina. These effects are roughly proportional to the dosage. In the female offspring there was enhanced growth of uterus and nipples, and inhibited development of the ovarian capsule.

C. A. K.

Duration of action of natural and synthetic cestrogens. J. M. ROBSON, A. SCHÖNBERG, and H. A. FAHIM (Nature, 1938, 142, 292—293).—The duration of action of several cestradiol and triphenylethylene compounds was studied after oral and subcutaneous administration in mice. On injection triphenylchloroethylene has a much more prolonged action than cestradiol benzoate. By mouth cestradiol and stilbcestrol have the most prolonged action.

C. A. K. Effect of synthetic cestrogenic substances on the body growth and endocrine organs of the rat. R. L. NOBLE (Lancet, 1938, 235, 192-195).-Subcutaneous implantation of crystals of a no. of synthetic œstrogenic substances (e.g., diethylstilbcestrol and triphenylethylene) in prepubertal and adult rats diminished the rate of growth, partly by direct action on the anterior pituitary, and partly by some other process, not yet localised. Gonadotropic activity of the anterior pituitary was completely inhibited; increases in wt. of the pituitary and adrenal glands occurred, with atrophy of the testis, prostate, and seminal vesicles. 3 carcinogenic hydrocarbons did not affect pituitary secretion or C. A. K. growth.

Action of cestradiol benzoate on the hen's comb. V. RÉGNIER and F. CARIDROIT (Compt. rend. Soc. Biol., 1938, **128**, 404—406).—Weekly injections of 0.5—1 mg. of cestradiol benzoate into growing hens result in regression in the size of the comb. There is no such action in adults during the laying season and a slight action during the rest of the year.

P. C. W. Ultra-violet radiation and cestrogenic substances. P. ENGEL (Endokrinol., 1938, 20, 86– 92).—Male rabbits were exposed to ultra-violet radiation for 7 min. per day for several weeks. Samples of blood and skin were tested for cestrogenic substances in immature female mice. 300—400 mouse

and they

units in blood were found after irradiation for 3 weeks. Previous injections of cholesterol did not increase the yield. Injections of irradiated cholesterol do not produce cestrogenic substances in blood. Ultraviolet radiation did not produce cestrus in rabbits after double ovariectomy. A. S.

Examination of the sarcoma-producing benzamidoquinoline styryl compound "styryl 430" and related substances for æstrogenic action. J. A. W. McCLUSKIE and J. S. F. NIVEN (J. Path. Bact., 1938, 47, 155—157).—In oophorectomised mice, no æstrone-like action was found after injection of the max. tolerated dose of styryl 430 (6-*p*-acetamidobenzamido-2-*p*-aminostyrylquinoline methoacetate), styryl 245 (6-*p*-aminobenzamido-2-*p*acetamidostyrylquinoline methoacetate), styryl 427 (6-*p*-aminobenzamido-2-*p*-dimethylaminostyrylquinoine methochloride), and anil 421 (6-*p*-acetamidobenzamido-2-*p*-dimethylaminoanilquinoline methochloride). C. J. C. B.

Influence of thyroid hormone on æstrin action. A. E. MEYER and A. WERTZ (Proc. Soc. Exp. Biol. Med., 1938, 38, 843—846).—Doses of thyroid substances, smaller than those necessary to raise the æstrin threshold, did not increase the sensitivity of castrated female rats to æstrin. V. J. W.

Effect of sex hormones on serum-calcium. J. CHEYMOL and A. QUINQUAUD (Ann. Physiol. Physicochim. biol., 1938, 14, 491—495).—Intramuscular injection of cestradiol benzoate or testosterone propionate into dogs for 10 days produces an initial rise of serum-Ca, then a fall, and finally a return to normal vals. C. C. N. V.

Does estrone raise the metabolic rate? J. F. MCLENDON (Endocrinol., 1938, 23, 102—103).— Basal metabolic rate is about 2% above the mean in the 4th week of the menstrual cycle, and about 2% below the mean during the 2nd week. V. J. W.

Androgenic activity of the ovary. L. DESCLIN (Compt. rend. Soc. Biol., 1938, 128, 557—560).— Three batches of male rats were castrated. Two batches had ovaries grafted in their kidneys; after 15 days one batch received urinary gonadotropic principle daily for 10 days to produce luteinisation of the ovary graft. The third batch received similar gonadotropic injections. The prostate and seminal vesicles showed no histological differences in the three batches. P. C. W.

Action of zinc on the cestrogenic effect of folliculin in ovariectomised rats. R. CAHEN and A. TRONCHON (Compt. rend., 1938, 206, 1409—1411).—Zn enhances and prolongs the cestrogenic effect of folliculin in ovariectomised rats when the proportion of $ZnCl_2$ to folliculin is greater than 625:1. Below this level Zn has no effect. E. M. W.

Six-hour assay for the determination of cestrogen. E. B. ASTWOOD (Endocrinol., 1938, 23, 25—31).—Single injections of cestradiol in immature rats increase the uterine wt., which reaches a max. in 6 hr. Between 0.006 µg. and 0.1 µg. there is a direct logarithmic relation between dose and wt. increase. V. J. W. Menopause. Symptoms, ætiology, and treatment by œstrogens. H. WIESBADER and R. KURZROK (Endocrinol., 1938, 23, 32—38).—Beneficial effects were observed among 200 patients treated with various œstrogenic substances, or with alcohol-ether ovarian extracts, or with Ca salts. V. J. W.

Effects of daily injections of Hebin on development of sexual characters in Leghorn chicks. L. V. DOMM (Trans. Dyn. Development. U.S.S.R., 1935, 10, 67-79). CH. ABS. (p)

Follicular hormone as a circulatory drug. I. VON ZÁRDAY (Klin. Woch., 1938, **17**, 981—982).— Several cases of premenstrual pseudo-angina, palpitation, and migraine are described which responded well to treatment with progynon dragées. E. M. J.

Quantitative studies of experimentally induced sexual receptivity in the spayed guineapig. V. J. COLLINS, J. L. BOLING, E. W. DEMPSEY, and W. C. YOUNG (Endocrinol., 1938, 23, 188—196). —To be effective a dose of æstrogen must be followed, after an interval called the conditioning period, by a dose of progesterone, the interval between this and æstrus being called the latent period. The conditioning period may be as long as 8 days, but its optimum length is 24 hr. The interval from the administration of progesterone to the end of æstrus is const. for a given procedure though the beginning of æstrus may be variable, and the duration of the conditioning period has no effect on these time relations.

V. J. W.

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Partial inhibition of sex activity in the intact female rat by injected cestrin. J. BALL (Endocrinol., 1938, 23, 197—199).—Daily injections of small doses of cestrin during 2 months suppressed the usual sexual cycles, causing a continuous low degree of sexual receptivity and cornified vaginal smears.

V. J. W.

Relations between hormones of pituitary and ovary. C. MÜLLER (Endokrinol., 1938, 20, 8— 10).—The threshold æstrogenic dose of subcutaneous injections of æstradiol benzoate was determined in ovariectomised rtas. Hypophysectomy increases the threshold up to 20 times; thyroidectomy has no effect. A. S.

Effects of ovarian hormones on pituitary and thyroid. P. GUMBRECHT and A. LOESER (Arch. exp. Path. Pharm., 1938, 189, 345-386).--Injections of large amounts of æstradiol monobenzoate diminish thyroid activity in normal female rats; the basal metabolic rate is lowered. This is due to diminished production of thyrotropic hormone. Corpus luteum hormone has no effect on the thyroid. Castration diminishes thyroid activity; this is not prevented by ovarian hormones or by transplantation of ovaries. The thyrotropic content in the pituitary of castrated female rats is increased; the thyroid gland is less responsive to thyrotropic hormone. Operations in the region of the genital organs (e.g., ligation of the Fallopian tubes; extirpation of the uterus) change the thyroid to the type seen in the castrated animal. H. BL.

Indications for the use of the female follicular sex hormone. J. J. FREYMANN (Nebraska Sta. med. J., 1938, 23, 173—177).—Mainly a review. Urticarial eruptions and psychotic disturbances were benefited by follicular sex hormone. A. J. B.

Season and rate of conception. J. EDWARDS (Nature, 1938, 142, 357).—The ratio of multiple conceptions (twins and triplets) per 1000 of single conceptions in Great Britain is correlated with the seasons of the year. The ratio is highest in mid-February and from the middle of August to September. C. A. K.

Rapid method for the early diagnosis of pregnancy. G. DE NITO (Münch. med. Woch., 1936, 83, 1272—1273; Chem. Zentr., 1936, ii, 2582).— 5—10 c.c. of urine injected intravenously into a guinea-pig markedly lowers the leucocyte count within 2—4 min. The effect is not due to known follicular hormones. A. H. C.

Skin tests for pregnancy. P. M. LASS, E. S. ENDERLE, and R. KURZROK (Endocrinol., 1938, 23, 71-74).—Gilfillen-Gregg pregnancy-urine skin tests were made on 254 patients with an error up to 64% in the non-pregnant group tested. Gruskin placental extract skin tests were made on 108 patients with an error of 52% in the pregnant group, 20% in the non-pregnant group, and 25% in the male group.

V. J. W.

Biological tests for pregnancy in forensic medicine. D. MACAGGI (Arch. Med. leg., 1933, 6, 331-347).

Control of length of gestation in rat. R. E. KINSCH (Amer. J. Physiol., 1930, 122, 86-93).-Regardless of the period of pregnancy at which surgical removal of embryos alone from the uterine horns is performed, the placentæ remaining in situ are retained until the date of expected parturition and are then delivered. The length of time these placentæ remain in utero is a criterion of the duration of pregnancy. Paraffin pellets replacing embryo and placenta in utero are retained until full term providing functional placentæ are present and the length of retention of these pellets in utero is a criterion of the length of pregnancy of the maternal organism. The foctus is excluded from being the essential regulator of the length of pregnancy and cannot be the cause of the onset of labour. The placento-uterine complex probably initiates labour and has an essential endocrine rôle which is directly concurrent with the maintenance and probably the control of length of M. W. G. gestation.

Motility of the human uterus in vivo. L. WILSON and R. KURZROK (Endrocrinol., 1938, 23, 79—86).—Uterine contractions were recorded by a balloon method in 29 patients. Two types of contraction occurred, a "follicular" type, with high tone, small rapid contractions, and uncertain response to pituitrin, lasting for about 10 days and beginning 4—7 days after the first day of menstruation, and a "luteal" type with low tone, slow and large contractions, and invariable response to pituitrin, lasting through the rest of the cycle. The latter type is absent in the absence of ovulation. V. J. W.

Naso-genital relationship: induction of pseudo-pregnancy in rat by nasal treatment.

M. C. SHELESNYAK and S. ROSEN (Endocrinol., 1938, 23, 58—63).—Various reagents were applied to the nasal mucosa of young female rats. Mustard oil made the æstrous cycles irregular; tannic acid or trichloroacetic acid caused prolongation of diæstrus, and anæsthetisation with nupercaine caused pseudopregnancy in about half the animals treated.

V. J. W. Free and bound acetylcholine in the human placenta. H. C. CHANG (Chinese J. Physiol., 1938, 13, 145—152).—Acetylcholine is present in an alcoholic extract of placenta, or, in the presence of eserine, in the pressed juice, saline extract, or residue. Placenta incubated at 37° before alcoholic extraction yields much more acetylcholine. N. H.

Extract of pregnant mares' serum and development of genital organs. R. MORICARD and S. GOTHIÉ (Compt. rend. Soc. Biol., 1938, 128, 509–512).—Immature mice were injected with an extract of pregnant mare's serum in doses of 1—200 µg. The curve relating ovary wt. to dose shows a slow rise corresponding with an increase in the no. of follicles followed by a steeper rise due to secretion of follicular fluid and a final fall due to follicular rupture. The increase in wt. of the uterus is largely due to its contained secretions. P. C. W.

Inhibition of uterine bleeding with œstradiol and progesterone and associated endometrial modifications. F. L. HISAW and R. O. GREEP (Endocrinol., 1938, 23, 1-14).-Bleeding which normally follows the cessation of cestrin administration in castrated monkeys is not postponed by dosages of 25 rat units of œstrin or 0.25 rabbit unit of progesterone daily, but is postponed for shorter or longer periods by twice these dosages or upwards. Small doses of œstrin plus progesterone cause the development of a premenstrual endometrium which requires, to postpone bleeding, dosages of about 500 rat units daily, which change the character of the endometrium. Estrin dosage causes the appearance of glycogen in the cells of the uterine glands, but progesterone is necessary for its liberation into the secretion. V. J. W.

Influence on the duration of gestation of the injection of pregnancy urine extract in the rat before and after implantation. J. C. RING (Amer. J. Physiol., 1938, 122, 455-459)-41 rats of Wistar stock were used; each animal was given one intraperitoneal injection of 50 rat units (0.5 c.c.) of antuitrin-S during the first half of gestation. Living feetuses were born at term if the injection was made before implantation; injections made after implantation (within 4 days) regularly resulted in prolongation of pregnancy and the birth of post-mature feetuses some of which were alive. M. W. G.

Relationship between uterus and ovaries in the pregnant hamster. M. KLEIN (Proc. Roy. Soc., 1938, B, 125, 348—363).—Complete ovariectomy at the 9—13th day of pregnancy terminates the pregnancy. In hamsters, ovariectomised about 10 days after mating, injection of progesterone alone did not maintain pregnancy and typical vaginal mucification, but these were both maintained by simultaneous injection of progesterone and æstrone, in several cases resulting in parturition at term with living litters. After complete removal of the pregnant uterus at the 8—13th day, there is premature and rapid regression of corpora lutea of pregnancy, and the ovarian cycle restarts. When fœtuses only are removed by Cæsarian section, leaving the placentæ inserted, the corpora lutea of pregnancy are maintained and inhibition of ovarian cycle continues. The results agree with previous work on rabbits and rats. F. B. P.

Effect of pregnancy and lactation on cholesterol and fatty acids in rat tissues. R. OKEY, L. S. GODFREY, and F. GILLUM (J. Biol. Chem., 1938, 124, 489-499).-Pregnant rats on a diet capable of supporting normal pregnancy and lactation, when fed 1% of cholesterol, had a liver-cholesterol content 20 times that of controls (with no added cholesterol). The water content in the livers of cholesterol-fed and control rats increased during pregnancy. Placentæ and fœtuses of cholesterol-fed rats had lower water and slightly higher cholesterol contents than did those from controls. Hence the placenta may protect the feetus from excessive cholesterol infiltration. Increased amounts of cholesterol were present in the milk of cholesterol-fed mothers as shown by the higher cholesterol in the stomach contents and livers of unweaned young. J. N. A.

Toxicity of the blood in cases of uterine fibromata. C. DANIEL and I. FLORIAN (Gynéc. Obstét., 1938, 37, 463-473).—Subcutaneous injection of defibrinated blood from patients with uterine fibromata into rabbits (dose : 150 c.c.) and guineapigs (dose : 80 c.c.) causes fatty degeneration of the liver and heart, and death in 20-30 days. The serum of the injected guinea-pigs produces an urticaria-like reaction when injected intracutaneously into patients with uterine fibromata, but not in other patients. Injection of defibrinated blood, from cases of ovarian cyst or from healthy people, produces no effects in rabbits and guinea-pigs. W. D'A. M.

Uterine fluid of the rat. M. R. WARREN (Amer. J. Physiol., 1938, 122, 602-608).—Female rats were killed at various periods of the cestrus cycle. The vol. (in c.c.) of fluid gently expressible from the uterus was: dicestrus 0.0258; pro-cestrus 0.4995; early cestrus 0.5131; late cestrus 0.4892; post-cestrus 0.0249. The uterine fluid exerts no hormonal influence on the cestrus cycle or, when injected, on the reproductive organs of castrate females; it serves as a medium for transportation of spermatozoa. M. W. G.

Maternal effects on growth and conformation in Shire horse–Shetland pony crosses. A. WAL-TON and J. HAMMOND (Proc. Roy. Soc., 1938, B, 125, 311—335).—By artificial insemination, reciprocal crosses between the large Shire horse and the small Shetland pony were made. Birth wt. of each foal was approx. proportional to the wt. of its respective mother and equal to that of the pure breed to which the mother belonged. This marked maternal regulation of fœtal growth obscured genetic differences, but these appeared after weaning. Growth of cross-foals from Shire mares was much slower than that of pure Shire foals. Growth of cross-foals from Shetland mares was much quicker than that of pure Shetland foals. Equilibrium was reached at about 18 months, when relative growth rates of cross-foals and pure Shetlands remained const. At 3 years, the difference between reciprocal crosses persists. Differences in wt. of the animals were more marked than differences in their proportions. The suggested mechanisms for maternal regulation are: (a) maternal regulation of foetal nutrition, (b) maternal hormonal control, and (c) cytoplasmic inheritance. F. B. P.

Absorption and deposition of dyes in the fœtus. E. BENECKE (Beitr. pathol. Anat., 1938, 100, 515— 559).—The absorption and deposition of trypan-blue by the fœtal guinea-pig was examined after injection into (1) the saccus vitellinus, (2) the amniotic cavity, (3) the subcutaneous tissue, and (4) the peritoneal cavity of the fœtus. There is a full discussion of the many interesting results. H. W. K.

Arginase in the mammary gland. J. C. SHAW and W. E. PETERSEN (Proc. Soc. Exp. Biol. Med., 1938, 38, 631-632).—Glycerin extracts of lactating and non-lactating mammary glands of cows were added to arginine solution, and urea was determined 24 hr. later. Arginase was present in the lactating glands only. V. J. W.

Amino-acids and other non-protein blood substances in relation to milk secretion. J. C. SHAW and W. E. PETERSEN (Proc. Soc. Exp. Biol. Med., 1938, 38, 632—635).—Amino-acid differences between arterial and mammary venous blood in the cow were determined. If amino-acids were the only source of milk-proteins, 1200 vols. of blood flow per vol. of milk would be necessary on these figures, whereas previous determinations of such differences for Ca, fat, and carbohydrate show that vol. of blood flow per vol. of milk is about 390. V. J. W.

Hormonal inhibition of milk secretion. A. P. RAMOS and E. COLOMBO (Dtsch. med. Wschr., 1938, 64, 782—784).—3 or 4 intramuscular injections of 10,000 units of dihydrofolliculin inhibit milk secretion in lactating women. A. S.

Composition of milk from breasts of newlyborn infants. W. L. DAVIES and A. MONCRIEFF (Biochem. J., 1938, 32, 1238—1240).—Data are given for five samples from newly born children (8—14 days). The total solids (7.4 to 12.5%) consist mainly of protein and lactose. Compared with normal milk the samples were low in lactose and high in globulin and non-protein-N. Appreciable amounts of peroxidase and phosphatase were present. J. N. A.

Physiology and inheritance of feathering in the growing chick. M. H. RADI and D. C. WARREN (J. Agric. Res., 1938, 56, 679—705).—Feathering was favoured by brooding under conditions of high R.H. or low temp., and by injection of thyroxine. The supply of vitamin-A and the character of the grain feed had little influence. Genetic differences in feathering were established by selection. A. G. P.

Mechanism of sexual deviations in females due to (a) testosterinisation, (b) hermaphroditism, (c) tumours of the adrenals (virilism). V. DANTCHAKOFF (Compt. rend., 1938, 206, 1411-1413).—A discussion. E. M. W. Increased resistance in mated animals to toxic agents. II. Ethyl alcohol. E. AGDUHR (Skand. Arch. Physiol., 1938, 78, 259-267; cf. A., 1938, III, 302, 397).—Mating of mice increased their resistance to subcutaneous injection of alcohol.

A. S.

Neonatal mortality by order of birth and age of parents. J. YERUSHALMY (Amer. J. Hyg., 1938, 28, 244—270).—A study of all infants born in the State of New York, exclusive of New York City, in 1936. B. C. H.

Determination of plane of bilateral symmetry in the eggs of Rana fusca. I-III. P. ANCEL and P. VINTEMBERGER (Compt. rend. Soc. Biol., 1938, 128, 412 -419).—Eggs from the uterus of R. fusca are fixed to a glass slide and placed in water so that the animal pole is vertically beneath the vegetative pole. After activating the egg by passage of an electric current the egg is rotated through 180° so that the position of the poles is reversed. The egg is then inclined at 45° so that the rotation of orientation and consequent bilateral symmetry fall on a known plane. If the 180° rotation follows more than $1\frac{1}{4}$ hr. after the electric activation the plane of bilateral symmetry is no longer determined by the plane of the rotation of orientation. The position of appearance of the grey crescent can also be modified by rotating the egg up to $1\frac{1}{4}$ hr. after the rotation of orientation has occurred. In experiments with spermatazoan activation it was found that the sperm entered the egg in the plane of the rotation of orientation on what was to be the ventral surface. P. C. W.

Effects of high hydrostatic pressure on cell division in Arbacia eggs. D. A. MARSLAND (J. Cell. Comp. Physiol., 1938, **12**, 57—70).—At pressures up to 333 atm. the onset of the first cleavage is not delayed, but its rate of progress is diminished by as much as 5 times at the highest pressure. At 450 atm. the first cleavage is suppressed, and if it has already begun it disappears. For 15 min. this change is reversible, but if pressure is kept up longer the first cleavage fails to occur. In all cases the onset and progress of the second cleavage are unaffected by pressure changes. V. J. W.

Enzymes in ontogenesis (Orthoptera). V. Further studies on the activation of the enzyme, tyrosinase. J. H. BODINE and T. H. ALLEN (J. Cell. Comp. Physiol., 1938, 12, 71—84).—Ground-up 1 day post-diapause eggs of the grasshopper are centrifuged and give 3 layers of which the middle layer contains tyrosinase, and the upper, lipin, layer the "natural activator" of the enzyme. This activator, and Na oleate, both activate the enzyme without injury to it, and have a crit. point beyond which no increased activation occurs with increased quantity. Urethane, urea, acetone, and heat also all activate but cause some enzyme destruction in addition. V. J. W.

Localisation of the micromere-, the skeleton-, and the endoderm-forming material in the unfertilised egg of *Arbacia punctulata*. S. HÖRSTADIUS (Biol. Bull. Wood's Hole, 1937, 73, 295-316).—Unfertilised eggs were divided equatorially and then fertilised. The animal halves cleaved equally and formed blastulæ. The vegetative halves cleaved unequally, gastrulated, and formed skeletons. Some developed into plutein with well formed skeleton, mouth, and anus, others into ovoid larvæ with a poor skeleton and no mouth. Micromeres were only formed by the vegetative halves. They varied in no. and were always formed at the original vegetative pole. The halves of eggs divided meridianally, when they developed, formed plutei or ovoid larvæ like the vegetative halves. Eggs were also divided along a plane perpendicular to the line joining the nucleus to the centre of the egg. These divisions were hence random in relation to the egg axis. Subsequent fertilisation showed that the nucleated and enucleate halves formed micromeres and gastrulated with equal frequency. It is concluded that the micromere-, skeleton-, and endoderm-forming material is located in the vegetative part of the A. D. H. unfertilised egg.

Experiments on determination in the early development of Cerebratulus lacteus. HÖRSTADIUS (Biol. Bull. Wood's Hole, 1937, 73, 317-342).-At the 16-cell stage the 4 quartets of blastomeres are termed an₁, an₂, veg₁, and veg₂ respectively, an1 being nearest to the animal and veg2 to the vegetative pole. Vital staining showed that an, gives rise to most of the pretrochal ectoderm and probably to the most anterior part of the ciliated band, an₂ to most of the ciliated band and the rest of the pretrochal ectoderm, veg, to part of the ciliated band, the inside of the lappets, and the œsophagus, and veg2 to the stomach of the pilidium larva. The first cleavage furrow may bear any relation to the median plane of the larva. Isolated blastomeres of the 2-cell stage may form perfect dwarf larvæ. Those of the 4-cell stage always form abnormal larvæ but the abnormalities are not characteristic of any particular blastomere. Hence, up to this stage bilateral symmetry is not established. In the 8cell stage the isolated animal and vegetative quartets develop as they would normally. The animal quartet forms a blastula which does not invaginate, and has one or more apical organs and a ciliated band. The vegetative quartet yields a gastrula having an archenteron corresponding only with the stomach of the pilidium and a ciliated field. Isolation of the 4 quartets of the 16-cell stage yielded results agreeing with those obtained with the 8-cell stage. Larvæ derived from the fusion of an₁ and veg₂ contained only those parts normally derived from these quartets, i.e., ectoderm with apical organ and a small part of the ciliated band and a stomach. An animal and a meridional half of an 8-cell stage were fused. The development was completely mosaic, each differentiating as it would have done normally.

A. D. H.

Nature of amphibian organisation centre. VII. Evocation by further chemical compounds. C. H. WADDINGTON (Proc. Roy. Soc., 1938, B, 125, 365—372; cf. A., 1935, 778).—Evocator capacity was shown by many carcinogenic and œstrogenic substances and other related compounds. Substances were implanted in the form of suspensions in coagulated ovalbumin in the blastocoel of newt gastrulæ. No hypothesis can yet be made concerning the relationship between chemical structure and evocator power. F. B. P.

Membranes of the rat egg. J. JOLLY and C. LIEURE (Compt. rend. Soc. Biol., 1938, **128**, 458— 462).—The two membranes surrounding the 9-day rat embryo in utero are described. The inner membrane regulates the passage of serum to the young embryo, since if the embryo is placed in a culture solution with the inner membrane intact the latter does not grow and the development of the embryo is restricted and finally ceases. If the membrane is removed the embryo swells and grows at a faster rate than in the uterus. P. C. W.

Action of dead "organisers" of amphibia and mammals on the ectoderm of the toad's gastrula. G. A. SCHMIDT (Compt. rend. Acad. Sci. U.R.S.S., 1938, **18**, 125—128).—Grafts of rat kidney were implanted in the blastocoel of a gastrula of the toad *Bufo viridus*. Rapid growth occurred in the medullary tube and the embryo became fixed in the swelling. The medullary plate of the host developed typically, but below the induced growth the medullary plate grew without the formation of the chorda. Hence the chemical stimulus (organiser) is insufficient for the complete development of the neural tube. C. A. A.

Morphology of Ruffini's heliotropic phenomenon in amphibian eggs by ultra-violet light. Surface tension of the mucous involucra. C. BRUGT (Boll, Soc. ital. Biol. sperim., 1938, 13, 16— 18).—Ultra-violet irradiation of the mucous involucrum of toad's or frog's eggs lowers the val. of γ (e.g., from 69 to 42 dynes per cm.) and produces a concomitant gravitational displacement of the eggs. F. O. H.

Graphical study of the movement of smooth muscle of the external male genitalia. I. DEL CARPIO and C. MARCHI (Boll. Soc. ital. Biol. sperim., 1938, 13, 32—33).—The results of direct graphical recording of dartoid and phallic movements during erection and ejaculation in man are described.

(k) DIGESTIVE SYSTEM.

Parotid secretory rate in schizophrenic patients. E. I. STRONGIN and L. E. HENSIE (J. nerv. ment. Dis., 1938, 87, 715—724).—The average parotid gland secretion on one side in normal subjects measured 0.07 c.c. for 5 min. over a 2-hr. period. In late psychotic subjects the average rate was 0.38 c.c. whilst in early psychotics it was 0.005 c.c.

J. D.

F. O. H.

Deglutition as an expression of emotion. V. DUCCESCHI (Boll. Soc. ital. Biol. sperim., 1938, 13, 30).—Deglutition as an expression of emotion is due to a psychological spasm of the pharynx and probably not to increased salivary secretion. F. O. H.

Gastric secretion. VI. Statistical analysis of neutral chloride-hydrochloric acid relationship in gastric juice. F. HOLLANDER (J. Biol. Chem., 1938, 125, 161-168).—Analysis of the author's previous results (cf. A., 1931, 861; 1932, 1055) shows that the linear relationship between total acidity and neutral Cl' holds for the gastric secretion of the dog. Reasons are suggested for the different acidityintercept vals. obtained by other workers.

P. G. M.

Physiological importance of the gastrogram. S. TAGITA (Arch. klin. Chir., 1938, 192, 383-404).— Peristaltic movements of the stomach were recorded graphically by means of a rubber balloon 16 cm. long, swallowed by the patient, and connected by tube with the gastrographic apparatus. X-Ray photographs were taken simultaneously. The gastrograms obtained showed three essential components : a slight slow fluctuation in tone of the stomach wall occurring every min.; greater fluctuations in tone affecting peristaltic strength, and occurring every 30 sec.; regular shallow or deep peristaltic contractions giving rise to a weak or powerful rhythm, which occurs every 20 sec. B. W.

Gastroduodenostomy and gastrojejunostomy; certain anatomic and physiologic considerations. J. M. T. FINNEY (Amer. J. Surg., 1938, 40, 118– 122).—A review. F. H. M.

Gastric acidity as a manifestation of extragastric disease. F. L. APPERLY (Sth. med. J., 1938, **31**, 671–675).—A review. A. J. B.

Factors involved in the retardation of gastric emptying after gastric operations. I. S. RAVDIN (Pennsylvania med. J., 1938, 41, 695–700).— Hypoproteinaemia was induced in the dog by a lowprotein diet and plasmaphoresis. As the serumproteins fell, gastric emptying time (observed by X-rays) increased in both the operated and unoperated dogs. Gastric emptying time was increased in hypoproteinaemic dogs by withholding fluids for 36—48 hr., which caused a temporary increase in serum-protein. Similar observations were made in man. A solution of amino-acids injected intravenously post-operatively in man may prevent gastric retention. A. J. B.

Acid factor in peptic ulcer. I. W. FRIEDBERG (Amer. J. digest. Dis. Nutr., 1938, 5, 181–187).— The relationship between hyperacidity and peptic ulcer is questioned; a series of unpublished cases are referred to in which uneventful healing of peptic ulcers was noted during the administration of HCl in place of alkalis. N. F. M.

Pseudo-duodenal ulcers of the normal dog. K. F. VOLINI, H. L. WIDENHORN, and H. DE FEO (Arch. Surg., Chicago, 1938, **37**, 259—268).—Ulcerlike depressions occur in the duodenum of 90% of normal dogs. These pseudo-ulcers probably correspond with but are not identical with Peyer's patches. Owing to this possible source of fallacy microscopic examination must be employed in all cases to confirm the presence of ulceration. G. C. K.

Production of gastric ulcer by bile acids. T. YOSIDA (Fukuoka Acta med., 1938, 31, 133—134). —Deoxycholic and cholic acids were 6 times as toxic as glycocholate or taurocholate when given intravenously to rabbits and rapidly produced gastric ulcers. Intraperitoneal injection of bile or ligature of the common bile duct also produced ulcers. Increase in the gastric acidity accelerated ulcer formation from intravenously administered bile acids; a decrease in gastric acid did not protect completely. About 25 mg.-% of cholic acid was found in the blood of ulcer-bearing rabbits. Ulcer formation by injected bile salts was accelerated by ligature of the bile duct or partial hepatectomy. W. D'A. M.

Treatment of gastritis and gastric ulcer by oral administration of serum. R. SPECHT (Münch. med. Wschr., 1938, 85, 1031–1033).— Satisfactory results in the treatment of gastritis, gastric ulcer, and gastric hæmorrhages were obtained by the administration of large quantities of ox serum into the empty stomach. A. S.

Nutritional disturbances associated with diseases of the stomach and duodenum. W. G. MADDOCK (Amer. J. Surg., 1938, 40, 12—17).— Nutritional disturbances are common in patients with disease of the stomach and duodenum owing to impairment of digestion and absorption; vitamin deficiencies are especially common. F. H. M.

Distribution of enzymes in the duodenum and ileum of the rat. H. VAN GENDEREN and C. ENGEL (Enzymologia, 1938, 5, 71—80).—The distribution of amylase, maltase, and dipeptidase in various layers of the mucosa of the ileum and duodenum of the rat, fasting and after ingestion of food, was studied. H. G. R.

Experimental pyloric and jejunal obstruction. T. G. ORR and M. J. RUMOLD (Arch. Surg., Chicago, 1938, 37, 295—302).—In dogs absorption of NaCl by the stomach and upper intestine increases the survival time of animals with obstruction. Alcohol and a combination of alcohol and NaCl did not lengthen the life of the animals. Changes in the blood chemistry are described. G. C. K.

Pancreatic necrosis in carp (Cyprinidus). M. PLEHN (Virchow's Arch., 1938, 302, 9-38).— Pancreatic necrosis with fat necrosis is described in higoi, a Chinese fish related to the European carp. In the higoi, the pancreas consists of numerous small aggregations of acinous tissue, situated along the small roots of the portal vein. Even normally, not all of these small nodules are connected with the excretory ducts; for this reason, very small necrotic foci may be found in normal fish. It is suggested that owing to inadequate exercise and overfeeding in captivity, more pancreatic tissue develops and the enzymes secreted from the numerous nodules with no excretory ducts cause a widespread necrosis of adipose tissue. H. W. K.

Acute pancreatitis and blood-amylase test. W. C. COLE (Amer. J. Surg., 1938, 40, 245—259).— The pathogenesis of acute pancreatitis is reviewed. The val. of the blood-amylase test as a diagnostic aid is stressed. F. H. M.

Ability of the intestine to absorb serumprotein. U. DACHÀ (Boll. Soc. ital. Biol. sperim., 1938, 13, 175—177).—The serum of dogs, but not that of ox, is absorbed (as indicated by disappearance of N) in significant amounts from a Vella fistula in dogs. F. O. H.

Absorption of unsaturated fats (linseed oil) from a Vella fistula. VI. U. LOMBROSO, L. BELLINI, and S. FILIPPON (Boll. Soc. ital. Biol. sperim., 1938, 13, 177—178; cf. A., 1938, III, 136).— Following introduction of 1 c.c. of linseed oil into the fistula (dog), 22% (as compared with 50% for olive oil) is absorbed within 1 hr. F. O. H.

Effect of phloridzin on absorption of neutral fats. VII. S. FILIPPON and L. BELLINI (Boll. Soc. ital. Biol. sperim., 1938, 13, 178—179).—The absorption of olive oil from a Vella fistula (dog) is considerably diminished by intravenous injection of phloridzin emulsified in oil (cf. A., 1937, III, 384). F. O. H.

Regeneration of frog intestines. A. M. VASIU-TOTSCHKIN (Compt. rend. Acad. Sci. U.R.S.S., 1938, 18, 503—504).—Regeneration of the intestinal epithelium of frogs occurs mainly in spring. A. S.

Nervous system of gastro-intestinal tract. P. NoLF (Ann. Physiol. Physicochim. biol., 1938, 14, 293—320).—A review. C. C. N. V.

Gastro-intestinal motility of mammals. G. MORIN (Ann. Physiol. Physicochim. biol., 1938, 14, 321—402).—A review. C. C. N. V.

Enteric coatings. J. T. GOORLEY and C. O. LEE (J. Amer. Pharm. Assoc., 1938, 27, 379–384).— In-vivo tests (man) by X-ray and fluoroscopic observations indicate that, of the materials examined, only shellac and shellac-castor oil coatings persist to the intestine and are there disintegrated (independently of the acidity or neutrality of the intestinal juice) within an appropriate time. The taking of small capsules 1-2 hr. before meals gives the best results. Na tetraiodophenolphthalein is superior to BaSO₄ as an opaque substance. F. O. H.

Action of potassium on the intestine. R. HAZARD and L. WURMSER (Compt. rend. Soc. Biol., 1938, **128**, 491—493).—Injection of KCl (15 mg. per kg.) in the dog diminishes intestinal tone and peristalsis. The action is increased by a previous injection of cocaine but is reversed by yohimbine or adrenalectomy. This increase in tone must be due to the direct action of the K ion on smooth muscle.

P. C. W.

Mechanics of simple intestinal obstruction. L. SPERLING (Arch. Surg., Chicago, 1938, 36, 778-815).-In simple obstruction of the ileum in dogs and cats the intraenteric pressure in the obstructed segment is 4-19 cm. H_2O ; active peristalsis is present 7 days after obstruction. Simple ileal obstruction produces shortening of the obstructed segment. The wt. of the ileum above site of obstruction is 114% above normal, owing to increased blood content, but correction for shortening of the intestine reduces this increase to 34%. The tensile strength of the normal ileum as measured by the pressure at which rupture occurs is 700 mm. Hg, as compared with 300 mm. in obstructed ileum. The portion of ileum immediately above the obstruction is most affected; the antimesenteric border is the most frequent site of rupture. The normal violent peristaltic response of healthy intestine to decompression is absent after prolonged obstruction. Ileal obstruction is associated with a reduced power to absorb water and drugs from the lumen. Increase of the intraenteric pressure to 40 cm. H₂O promotes the absorption of water in normal loops but above this pressure absorptive power decreases. In obstructed segments there is a similar optimal pressure for absorption but with higher pressures decrease in absorption is more marked. Raised intraenteric pressure eventually produces circulatory disturbance in the intestinal wall. Venous stasis occurs with leucocytic infiltration of tissues, and infarction, necrosis, and perforation may result. Abnormal permeability is manifest only when viability of the wall is impaired by increased pressure maintained for a long period. D. S.

Rœntgenological studies of megacolon treated by sympathectomy. E. M. VAN BUSKIEK (Amer. J. Roentgenol., 1938, 39, 228—234).—In 4 cases of megacolon treated by resection of the lumbar sympathetic ganglia, X-ray photographs show postoperative changes in the colon. W. F. F.

Non-invagination of the appendical stump. J. K. DONALDSON and H. S. THATCHER (Sth. med. J., 1938, 31, 488—496).—Experiments on 82 dogs show that ligation of the stump followed by invagination is preferable to leaving the stump free in the peritoneal cavity; adhesions are less common. A. J. B.

Effect of irritants and autonomic drugs on the mucosa of the normal rectum and retosigmoid, with especial reference to mucous colitis. B. V. WHITE, jun., and C. M. JONES (New Eng. J. Med., 1938, 218, 791—797).—The rectal and rectosigmoid mucosa in a group of healthy young adult males was studied sigmoidoscopically. Irritants applied caused more reflex activity in the rectum than in the lower sigmoid. Local application of pilocarpine hydrochloride or physostigmine, or oral administration of acetyl-β-methylcholine or carbamylcholine, caused mucosal changes like mucous colitis. The response to other autonomic drugs was noted. A. J. B.

Chronaxie of the external anal sphincter. G. BOURGUIGNON and D. THEODORESCO (Compt. rend. Soc. Biol., 1938, **138**, 629-631).—The chronaxie vals. are greater in the female. The sphincter has three sets of fibres of different chronaxie vals. in both sexes. J. H. T.

(I) LIVER AND BILE.

Hæmoglobin injections as test of liver function. R. DUESBERG and H. HAGENBECK (Dtsch. Arch. klin. Med., 1938, **182**, 22—27).—2—3 g. of hæmoglobin dissolved in glucose are injected intravenously in man; after $1\frac{1}{2}$ and 3 hr. venous blood is tested for bilirubin (van den Berg's colorimetric method) and for hæmatin [measured spectroscopically as hæmochromogen following addition of ether and (NH₄)₂S]. A hæmatinæmia was found in cases of damaged liver cell function where the transformation of hæmoglobin into bilirubin was disturbed. A. S.

Clinical value of estimation of fructose tolerance by analysis of blood-fructose. F. K. HERBERT and G. DAVISON (Quart J. Med., 1938, 7, 355-371).—The rise in blood-fructose after 50 g. of fructose orally was determined by Patterson's method. This separate determination is preferable as variations in the blood-glucose, especially in diabetics, mask the changes in blood-fructose. Impairment of fructose tolerance is associated with disease of the liver parenchyma but the climical signs of this usually precede change in the fructose tolerance. H. P. H.

Changes in the livers of mice after administration of 3:4:5:6-dibenzcarbazole. E. BOYLAND and E. H. MAWSON (Biochem. J., 1938, 32, 1460-1466).—In mice, a single intraperitoneal injection of 3:4:5:6-dibenzcarbazole, in doses of 0.25 mg. per 20 g. of body-wt., increases the glutathione content of the liver, the max. effect being produced during the first 20 days. In 40% of the mice, considerable proliferation of the bile ducts subsequently occurs. When the dose is 0.5 mg., the glutathione content usually increases but sometimes decreases, the decrease being usually accompanied by partial necrosis of the liver lobules. The glutathione content is not increased by injection of 1:2:5:6-dibenzanthracene or of methylcholanthrene. The ascorbic acid and cholesterol contents of the liver are not affected by injection of these three compounds. W. McC.

[Effect of] choline and pancreas extract on fatty livers and ketosis due to anterior pituitary extract. E. M. MACKAY and R. H. BARNES (Proc. Soc. Exp. Biol. Med., 1938, 38, 803—805).—Increase of liver-fat due to certain pituitary extracts is not influenced by choline or by "Lipocaic." The accompanying ketonuria is not affected by "Lipocaic" but is slightly reduced by choline. V. J. W.

Treatment of hepatic disease. J. L. BOLLMAN (Ann. int. Med., 1938, 12, 1-5).—The toxic action of ethyl alcohol and CCl₄ on the liver is discussed.

C. A. K.

Desiccated liver powder in secondary amyloidosis. H. G. GRAVZEL and M. JACOBI (Ann. int. Med., 1938, 12, 39—58).—8 out of 13 cases of amyloid disease secondary to chronic infection in children were successfully treated by oral administration of desiccated powdered whole liver. C. A. K.

Vitamin- A_1 and $-A_2$ contents of mammalian and other animal livers. A. E. GILLAM (Biochem. J., 1938, 32, 1496—1500).—Livers of various mammals and birds generally contained considerable quantities of vitamin- A_1 but no $-A_2$; those of the giant monitor and fish-eating animals (seal and otter) contained small quantities of $-A_2$. The liver of a rat fed on a concentrate of fresh-water fish liver contained more $-A_2$ than $-A_1$. The $-A_1$ contents of all livers examined ranged from 0.7 to 32 mg. per 100 g. of fresh liver with the exception of the otter (47 mg.), python (86 mg.), and giant monitor (250 mg.).

W. O. K.

Combined cholecystography and liver function. Determination following the intravenous administration of iso-iodeikon. C. H. MCINTYRE (Amer. J. Surg., 1938, 40, 152-156).—Intravenous administration of iso-iodeikon is a safe procedure for all classes of suspected biliary tract pathology and factors of doubt present in oral administration are eliminated. The val. of blood-stream retention of this drug as a test of liver function is debatable; it is useless in the differential diagnosis of obstructive jaundice. F. H. M.

Evaluation of cholangiography. C. G. MIXTER and L. HERMONSON (Amer. J. Surg., 1938, 40, 223— 231).—From a study of 105 patients it is concluded that a normal cholangiogram is a reliable contraindication to operative opening up of the bile duct, except where there are very small stones in the gall bladder or the bile duct contains muddy bile or is the seat of cholangitis which may need drainage. If the cholangiogram is abnormal operation is indicated. It is advisable after opening the bile duct to do a follow up cholangiogram as there is a failure in 19% of such cases to eradicate stones or obstruction completely. F. H. M.

Reflux into the major pancreatic duct during cholangiography. N. L. LEVEN (Proc. Soc. Exp. Biol. Med., 1938, 38, 808—809).—Radio-opaque material injected into the bile duct was observed in the pancreatic duct in 21 patients out of 91 examined but was not const. in any one case. The reflux is probably caused by spasm at the ampulla. V. J. W.

Experiences with a substance ["Tembil," Temmler] influencing bile secretion. S. MARKEES (Dtsch. med. Wschr., 1938, 64, 778—781).—Prep. T 255 ("tembil," Temmler), obtained from *Curcuma longa*, increases bile secretion in dogs with a bile fistula. It increases bile formation in the liver and the excretion of bile from the gall bladder in man (duodenal tube experiments). A. S.

Total bile acid-cholesterol ratio in human and canine bile. H. DOUBILET and R. COLP (Arch. Surg., Chicago, 1938, 36, 998-1018).---Using Doubilet's method of determining cholic acid, deoxycholic acid, free, conjugated, and total bile acids, the bile acid-cholesterol ratios were determined in bile from normal and pathological gall bladders and from biliary fistulæ in man. The normal total bile acidcholesterol ratio is 20 in human gall-bladder bile. In cholecystitis the gall-bladder bile acids fell but cholesterol was const., the ratio falling as low as 6 in acute cholecystitis. The results are attributed to more rapid absorption of bile acids by the inflamed gall-bladder mucosa. They do not account for pptn. of cholesterol as it is four times as sol. in deoxycholic as in cholic acid. Hence a total bile acid-cholesterol ratio of 10 may be equal to a normal ratio of 20 on account of the observed relative increase in deoxycholic acid. In diseases affecting the liver parenchyma the amount of bile acids excreted falls slightly while the cholesterol excretion almost ceases. In bile from biliary passages obtained in continued drainage bile acids fluctuate in concn. while cholesterol remains const. Hepatic bile in cholangitis has a low bile acid but a normal cholesterol content. Bile acid and cholesterol excretion are thus independent hepatic functions. Bile salts administered by mouth diminish the danger of pptn. of cholesterol from the bile.

B. W. Bile acids in seal's bile. T. MORI (J. Biochem. Japan, 1938, 28, 161—164).—Cholic and β-phocæcholic acids (Windaus and Schoor, A., 1928, 639) were isolated from the bile of Otaria ursina. F. O. H. Cholic acid in rabbit's bile. N. ISHINO (J. Biochem. Japan, 1938, 28, 133—136).—Cholic acid was isolated and identified as the methyl ester and dehydrocholic acid. F. O. H.

Biochemistry of bird bile. T. ISHIHARA and T. MORI (Arb. med. Univ. Okayama, 1938, 5, 538— 541).—The bile of the common duck (*Anas domestica*), of the wild duck (*Mareca penelope*), and of the turkey (*Meleagris gallopavo*) contains mainly chenodeoxycholic acid and cholic acid; these acids are combined with taurine. A. S.

Biochemistry of the bile of the "Nibe"-fish. T. S. SIHN and K. MAEDA (Arb. med. Univ. Okayama, 1938, 5, 542—544).—The bile of the fish *Nibea Mitsukurii* contains mainly cholic acid and chenodeoxycholic acid, coupled with taurine. A. S.

Action of bile fractions of hibernating toads on blood and urinary calcium and phosphorus of rabbits. I. IMAI (Arb. med. Univ. Okayama, 1938, 5, 555—590).—Various fractions of bile of hibernating toads were injected subcutaneously into rabbits. Blood-P and -Ca are increased by alcohol-sol., ethersol., and ether-insol. bile fractions. Subcutaneous injections of cholic acid and ergosterol increase the blood-Ca and -P. Various bile fractions, cholic acid, and ergosterol increase the Ca and P excretion in rabbits. Bilirubin does not influence blood- and urine-Ca or -P. Blood-P is at first increased and subsequently diminished during obstructive jaundice. A. S.

Action of bile fractions of hibernating toads on the bile excretion of dogs. I. IMAI (Arb. med. Univ. Okayama, 1938, 5, 591—599).—Injections of alcoholic extracts of bile of hibernating toads increase the secretion of bile in the dog. A. S.

Biochemistry of fish bile. T. ISHIHARA (Arb. med. Univ. Okayama, 1938, 5, 535—537).—The bile of the Akô fish (*Sebastodes Matsubaræ*) contains mainly taurochenodeoxycholic acid and taurocholic acid. A. S.

Formation of gallstones. J. E. SWEET (Amer. J. Surg., 1938, 40, 162–170).—A discussion. F. H. M.

(m) KIDNEY AND URINE.

Measurement of the tubular excretory mass, effective blood flow, and filtration rate in the normal human kidney. H. W. SMITH, W. GOLD-RING, and H. CHASIS (J. clin. Invest., 1938, 17, 263-278) .- Methods are described, based on the capacity of the renal tubules to remove certain foreign substances (phenol-red, diodrast, hippuran) from the blood and to excrete them into the urine independently of glomerular activity, for measuring the "tubular excretory mass," and the effective renal blood flow in the human kidney. No significant quantity of phenol-red, diodrast, or hippuran was stored in the renal tubules. In 6 individuals the min. renal plasma flow, as measured by the diodrast clearance, had an average val. of 820 c.c. per 1.73 sq. m. surface area per min., which corresponds with a min. whole blood flow of 1384 c.c. Of the 820 c.c. of plasma, an average of 137 c.c. (16.7%) are filtered,

as shown by the inulin clearance, and the constancy of the relative vals. of the phenol-red and inulin clearances indicate that the filtration factor in the normal kidney is remarkably uniform. The average inulin clearance in 25 men was $122 \cdot 5 \pm 10.7$ c.c. per 1.73 sq. m. per min.; the average phenol-red clearance was 394 ± 45 c.c. per min. These clearances were const. from time to time in the same subject.

C. J. C. B.

Metabolic activity of the kidney on nitrogenous substances. S. FERDINANDO (Boll. Soc. ital. Biol. sperim., 1938, 13, 232—233).—During the passage of blood through the kidney (dog, cat, rabbit), the loss of N to the urine is compensated by the acquisition of non-protein, nitrogenous substances. The mechanism of this process is discussed. F. O. H.

Effect of kidney extracts on the elimination of copper. L. CALLEGARI and E. PESCETTO (Boll. Soc. ital. Biol. sperim., 1938, 13, 199-201).--Urinary excretion of Cu by rabbits, intravenously injected (in one or more doses) with Na Cu tartrate (equiv. to 4-6 mg. of Cu per kg.), is diminished by prior injection of glycerol extracts of kidney, whilst the fæcal excretion of Cu is increased. F. O. H.

Regeneration of the kidney of the rat produced by colchicine. P. CARNOT and R. M. MAY (Compt. rend. Soc. Biol., 1938, 128, 641-643).—After unilateral nephrectomy followed by injections of colchicine, mitotic division occurs in the remaining kidney and is confined almost entirely to the cortex. It attains its max. degree of activity during the first week following the nephrectomy. J. H. T.

Secretion in tissue cultures. III. Tonicity of fluid in chick mesonephric cysts. J. KEOSIAN (J. Cell. Comp. Physiol., 1938, 12, 23–37).—Tubules of the embryonic chick's kidney, grown in vitro, develop into cysts. The osmotic pressure of the fluid in these cysts was determined by comparing it in capillary tubes, by a modification of Barger's method, with known solutions. The fluid is 4-15%more dil. than the fluid of the culture medium, it is free from protein, and its accumulation proceeds against a positive hydrostatic pressure, and against an increasing concn. gradient. V. J. W.

Nephrectomy [and hepatic grafts] in preimmunised rabbits and augmentation of antitoxin. P. SÉDALLIAN, F. JOURDAN, and C. CLAVEL (Compt. rend. Soc. Biol., 1938, 127, 1510-1512).-Rabbits immunised with tetanus antitoxin were submitted to bilateral nephrectomy three days later. They lived 20-48 hr. One of the excised kidneys was grafted in to the neck of a rabbit homologically immune and perfused from the carotid artery of the recipient and secreted urine. Bilateral nephrectomy did not interfere with antitoxin augmentation. Grafting of the kidney of pre-immunised animal on to an animal with antitoxin content in the ascendant did not cause any augmentation of antitoxin in the J. H. T. grafted animal.

Effect of stimulation of ureter on kidney volume. M. BARIÉTY and D. KOHLER (Compt. rend. Soc. Biol., 1938, 128, 375-378).—Distension of the ureter results in vol. changes in the kidney of the same side, usually a diminution, rarely an increase, in chloralosed dogs. These changes bear no relation to blood pressure changes while the vol. changes in the kidney of the opposite side parallel pressure changes. The effects are more marked in the denervated kidney and the nearer the distension is to kidney. P. C. W.

Diminished oxygen tension in the kidney and "reversible" uræmic acidosis. W. KEMP-NER (Klin. Woch., 1938, 17, 971-973).—Renal tissue slices (rat, rabbit) subjected to O_2 lack (5.6% O_2) showed diminished power of NH₃ formation. E. M. J.

Renal diabetes. A. RÜHL and S. THADDEA (Dtsch. Arch. klin. Med., 1938, 182, 1-9).-Injections of large doses of adrenal cortex hormone reduced considerably the sugar excretion in urine in 2 cases of renal diabetes. A. S.

Neuro-hormonal regulation of water economy. I. Effects of cerebral narcotics or diuresis in healthy individuals. II. Diuretic disturbance by large intake of water. D. ALDERSBERG and R. FRIEDMANN (Z. klin. Med., 1936, 129, 319— 326, 327—362).—I. Chloretone and luminal have no effect or a moderately inhibitory action on diuresis in normal patients; in certain diseases chloretone produced increased diuresis.

II. Effects of pituitrin and cerebral narcotics on diuresis in certain neurological and internal disorders are examined in relation to the regulatory system of the mid-brain. A. G. P.

Antidiuretic substance present in the urine of dehydrated rats. G. A. BOYLSTON and A. C. Ivy (Proc. Soc. Exp. Biol. Med., 1938, 38, 644— 647).—Extracts were made of the urine of rats which had been deprived of water for 24—72 hr. These were injected into rats to which 20—30 c.c. of water had been given by stomach tube and the time taken for half this to be excreted was determined as an index of antidiuretic property of the urine. This time rose from 100 min. in controls to 147 min. in the 24-hr. group and did not increase further in the remaining groups. V. J. W.

Residual nitrogen and urea-nitrogen of the blood in some surgical, particularly kidney, diseases. J. KAYA (Tohoku J. exp. Med., 1938, 33, 383-397).—Report on 353 cases; the numerical findings in the individual cases are not given. F. JA.

"Vacate" oxygen determination in the urine of cases with kidney diseases. R. ENGER and E. VON SACHS (Dtsch. Arch. klin. Med., 1938, 182, 112—140).—" Vacate" O_2 is the amount of O_2 taken up by a substance during total combustion; "oxidation quotient" is the relation vacate O_2 /total urinary N; an increased oxidation quotient is found if more insufficiently oxidised substances are excreted in urine. Deproteinised urine is oxidised, in the presence of conc. H₂SO₄, with KIO₃. The consumption of KIO₃, determined by titration with I and Na₂S₂O₃, is an indication of the O₂ required for a total combustion of the urine. The vacate O₂ is very const. in normal persons; variations are indicative of disease. A. S.

Urinary [nitrogen : "vacate" oxygen] quotients in fasting rays and turtles. M. LÜDICKE (Biochem. Z., 1938, 298, 27—37; cf. A., 1938, III, 206).—In fasting rays (*Catulus stellaris*, L., *Scylliorhinus canicula*, L.) at 13.5° the quotient, which is approx. equal to that of tortoises, remains nearly const. for 30—45 days. In turtles (*Caretta caretta*, L.) the val. before and after a 50-day fast is equal to that in tortoises at the beginning of a fast. After 50 days the val. rises slightly. In *Lophius piscatorius*, L. the quotient is low. The Cl content of the urine of the rays is high and that of the turtles is low. A method of collecting the urine of the rays is described. W. MCC.

Action of vitamin-C on thyrotoxic creatinuria. H. J. VON PLEHWE (Dtsch. Arch. klin. Med., 1938, 182, 145—149).—The considerable creatinuria (up to nearly 500 mg. per day) produced by daily injections of thyroxine in a normal subject and in 2 cases of Graves' disease was reduced to subnormal by injections of large doses of ascorbic acid. A. S.

Action of autonomic drugs on urinary creatine and creatinine in castrated rabbits. K. KYOGOKU (Arb. med. Univ. Okayama, 1938, 5, 503-534).--The excretion of creatine in the urine is increased by subcutaneous injections into rabbits of cholic acid and diminished by adrenaline; the creatinine excretion is reduced by cholic acid and increased by adrenaline. These effects are reversed by previous extirpation of the testes. Removal of the testes diminishes the creatine and increases the creatinine excretion in urine. Atropine increases the creatine and reduces the creatinine excretion; ergotamine diminishes the creatine and increases the creatinine excretion; these effects are reversed by removal of the testes. Administration of extracts of testes increases the creatine and diminishes the creatinine excretion in the urine of castrated rabbits. A. S.

Ratio of urea to urinary ammonia ; its significance. J. CLARENS and H. CLARENS (Bull. Soc. chim., 1938, [v], 5, 1159-1162).—The ratio R =urea/NH₃ as a function of urinary acidity is best determined on a continuous series of samples. There are three periods in the variations of R. In the first, corresponding with very low acidities, R may attain very high vals. There is a second period with less rapid variation of R and, in the very acid region, a period of still less rapid variation. These latter merely establish the dependence of R on urinary acidity. Urea can only be formed in the liver from NH_4 in the presence of OH'. NH_4 are eliminated in the urine if the corresponding OH' have been used for the neutralisation of acids. In highly conc. urines R can have very low vals. Probably the parts of the kidney which secrete urea are not identical with those which secrete NH₃. H. W.

Variations during 24 hours in the elimination of the principal constituents of urine. S. BELLUC, J. CHAUSSIN, H. LAUGIER, and T. RANSON (Compt. rend., 1938, 207, 90-92; cf. A., 1936, 1406).—For successive periods of 4 hr. the urea and Cl eliminated

vary in the same sense; SO_4'' and PO_4''' vary in the same sense during waking hours and in the opposite sense during sleep. $p_{\rm H}$ shows min. during sleep and after the midday meal. The relationship between the concn. changes of the urinary constituents and the total osmotic pressure are shown graphically.

J. L. D.

Appearance of fat in urine after short occlusion of renal artery of dog. E. B. VERNEY and M. Voor (J. Physiol., 1938, 93, 51—52P).—One kidney (dog) is denervated and the other removed. Occlusion of the renal artery is effected by means of a special "compression unit." Occlusions of 5—10 sec. duration are sufficient for an excretion of fat provided they also produce an inhibition not necessarily complete of water diuresis. Large amounts of fat are normally present in the descending distal limbs of the proximal convoluted tubules; excretion of this fat into the tubules, as the result of ischæmia, is the probable explanation of the phenomenon.

J. A. C. Biochemistry of carbohydrates. XXXIII. Determination of sugars in glycoproteins by fractionation of their hydrolysates. H. MASAMUNE and Y. TANABE. XXXIV. Polysaccharides from urine. I. T. KOBAYASI. XXXV. Chondrosin. H. MASAMUNE and H. HISAMURA. XXXVI. Preparation of chondroitinsulphuric acid and the Molisch reaction. H. HISAMURA (J. Biochem. Japan, 1938, 28, 19-29, 31-35, 137-140, 141-148). -XXXIII. The glycoprotein is hydrolysed by N-H2SO4 and treated with phosphotungstic acid, excess of which is removed from the filtrate by KOH. The solution, after extraction with ether, is then examined for reducing power before and after treatment with HgII acetate and also for type of hexose by the orcinol and indole-diphenylamine reagents (Ozaki, A., 1937, III, 87). An alternative method is based on treatment of the hydrolysate with Pb acetate and is used when, e.g., chondromucoid is present.

XXXIV. The ppt. obtained from 50 l. of human urine by means of basic Pb acetate contained aminosugar, hexuronic acid, acetyl groups, $SO_4^{\prime\prime}$ -S, and galactose. At least two polysaccharides (mucoitinsulphuric acid ?) are present.

XXXV. Chondrosin ethyl ester hydrochloride, $[\alpha]_{12}^{23} + 49.02^{\circ}$ at equilibrium (5-48 hr.) in water, contains 43.9% of chondrosamine and 45.3% of glycuronic acid (cf. Levene and La Forge, A., 1915, i, 601).

XXXVI. Molisch tests indicate that chondroitinsulphuric acid, as prepared by various published methods, contains a common sugar as a contaminant. F. O. H.

Experimental alcaptonuria. A. FÖLLING and K. CLOSS (Z. physiol. Chem., 1938, 254, 256–257; cf. Papageorge and Lewis, A., 1938, III, 405).— If *l*-phenylalanine (0·33 g. per 100 g. body-wt.) in an equiv. amount of HCl is administered to rats, phenylpyruvic acid in amounts proportional to the dose of *l*-phenylalanine is excreted in the urine during the 24 hr. following administration. If the aminoacid is given in dil. aq. Na₂CO₃ ($p_{\rm H}$ approx. 8), large amounts of phenylpyruvic acid, and if in an equiv. amount of NaOH, small amounts of homogentisic acid and varying amounts of phenylpyruvic acid, are excreted. The acid and alkali of the solvent do not affect the liver enzymes of the rats but greatly affect intestinal absorption. Large doses of *d*phenylalanine, phenylpyruvic acid, or phenyl-lactic acid in approx. equiv. amounts of NaOH do not cause alcaptonuria. The disease is more readily produced in males than in females. W. McC.

Metabolism in infantile alcaptonuria. E. SCHMIEDLING (Monatsschr. Kinderheilk., 1938, 73, 216—227).—Campolon and fresh-liver treatment does not diminish the excretion of homogentisic acid in cases of alcaptonuria; thyroxine increased excretion of homogentisic acid as well as of N. Under anaërobic conditions neither normal serum nor serum of these patients can break down homogentisic acid; aërobically the acid disappears from both sera. The amount of homogentisic acid excreted in thyrotoxicosis exceeded the simultaneously increased N excretion. H. R.

Excretion of phenylpyruvic acid in the urine of the white rat in vitamin- B_1 deficiency. K. CLOSS and A. FÖLLING (Z. physiol. Chem., 1938, 254, 258—265).—In rats suffering from vitamin- B_1 deficiency (but not in healthy rats, or in rats suffering from -A deficiency), administration of large doses of *l*-phenylalanine results in excretion in the urine of small amounts of phenylpyruvic acid. The deficiency has no effect on the amounts of *d*-amino-acid deaminase in the liver and kidney. The loss of wt. resulting from $-B_1$ deficiency is slight in the kidneys and brain but great in the liver. In -A deficiency, the loss of wt. of the liver is great and the enzyme contents of the liver and kidneys decrease. In vitro, $-B_1$ in concns. of 0.01—0.1 mg. per ml. increases the activity of amino-acid dehydrogenases from $-B_1$ -deficient rats but does not affect that of healthy rats. W. McC.

Isolation of androsterone and trans-dehydroandrosterone from the urine of normal women. N. H. CALLOW and R. K. CALLOW (Biochem. J., 1938, 32, 1759–1762).—These substances have been isolated in yields comparable with those from the urine of normal men. H. G. R.

Absorption of anæsthetic agents from urinary bladder. R. R. MACINTOSH and C. L. G. PRATT (J. Physiol., 1938, 93, 53—54P).—General anæsthesia may be induced in a cat by placing 0.6 g. of tribromoethanol ("avertin") in the bladder; this quantity is 20 times the rectal dose for a 3-kg. cat. The dose of cyclohexenylmethyl-N-methylbarbituric acid ("evipan") given by this method is 2 g. (10 times as great as the intraperitoneal dose). Congestion of the bladder follows but is not serious if the bladder is emptied (by manual compression) as soon as general anæsthesia is established. J. A. C.

Determination of nicotinic acid, nicotinamide, and other pyridine-like substances in human urine. S. P. VILTER, T. D. SPIES, and A. P. MATHEWS (J. Biol. Chem., 1938, 125, 85–98).—Urine (3 c.c.), decolorised by C, is evaporated to dryness at 80—100° and 1 c.c. of 1% alcoholic 2:4-dinitrochlorobenzene is added to the residue. After 1—3 hr., the solution is evaporated and the residue heated at 105° for 10 min., after which it is dissolved in 15 c.c. of cold 0.1% alcoholic NaOH, filtered, and the colour determined, using special light filters, with reference to the appropriate curve. Nicotinic acid gives a purple and the amide a red colour. Trigonelline and picolinic acid give no colour. Pellagrins excrete little colour-producing compounds. Liver and yeast, but not flour, cabbage, etc., contain nicotinic acid compounds. P. G. M.

Micro-determination of lead in urine. J. F. REITH and C. P. VAN DIJK (Chem. Weekblad, 1938, 35, 671-677).-500 c.c. of urine are neutralised with 25% aq. NH₃ to $p_{\rm H}$ 4-5, 20 c.c. of 4% aq. NH₄ oxalate are added, and the Pb is co-pptd. on Ca oxalate by adding 10% aq. CaCl₂. The ppt. is separated, freed from oxalic acid by HNO₃, followed by HClO₄, dissolved in 50 c.c. of water, and treated with 8 c.c. of 30% NH₄ citrate, 2 c.c. of 10% aq. NaCN, and 25% aq. NH₃ unil alkaline (phenolphthalein). Separation of Pb from the solution and its titration with diphenylthiocarbazone then follows the method of Wilkins *et al.* (A., 1935, 531). Details are also given for the prep. of the necessary reagents and the apparatus to ensure freedom from Pb. S. C.

(n) OTHER ORGANS, TISSUES, AND BODY-FLUIDS. TUMOURS.

Temperature of whales. B. A. ZENKOVITSCH (Compt. rend. Acad. Sci. U.R.S.S., 1938, 18, 685— 687).—The body-temp. of dying whales, determined by inserting thermometers 30—40 cm. below the surface of the animal, varied between 38° and 38.5°. A. S.

Influence of posture on skin and subcutaneous temperatures. H. S. MAYERSON and L. A. TOTH (Proc. Soc. Exp. Biol. Med., 1938, 38, 879—881).— Human subjects were placed on a tilting table, and surface and subcutaneous temp. of various regions of the body were measured by thermocouples. When the subject was raised to an angle of 75° with the horizontal all the temp. fell, with the exception of that of the chest, and most markedly in the extremities, and returned to their former levels when the subject was brought back to the horizontal. V. J. W.

Optimal temperature for growth in young dogs. M. BACCINO (Compt. rend. Soc. Biol., 1938, 128, 401-403).—By placing a litter in various positions along a tube with a temp. gradient from end to end and observing their behaviour a good approximation to the optimal temp. can be obtained. Curves are given showing the rapid fall in optimum temp. during the first few days after birth and slow fall later. P. C. W.

Normal variations in composition of Light Sussex cockerels. E. T. HALNAN (J. Agric. Sci., 1938, 28, 379—392).—A negative correlation is established between the % fat and the % water in the carcases. Use of live-wt. increases as a measure of energy storage is vitiated by the variability of the fat content of individuals. Bones as well as flesh are probably concerned in the general fat metabolism of the body. The ash content of bones is positively correlated with that of the flesh and offal. The protein : ash ratio in two breeds examined is practically const. for all individuals above 7 weeks of age. The individual variation in energy content is $\pm 11.4\%$ of the total energy content. A. G. P.

Relationship between choline-esterase and development of behaviour in amphibia. K. A. YOUNGSTROM (J. Neurophysiol., 1938, 1, 357—363).— The amount of choline-esterase present during representative stages of development has been determined for three species of amphibian embryos. A significant increase occurred during the period of developing motility. S. Cr.

Genetics of transposition of the viscera. E. A. COCKAYNE (Quart. J. Med., 1938, 7, 479–493).— Complete transposition of the viscera is inherited as a recessive and is determined by a single autosomal gene. Developmental abnormalities are more likely to occur with sinistral than with dextral rotation of the viscera and are commoner when the rotation is incomplete. H. P. H.

Body growth and visceral disease. A. LOESCHKE (Arch. Kinderheilk., 1938, 114, 22–37).— The disturbance of growth which may be associated with visceral disease is attributed to constitutional abnormalities. H. R.

Occurrence of shock disease among young snowshoe hares. R. G. GREEN, D. W. MATHER, and C. L. LARSON (Proc. Soc. Exp. Biol. Med., 1938, 38, 816—817).—This disease, involving hepatic degeneration and hypoglycæmia, was found to occur in a controlled population of haros during the summer as well as the winter, and in 6-week old as well as in adult hares. V. J. W.

Acquired resistance of fixed tissue cells to injury. W. DE B. MACNIDER (Ann. int. Med., 1938, 12, 147-165).—A review. C. A. K.

Age and the concentration of acid-soluble phosphorus in human tissues. L. PINCUSSEN, C. I. REED, and M. B. VISSCHER (Ann. int. Med., 1938, 12, 59—70).—The total acid-sol. P in human pectoral muscle, liver, and kidney cortex was determined in 76 cases (aged 3 hr. to 90 years) post-mortem. In muscle the mean concn. increased up to 30 years of age and decreased after 40. In liver and kidney the concn. increased up to 3 years, remained const. up to 50, and subsequently declined progressively. C. A. K.

Free and bound water in the tissues. M. NICLOUX (Ann. Physiol. Physicochim. biol., 1938, 14, 613-616).—By exposing fish to an atm. of dil. alcohol the coeff. k representing the protein-bound water can be calc. and is shown to be variable in different species. k approximates to 1 the higher the mol. concn. of the milieu. If marine animals which can live in fresh water are transposed, k gradually increases and vice versa. By attaching a cannula to the cloaca of a frog it has been found that the alcohol content of the body-free water is identical with that of the milieu in which the animal is placed. C. C. N. V.

Relation between skeletal calcification and body growth. A. ROCHE, J. ROCHE, and Y. MAR-CELET (Compt. rend. Soc. Biol., 1938, 128, 910— 912).—The P/N ratio for various bones and teeth of growing rats is plotted against body-wt. The curves show that calcification occurs uniformly throughout the whole skeleton, the max. rate being at 125 g. bodywt. The periods of max. calcification are related to stages in the body growth of the rats. P. C. W.

Development of the carpus and rickets. E. GRASER (Z. Kinderheilk., 1938, 60, 30-51).-257 X-ray photographs of normal carpi showed that the centre of ossification for the os triquestrum appears at the end of the 3rd year. Rickets causes precocious ossification in the 1st and 2nd year. Florid rickets diminishes the growth of the carpal centres; during healing ossification is accelerated and new centres may appear (in the os triquetrum and lunatum). Apart from rickets and congenital syphilis, no other disease accelerates ossification. H. R.

Resistance of osseous tissue in different breeds of animal (Bos taurus). E. TOAJARI (Boll. Soc. ital. Biol. sperim., 1938, 13, 140—142).—The metacarpus of the Dutch breed of calf has a smaller mechanical strength than that of the Podolian breed, the difference being related to the fine structure of the bones. F. O. H.

Osteosynthesis in the presence of metals. C. S. VENABLE (Sth. med. J., 1938, 31, 501-508).-Observations on the effect of various metals on salt solution showed that only vitallium (alloy of Co, Cr, and Mo) underwent no corrosion. A voltaic cell was created by placing various metals in the tibia of a rabbit. No current was registered with vitallium. Vitallium screws were successfully used (with no rarefaction of bone) in a no. of fractures. A. J. B.

Osteotropism of pharmaceutical substances. I. N. ERCOLI (Boll. Soc. ital. Biol. sperim., 1938, 13, 237—240).—The fixation of trypan-blue, alizarin, and porphyrin derivatives by bone tissue is discussed. F. O. H.

General reactions of the skeleton following the fracture of a bone. J. ROCHE, A. FILIPPI, and M. MOURGUE (Compt. rend., 1938, 207, 254—257).— All long bones of pigeons show enhanced phosphatase activity after fracture, reaching a max. in 20 days and diminishing after calcification (40 days). The P/Nratio of both humerus bones, one of which is fractured, diminishes at first and then increases, due to the fixation of PO_4''' as the callus forms. J. L. D.

Solubility of bone salt. II. Factors affecting its formation. III. Partial dissolution of bone and carbonate-containing calcium phosphate precipitates. M. A. LOGAN and H. L. TAYLOR (J. Biol. Chem., 1938, 125, 377–390, 391–397; cf. A., 1937, I, 412).—II. Ca₃(PO₄)₂ ppts. formed at $p_{\rm H}$ 7·0–7·4 in solutions containing HCO₃' remove Ca^{**} and CO₃'' from solution even when the product [Ca^{**}][CO₃''] is less than the solubility product of CaCO₃. During ageing of the ppt. in contact with the solution the Ca^{**} and CO₃'' contents of the ppt. increase, whilst the PO₄''' content decreases, most of these changes occurring during the first 5 min., and the final composition of the ppt. depends on the relative concn. of the ions present.

III. By continuous extraction with dil. H_2SO_4 or lactic acid, more than 50% of the CaCO₃ can be removed from the glycerol ash of bone, whilst less than

10% of the $PO_4^{\prime\prime\prime}$ is removed. Similarly most of the $CO_3^{\prime\prime\prime}$ can be removed from pptd. $Ca_3(PO_4)_2$ whilst only 4—8% of the $PO_4^{\prime\prime\prime\prime}$ is dissolved. In the latter case, however, the amounts of cation removed are much less than the equiv. of the anions removed. This is attributed to replacement of $CO_3^{\prime\prime\prime}$ and $PO_4^{\prime\prime\prime\prime}$ by OH'. J. W. S.

Glycogen in ossifying cartilage. H. GENDRE (Bull. Histol. Tech. micr., 1938, 15, 165—178).— Glycogen is present in large amount in the hypertrophied cartilage cells at the zone of arrival of blood vessels : fine granules are also present in the osteoblasts and between the young trabeculæ. The glycogen content of the cartilage cells increases with their vol.; when the cells are destroyed the glycogen is dispersed between the trabeculæ. Cartilage-glycogen may participate in general carbohydrate metabolism, in addition to its local rôle in chemical changes of ossification. E. E. H.

Skin distensibility. W. A. SODEMAN and G. E. BURCH (Proc. Soc. Exp. Biol. Med., 1938, 38, 882-883).—Two Bakelite cubes are fastened to the skin with collodion 5 cm. apart. A steel spring caliper presses the cubes apart with a force of 100 g. and the distance they are separated is measured. The method has been used in cases of scleroderma and cedema. V. J. W.

Occurrence of histamine in mammals. D. ACKERMANN and M. MOHR (Z. physiol. Chem., 1938, 255, 75—81).—The isolation of histamine [dipicrate; aurichloride; diflavianate, m.p. 262—263° (decomp.)] and *l*-histidine from fresh ox liver is described, a modification of the method of Kossel and Kutscher being used. W. McC.

Preparation of nucleosides from thymonucleic acid. W. KLEIN (Z. physiol. Chem., 1938, 255, 82-88; cf. A., 1932, 776, 1167; 1934, 922).---Na thymonucleate in NH₃-(NH₄)₂SO₄ buffer ($p_{\rm H}$ 8·9) in presence of MgSO₄ is hydrolysed with glycerol extract of intestinal mucous membrane of the calf. From the hydrolysate cryst. guaninedeoxyriboside, hypoxanthinedeoxyriboside, thymosine, and cytosinedeoxyriboside are obtained by pptn. and fractional crystallisation, treatment with Pb" and NH₃ being unnecessary except in the case of the guaninenucleoside. The total yield of the nucleosides is 40% or more. The procedure may also be applied to yeastnucleic acid, most of the cytosineriboside of which is deaminated by the enzymes of the extract. Deoxyribose has m.p. 90° and $[\alpha]_{20}^{20}$ -58° in water.

W. McC. Carotenoid pigments of various Salmonidæ. C. MANUNTA (Boll. Soc. ital. Biol. sperim., 1938, 13, 226—227).—The distribution of xanthophyll (free and esterified), lutein, astacene, and carotene in the skin and eggs of Salmo iridea, S. fario, and their hybrids, and in Thymallus vulgaris is described.

F. O. H. Astaxanthin and ovoverdin.—See A., 1938, II, 446.

Inheritance of abnormal amylase activity in Bombyx mori. K. YAMAFUJI and S. GOTO (Enzymologia, 1938, 2, 329-330).—Diminished amylase activity, brought about by unfavourable breeding conditions, is not inherited in the second generation. P. G. M.

Blood circulation and metabolism of sabellids. H. M. Fox (Proc. Roy. Soc., 1938, B, 125, 554-569).—The distinguishing feature of sabellid worms is the presence in their blood of the respiratory pigment chlorocruorin. Most of the blood vessels of sabellid worms are rhythmically contractile and there is evidence that the movement of the blood is a circulation. Since capillary blood vessels supply body-wall glands but not the muscles, the muscles must obtain O, from the sea-water and from the coelomic fluid. Spirographis with its tube can live in water deficient in O2, but dies when deprived of its tube. It can live indefinitely in aërated water even when deprived of its tube. If it is put into a glass tube after being deprived of its tube, it remains healthy in water deficient in O_2 , and lines the glass tube with a secretion. Worms in natural or artificial tubes perform vigorous rhythmic body movements which are unaffected by O₂ deficiency or CO₂ excess in the water. These movements probably continually renew the water in the tubes, and enable the animal to get enough O₂ to support life even from O2-deficient water. The movements are very feeble or absent in tubeless worms. Therefore, in addition to being protective, the tube also provides a mechanical stimulus for reflex rhythmic body movements necessary to the animal with its tube. There is a fall in O_2 consumption and in NH₃ excretion of Spirographis removed from its tube, probably partly due to lack of vigorous movements. The crown of these worms is a respir-F. B. P. atory organ.

Choline-esterase in cobra venom. N. K. IYENGAR, K. B. SEHRA, B. MUKERJI, and R. N. CHOPRA (Current Sci., 1938, 7, 51—53).—Cobra venom (0.005%) hydrolyses acetylcholine but not ethyl butyrate; eserine inhibits the reaction. Russell's viper venom has no choline-esterase activity. The presence of the esterase in the venom probably explains its effect in paralysing the respiratory muscles, but not necessarily its central effect (cf. A., 1935, 115). J. L. D.

Phosphoric esters in human, goat, and cow milk. G. DE TONI and G. GRAF (Z. Kinderheilk., 1938, 60, 74—76).—Autolysis of milk (by its phosphatase) shows that human and goat milk, unlike cow milk, contain practically no pyrophosphates, but contain hexose phosphoric esters which do not occur in cow milk. Boiling cow milk increases its inorg. P concn. but the inorg. P contents of human and goat milk are unaffected. The phosphatases in human milk can hydrolyse the phosphoric esters of milk and blood, but blood-phosphatases cannot hydrolyse the phosphoric esters of milk. H. R.

Relation between rate of growth and milk and fat production. H. P. DAVIS and E. L. WILLETT (J. Dairy Sci., 1938, 21, 132).—No relationship exists between rates of growth during the first 2 years of life, as measured by live wt., height at withers, and chest girth, and production in subsequent lactations. W. L. D. Methods of determining chlorine in milk and their application in the detection of mastitis. G. P. SANDERS (J. Dairy Sci., 1938, 21, 153—154).— The method whereby milk, HNO_3 , $KMnO_4$, and excess of $AgNO_3$ are digested together, followed by titration with aq. KCNS by the Volhard method, is accurate. Digestion can be omitted by using a $AgNO_3$ - HNO_3 -Fe alum solution and titrating with aq. KCNS. Milk with more than 0.15% Cl was always mastitis positive, and vals. of 0.12—0.15 were either suspected or positive cases. After recovery from mastitis yield and Cl content of milk do not return to normal during the same or succeeding lactations.

W. L. D.

Fibroma virus infection in tarred rabbits. C. G. AHLSTROM and C. H. ANDREWS (J. Path. Bact. 1938, 47, 65-86).—Regression of lesions produced by intradermal or subcutaneous inoculation of the infectious fibroma virus (OA strain) is much delayed in tarred rabbits which have been injected intramuscularly even with a single dose of tar. Subcutaneous tumours may even grow progressively and invasively in some tarred rabbits until the animal's death, coming to resemble true neoplasms very closely, both clinically and histologically. After intravenous inoculation of fibroma virus into tarred rabbits, generalised fibromatosis commonly develops and may be fatal. Tarred rabbits develop antibodies to the virus and become immune to re-inoculation in the same way as controls. Benzpyrene and other carcinogenic hydrocarbons produce a similar effect to that of tar, but it is not certain how far the effect is sp. for carcinogenic substances. No effect of tar was detected in infections with the inflammatory (IA) varient strain of fibroma virus nor with vaccinia virus. [11 photomicrographs.] C. J. C. B.

Transplantable sarcoma occurring in a rabbit inoculated with tar and infectious fibroma virus. C. H. ANDREWS and C. G. AHLSTROM (J. Path. Bact., 1938, 47, 87—99).—In a rabbit which had received 2 intramuscular tar injections 41 months apart, followed by intravenous injection of fibroma virus, the virus became localised at the tarred site and later a fibrosarcoma developed there. This proved transplantable in series through 12 rabbits. At first regression was the rule but later many of the rabbits showed progressive growth and in some metastases occurred. All attempts to demonstrate fibroma virus in the sarcoma by direct and indirect means failed. In 2 rabbits transplants of the sarcoma and regressed but showed renewed growth following intravenous inoculation of fibroma virus. [3 photomicrographs.] C. J. C. B.

Cancer of the lung in miners of Joachimsthal. H. SIKL (Presse méd., 1938, 46, 673-674).—A review. G. SCH.

Schneeberg lung carcinoma. H. R. DÖHNERT (Z. Krebsforsch., 1938, 47, 209–239).—48 white mice introduced into the Schneeberg mines had a higher incidence of tumours (25%) than the controls (10-15%). E. M. J.

Lymphatic injection with radio-opaque substance for Röntgen examination in carcinoma of the mammary gland. J. J. GLERIDE (Amer. J. Surg., 1938, **39**, 617—619).—A technique is described for injecting the breast lymphatics with a radio-opaque solution for determination of the extent of breast disease and the extent of metastases. F. H. M.

Individuality of the enzymes of cancerous blood. Blood-enzymes and the "suppressor." A. GURWITSCH and L. GURWITSCH (Enzymologia, 1938, 5, 26—33).—The principle in cancerous blood abolishing the mitogenetic activity occurring in normal blood (Siebert and Seffert, A., 1937, III, 122) or yeast is contained in the protein-free blood filtrate. It is purified by adsorption on kaolin and elution with aq. NH₃ reagent. Its source is the tumour tissue; only min. amounts occur in the body fluids. It resembles in some respects (e.g., stability, electric charge) the enzymes of cancerous tissue. The relationships between suppressor, blood-enzymes, and mitogenetic irradiation are discussed. F. O. H.

Papain activators and cathepsin in tumours and the action of cysteine. M. J. EISEN and A. LANGER (Enzymologia, 1938, 2, 321-328).—The contents of cathepsin and papain activator in 60% glycerol extracts of healthy Ehrlich mouse carcinoma are less than those of extracts of parenchymatous organs; the differences are greater in regressing tumour tissue but are independent of the age of the tumour. Intraperitoneal injection of 1:80 papain solution or of 2--2.5 mg. of cysteine hydrochloride per 20-g. animal had no effect on tumour growth. P. G. M.

Transmission of the Rous filterable agent to normal tissues of fowls. E. MELLANBY (J. Path. Bact., 1938, 47, 47-64).-In fowls with Rous sarcoma, the Rous agent is widely diffused throughout the organs. It is unusual to find Rous virus in the tissues of a Rous tumour-bearing fowl until the 7th day after injection, i.e., till the growth is established, or at a later period than the 20th day (when the fowl is dying) even when metastases are present. The spleen and liver of tumour-bearing fowls can be dried and ground and still retain their tumourinducing properties. After washing out the blood of Rous fowls, or of fowls which had received an intravenous injection of Rous agent, with Ringer's solution, the injection of cells of spleen and liver may still induce growths in other birds, indicating that the Rous agent enters the cells of these organs. On giving one injection of a cell-free filtrate of Rous sarcoma intravenously to fowls, the presence of the Rous virus can be demonstrated in the spleen at all periods up to 5 days, suggesting that the virus injected is not reduced in amount or in effectiveness C. J. C. B. in this time.

Resistance of animal cells to cold. J. KLINKE (Naturwiss., 1938, 36, 594—595).—Tumour cells which have been frozen in liquid N₂ at -196° and then thawed retain the property of producing tumours on inoculation into animals. Evidence has been obtained that cells both of tumour and normal tissue which have been so frozen and thawed still possess properties characteristic of life. W. O. K. Glycolysis and glycogenolysis in the blood, muscle, sarcomatous tissue, and liver of normal and sarcomatous rabbits. H. MARUYAMA (Fukuoka Acta med., 1938, 31, 136-138).

W. D'A. M.

Reversible oxidisability and carcinogenic activity in polycyclic series. L. VELLUZ (Compt. rend., 1938, 206, 1514-1516).-The following compounds applied cutaneously to mice over a period of 10 months were not carcinogenic: (1) 9methyl-, ethyl-, -phenyl-, or -anthranyl-anthracene, or (2) anthracenes substituted at the 9:10 positions by phenyl, naphthyl, phenyl + carboxy, phenyl + carbomethoxy, and phenyl + 9'-anthranyl; (3) 9:10:11:12-tetraphenylnaphthacene and its tetramethyl and hexabromo-derivatives; (4) 9:12:10:11diphenylene - 9: 10 - diphenyl-9: 10 - dihydronaphthacene, and the blue hydrocarbon described by Badoche (A., 1932, 507). Injection of the compounds in 0.2% oily solution did not affect the occurrence of papillomas and epitheliomas resulting from simultaneous application of 3-methylcholanthrene. The only exception was 9-phenylanthracene (m.p. 156°) which caused a temporary alopecia on cutaneous application and when injected caused a 2-3 months' delay in carcinogenesis by methylcholanthrene. 1:2:5:6-Dibenzanthracene and methylcholanthrene were not photo-oxidisable, and the latter retained its carcinogenic activity after 2 weeks' insolation.

J. L. C.

Procedures for assessing the biological activity of mineral oils. C. C. TWORT and J. M. TWORT (Oil and Col. Tr. J., 1938, 94, 251-254, 315-318).—Tests on mice show that the carcinogenic activity of the oils can be closely correlated with the val. of the expression $(n-1)/d + 3(d-0.9000)/20 - \eta/50d$. The dermatitic activity is related to the fall in *n* after injection into the peritoneal cavity of mice, *n* being determined on the oil used and on that recovered 7 days after injection. Disturbing factors and possible correlations with other physical consts. are discussed. D. R. D.

Specificity of tumour antigens. G. D'ALES-SANDRO and E. SALADINO (Z. Immunitätsforsch., 1938, 93, 27—43).—When immunising rabbits with suspensions of Jensen sarcoma, occasionally antisera which react only with sarcoma-, spleen-, and lungantigen are produced. The sensitivity to Jensen sarcoma can be further increased by absorption. This is not due to sp. sarcoma antibodies but to the high content of species-sp. antibodies, the Jensen sarcoma being a very potent antigen. G. W.

(o) NUTRITION AND VITAMINS.

Relation of nutrition to hormones. C. W. TURNER (J. Dairy Sci., 1938, 21, 99–100).—The importance of dietary composition in relation to growth hormones is discussed. If a ration is deficient in org. or inorg. constituents which influence the secretion of hormones associated with growth or milk secretion even if sufficient for supplying the precursors of growth and milk, production is limited. Traces of elements needed for nutrition are due to their presence in hormones. The interrelation of the

3 T (A., III.)

vitamins and hormones has already been shown to exist, e.g., vitamin-B and the secretion of the gonadotropic hormone, probably associated with P deficiency. W. L. D.

Relation of the creatinine-height coefficient to various indexes of nutrition. A. L. DANIELS, M. K. HUTTON, and B. NEIL (Amer. J. Dis. Child., 1938, 55, 532—543).—The relation of creatinine excretion to the (height)³ is studied in two main groups of privileged and unprivileged children. The creatinine-height coeff. possibly coupled with studies of bone growth by X-rays might be used for evaluation of nutritional status. A. C. F.

Nutritional requirements of pregnant and lactating rats studied by the self-selection method. C. P. RICHTER and B. BARELARE, jun. (Endocrinol., 1938, 23, 15—24).—Rats were kept under such conditions that they had access to various foodstuffs and saline solutions, and the rates at which these were consumed were measured. During pregnancy the appetite for casein, olive oil, NaCl, Na phosphate, Ca lactate, and yeast was increased, that for KCl and cod-liver oil was unaltered, and that for sucrose was decreased. During lactation the same desires were shown to a rather higher degree and after weaning all fell to normal except for a Ca lactate appetite which persisted for some weeks. V. J. W.

Effect of fasting and refeeding on milk secretion in cow and goat. L. E. WASHBURN (J. Diary Sci., 1938, 21, 123).—There is a persistency to maintain lactation during fasting in both species and fasting may have a beneficial effect on later secretion. In 72 hr. after feeding, the yield from the cow has decreased 50% and the fat % has increased 100% while in the goat yield has declined 80% and the fat % increased 400%. W. L. D.

Nutritional growth-values of protozoal fauna of the cud of ruminants. F. USUELLI and P. FIORINI (Boll. Soc. ital. Biol. sperim., 1938, 13, 11— 14).—The growth of young fowls on a basal diet of maize, mineral salts, and vitamins is increased by the addition of the bacterial and, to a greater extent, protozoal fraction from the contents of the rumen; the normal food fraction is without effect.

F. O. H.

Dietetic treatment of obesity. R. BOLLER (Klin. Woch., 1938, 17, 1018).—12 cases of obesity showed considerable loss of wt. on a diet which consisted of alternate periods of protein-fat (5 days) and proteincarbohydrate, the caloric vals. being 2000—3200 and 1600—2400 respectively. E. M. J.

Nerve degeneration and bone hypertrophy induced in young animals by diet. E. MELLANBY (J. Physiol., 1938, 93, 42—43P).—Degeneration of afferent nerves and ascending tracts in the central nervous system is produced in young dogs by diets deficient in vitamin-A and rich in cereals. It is suggested that all these degenerations are due to bone overgrowth which may press on or stretch the various nerves. J. A. C.

Roasted soya bean in infant feeding. R. A. GUY and K. S. YEH (Chinese Med. J., 1938, 54, 101—110).—Soya bean, roasted, ground dry, and emulsified with water, when supplemented with NaCl, Ca lactate, cabbage soup, and cod-liver oil is palatable and contains all the amino-acids, vitamins, and salts necessary for human growth. W. J. G.

Acid-base balance of cereals and some related food materials. J. DAVIDSON and J. A. LECLERC (Food Res., 1938, 3, 393-402).—Employing the method described previously (A., 1935, 554), all cereals tested, except yellow maize, had an acid balance, buckwheat, soya beans, jack beans, and potatoes a base balance. The ash of all was alkaline. High alkalinity is related to a high proportion of P as $PO_4^{\prime\prime\prime}$. E. C. S.

Effect of percentage of protein in the diet on growth and feed utilisation of male chickens. J. C. HAMMOND, W. A. HENDRICKS, and H. W. TITUS (J. Agric. Res., 1938, 56, 791-810) .- Live wts. of chicks (1-14 weeks) increased with the level of protein intake. Differences in wt. thus produced were maintained but not increased from 14 weeks to maturity. Optimum food utilisation was attained with rations containing 21 and 25% respectively for ad lib. and restricted feeding. For optimum protein utilisation the corresponding protein contents of the ration are 17 and 15% respectively. Chicks fed ad lib. reached maturity much earlier than when food consumption was restricted. When chicks reach half mature wt. differences in protein consumption have less influence on the efficiency of utilisation. When max. live wt. is reached 13% of protein in the diet is adequate for maintenance. A. G. P.

Variation in nutrient value of casein. H. D. BRANION, R. L. MARTIN, E. B. ROBERTSON, L. A. STEPHENS, and R. VAN DER HOORN (Poultry Sci., 1938, 17, 301—316).—Certain commercial samples of casein used in poultry foods may contain riboflavin and the chick anti-dermatitis factor. Poor growth and occurrence of "arthritis" due to feeding of purified casein may depend on absence of inorg. substances. "Vitamin- B_2 -deficient" diets are deficient in flavin and the anti-dermatitis factor. Differences in the requirements of the sexes of the factors of the $-B_2$ complex are indicated.

A. G. P.

Effect of cystine deficiency on the development of experimental granulomata. H. MAZOUÉ and B. NATAF (Compt. rend. Soc. Biol., 1938, 128, 825—826).—Cystine, though indispensable for growth, does not enter into the composition of collagen fibres. Development of experimentally induced granulomata in rats on a cystine-deficient diet is retarded in the inflammatory stage but is normal after the fibrous tissue has appeared. P. C. W.

Development of the fowl to six weeks of age on a mineral-deficient ration. H. E. LE MASURIER and H. D. BRANION (Poultry Sci., 1938, 17, 270— 275).—Birds receiving a mineral-deficient ration develop either to small size but with a normal skeleton or to a moderately large size with a skeleton showing rachitic lesions. The severity of rickets is directly proportional to the amount of growth attained.

A. G. P.

Effect of manganese, zinc, aluminium, and iron salts on incidence of perosis in chicks. W. M. INSKO, jun., M. LYONS, and J. H. MARTIN (Poultry Sci., 1938, **17**, 264—269).—Mn tended to prevent, and Al and Zn slightly to increase, the occurrence of slipped tendon in chicks. A. G. P.

Is copper essential for iron utilisation? L. H. BENYON (Amer. J. Physiol., 1937, 120, 423—426).— Rats fed on an exclusive diet of fluid milk soon die and show a low hæmoglobin concn.; this is due to the excessive water content of fluid milk and its incorrect balance of fat, protein, and carbohydrate. The animals are unable to eat sufficient food for growth and hæmoglobin formation; they suffer from intestinal stasis and are liable to infections. Cu and Fe supplements to special diets showed that Cu is not an essential element in nutrition; Cu facilitates intestinal evacuation. M. W. G.

Bioassay technique for determining available iron in foods. P. L. HARRIS and G. L. POLAND (Food Res., 1938, 3, 383–388).—Smith and Otis' modification (A., 1937, III, 459) of Elvehjem's procedure is endorsed. The depletion of Fe storage is considered sufficient when the hæmoglobin level has reached 3—4 g. per 100 ml. of blood. Further depletion decreases the uniformity and accuracy of the response to Fe feeding. Heating foods in some cases increases, in others decreases, the availability of their Fe. E. C. S.

Effect of chloride on growth. M. MARQUIS (Compt. rend. Soc. Biol., 1938, 128, 449—451).—Rats fed on a Cl-free diet do not grow. No Cl is excreted in the urine. P. C. W.

Physiology of vitamin-A. A. CHEVALLIER (Ann. Physiol. Physicochim. biol., 1938, 14, 403–475).—A review. C. C. N. V.

Effect of vitamin-A deficiency on rate of pupil dilatation during dark-adaptation. I. H. WAG-MAN and J. E. GULLBERG (Proc. Soc. Exp. Biol. Med., 1938, 38, 613—615).—No change took place in the rate of dilatation in the rabbit as vitamin-A deficiency progressed. V. J. W.

Vitamin-A deficiency in chicks fed purified rations containing cod-liver oil. H. R. BIRD and J. J. OLESON (Proc. Soc. Exp. Biol. Med., 1938, 38, 870-871).—When cod-liver oil was mixed with the rations at weekly intervals the chicks developed an ataxia and lack of growth which were curable by administration of oleum percomorphum or carotene. V. J. W.

Cellular changes in the anterior hypophyses of vitamin-A-deficient rats. T. S. SUTTON and B. J. BRIEF (Endocrinol., 1938, 23, 211-215).--Vitamin-A deficiency caused an increase of the basophil cells in both sexes, though to a slightly greater extent in males. V. J. W.

Degenerative changes in axis cylinders of dental nerves due to diets deficient in vitamin-A and carotene. J. D. KING, W. LEWINSKY, and D. STEWART (J. Physiol., 1938, 93, 206-214).—The nerves (rat) of the pulp are markedly affected and the nerves of the periodontal membranes show somewhat less severe changes. [Illust.] J. A. C.

Influence of hepatic vitamin-A storage on granuloma formation. A. CHEVALLIER, A. ESCAR-RAS, and J. PAILLAS (Compt. rend. Soc. Biol., 1938, 128, 916—917).—Granuloma formation in response to the intrapleural injection of kieselguhr in the guineapig is diffuse and without cystic limitation in animals with low vitamin-A stores in the liver. P. C. W.

Cancer and vitamin metabolism. E. SCHNEIDER (Arch. klin. Chir., 1938, 192, 462-480). -Investigation of vitamin metabolism in human patients and experimental animals suffering from various types of malignant tumour showed that the degree of disturbance in vitamin-A metabolism depends on the severity of the accompanying toxic liver damage. Pathological secretion of -A in the urine, found in 20% of cases, always coincides with -C deficiency which is attributed to the abnormal use of -C in glycogen synthesis. $-B_1$ deficiency also exists, similar in character to that of -C. B. W.

Relationship between carotene, blindness due to constriction of the optic nerve, papillary cedema, and night blindness in calves. L. A. MOORE (J. Dairy Sci., 1938, 21, 114).—The sight defects are due to vitamin-A deficiency. Calves on an -A-deficient ration, which had produced blindness, fed on carotene in cottonseed oil so that the blood plasma content of carotene was at least 0.13×10^{-6} g. per ml. did not develop blindness. Blindness due to constriction of the optic nerve does not occur in mature cows. W. L. D.

Carotene requirements for normal reproduction. H. T. CONVERSE and E. B. MEIGS (J. Dairy Sci., 1938, 21, 114—115).—From experiments on cows and feeding with good and poor lucerne and timothy hay, it was deduced that, for normal calving, cows should receive 80—100 mg. of carotene daily during the last months of gestation. If the carotene is below 60 mg. per cow daily, there will be a considerable proportion of dead calves. W. L. D.

Vitamin-A for growth and reproduction in dairy heifers. I. R. JONES and J. R. HAAG (J. Dairy Sci., 1938, 21, 115—116).—Two groups of heifers were fed on a ration containing hay with a carotene content of 9 p.p.m., one group obtaining a supplement of 5 ml. of salmon oil per 100 lb. live wt. The vitamin-A potency of the oil was double that of U.S.P. reference cod-liver oil. The control heifers showed delay in cestrus and failure to conceive more frequently than the oil-fed group. A ration low in -A does not cause serious disturbances when fed for 6 months followed by a pasture period. W. L. D.

Carotene requirement of dairy calves. R. E. WARD, S. I. BECHDEL, and N. B. GUERRANT (J. Dairy Sci., 1938, 21, 168—169).—27 animals have been fed carotene from different sources, mostly vegetable. With lucerne hay, 12—14 µg. of carotene per lb. body-wt. daily was sufficient to prevent symptons of vitamin-A deficiency. With timothy hay and maize the requirements were 25% higher. Improved growth and condition did not occur on feeding 20—30 µg. per day per lb. body-wt. Guernsey calves require the same amounts of carotene as Holstein calves, but are more subject to intestinal and respiratory disorders at low carotene intake. Calves require a higher carotene intake in winter than in summer but heifers do not suffer from -A deficiency in winter if on good pasture in summer. W. L. D.

Vitamin-A content of the colostrum of dairy cows. J. STEWART and J. W. McCALLUM (J. Agric. Sci., 1938, 28, 428—436).—Among 100 cows under the same system of feeding and management the vitamin-A content of the colostrum ranged from 35 to 1180 international units per 100 ml. Variations are unrelated to breed or period of calving but are probably influenced by the length of the "dry" period between calving. A. G. P.

Vitamin requirements of pigs. A. S. FOOT, J. GOLDING, S. K. KON, J. CAMPION, K. M. HENRY, and S. L. HUTHNANCE (Nat. Inst. Res. Dairying Univ. of Reading, 1938, Publ. No. 462, 68 pp.).-Of 56 pigs in three feeding trials on a vitamin-A-deficient ration, 12 developed abnormal gait or convulsive fits and nervous collapse, 4 died, and 3 were killed. The first 12 were cured by adding -A concentrate, cod-liver oil, or dried whole milk to the ration. Irradiated yeast or milk powder free from -A did not cure. Growth on the deficient ration was not impeded until 250 lb. live wt. was reached and failure to grow was apparent after reaching this stage. The -A contents of the livers of the treated pigs were closely correlated with the amount of -A given as supplement. Piglings at birth contained from 260 to 4340 international units of -A per liver, and no increases were evident in suckling pigs until fed on supplementary foods. -A reserves in the livers of fattening pigs were small unless the animals were given supplements rich in -A or carotene. About 20% of large doses of -A given to young pigs was stored in their livers after 2 days and this reserve was used up in 100-140 days on feeding with an -Adeficient diet. In pigs dosed with large amounts of -A before slaughter, the liver reserve varied with the amount given, about 30% being stored in the liver. In fixed dose tests, the concn. of -A in blood rose to a peak in 5 hr. and then dropped sharply but the liver reserve did not reach its max. val. until 24 hr., indicating an intermediate storage place for -A between blood and liver. The min, daily -A require-ment of the pig is $6-8 \ \mu g$. or $25-30 \ mg$. of carotene per kg. body-wt. Pigs fed on a diet deficient in -B complex failed to grow, but normal growth was obtained by adding 5% of brewers' yeast to the ration. Subnormal growth only was given by autoclaved yeast and it appears that $-B_1$ alone is needed. The pig's requirement of -C is very low. W. L. D.

Vitamin-A (carotene) and -C content of mangoes. B. N. BANERJEE and G. B. RAMASARMA (Agric. Live Stock India, 1938, 8, 253-258).-Data for numerous varieties are given. Vals. differ widely among different varieties and to a considerable extent between different samples of the same variety.

A. G. P. Treatment of delirium tremens with vitamin- B_1 . J. KLOSTER (Nervenarzt, 1938, 11, 413-415).—Two cases were successfully treated with vitamin- B_1 . C. A. K. Vitamin- B_1 metabolism during pregnancy. F. STÄHLER (Dtsch. med. Wschr., 1938, 64, 1137— 1140).—10 mg. of vitamin- B_1 per day were injected intramuscularly for 4 days into non-pregnant and pregnant women. 30% less $-B_1$ was recovered in the urine of pregnant women (Karrer and Ritsert method) than in non-pregnancy urine. Pregnant women (6th—8th month) require 7—8 mg. of $-B_1$ in 24 hr.; non-pregnant women require 5—6 mg. The placenta is permeable to $-B_1$. The $-B_1$ content of foctal blood is increased after $-B_1$ injection into the mother. Considerable amounts of $-B_1$ are excreted in milk during lactation. A. S.

Intake and excretion of aneurin in normal subjects and in pregnant women. H. G. K. WESTENBRINK and J. GOUDSMIT (Arch. Néerland. Physiol., 1938, 23, 79-96).-The thiochrome method for determination of aneurin has been improved in speed and accuracy. Subjects who excreted spontaneously 100 µg. or more of aneurin per 24 hr. excreted about the same amount when 5 mg, per day was given for several days. 10 men and 10 women on a plentiful diet excreted 230 µg. and 120 µg. respectively. When 5 mg. per day was given by mouth the average excretions were 560 and 460 µg., respectively. Excretion was greater if the dose was divided or given intramuscularly, but only during the first hr. in the latter case. Women on a poor diet excreted less aneurin than those on a plentiful diet. Pregnant women with good aneurin excretion had few or no symptoms during pregnancy. C. E. B.

Vitamin- B_1 intake of nursery school children. E. ROBB, E. M. VAHLTEICH, and M. S. ROSE (Amer. J. Dis. Child., 1938, 55, 544—552).—If 40% of the total calories are derived from milk, 20% from cereals, and 20% from fruit and vegetables with 100 c.c. of orange juice added per diem, the diet will contain an adequate amount of vitamin- B_1 for the normal nursery school child. The importance of milk and whole grain cereals is emphasised. A. C. F.

Effect of hyperthyroidism on vitamin- B_1 content of rat tissues. V. A. DRILL (Amer. J. Physiol. 1938, 122, 486—490).—Rats fed 12 g. of normal diet + 100 mg. of thyroid gland per day showed a normal content of vitamin- B_1 in the spleen, a reduction in the kidney, and a marked reduction in the liver. Rats similarly fed and injected later with 500 µg. of $-B_1$ per day showed normal amounts of $-B_1$ in the spleen and muscle, slightly raised content in the heart, and a definite reduction in the kidney and liver, as compared with normal rats receiving 500 µg. of $-B_1$ per day. The $-B_1$ content of the whole liver per 200 g. wt. of rat was reduced 35% in the hyperthyroid rats. The normal and hyperthyroid animals while being injected with 500 µg. of $-B_1$ per day eliminated the same amount of $-B_1$ in the urine. M. W. G.

Sensory neurone degeneration in vitamin deficiency. M. M. WINTROBE, D. M. MITCHELL, and L. C. KOLB (J. Exp. Med., 1938, 68, 207—220).— Ataxia develops in young pigs fed on an adequate diet in which the yeast is gradually reduced until vitamin-*B* deficiency occurs. Replacement of the yeast with thiamin and riboflavin did not prevent selective

degeneration of the whole of the peripheral sensory neurones. A. C. F.

Newer aspects of nervous disorders in avitaminosis. H. M. ZIMMERMAN (Confinia neurol., 1938, 1, 6—39).—Vitamin- B_1 - and $-B_2$ -free diets produce degenerative changes in the medullary sheaths and the axis cylinders in man and dog. B_2 avitaminosis may produce further degeneration of the posterior column and the lateral spinal tracts. A. S.

Neurological aspects of *B*-avitaminosis. F. H. LEWY (Confinia neurol., 1938, 1, 40–48).—Changes in the strength-duration curves of motor and sensory nerves were observed in cases suffering from lack of vitamin-B. A. S.

Green fæces in *B*-avitaminotic pigeons as a symptom of deficiency. E. GANASSINI (Boll. Soc. ital. Biol. sperim., 1938, 13, 227—230).—The green fæces (due to biliverdin) of pigeons fed on a B_1 deficient diet are unchanged by healing doses of vitamin- B_1 of varying degrees of purity; devitaminised brewer's yeast, however, decreases the biliverdin content, which is therefore due to dietary deficiency other than that of -B. F. O. H.

Vitamin- B_1 and cocarboxylase in animal tissues. S. OCHOA and R. A. PETERS (Biochem. J., 1938, 32, 1501-1515).-Vitamin-B1 and its monophosphoric ester both stimulate the decarboxylation of pyruvic acid by washed (0.1N-Na2HPO4) yeast in presence of cocarboxylase $(-B_1$ pyrophosphate). This action, which is not effected by removal of acetaldehyde through oxidation or dismutation, 18 referable to the pyrimidine half of the mol. Hexose diphosphate in presence of cozymase and pure cocarboxylase increases the rate of decarboxylation in the total absence of -B1. Mn" greatly stimulates the carboxylase system if present in sufficient concn. The activation of cocarboxylase by $-B_1$ is utilised in the separate determination of cocarboxylase and $-B_1$ (including monophosphoric ester). Boiled extracts from rat and pigeon brain and liver contain much less $-B_1$ than cocarboxylase; those from muscle and heart tissue contain both. The cocarboxylase content of tissues and especially of brain tissue is much reduced in animals suffering from $-B_1$ deficiency. Administration of $-B_1$ to animals leads to an immediate accumulation of both $-B_1$ and cocarboxylase in the liver.

W. O. K.

Use of the formaldehyde azo reaction for vitamin- B_1 . H. W. KINNERSLEY and R. A. PETERS (Biochem. J. 1938, 32, 1516—1520; cf. A., 1938, III, 614).—The formaldehyde azo test for vitamin- B_1 (A., 1934, 705) is modified to increase its sensitivity; the effects of traces of various metals are ascertained. When applied to various foodstuffs the modified test gives results in substantial agreement with those of the biological method. W. O. K.

Use of phenol in application of Prebluda-McCollum reagent for determining vitamin- B_1 . D. MELNICK and H. FIELD, jun. (Proc. Soc. Exp. Biol. Med., 1938, **38**, 723-725).—For solutions of pure vitamin of 4—50 µg. per c.c., colorimetric determination is made more accurate if 50 mg. of phenol is added to the 10 c.c. of solution and the pigment which is formed by the reagent is extracted with xylene. V. J. W.

Rat-growth method for determining vitamin-B and its content in meals from certain oily seeds. F. W. SHERWOOD and J. O. HALVERSON (J. Agric. Res., 1938, 56, 927-934).-In the rat test a feeding period of 7 days is inadequate for accurate results. Feeding for more than 3 weeks is unnecessary. The daily dosage of vitamin-B and the total gain in the test period show a linear relationship provided the gain is less than 50 g. in 4 weeks and the dosage is between 0.6 and 1.4 international units. Within these limits there is no difference in response due to sex. Seasonal variations in response to a given dose of -B are max. when the dose is slightly above maintenance level. The -B requirement of rats is low in spring and summer. Data for peanut, cottonseed, soya-bean, and linseed products are given.

A. G. P.

Spastic paraplegia in pellagra relieved by vitamin- B_1 . I. CLAUDIAN, V. RUNCAN, A. VRANCEA, and L. ALEXANDRESCU (Bull. Soc. Med. Bucarest, 1938, 20, 147—153).—Injections of vitamin- B_1 cured spastic paraplegia in a case of pellagra.

C. A. K.

Excretion of porphyrin in pellagra. K. DO-BRINER, W. H. STRAIN, and S. A. LOCALIO (Proc. Soc. Exp. Biol. Med., 1938, **38**, 748—752).—A pellagra patient excreted 897 mg. of porphyrin daily, 254 mg. being contained in the urine. With recovery excretion fell to 298 mg. [In the accompanying figure these units are labelled as μ g.] V. J. W.

Vitamin- B_2 complex. VIII. "Monkey pellagra" and its cure with nicotinic acid. L. J. HARRIS (Biochem. J., 1938, 32, 1479–1481).— Monkeys suffering from pellagra (A., 1937, III, 405) are completely cured by the addition of nicotinic acid to the diet, 5 mg. per day sufficing for a 2-kg. animal. W. O. K.

Failure of nicotinic acid to prevent nutritional cytopenia in the monkey. P. L. DAY, W. C. LANGSTON, and W. J. DARBY (Proc. Soc. Exp. Biol. Med., 1938, **38**, 860—863).—50 mg. daily of nicotinic acid failed to cure the fatal blood disease caused in monkeys by a diet deficient in vitamin- B_2 . V. J. W.

Vitamin- B_6 (adermin) as growth-substance for lactic acid bacteria. E. F. MÖLLER (Z. physiol. Chem., 1938, 254, 285–286).—Vitamin- B_6 (optimal concn. 0·01—1·0 µg. per c.c.) is a necessary factor for the growth of lactic acid bacteria (e.g., B. acetylcholini) and of certain yeasts. Nicotinic acid, aneurin, amino-acids, purines, inositol, and/or uracil in various combinations cannot replace $-B_6$ or the ether-sol., N-containing acid, labile to acid and alkali, of Snell et al. (A., 1937, III, 487) as growth-factors for micro-organisms. W. McC.

Correlation between vitamin-C content and complement titre of human blood plasma. F. CHU and B. F. CHOW (Proc. Soc. Exp. Biol. Med., 1938, **38**, 679—682).—Administration of ascorbic acid was followed by a rise in blood complement, and cessation of such administration was followed by a fall. V. J. W.

Influence of vitamin-C on diphtheria toxin. J. PARTER and B. SCHICK (Amer. J. Dis. Child., 1938, 55, 12—26).—Vitamin-C, given by all possible methods, has no influence on the development of positive Schick reactions in sensitive children. Slight detoxication by the vitamin occurs if mixed with toxin *in vitro*. A. C. F.

Vitamin-C and anaphylactic shock in dogs. S. W. EYER, C. A. DRAGSTEDT, and M. R. DE ARELLANO (Proc. Soc. Exp. Biol. Med., 1938, **38**, 642—644).— Administration of ascorbic acid in dosage sufficient to raise the blood content to 20 mg.-% did not protect dogs from anaphylaxis due to horse serum.

V. J. W.

Vitamin-C and peptone shock in dogs. C. A. DRAGSTEDT, S. W. EYER, and M. R. DE ARELLANO (Proc. Soc. Exp. Biol. Med., 1938, 38, 641-642).— Ascorbic acid in doses of 25-100 mg. per kg. does not protect dogs against peptone shock. V. J. W.

Effect of vitamin-C on the sugar consumption of the surviving guinea-pig heart. Z. Aszón and L. SAS (Biochem. Z., 1938, 298, 1–7).—Since the surviving hearts of guinea-pigs which have received large doses of ascorbic acid consume less and those of scorbutic guinea-pigs consume more glucose than do the hearts of normal guinea-pigs, it is concluded that in scurvy the activity of the thyroid gland increases. W. McC.

Effect of vitamin-C on normal and alimentary blood-sugar. N. BORSETTI (Boll. Soc. ital. Biol. sperim., 1938, 13, 243—248).—Intravenous injection into rabbits (fasting or after subcutaneous injection of 9 c.c. of 30% glucose) of 7.5—100 mg. of ascorbie acid per kg. body-wt. has a hypoglycæmic action, the blood-sugar of the glucose-treated rabbits being reduced by up to 0.1%. F. O. H.

Vitamin-C and healing of fractures. G. GIAN-GRASSO (Boll. Soc. ital. Biol. sperim., 1938, 13, 153).—The healing of fractured bones in man is accelerated by injection of vitamin-C (0.05—0.10 g. every 3 days). F. O. H.

Ascorbic acid and contractility of the spleen. L. CIOGLIA and G. FRADÀ (Boll. Soc. ital. Biol. sperim., 1938, 13, 40-41).—Injection of 2·5-33·5 mg. of ascorbic acid per kg. into chloralosed dogs reduces the splenic vol., the max. effect being 15-60 min. after injection and greatest with the smaller doses. F. O. H.

Vitamin-C metabolism in the dairy cow. W. H. RIDDELL and C. H. WHITNAH (J. Dairy Sci., 1938, 21, 121).—Change from winter to grass feeding did not raise the vitamin-C in milk although the -C intake per cow amounted to 60 g. daily, and the mean -C in blood was doubled in 12 hr. after the first supply of green food. The output of -C in the urine was increased 5-fold within 60 hr. of feeding green food. The rumen contents contained less than 20% of the -C of grass ingested 12 hr. earlier. Increased intake of -C is accompanied by increased destruction in the cow's body. W. L. D. Relationship between vitamin-C and adrenaline. K. M. DAOUD and M. A. S. EL AYYADI (Biochem. J., 1938, 32, 1424—1434).—Injection of a total of 1·4 g. of vitamin-C at $p_{\rm H}$ 7 into a pithed cat neither augments nor prolongs the effect of adrenaline on the blood pressure, but unneutralised -C diminishes both the magnitude and the duration of the adrenaline effect. The destruction of adrenaline is the same in normal intact animals as in those saturated with -C, although the latter exerts a limited protective effect *in vitro* at $p_{\rm H}$ 7 by temporarily preventing further oxidation of the o-quinone which is first formed from adrenaline. P. G. M.

Effect of hyperthyroidism on the metabolism of vitamin-C. R. A. LEWIS (Johns Hopkins Hosp. Bull., 1938, 63, 31-40).—Vitamin-C excretion of human hyperthyroid patients on a const. diet was below normal before, and rose to normal after, thyroidectomy. T. F. D.

Silver chloride scurvy. T. BERSIN, S. RAABE, and H. J. LAUBER (Klin. Woch., 1938, 17, 1014— 1016).—Intravenous injection of colloidal AgCl in rabbits lowers the ascorbic acid and esterase content of various organs to 40%. The blood, however, shows an abnormally high level of ascorbic acid and its excretion in the urine is increased. E. M. J.

Blood-ascorbic acid in anoxæmia. P. SACER-DOTE (Ann. Physiol. Physicochim. biol., 1938, 14, 271—286).—In the guinea-pig and the rabbit a rapid or gradual exposure to reduced O_2 tensions ($O_2 =$ 3%) raises blood-ascorbic acid; in the guinea-pig there is a decreased ascorbic acid content of the adrenals and usually an increase in the liver and jejunum. C. C. N. V.

Seasonal changes in the serum-ascorbic acid level. E. TRIER (Klin. Woch., 1938, 17, 976—979).— The serum-ascorbic acid was determined throughout 12 months in 750 cases (healthy people and subjects with afebrile internal and surgical diseases) in a Danish clinic. The highest vals. (0.5-0.47 mg.-%)occur in July and August and the lowest in May (0.18 mg.-%). Febrile cases and afebrile with pyogenic diseases had lower vals. throughout. There was some correlation between the vitamin-*C* content of the diet and the serum level. E. M. J.

Ascorbic acid content of fœtal blood. C. P. MANAHAN and N. J. EASTMAN (Johns Hopkins Hosp. Bull., 1938, **62**, 478—481).—With normal food intake the vitamin-C content of fœtal blood (0·71—1·84 mg. per 100 ml. of plasma) was three times as high as maternal blood at the moment of delivery in 50 cases. Feeding 100 ml. of orange juice thrice daily during the last few prenatal weeks caused the blood -Ccontent to rise to 1·80—3·46 mg. per 100 ml. of plasma in the fœtus and 0·95—1·64 mg. in the mother. The placenta thus exerts a selective action with respect to -C. T. F. D.

Vitamin-C in urine and the administration of autonomotropic substances. I. Adrenaline. II. Pilocarpine and atropine. G. MICHETTI, B. BARTOLINI, and E. RONCALLO (Boll. Soc. ital. Biol. sperim., 1938, 13, 179—181, 181—184).—In disease, intramuscular injection of adrenaline or atropine

increases urinary excretion of vitamin-C and the ratio of dehydroascorbic acid to -C whilst pilocarpine decreases both these vals. F. O. H.

Ascorbic acid. I. Distribution of ascorbic acid and glutathione in animal tissues and organs. K. FUJIMURA (J. Agric. Chem. Soc. Japan, 1938, 14, 1016—1026).—By a modification of Wachholder's method (A., 1935, 793) for determining ascorbic acid, and Quensel's method (*ibid.*, 511) for glutathione, the amounts of the oxidised and reduced forms of these substances in the bodies of hens and carp are determined. The relations between glutathione and ascorbic acid in the body, and the action of ascorbic acid on glycolysis, are discussed.

J. N. A. Vitamin-C in marine algæ. G. LUNDE and J. LIE (Z. physiol. Chem., 1938, 254, 227-240).—Fresh Ulva lactuca contains approx. 0.027% of vitamin-C and various types of Laminaria contain approx. 0.01-0.046% in spring and 0.004% in winter. Amongst the brown algæ, the Fucoideæ are richest in -C whilst the -C content of the Fucus group ranges from 0.02 to 0.1%. Amongst the red algæ, Gigartina and Porphyra are very rich in -C, Porphyra containing up to 0.14%. Rhodymenia contains only approx. 0.005%, the val. obtained biologically being only 10% of that obtained by titration; reducing substances other than -C are oxidised by ascorbic acid oxidase. In species other than Rhodymenia, the vals. obtained biologically agree with those by titration. W. McC.

Possibility of determining vitamin-C by means of the formation of furfuraldehyde with concentrated hydrochloric acid. H. DE GRAAF and H. J. BOORSMA (Chem. Weekblad, 1938, 35, 692—694).— The yield of furfuraldehyde, which depends on the concn. of HCl and of ascorbic acid, and on the presence of O_2 , is very variable. It is impossible to standardise conditions to give concordant results. S. C.

Chemical determination of vitamin-C. Its rôle and distribution in vegetable tissues. M. VISCONTINI (Bull. Soc. Sci. Hyg. aliment., 1938, 26, 215-230).—A review. E. C. S.

Tillmans' reaction for ascorbic acid in plants. C. GATTI and A. KNALINSKY (Arch. int. Pharmacodyn., 1938, **59**, 195—197).—Solutions of medicinal tannin reduce Tillmans' reagent especially after exposure of tannin to air or heat. Tannin is only partly pptd. by Pb acetate and formalin; the typical Fe^{III} salt reaction is always intense after pptn. The non-pptd. portion of tannin reduces 2:6-dichlorphenol-indophenol. Tillmans' reagent is thus unsuitable for vegetable products like China tea, coffee, certain fruits, etc. China tea, which contains no antiscorbutic principle, has an apparent ascorbic acid content of 40 mg.-%. The reducing power of vegetable infusions is tripled when the temp. is raised to 95°. The tannin should be completely pptd. by a procedure which does not affect the ascorbic acid. D. T. B.

Histochemical detection of vitamin-C in plants. O. DISCHENDORFER (Protoplasma, 1937, 28, 516-523).—Previous work on the occurrence and detection of vitamin-C in plant cells is reviewed, and the relation between occurrence of -C and chlorophyll is discussed. M. A. B.

Photochemical decomposition of *l*-ascorbic acid.—See A., 1938, II, 391.

Importance of the liver for antirachitic efficacy of vitamin-D. W. HEYMANN (Amer. J. Dis. Child., 1938, 55, 913—923).—Rats with obstructive biliary cirrhosis require 10—12 times as much vitamin-D to cure rickets as is effective in rats without cirrhosis. Parenteral glycerophosphate is still effective, showing no interference with osteogenesis. Impairment of liver function due to CCl_4 also decreases the antirachitic potency of -D.

A. C. F.

Antirachitic effect of some foods. E. F. KOHMAN, W. H. EDDY, M. E. WHITE, and N. H. SANBORN (Food Res., 1938, 3, 373-381).—While maintaining the low P and the Ca: P ratio of the Steenbock-Black diet No. 2965, a proportion of the diet was replaced by mixtures of peas, peaches, spinach, etc. with either meat or casein as the source of P. 50% substitution by the meat mixture resulted in max. calcification, but 50% substitution by the casein mixture gave only a small improvement, which is ascribed to a calcifying principle in the vegetable foods administered. E. C. S.

Effect of light on the antirachitic action of phosphorus. F. COPELLO and B. BARTOLINI (Boll. Soc. ital. Biol. sperim., 1938, 13, 164—166).—The curative action of P (subcutaneously injected in olive oil solution) in rachitic rats (high-Ca and low-P diet) is dependent on irradiation by daylight; this explains the varying results obtained with animal and human experiments. F. O. H.

Rôle of the thyroid in rickets. W. HAASE (Beitr. klin. Chir., 1938, 168, 64—79).—Subcutaneous injections of 0.3 mg. of thyroxine every two days do not prevent rickets in normal or thyroidectomised rats; healing was produced by tyrosine feeding (20 mg. every 2 days). The thyroid in rickets appears inactive. H. B. C.

Effects of a vitamin-D deficiency on mature dairy cows. G. C. WALLIS (J. Dairy Sci., 1938, 21, 315-333).-3 lactating and one dry cow were kept under vitamin-D-deficient conditions and examined over a period of 400 days. Under these conditions total blood plasma-Ca decreased to half and inorg. P to $\frac{1}{5}$ of normal vals., and significant drafting of Ca and P reserves took place. On administering -D, Ca and P losses were changed into large retentions. Milk-Ca and -P showed no change from those of milks from normal cows. Calves from -D-deficient cows showed rachitic symptoms but no abnormalities in blood and histological pictures. Butter from such milk contained no -D. The animals failed to show cestrus and one animal developed fragile bones but it was not established that this was due to -D-deficiency.

W. L. D.

Nature of toxic action of vitamin-D. C. I. REED (Proc. Soc. Exp. Biol. Med., 1938, 38, 791-792).—Over-irradiated ergosterol, or calciferol solution which had been kept in the warm till it became rancid, was given to dogs. A large majority developed

Vitamin-D content of milk of Jersey and Holstein cattle receiving the same vitamin-D intake. G. C. WALLIS (J. Dairy Sci., 1938, 21, 111). —Using the paired feeding method and feeding lucerne hay representing a daily intake of 19,000 I.U., the vitamin-D potency of the butter fat of both breeds was determined on 4—6-day samples. Early and late lactation -D contents per g. for Holstein and Jersey were 0.43 and 0.25, and 0.63 and 0.43 I.U. The -D content per quart of milk was uniform : 8—12 for Holstein, 27—33 for Jersey. The total -D recovered in the milk was the same. Only 0.5—1.8% of the -D fed was recovered in milk. W. L. D.

Storage of vitamin-D in the tissues of growing calves. N. B. GUERRANT, R. A. MORCK, S. I. BECHDEL, and N. W. HILSTON (Proc. Soc. Exp. Biol. Med., 1938, 38, 827—831).—Calves were kept on a known vitamin-D intake for 164—210 days. Only a very small % of the vitamin given was retained in the blood and liver. V. J. W.

Percomorph-liver oil as an antirachitic agent. R. L. RODDY, E. K. ROSE, P. J. HODES, and J. C. GUTTINGS (Amer. J. Dis. Child., 1938, **55**, 526—531).— The oil is an efficient antirachitic agent. A. C. F.

Assay of vitamin-*D* preparations. P. LAMI (Boll. Chim. farm., 1938, 77, 490-494, 497-499).--Colorimetric and biological methods of assay and the nature and stability of vitamin-*D* preps. are discussed. F. O. H.

Claim for thyroid subnormality in vitamin-Elow rats. I. R. TELFORD, G. A. EMERSON, and H. M. EVANS (Proc. Soc. Exp. Biol. Med., 1938, 38, 623-624).—No histological evidence of hypoplasia and no lowering of O₂ consumption were obtained in vitamin-E-deficient rats or their offspring.

V. J. W.

Degeneration of cross striated musculature in vitamin-E-low rats. H. M. EVANS, G. A. EMERSON, and I. R. TELFORD (Proc. Soc. Exp. Biol. Med., 1938, 38, 625—627).—Muscles of rats showing paralytic symptoms resulting from vitamin-E deficiency show a lack of striation and infiltration by leucocytes and connective tissue cells. V. J. W.

Effect of vitamin-E-deficient diet on skeletal muscle. G. C. KNOWLTON and H. M. HINES (Proc. Soc. Exp. Biol. Med., 1938, 38, 665-667).—Rats reared on a vitamin-E-deficient diet show, especially in males, decreased muscular power with decreased creatine and increased Cl in the gastrocnemius muscle. Onset of these symptoms precedes gross histological changes. V. J. W.

Effect of vitamin-E on lactation and growth of offspring. G. GAEDKE and C. BENNHOLDT-THOMSEN (Z. Kinderheilk., 1938, 60, 52—73).— Addition of vitamin-E to a normal diet does not affect the quantity or fat content of the milk, the growth rate of the children, or the hæmoglobin content of the blood of mother or child. -E-treated rabbits show stunting of growth, which is attributed to a toxic substance occurring in the -E extracts. H. R. Action of vitamin-E on lactation and growth. G. GAEDKE and C. BENNHOLDT-THOMSEN (Klin. Woch., 1938, 17, 983-984).—Treatment with vitamin-E (wheat-germ oil) has no influence on the quantity of milk, its fat content, or the baby's wt. or height curve in the human subject. It has an adverse effect in the rabbit. E. M. J.

Effect of vitamin-*E* deficiency on the rat. I. Duration of gestation. II. Lactation. M. M. O. BARRIE (Biochem. J., 1938, 32, 1467—1473, 1474— 1478; cf. A., 1937, 111, 406, 441).—I. Female rats partly deficient in vitamin-*E* are unable to develop all ova implanted; some of the fœtuses are consequently resorbed in the uterus, and the length of the gestation period is inversely related to the -*E* content of the diet. Hence, -*E* deficiency appears to cause deficiency of the anterior pituitary gland with resulting impairment of the ovary, the consequent resorption of some of the fœtuses delaying the development of the others.

II. The paralysis which develops in the suckling young of rats deficient in -E is due to the absence of -Efrom the milk and is cured by administering -E to the young. The paralysis is probably connected with failure of the function of the anterior pituitary gland (cf. Evans and Burr, A., 1928, 333; Morelle, A., 1932, 1176). W. McC.

Vitamin-E and reproduction in herbivora. B. H. THOMAS, C. Y. CANNON, S. H. MCNUTT, and G. UNDERBJERG (J. Dairy Sci., 1938, 21, 98—99).— Various ruminants and rodents were fed for periods up to $4\frac{1}{2}$ years on vitamin-E-restricted diets, by destroying the vitamin with FeCl₃. The -E requirement of different species differ greatly. Rats of both sexes showed signs of reproductive degeneration in 2 months but goats showed no such effect in $4\frac{1}{2}$ years and rabbits none in 2 years. -E therapy to counteract decreased fertility and fecundity is not always reliable. W. L. D.

Responses of Daphnia magna to vitamin-E. A. VIEHOEVER and I. COHEN (Amer. J. Pharm., 1938, 110, 297—315; cf. A., 1937, III, 137).—D. magna, grown in a vitamin-E-free medium, shows deficiencies in growth, in rhythmic ovarian function, in reproduction, and in vitality which are corr. by addition of wheat-germ oil to the medium. The possible use of D. magna as a test animal for the assay of -E preps. is discussed. F. O. H.

Lower homologues of α -tocopherol. Determination of α -tocopherol.—See A., 1938, II, 450.

Mode of action of vitamin-K. H. DAM, J. GLAVIND, L. LEWIS, and E. TAGEHANSEN (Skand. Arch. Physiol., 1938, 79, 121–133).—The clotting power of blood of chickens suffering from avitaminosis-K is reduced. It is restored to normal 5 hr. after an intravenous or intramuscular injection of 2-5 units of -K per g. body-wt. Contact of -K with blood or plasma *in vitro* has no influence on clotting. -K action *in vivo* does not depend on the spleen, and is not influenced by ether anæsthesia. The vitamin is not secreted into the stomach and no active principle is absorbed from the intestinal canal. A. S.

Assay of a vitamin-K preparation for vitamin-D. H. S. WIGODSKY and A. C. IVX (Proc. Soc. Exp. Biol. Med., 1938, 38, 785-786).—Samples of a vitamin-K prep. which were effective in protecting chicks from hæmorrhagic symptoms failed to cure rickets in rats. V. J. W.

Factor promoting growth and preventing paralysis in chicks on a simplified diet. T. H. JUKES and S. H. BABCOCK, jun. (J. Biol. Chem., 1938, **125**, 169—181).—Lucerne meal is more effective than soya-bean oil in preventing paralysis and giving improved growth in chicks on a basal diet. Autoclaving of lucerne meal at 120° largely destroys the active factor, which is sol. in water and 40% alcohol but insol. in 90% alcohol and in hexane. P. G. M.

(p) METABOLISM, GENERAL AND SPECIAL.

Basal metabolism standards for children. F. B. TALBOT (Amer. J. Dis. Child., 1938, 55, 455– 459).—Standards for basal metabolism in children in relation to wt. and height, based on statistical investigation of data from 2200 subjects, are presented. A. C. F.

Insensible loss of weight in infancy. J. L. Law (Amer. J. Dis. Child., 1938, 55, 966—978).— An infant under defined basal conditions is equilibrated. A known wt. is removed from the wt. pan of the balance and the time taken for equilibrium to be re-established is recorded. The relation of this insensible weight-loss to age, wt., height, and surface area as a measure of basal metabolism is discussed. A. C. F.

Metabolism, body size, and age in baby chicks. M. KLEIBER (Proc. Soc. Exp. Biol. Med., 1938, 38, 793—796).—Heat output in chicks of 5—20 days increases with age. This increase is 0.2—1% per day per unit of body wt., 2% per day per unit of (body wt.)[‡], and 3% per day per unit of (body wt.)[‡].

V. J. W.

Comparison of tissue metabolism in normal, spayed, spayed-thyroidectomised, and hypophysectomised female rats. J. VICTOR and D. H. ANDERSEN (Amer. J. Physiol., 1938, 122, 296-301).-Comparisons were made of liver and renal cortex metabolism in female rats 98-130 days old. Normal females included those in œstrus and diœstrus. Tissue respiratory rates and quotients were measured with differential volumeters. The Ringer solution contained 0.2% of glucose. Compared with normal tissue metabolism, spaying or spaying and thyroidectomy lower the respiratory rate of the liver and the R.Q. of the kidney; hypophysectomy lowers in addition the R.Q. of the liver and the respiratory rate of the kidney and lowers the R.Q. of the kidney further. Thyroidectomy after spaying produces no further change in the respiratory rate or quotient of liver and kidney; hypophysectomy lowers the respiratory rates and quotients of both liver and kidney. Infection in hypophysectomised rats increases the rate of O₂ consumption and the R.Q. of liver as well as in normal or spayed animals. M. W. G.

Effects of prolonged muscular exercise on metabolism. J. N. MILLS (J. Physiol., 1938, 93,

931

144-158).—The metabolism of two non-athletic subjects was studied before and after a walk of 10 miles in the post-absorptive state. One, who lived on a high-carbohydrate diet, showed an inconst. lowering of the R.Q. after the walk, but no ketonuria or depression of the glucose tolerance, even when he restricted the carbohydrate in his diet. The other, who always consumed a lower proportion of carbohydrate, showed a low R.Q. and ketosis after a walk unless he greatly increased the carbohydrate in his diet. His glucose tolerance was considerably depressed after the walk, unless he had partaken of a diet high in carbohydrate. The depressed glucose tolerance was not due to increased sensitivity to insulin. The latter raised the R.Q. much farther after exercise than before. J. A. C.

Fasting energy production curves in the lactating and dry dairy cow under similar environmental conditions. L. E. WASHBURN (J. Dairy Sci., 1938, 21, 123).—The fasting energy production of the lactating cow is 10% higher than that of the dry cow. The heat production of both cows decreases 47% and reaches a level 36—48 hr. after feeding, which is maintained by the dry animal but decreases a further 16% in 60 hr. in the lactating cow. Fat production remains const. but milk yield decreases 50% in 72 hr. The higher energy metabolism during lactation is due mainly to the sp. dynamic effect of the food. W. L. D.

Heat regulation and surgical intervention in man. H. J. VON BRANDIS (Arch. klin. Chir., 1938, 192, 245—327).—An apparatus for the continuous recording of skin and body temp. before, during, and after surgical operation is described. There is a marked fall in heat production and increase in heat loss under general anæsthesia, similar but less marked phenomena under lumbar anæsthesia, and a slight rise in body temp. with no change in heat loss under local anæsthesia. Disturbances in heat regulation also varied according to the severity and site of operation and the patient's constitution. B. W.

Effect of oxalic acid on in vitro respiration of tissues. G. DOMINI (Boll. Soc. ital. Biol. sperim., 1938, 13, 21–23).—The O_2 consumption of rat's muscle, spleen, and liver in Richardson's solution is diminished by presence of 0.115M-Na oxalate. The initial effect is greatest with spleen whilst that with liver, unlike that with spleen or muscle, increases with time, an initial fall of 10% becoming one of 70–80% after 80 min. F. O. H.

Influence of some constituents of serum on gas metabolism of tissue in vitro. H. YAMA-MOTO (Tohoku J. exp. Med., 1938, 33, 454—472).— Respiration of rabbit kidney cortex slices (modified Warburg's method) in serum was greater than in Ringer's solution (containing NaHCO₃ and glucose). Respiration in dialysed serum was almost the same as in Ringer's solution. The factors responsible for increased respiration are, therefore, to be sought in the diffusible constituents of the serum. F. JA.

Probable rôle of calcium and indigo in cellular respiration. J. E. DAVIS (Amer. J. Physiol., 1938, 122, 402–408).—The O₂ consumption of

excised rat and mouse tissues in cerebrospinal fluid (C.S.F.) and Ringer's solution as affected by variations in the concn. of the constituents and by the addition of methylene-blue and of indigosulphonate (indigo-di- or -tetra-sulphonate) was studied. Respiration was at its max. with a min. of glycolysis in C.S.F. The addition of indigosulphonate to Ringer's solution brought about a Ca ion supersaturation and respiration equal to those in C.S.F. Increases in respiration caused by the addition of methylene-blue to the liquid medium was attributed to injury rather than catalysis. Indigo was isolated from the veins of rabbits and its function in the animal body might be the maintenance in the body fluids of a state of Ca ion supersaturation, exciting the O2 and making it more available for use by the tissues. M. W. G.

Peculiarities of gaseous metabolism in insect tissues. I. V. KOSHANTSCHIKOV (Compt. rend. Acad. Sci. U.R.S.S., 1938, 19, 759–761).—The activity of hæmolymph towards O_2 in *Tracheata* varies with the species. W. F. F.

Distribution of proteins containing the thiol group during development of amphibia. J. BRACHET (Bull. Acad. roy. Belg., 1938, [v], 24, 499— 510; cf. A., 1934, 1390).—Giroud and Bulliard's method, which shows the distribution of thiol-containing proteins, indicates their depletion in the cytoplasm during the development of the oocyte and their retention in the germinal vesicle. The distribution of these proteins during gastrulation is described and their rôle in morphogenesis discussed. F. O. H.

Use of amino-acids containing deuterium to follow protein production in the organism. H. USSING (Nature, 1938, 142, 399—400).—Rats were fed on casein hydrolysate (containing D) for 3 days, and then killed. From the proportion of D it was shown that 10% of liver-protein and 2.5% of muscleprotein were newly formed. C. A. K.

Breakdown and synthesis of amino-acids through re-amination. III. Metabolism of glutamic acid in various tissues and organs. M. G. KRITZMANN (Enzymologia, 1938, 5, 44-51; cf. A., 1938, III, 319).-Re-amination processes (e.g., formation of alanine from glutamic and pyruvic acids) occur in heart, kidney, liver, and brain tissues (ox, rabbit). In heart tissue, alanine formation from glutamic acid occurs only in presence of pyruvic acid; in absence of pyruvic acid, glutamic acid is (aërobically) catabolised without disappearance of lactic acid, the total amino-, NH₃-, amide-, and urea-N remaining const. In kidney and liver tissue, aërobic conversion of glutamic acid occurs at the expense of lactate, which is oxidised to pyruvate; part of the glutamic acid is oxidatively deaminated, the liberated NH_a yielding glutamine. Addition of pyruvate greatly increases the yield of alanine. Similar reactions occur in brain but not in intact or hæmolysed avian erythrocytes, lung tissue, or smooth muscle (hen's stomach). F. O. H.

Oxidative deamination of structurally related aminopropionic acids by liver and kidney tissues of the rat. G. RODNEY and R. L. GARNER (J. Biol. Chem., 1938, **125**, 209–217).—dl-Alanine is more readily oxidised by the deaminase of rat liver and kidney tissue than is dl-serine or dl- $\alpha\beta$ -diaminopropionic acid. dl-isoSerine and β -alanine are not affected. The deaminase is a sp. enzyme and its activity towards α -amino-acids is suppressed by β substitution. P. G. M.

Rôle of the reticulo-endothelial system in nitrogenous metabolism. E. F. TERROINE and B. NATAF (Ann. Physiol. Physicochim. biol., 1938, 14, 145-181).-On a min. N but otherwise adequate calorie diet, 7 rats and 1 rabbit were injected introperitoneally with trypan-blue, 2 rabbits with Indian ink, and 1 rabbit with Li-carmine intravenously. Examination of the urinary N excretion usually showed an increased total N output which is ascribed to the toxicity of the reagents. Urea-N + NH_3 -N, and creatine-N are increased whereas allantoin-N + purine-N and creatinine-N are decreased, except in the carmine rabbit where the purine-N is raised. Addition of yeast-nucleic acid to the diet of trypanblue rats does not alter the coeff. of the oxidation of purines. The reticulo-endothelial system plays no part in protein catabolism or in the oxidation of the excreted purines and controls excretion of purine and creatinine. C. C. N. V.

Degradation and resynthesis of adenylic acid in muscle of warm-blooded animals. T. KOR-ZYBSKI and J. K. PARNAS (Z. physiol. Chem., 1938, 255, 195—204).—Inosic acid, prepared from the muscle of rabbits and pigeons injected with Na_2HPO_4 containing radioactive P, also contains radioactive P. Resynthesis of adenylic acid by absorption of added P takes place in the course of a month. P. G. M.

Synthesis of purines from amino-acids in exogenous protein metabolism. C. DEGAN (Ann. Sci. Univ. Jassy, 1938, 24, II, 409—424).—Addition of glycine, alanine, tyrosine, leucylglycine, and aspartic and glutamic acid to a diet of potato-starch, sucrose, lard, salts, and vitamins fed to dogs and pigs did not increase urinary excretion of purines. Addition of arginine and, to a smaller extent, histidine and leucine increased purine excretion. J. N. A.

End-products of purine metabolism in mammals. G. MOUROT (Compt. rend., 1938, 207, 407-408).—Rabbits (chloralose) receiving const. (50-100 c.c. per hr.) intravenous injections of glucose excrete in the urine traces of allantoic acid, the amount being increased when uric acid or allantoin (more rapidly with the latter) is injected. Allantoin, allantoic and uric acids are excreted partly unchanged. After a large injection of allantoic acid some glyoxylic acid is excreted. The course of purine metabolism is probably: allantoin \Rightarrow allantoic acid \Rightarrow uric acid \Rightarrow glyoxylic acid. J. L. D.

Fat organs and metabolism (including "brown fat"). W. EGER (Klin. Woch., 1938, 17, 1033-1036).—A review. E. M. J.

Fat metabolism of the mammary gland. J. C. SHAW and W. E. PETERSEN (J. Dairy Sci., 1938, 21, 122).—By determining arterio-venous differences, the consistent and comparatively large losses of bloodfat were sufficient to account for all the fat in milk. The Ca differences and loss of glucose and lactic acid support this. The presence of lower fatty acids shows that fat is used as a source of energy in the gland. Blood-fat loss shows no relation to the fat level in arterial blood or yield of milk. W. L. D.

Inter-relations of milk fat, protein, and milk-energy yield. W. L. GAINES and O. R. OVERMAN (J. Dairy Sci., 1938, 21, 261-271). Milk energy (E = g.-cal. per kg.) is determined by the equation $E = \text{fat } \% \times 93\cdot12 + \text{protein } \% \times 53\cdot58 + \text{lactose } \% \times 39\cdot87 + \text{ash } \% \times 49\cdot80 - \text{H}_20\% \times 0.356$. The milk energy yield can be determined more accurately from milk and fat yields than from protein yield whilst determination from milk and protein yields is intermediate in accuracy. It is claimed that the protein-energy relation is of most biological significance and energy yield is a simple multiple of protein yield. If there is no making of milk protein there is no milk secretion but the making of milk fat may fall nearly to zero without interrupting milk secretion. The large energy transformations of milk secretion is proportional to the manufacture of milk protein or to N metabolism of the mammary gland in lactation. The modification of the protein/calorie ratio in selective breeding should not be attempted. W. L. D.

Liver-glycogenesis from fat. F. CEDRANGOLO (Boll. Soc. ital. Biol. sperim., 1938, 13, 216-217).— In phloridzinised dogs, liver-glycogen is increased and liver-fat diminished by oral administration of choline (cf. A., 1937, III, 265). F. O. H.

Sterol metabolism in young white rats. II. Effect of saponifiable lipins and degree of unsaturation of lipins. III. Effect of high- and low-fat diets on the sterol balance and sterol content of the hair of white rats. H. C. ECKSTEIN (J. Biol. Chem., 1938, **125**, 99-105, 107-112; cf. A., 1936, 234).—II. Sterol synthesis is greater on a high-fat diet, and when highly unsaturated fats are fed.

III. The negative sterol balance is 9.4 and 2.4 mg. per day when the diet contains 28 and 5% of fat, respectively. The balances decreased with age but were independent of sex. P. G. M.

Metabolism of sitosterol in the toad. H. ASHIKARI (Arb. med. Univ. Okayama, 1938, 5, 489– 491).—3—5 c.c. of a 1% solution of sitosterol in olive oil was subcutaneously injected into toads. Sitosterol was recovered unchanged in the bile. A. S.

Carbohydrate and fat metabolism of yeast. V. Synthesis of fat from acetic acid. Influence of metallic ions on carbohydrate and fat storage. L. D. MACLEOD and I. SMEDLEY-MACLEAN (Biochem. J., 1938, 32, 1571—1582).—Yeast incubated in oxygenated solutions of acetoin, $\beta\gamma$ -butylene glycol, methyl ethyl ketone, or Na salt of citric, succinic, maleic, fumaric, crotonic, lævulic, or gluconic acid produced no extra lipin over that produced in water alone. Substances containing two double linkings inhibited the lipin increase normally found on incubating in oxygenated water. Ca." or Mg", and Ca", Mg", or Na added to oxygenated glucose media in which yeast was incubated, lowered the lipin stored and the carbohydrate content, respectively, the latter ions being added as Cl' or acetate. Ca" or Mg" added to yeast in oxygenated acetate media lowered the lipin normally formed from the acetate. Addition of PO_4''' failed to increase the amount of lipin formed on incubating yeast in aq. Na acetate. Increases in production of ketonic substances, as judged by ppts. of dinitrophenylhydrazones, resulted from addition of K^{*}, Na^{*}, Ca^{**}, or Mg" to aq. glucose in which yeast was incubated; when acetates of these metals were added to the medium, pyruvic acid and acetaldehyde were produced. T. F. D.

Action of yeast in diabetics. W. BECKERT (Münch. med. Wschr., 1938, 85, 1231—1232).—Satisfactory results were obtained in slight cases of diabetes mellitus by prolonged administration of baker's yeast. A. S.

Diet in the treatment of diabetes mellitus in children. W. E. NELSON and D. WARD (Amer. J. Dis. Child., 1938, 55, 487—495).—From observations on diabetic children support is given to the view that adequate and more normal diets should be given in such cases in preference to the much restricted diets commonly used. A. C. F.

Retardation of growth in diabetic children. J. D. BOYD and A. H. KANTROW (Amer. J. Dis. Child., 1938, 55, 460—471).—Retardation of growth can be prevented or corr. in diabetic children when frequent or continuous glycosuria is avoided by an adequate controlled diet, suggesting a nutritional rather then endocrine background for the slow rate of growth.

A. C. F.

Action of cholic acid on the formation of glycogen from various sugar derivatives. T. ISHIMARA, T. KIMURA, S. MIYAZI, T. SHINTAKU, and G. SUGIYAMA (Arb. med. Univ. Okayama 1938, 5, 545—554).—The liver-glycogen of rats fed on gluconic, mannonic, and galactonic acids is increased; this effect is potentiated by subcutaneous injections of cholic acid. Dulcitol increases liver-glycogen only if cholic acid is given simultaneously. The glycogenic effect of mannitol is also increased by cholic acid.

Relation of lactic acid and glucose of the blood and glycogen in the mammary gland to milk secretion. W. E. PETERSEN and J. C. SHAW (J. Dairy Sci., 1938, 21, 168).—The active gland removes both lactic acid and glucose from blood and it is suggested that these are used for the synthesis of lactose. This has been proved by synthesis *in vitro*. Lack of a definite relation between the amounts of glucose and lactic acid removed from time to time indicates that another mechanism is involved and can be accounted for by storage of carbohydrate in the gland. Analyses of lactating and non-lactating glands showed a content of 0.2% of glycogen probably built up from blood-carbohydrate and used as a source of lactose precursors when small amounts of glucose are taken out of the blood. W. L. D.

Relation between carbohydrate and β -hydroxybutyric acid utilisation by the heart-lung preparation. E. T. WATERS, J. P. FLETCHER, and I. A. MIRSKY (Amer. J. Physiol., 1938, **122**, 542-546).-

β-Hydroxybutvric acid was added to the circulating blood in a heart-lung prep. The total carbohydrate utilised by the system was computed by multiplying the amount of glucose and lactic acid removed from each c.c. of blood by the total blood vol. The ketone utilisation was calc. in a similar manner. There is no positive correlation between the sugar and ketone utilisation. Mol. ratios of ketones oxidised to glucose oxidised vary from 0.2 to ∞ . The results suggest that instead of facilitating ketone utilisation, carbohydrate inhibits it in the heart-lung prep., and that there is preferential utilisation of carbohydrate by the heart which, while presumably deriving most of its energy from the oxidation of fat, is still able to use β-hydroxybutyric acid. M. W. G.

Carbohydrate changes in various animals following potassium administration. H. SIL-VETTE, S. W. BRITTON, and R. KLINE (Amer. J. Physiol., 1938, **122**, 524—529).—Male and female rats, mature cats of both sexes, and full-grown male opposums were injected intraperitoneally with subtoxic amounts of K salts. A marked and prolonged hyperglycæmia occurs with decrease in liver-, muscle-, and cardiac glycogen. When a K-glucose solution is injected the blood-sugar levels are raised 100% over control vals., while both liver- and muscleglycogen are reduced. M. W. G.

Galactose 1-phosphate in liver during galactose assimilation. H. W. KOSTERLITZ (J. Physiol., 1938, 93, 34—35P).—38 rabbits were fed with galactose and the phosphoric esters in the liver isolated. At least 9—10 mg. of galactose are present as the phosphoric ester in 100 g. of liver (cf. A., 1938, III, 137). Attempts to isolate the pure ester were unsuccessful but some evidence is given that the naturally occurring ester is a galactose 1-phosphate. J. A. C.

Ketosis. XV. Metabolism of *d*-mannose and *d*-glucose. H. J. DEUEL, jun., L. F. HALLMAN, S. MURRAY, and J. HILLIARD [with L. KNOTT and V. E. HALLSTONE] (J. Biol. Chem., 1938, **125**, 79-84; cf. A., 1938, III, 748).—In rats the relative rates of absorption of mannose and glucose are 12·3:100, the abs. absorption coeff. of mannose being 16·3 mg. per 100 g. of body-wt. The amounts of glycogen deposited in the liver after administration of mannose are much less than those deposited after that of glucose. After consumption of a high-fat diet the resulting ketonuria is diminished to approx. 33% of its original level by giving glucose but is only slightly diminished by mannose. W. McC.

Phloridzin ketonuria in male and female rats. R. CONTE-MAROTTA (Boll. Soc. ital. Biol. sperim., 1938, 13, 218—219).—During phloridzin administration in fasting rats, excretion of ketonic substances is the same in both sexes (cf. Butts and Deuel, A., 1933, 631). F. O. H.

Utilisation of pyruvic acid by the dog. E. FLOCK, J. L. BOLLMAN, and F. C. MANN (J. Biol. Chem., 1938, 125, 49-56).—In normal, fasted, adrenalectomised, or depanceratised dogs injection of pyruvic acid causes increase in the pyruvic and lactic acid contents of blood and urine but most of the pyruvic acid is rapidly utilised. Na pyruvate incubated *in vitro* with blood is not reduced to lactate. Blood-glucose is not affected by injecting pyruvate or lactate but the -inorg. $PO_4^{\prime\prime\prime}$ is decreased. Injection of lactic acid increases blood-lactic acid and slightly increases pyruvate in urine, but does not affect blood-pyruvate. The latter is greatly increased by injecting glucose, fructose, or adrenaline.

W. McC.

Pyruvate oxidation in brain. IV. Oxidation products of pyruvic acid. C. LONG (Biochem. J., 1938, 32, 1711—1717).—Formation of acetic and lactic acids accounts for 30% of the enzymic oxidation of pyruvic acid by pigeon's brain, the remainder being oxidised completely to CO_2 and water. H. G. R.

Behaviour of phenyl-lactic acid in vitro and in vivo. K. CLOSS and A. FÖLLING (Z. physiol. Chem., 1938, 254, 250-255; cf. A., 1938, III, 737).d-Phenylalanine cannot be detected in the urine of persons suffering from imbecillitas phenylpyrouvica by means of the enzyme of rat's kidney if, after destruction of phenylpyruvic acid with FeIII, the urine is first extracted with ether. Since the l-phenylalanine of the urine does not occur in the form of ester and since the increase in the amount of d-phenylalanine excreted by the diseased or healthy persons caused by administration of large doses of d- or dlphenylalanine is not accompanied by increase in the amount of the ether-sol. substance, this is probably not an ester of *d*-phenylalanine. *d*-, *l*-, and *dl*-Phenyl-lactic acid and " β -phenyl- α -lactic acid" react with the enzyme yielding phenylpyruvic acid but not with suspensions of B. proteus. These phenyl-lactic acids, fed as Na salts to rats, are excreted largely unchanged in the urine together with varying amounts of phenylpyruvic acid, these amounts being smaller than those obtained after administration of large amounts of d-phenylalanine. In rats, the extent of transformation of l- is greater than that of d-phenyl-lactic acid. In the organism, phenyllactic acid is probably not an intermediate in the production of phenylpyruvic acid from phenylalanine but is produced from phenylpyruvic acid.

W. McC.

Excretion of homogentisic acid after oral administration of phenylalanine to alcaptonuric subjects. E. T. PAPAGEORGE, M. M. FRÖHLICH, and H. B. LEWIS (Proc. Soc. Exp. Biol. Med., 1938, 38, 742—745).—10—15 g. of *l*-phenylalanine, given daily to two subjects, caused an increase in excretion of homogentisic acid amounting to 70% of the amount theoretically obtainable. Excretion began at once and was nearly complete in 12 hr. V. J. W.

Adaptability of Atherina pontica, Eichwaldi, to changes in salinity. E. A. PORA (Ann. Sci. Univ. Jassy, 1938, 24, II, 319—326).—A. pontica is a Mediterranean animal which has been adapted to the conditions of salinity occurring in the Black Sea. It can exist in solutions containing 12-20% of NaCl, the optimum conc. being 16%. In solutions containing less than 12% of NaCl, the time of survival decreases with increase in dilution and the small animals die first. With solutions containing more than 20% of NaCl, the time of survival decreases

with increasing conen. but in this case it is the large animals which are the first to die. J. N. A.

Behaviour of Palaemon squilla to variations in salinity. E. A. PORA (Ann. Sci. Univ. Jassy, 1938, 24, II, 327-331).—P. squilla can exist in solutions containing 8-20% of NaCl. With less than 8% of NaCl, the animals die at first in small nos., but the no. of deaths increase with time. In solutions containing more than 20% NaCl, the no. of deaths decreases with time. J. N. A.

Insensible [water] loss in surgical patients. W. W. FUGE and B. N. HOGG (Ann. Surg., 1938, 108, 1-12).—The insensible loss was obtained from the formula : initial wt. + total intake - perceptible output - final wt. In 12 patients the average insensible loss for 175 24-hr. periods was 1.457 g. per period which corresponds with 39% of the total output. The loss varied with the size of the patient rather than with the type or extent of the surgical procedure. G. C. K.

Effect of [mineral] water of Salsomaggiore on nutrition of the guinea-pig. G. GUIDI (Boll. Soc. ital. Biol. sperim., 1938, 13, 157—158).— Repeated application of the water to the skin of guinea-pigs results in loss of wt. (probably due to the I' content) and finally death (due to the osmotic effect of the water). F. O. H.

Absorption of iodine from [mineral] water of Salsomaggiore through the intact skin. G. GUIDI (Boll. Soc. ital. Biol. sperim., 1938, 13, 156– 157).—Application of the normal and conc. mineral water (containing MgI₂) to the skin of guinea-pigs for 1 hr. is followed by the occurrence of traces of I' (detected by normal analysis and ionophoretic separation) in urine and fæces. F. O. H.

Mineral metabolism in Batavia. W. RADSMA and V. R. C. PLOEGMAN (Arch. Néerland. Physiol., 1938, 23, 56-61).—Determinations were made of Ca, K, Na, and Mg in 3-day samples of fæces and of urine from 8 servants and 9 students; certain other urinary examinations were also made. Fetter's method for Mg was preferred to that of Kramer and Tisdall. C. E. B.

Mineral metabolism in Batavia. W. RADSMA and G. M. STREEF (Arch. Néerland. Physiol., 1938, 23, 107—125).—The average plasma-Ca of Europeans was 9·3 mg.-%, compared with 9·7 mg. for native servants. The K contents were 18·8 and 17·2 mg.-% respectively. The latter difference is considered significant. C. E. B.

Mineral metabolism of pullets. III. R. H. COMMON (J. Agric. Sci., 1938, 28, 347-366; cf. A., 1936, 371).—The fat content of pullets receiving a high-Ca ration was greater than of those on a low-Ca ration. Increased dietary Ca causes greater storage of Ca in bones; total bone-Ca may become 97-98% of the total Ca in the body. Pullets may utilise $\frac{1}{4}$ of the total body-Ca for shell production at the onset of laying. Effects of various mineral supplements and of egg laying on the Mg, Ca, and P contents of the skeleton are examined. A. G. P.
Plasma-magnesium in growing calves. C. W. DUNCAN and C. F. HOFFMAN (J. Dairy Sci., 1938, 21, 111-112).—The plasma-Mg in calves increased up to 12-13 months of age with a mean val. of 2.4 (variation 1.9-2.8) mg.-% (2286 samples). The results for individual calves show rhythmic variations. Season of year has some influence on plasma-Mg irrespective of age, there being a tendency to fall in May-June and to rise in July-November. W. L. D.

Phosphorus in biological chemistry. Phosphorus in plants and inorganic phosphorus of blood. I. Poror (Ann. Sci. Univ. Jassy, 1938, 24, II, 30-107).-Data are given for total and lipin-P, P sol. in water and aq. NaCl, and ultrafilterable P in wheat leaves. Practically the same amounts of P are extracted by water from fresh leaves and by aq. NaCl from dried, defatted leaves. The ultrafilterable P, which consists mainly of $PO_4^{\prime\prime\prime}$, decreases as the $p_{\rm H}$ of the extract increases. Total P is max. during April-May and then decreases, attaining a level of about 25% of its original val. when the ears are forming. Lipin-P decreases considerably during May—July. Sol. org. P is reduced at the end of vegetation to about 20%, and ultrafilterable P to about 33%, of its max. val. Most of the total P in the leaves is easily sol. in water, and the ratio water-sol. P: total P fluctuates during growth, and increases rapidly during June-July. P not extracted by water, aq. NaCl, or alcohol-ether is 20-30% of the total P in May-June, 10% at the end of June, and zero at the end of July. Data are given also for acid-sol. P, inorg. P, and ultrafilterable P in serum and plasma. Acid-sol. P consists of 60-80% of $PO_4^{\prime\prime\prime}$, and the amount is practically the same whether trichloroacetic acid or $HgCl_2$ -HCl is used for removal of protein. Temp, during deproteinisation has little effect on the amount of acid-sol. P, which, however, increases with the time taken during pptn. After deproteinisation at 0°, the amount of acid-sol. P is not altered at 0° for 96 hr., but at 25° it increases owing to phosphatase activity. Ultra-filtration at 0° or 25° must be completed within 24 hr. of taking samples otherwise the amount of ultrafilterable P increases. Addition of CaCl₂ to serum has very little effect on acid-sol. P, whilst ultrafilterable P is considerably decreased. Removal of successive small amounts of blood from a dog at first decreases and then increases the acid-sol. P, whilst the alkaline reserve increases and then decreases. Removal of successive large quantities of blood considerably decreases the alkaline reserve. Ca and ultrafilterable Ca at first decrease and then increase, whilst the vals. for acid-sol. P and inorg. P increase slightly. Intravenous injection of 2N-HCl decreases the alkaline reserve in the serum, whilst acid-sol. P and inorg. P increase and then decrease. The ultrafilterable P is entirely PO₄^{'''}. Ca increases from the moment of injection. Injection of lactic acid considerably decreases the alkaline reserve; the effects on acid-sol., inorg., and ultrafilterable P, and Ca are the same as with HCl. Similar results are obtained with an intravenous injection of NH₄Cl. Injection of 6% Na₂CO₃ causes an increase in alkaline reserve, whilst Ca, acid-sol. P, and inorg. P decrease. Substitution of NaOH for Na2CO3 has no immediate effect on the alkaline reserve, which decreases by approx. 50% after 30 min. Ca decreases whilst acid-sol. P and inorg. P decrease and then increase. Variation of $p_{\rm H}$ from 5.70 to 8.54 does not affect the amount of acid-sol. P in normal human or dog's serum *in vitro*. The amount of ultrafilterable P, which consists entirely of PO₄''', varies inversely with $p_{\rm H}$. The ultrafilterable Ca is higher than that of normal serum at low $p_{\rm H}$ vals. and lower at high $p_{\rm H}$ vals. Gravimetric, volumetric, and colorimetric methods for determination of P, and methods for destruction of org. material, are discussed. J. N. A.

(q) PHARMACOLOGY AND TOXICOLOGY.

Sulphanilamide derivatives.—See A., 1938, II, 439.

Derivatives of p-aminobenzenesulphonanilide. —See A., II, 358.

Sulphanilamide and "M. and B. 693" in experimental pertussis in mice. J. C. CRUICK-SHANK (Lancet, 1938, 235, 310—311).—Sulphanilamide and M. and B. 693 given orally or by injection have no effect on the course of experimental pertussis in mice infected by the intranasal route. C. A. K.

Sulphanilamide in gonorrhœa. A. J. COK-KINIS and G. L. MCELLIGOTT (Lancet, 1938, 235, 355—362).—633 cases of gonorrhœa (491 male, 142 female) were treated with sulphanilamide. The exact technique, which includes vaccine, is fully described. A permanent cure was seen in 80% of male cases after 3 weeks' treatment; the incidence of complications was about $\frac{1}{8}$ of that seen with previous forms of treatment. Minor toxic effects were fairly frequent, women being more sensitive than men; serious toxic actions were rare. C. A. K.

Pneumococcal meningitis treated with sulphanilamide. F. YOUNG (Brit. Med. J., 1938, II, 286-287).—A case of pneumococcal meningitis (in a boy aged 5 years) was successfully treated with sulphanilamide given by mouth. Cyanosis was seen and an after rise of temp. was attributed to the drug. C. A. K.

Sulphanilamide and hæmolytic streptococcal septicæmia in a diabetic. J. H. D. MILLAR (Brit. Med. J., 1938, II, 404—405).—Sulphanilamide was successfully used in a case of hæmolytic streptococcal septicæmia occurring in a diabetic subject.

C. A. K.

Urinary changes due to sulphanilamide administration. M. B. STRAUSS and H. SOUTHWORTH (Johns Hopkins Hosp. Bull., 1938, 63, 41-45).--Administration of sulphanilamide in man caused a decrease in CO₂-combining power of plasma, diuresis, and increase in urinary Na and K. Dogs showed slight loss of base in urine but not enough to alter their plasma-CO₂-binding power, although they received comparatively large doses of sulphanilamide. T. F. D.

Sulphanilamide compounds in the treatment of erysipelas. W. R. SNODGRASS, T. ANDERSON, and J. L. RENNIE (Brit. Med. J., 1938, II, 399-403).— Sulphamidochrysoidine, sulphanilamide, or benzylsulphanilamide was given to 242 cases of erysipelas. All diminished the death rate, shortened the duration of spread and primary pyrexia, and lowered the frequency of recurrence and complications, as compared with previous untreated series. Cyanosis occurred in 30% of cases but produced no serious symptoms; other toxic effects were slight. Sulphamidochrysoidine and sulphanilamide are the best and are about equally effective. C. A. K.

Fatal acute hæmolytic anæmia during administration of sulphanilamide. H. WOOD (Sth. med. J., 1938, **31**, 646—648).—Acute hæmolytic anæmia developed in a negro aged 28 years suffering from lobar pneumonia and streptococcal septicæmia treated with sulphanilamide. Hæmosiderosis was present in the liver, spleen, and kidneys. Pulmonary and brain hæmorrhages, and erythropoietic hyperplasia of the marrow were found. A. J. B.

Sulphanilamide therapy in gonorrhœa and its complications. E. P. ALAJEA, W. E. DANIEL, and J. S. HARRIS (Sth. med. J., 1938, **31**, 395-406). --158 cases of gonococcal urethritis and its complications treated with sulphanilamide are reported. 86% are cured of acute urethritis. Combined treatment with sulphanilamide and anterior urethral instillations or hyperpyrexia may improve the results. A definite blood concn. is desirable and methods for the determination of free sulphanilamide, methæmoglobin, and sulphhæmoglobin are described A. J. B.

Action of sulphonated benzene compounds in streptococcal infection. C. LEVADITI and A. VAIS-MAN (Compt. rend. Soc. Biol., 1938, **128**, 476—478).— Sulphanilamide is more efficacious in protecting mice against streptococcal infection when given by mouth than given intraperitoneally together with the streptococci. Trypaflavine, which has bactericidal activity *in vitro*, only delays the death of mice when given intraperitoneally with streptococci. P. C. W.

Chemotherapy of tuberculosis. K. GANAPATHI (Current Sci., 1938, 6, 608-609).—Condensation products of prontosil, sulphanilamide, and 4:4'diaminodiphenylsulphone, and their derivatives, with allylthiocarbimide are listed. L. S. T.

Chemotherapy of pneumococcal (type II) meningitis in the rat. F. B. COOPER, P. GROSS, and M. LEWIS (Proc. Soc. Exp. Biol. Med., 1938, 38, 835—836).—Rats were inoculated intracranially with this organism and 100 mg. of sulphanilamide, or of 4:4'-di (acetamido)diphenylsulphone, was given twice daily by mouth for 2 days and then once daily for 8 days. 20 untreated rats died within 68 hr. Of 15 sulphone-treated rats, 9 died with an average survival time of 68 hr. Of 15 sulphanilamide-treated rats, 4 died with an average survival time of 8.5 days.

V. J. W.

In vitro and in vivo effect of sulphanilamide on Brucella abortus and Brucella suis. B. D. CHINN (Proc. Soc. Exp. Biol. Med., 1938, 38, 732— 734).—On suspensions of 1000—3000 organisms per c.c. sulphanilamide was bactericidal up to 1 in 10,000 and partly bacteriostatic up to 1 in 10⁶. Daily oral administration of 100 mg. to guinea-pigs, begun 2 hr. after inoculation, protected them from infection.

V. J. W.

Prophylactic and therapeutic effect of sulphonamide compounds in experimental malaria. L. T. COGGESHALL (Proc. Soc. Exp. Biol. Med., 1938, 38, 768—773).—Sulphanilamide, by mouth or injection, prevented or cured malaria in monkeys, caused by intraperitoneal injections of *P. knowlesi*. It also destroyed the parasites *in vitro*. Similar experiments with sulphanilyl sulphanilate gave negative results. Neither drug was of any val. against *P. cathemerium* in canaries or *P. lophura* in chicks. V. J. W.

Chemotherapy of experimental lymphogranuloma. C. LEVADITI (Compt. rend. Soc. Biol., 1938, 128, 875—877).—Sulphanilamide exerts a therapeutic effect in some mice with experimental lymphogranulomata produced by intracranial injection of the virus. Some mice, however, cannot be cured even with large doses. P. C. W.

Sulphanilamide in the treatment of erysipelas. J. A. TOOMEY (Ann. int. Med., 1938, **12**, 166—177).— 72 out of 75 cases of erysipelas recovered after administration of sulphanilamide. The lesions disappeared in 4—10 days without spread and the temp. fell rapidly by lysis. Erysipelas antitoxin was found ineffective in 520 cases. C. A. K.

Use of sulphanilamide in the treatment of bladder infections. W. J. EZICKSON (Ann. int. Med., 1938, 12, 244—247).—16 out of 25 cases of long-standing bladder or upper urinary tract infection were much improved by sulphanilamide. C. A. K.

Severe hæmolytic anæmia due to sulphanilamide. P. ROSENBLUM and A. H. ROSENBLUM (Arch. Pediat., 1938, 55, 511—512).—A child aged 10 was given 30 grains of sulphanilamide in 2 days for acute otitis media and bronchopneumonia. At the end of this time the patient suddenly showed marked pallor and icterus due to hæmolytic anæmia. Recovery was uneventful after 2 transfusions.

C. J. C. B.

Sulphanilamide and spermatogenesis. M. PALAZZOLI, F. NITTI, D. BORET, and M. LEVINSON (Compt. rend. Soc. Biol., 1938, 128, 261—263).— Sulphanilamide given by mouth to rabbits in daily dose of 0.5 g. per kg. for 7 days had no demonstrable action on spermatogenesis. P. C. W.

Sulphonamide derivatives and spermatogenesis. C. LEVADITI and A. VATSMAN (Compt. rend. Soc. Biol., 1938, **128**, 352—355).—Sulphanilamide, *p*-aminobenzenesulphonamidodimethylsulphonamide, and Na 4'-sulphonamidobenzeneazo-3 : 5diaminobenzoate have no effect on spermatogenesis when given to adult rabbits and mice by mouth. The former two substances depress spermatogenesis in young mice but also stop their growth.

P. C. W.

Influence of prontosil-soluble on beta hæmolytic streptococci growing in tissue culture media. J. T. KING, A. F. HENSCHEL and B. S. GREEN (Proc. Soc. Exp. Biol. Med., 1938, 38, 810-812).—When these organisms were grown in a tissue culture medium containing 0.1% of the drug, their hæmolysing power, as determined by the diameter of the hæmolytic zone, was diminished by about 20%, while their rate of growth, as determined by the diameter of the colony, was unaffected. V. J. W.

Treatment of Malta fever with prontosil. M. D. PETZETAKIS (Dtsch. med. Wschr., 1938, 64, 1147—1148).—Excellent results with intramuscular injection and oral administration of prontosil were obtained in a severe case of Malta fever. Normal temp. was restored after 3 days. A. S.

Treatment of mixed infection of bone tuberculosis and of osteomyelitis with prontosil. M. WEIDEKAMP (Dtsch. med. Wschr., 1938, 64, 854-856).—Cases of bone tuberculosis with mixed infection and patients with osteomyelitis were treated with 0.9—1.8 g. of prontosil per day. Temp., blood sedimentation rate, and the secretory processes in the wounds were satisfactorily influenced in many cases. A. S.

Treatment of undulant fever with prontosil. C. Z. NEUMANN (Brit. Med. J., 1938, II, 342—344).— Prontosil red was given to 20 patients with undulant fever. In 15 of 16 cases given the drug by mouth the duration of fever averaged 7 days (in untreated cases fever lasts 2—6 months). With intramuscular injection only 1 of 4 cases showed any response.

C. A. K.

Undulant fever treated with prontosil. A. L. PUNCH (Lancet, 1938, 235, 429–430).—Sulphanilamide and prontosil sol. were successfully used in a case of undulant fever. C. A. K.

Anti-bacterial power of blood of patients receiving 2 - p - aminobenzenesulphonamidopyridine. A. FLEMING (Lancet, 1938, 235, 564— 567).—The blood of patients taking M. and B. 693 shows a much increased antibacterial power against hæmolytic streptococcus and pneumococcus. This power resides in the serum and not in the leucocytes; it is bacteriostatic and not bactericidal. Such serum also restrains the production of hæmolysins and other toxic substances but does not prevent encapsulation of pneumococci. C. A. K.

Chronic meningococcal septicæmia treated with 2-*p*-aminobenzenesulphonamidopyridine. S. B. DIMSON (Lancet, 1938, 235, 424).—M. and B. 693 was successfully used in a case of meningococcal septicæmia of 8 weeks' duration. C. A. K.

Use of 2-*p*-aminobenzenesulphonamidopyridine in gonorrhœa. F. J. T. BOWDE (Brit. Med. J., 1938, II, 283—284).—31 cases of gonorrhœa were successfully treated with the compound (M. and B. 693). The action was more rapid than that of sulphanilamide and benzylsulphanilamide; a few minor toxic symptoms occurred. A case of gonococcal ophthalmia neonatorum was also cured by the compound. C. A. K.

Gonococcal ophthalmia treated with 2-paminobenzenesulphonamidopyridine. A. M. MICHIE and M. H. WEBSTER (Lancet, 1938, 235, 373).—2 cases of gonococcal ophthalmia in infants aged 6 and 12 days were successfully treated with M. and B. 693. Smears became negative for gonococci after 3 days (compared with 49 days in 10 cases not given the drug). C. A. K. Polyneuritis following administration of uleron. O. FREUSBERG (Dtsch. med. Wschr., 1938, 64, 776—778).—Several cases of severe polyneuritis occurred in the course of uleron treatment of gonorrhœa, although large doses of vitamin- B_1 were given. A. S.

Peroral treatment of gonorrhœa with uleron. F. JACOB (Dtsch. med. Wschr., 1938, 64, 786—787).—Secretory processes in chronic gonorrhœa are diminished by uleron; gonococci disappear in approx. 50% of the cases. Polyneuritis and other side actions of the drug were observed in some cases. A. S.

Use of uleron. G. STÜMPKE (Dtsch. med. Wschr., 1938, 64, 785—786).—The indications and dosage of uleron in the treatment of gonorrhœa are discussed. A. S.

Cure of gonococcal septicæmia with uleron. K. W. SCHULTZE (Dtsch. med. Wschr., 1938, 64, 1042—1043).—Report of a severe case of puerperal gonococcal septicæmia which did not respond to prontosil and was cured with uleron. A. S.

Chemotherapy of gonorrhœa. B. SPIETHOFF (Dtsch. med. Wschr., 1938, 64, 1097—1102).—A review. A. S.

Treatment of gonorrhœa with uleron. D. F. WALSH (Brit. Med. J., 1938, II, 215—218).—Uleron (a sulphonamide compound) was used in the treatment of 43 cases of gonorrhœa. Non-acute cases responded better than acute ones. No toxic symptoms were seen with the doses used (1.5 g. daily). C. A. K.

Tissue affinities of azosulphonamides. C. LEVADITI, R. BEQUIGNON, and L. REINIÉ (Compt. rend. Soc. Biol., 1938, 128, 355—358).—Following the production in mice of granulomata by the intraperitonial injection of tapioca, edestin, animal charcoal, tubercle bacilli, or a culture of *Pasteurella avicida*, 2 : 3-diamino-4-sulphonamidoazobenzene was given by mouth. In all cases on killing the mice the colour was found localised around the granulomata. P. C. W.

Action of substances allied to 4:4'-diaminodiphenylsulphone in streptococcal and other infections in mice. G. A. H. BUTTLE, T. DEWING. G. E. FOSTER, W. H. GRAY, S. SMITH, and D. STEPHENson (Biochem. J., 1938, 32, 1101-1110).-4:4'-Diacetamidodiphenylsulphone is 10 times as active as sulphanilamide in the treatment of streptococcal infections in mice; its toxicity is less, since 800 mg. can be given orally to 20 g. mice. Tetrabenzyldiaminodiphenylsulphone is inactive, as are the 4:4'dichloro- and 4:4'-dihydroxy-compounds. p-Acetamidobenzenesulphinic acid is active; the corresponding sulphonic acid is not. 2-Pyrrolidone-5carboxylamidobenzene-4'-sulphinic acid has the same activity as sulphanilamide and is less toxic (100 mg. is tolerated by mice). The benzylidene Schiff's base of the sulphone produces a good therapeutic effect in pneumococcal infections. P. G. M.

Hydroxyalkyl ethers of basic phenols. Antipneumococcic activity of some 8-quinolyl ethers. --See A., 1938, II, 359. Chemotherapeutic studies in the acridine series. VI. Acridanes. F. R. BRADBURY and W. H. LINNELL (Quart. J. Pharm., 1938, 11, 240-251; cf. A., 1938, III, 513).-3:7-Diamino-5:5dimethyl-5:10-dihydroacridine and 7-amino-3-imino-5:5-dimethyl- and -5:5-diphenyl-3:5-dihydroacridine are inactive towards *B. coli, Staph. aureus, Strept. pyogenes,* and *B. pyocyaneus* in broth and in serum. For new compounds described, see A., 1938, II, 443. J. N. A.

Malaria in the Panama Canal Department, United States army. C. J. GENTZKOW and G. R. CALLENDER (Amer. J. Hyg., 1938, 28, 174—189).— Treatment of 1696 cases of malaria showed that atebrin failed to prevent recurrences. Quinine, in large and long-continued doses, was slightly more effective than atebrin in vivax malaria, and markedly more so in *falciparum* malaria. Plasmoquin given with or following atebrin showed a very definite effect on the relapse rate in all types of malaria, and especially in vivax cases. B. C. H.

Synthetic anti-malarials.—See A., 1938, II, 422.

Treatment of pulmonary tuberculosis with a lipin-soluble silicate. T. STREIT (Dtsch. med. Wschr., 1938, 64, 1178—1181).—Silogran is an ethyl ester of silicylricinoleic acid. Satisfactory results were obtained in the treatment of pulmonary tuberculosis. A. S.

Ethyl esters of chaulmoogra oil therapy in the treatment of mycosis fungoides. S. J. WILSON (Sth. med. J., 1938, **31**, 675-678).-4 patients with mycosis fungoides were treated with ethyl chaulmoograte. Relief from pruritus was obtained in all. A. J. B.

Treatment of pneumonia with a deuteroproteose. C. BROOKS (Sth. med. J., 1938, 31, 534-541).—1787 cases of pneumonia were studied. About 50% were given a deuteroproteose prepared by peptic and HCl digestion and $(NH_4)_2SO_4$ pptn. from ox-blood fibrin (parenterally). The deuteroproteosetreated cases had a 25% lower mortality rate and shorter and milder course than the controls.

A. J. B.

Mechanism of anti-endotoxic chemotherapy. C. LEVADITI and A. VAISMAN (Compt. rend. Soc. Biol., 1938, **128**, 463—465).—Oral administration of various sulphoxide and sulphonamide compounds protects mice against the intraperitoneal injection of the endotoxins of dysenteric bacilli Shiga and Flexner. They do not have this action *in vitro*. If the protection is due to a breakdown product this is not produced in the gut since subcutaneous injection is equally efficacious. P. C. W.

Stability of Bayer 205 resistance in Trypanosoma Gambiense. L. VAN HOOF, C. HENRARD, and E. PEEL (Trans. Roy. Soc. trop. Med. Hyg., 1938, 32, 197—208).—Drug-resistance of T. Gambiense to Bayer 205 is an unstable character which progressively decreases in mechanical passages through mammals of the same species, decreases more rapidly still in passages through mammals of different species, and disappears in cyclical transmission through Glossina palpalis. In the epidemiology of Gambian sleeping sickness, resistance to Bayer 205 is of much less importance than the corresponding As-resistance. C. J. C. B.

Influence of colour filters on photodynamic action of fluorescent dyes on gonococcus. T. L. CH'IN (Proc. Soc. Exp. Biol. Med., 1938, 38, 697— 700).—Gonococci were suspended in dil. dye solutions and illuminated through colour filters. They proved very sensitive to photodynamic action, the orange rays being most effective in methylene-blue and trypaflavine whilst green and blue are most effective for eosin. For mercurochrome all parts of the spectrum are equally effective. V. J. W.

Neostibosan and experimental kala-azar in Chinese hamsters. I. Normal hamsters. II. Infected hamsters. C. W. WANG and C. U. LEE (Proc. Soc. Exp. Biol. Med., 1938, 38, 670-674, 674-678).—The max. non-lethal subcutaneous dose is 1 g. per kg. The max. tolerated dose is 3 g. per kg. The universal lethal dose is 4 g. per kg. No tolerance was set up by repeated doses but the drug was markedly cumulative and two non-lethal doses caused death when given at a 2-month interval.

II. Total dosage of 5—7 g, per kg. in doses of 200— 500 mg. per kg. produced cure in 50% of infected animals as shown by an inoculation test which is necessary to prove cure. V. J. W.

Treatment of undulant fever. H. F. FLIPPIN (Ann. int. Med., 1938, 12, 232).—5 cases of undulant fever were successfully treated with multivalent antiserum of bovine origin. C. A. K.

Benzedrine and paredrine in the treatment of orthostatic hypotension. H. M. KORNS and W. L. RANDALL (Ann. int. Med., 1938, 12, 253—255).— Paredrine (β -*p*-hydroxyphenyl*iso*propylamine) has a similar pressor effect in orthostatic hypotension to benzedrine, but has no stimulant action on the nervous system. No insomnia occurred even with 400 mg. daily. C. A. K.

Tolerance to benzedrine sulphate. L. J. ROBINSON (Ann. int. Med., 1938, 12, 255—257).— A man, aged 24, with hyperirritable carotid sinus was at first successfully treated with 60 mg. of benzedrine sulphate daily. At intervals it was necessary to increase the dose until finally 250 mg. daily was required to prevent spontaneous seizures.

C. A. K.

Action of benzedrine sulphate on smooth muscle. B. N. HALPERN (Compt. rend. Soc. Biol., 1938, 128, 487-491).—Benzedrine sulphate has no action on the normal isolated uterus of rabbit or guinea-pig or the isolated rabbits intestine. If these tissues are in a hypertonic state following application of acetylcholine, pilocarpine, or BaCl₂ benzedrine will diminish the tone. It has an antagonistic action to adrenaline on the isolated rabbits intestine and is unaffected by sympathetic inhibitors such as F. 883. It must act directly on the smooth muscle.

P. C. W.

Action of benzedrine. T. VON LEHOCZKY (Klin. Woch., 1938, 17, 1006—1009).—Benzedrine was administered to 110 cases. Healthy persons show an increased capacity for work and euphoria. Light and moderately severe cases of depression and melancholics react favourably. The blood pressure is unaffected. E. M. J.

Effect of benzedrine on cardiac output and basal metabolism in man. S. BERGGREN and L. SÖDERBERG (Skand. Arch. Physiol., 1938, 79, 115— 120).—Arterio-venous O_2 difference was determined with the acetylene method (Grollman); the O_2 consumption was measured with a Krogh spirometer. Benzedrine (20 mg. by mouth) raised the basal metabolism by 10% and increased cardiac output in 2 normal subjects. A. S.

Action of phenylpropylamine in barbiturate poisoning in the guinea-pig. A. LUMIÈRE and P. MEYER (Compt. rend. Soc. Biol., 1938, 128, 678— 680).—The efficacy of the three isomerides of phenylpropylamine in counteracting the sleep induced by Na veronal was determined. β -Phenylpropylamine is the most efficient and superior to strychnine; α - and γ -phenylpropylamine exercise a weaker and more transient action than benzedrine. J. H. T.

Toxicity of phenylpropylamine. A. LUMIÈRE and P. MEYER (Compt. rend. Soc. Biol., 1938, 128, 680).— α - and γ -Phenylpropylamine are more quickly converted into a non-toxic form by the body than benzedrine. This explains the transiency of their action and their inactivity by oral administration. These isomerides do not lose their toxicity to any greater degree than benzedrine when subjected to prolonged contact with fresh serum, to formaldehyde, or to H₂O₂ in the presence of a catalyst.

J. H. T.

Action of atropine in bird. J. D. P. GRAHAM (J. Physiol., 1938, 93, 56-58P).—Atropine sulphate (0.5 mg. per kg.) depresses salivary secretion. It inhibits tone of gut and the increase of tone due to acetylcholine is abolished. The pupil fails to dilate (drug 1 in 1000, frequent instillations). 0.5 mg. per kg. increases heart rate and amplitude; stimulation of vagus then diminishes amplitude but not rate of contraction. Blood pressure is influenced as in the mammal. There is an increase in inspiratory tone. J. A. C.

Treatment of epidemic encephalitis [with belladonna]. H. D. WITZLEBEN and A. WEBER (Dtsch. med. Wschr., 1938, 64, 1174—1178).— The "Homburg 680" is beneficial in treatment of chronic epidemic encephalitis. The prep. is obtained from Bulgarian belladonna roots and contains 2.3 mg. of hyoscyamine, 0.6 mg. of atropine, and 0.09 mg. of scopolamine per c.c. A. S.

Influence of tobacco extracts on cardiac automatism. M. POPESCO (Compt. rend. Soc. Biol., 1938, 128, 323-326).—The frog's ventricle kept in cold saline until only the auricles are beating, when placed in a dil. solution of tobacco extract commences to beat; in some cases the relation of auricular to ventricular beat becomes normal. P. C. W.

Nicotine-like action of pilocarpine. Z. M. BACQ and A. SIMONART (Compt. rend. Soc. Biol., 1938, 128, 556-557).—Pilocarpine has no effect on striated muscle (tibialis ant.) of the spinal cat and does 3 U (A., III.) not modify the effects of acetylcholine or max. stimulation of the motor nerve. P. C. W.

Action of acetylcholine and adrenaline on atropinised melanophores. M. BEAUVALLET (Compt. rend. Soc. Biol., 1938, 128, 635—636).— Atropine prevents the action of acetylcholine and adrenaline on the melanophores of *Carassius vulgaris* and depresses their response to electrical stimulation. J. H. T.

Effect on yohimbine on adrenaline apnœa in the rabbit. R. HAZARD, J. CHEYMOL, and A. QUINQUAUD (Compt. rend. Soc. Biol., 1938, 128, 529—532).—In chloralosed rabbits yohimbine causes a temporary apnœa but has no effect on adrenaline apnœa. In the non-anæsthetised rabbit yohimbine causes a hyperpnœa but has no effect on adrenaline apnœa. P. C. W.

Does atropine modify inversion by F. 933 of hypermetabolism of cold? C. LOMBROSO and A. MERCIADRI (Arch. int. Pharmacodyn., 1938, 59, 329—339).—In rats and rabbits F. 933 stimulates metabolism at body temp. of 27—29°, and decreases it at 2—5°. In presence of F. 933 external cold depresses metabolism; this is unaffected by atropine. D. T. B.

Action of the ephedrine group on the heart. M. KIESE, R. GARAN, and A. KRAUTWALD (Klin. Woch., 1938, 17, 967—971).—Ephetonin (0.5— 20 mg.) increases the efficiency and metabolism of the failing heart. Infusion with ephetonin at a slow rate $(1-5 \ \mu\text{g}. \text{ per min.})$ diminishes the O₂ consumption without change in heart rate. *p*-Hydroxyephedrine and dihydroxyephedrine are more potent than ephedrine. Veritol acts similarly to the corresponding hydroxyephedrine. Isalon (*N*-diethylaminoethylephedrine) has a much weaker and more irregular action than ephedrine. E. M. J.

Influence of sympatol on carbohydrate and gas metabolism. C. BRENTANO and E. PFLUG (Klin. Woch., 1938, 17, 979—981).—Sympatol causes a min. rise of blood-lactic acid and -sugar and O₂ consumption. E. M. J.

Effect of histidine on the histamine content of the lungs and on histamine reactions. M. MACKAY (Austral. J. Exp. Biol., 1938, 16, 137— 142).—Injection of histidine does not produce changes in the histamine content of the lungs. Histidine inhibits the contraction produced by histamine, peptone, and acetylcholine on the isolated guinea-pig jejunum, but does not influence the depressor action of histamine in the cat. D. M. N.

Effect of (A) ergobasine [ergometrine], (B) ergotamine on cardiac function. L. DONATELLI (Boll. Soc. ital. Biol. sperim., 1938, 13, 158—159, 159—160).—(A) Ergobasine (0·1—2 mg.) has a transient accelerating action on the heart (frog, toad, rat, rabbit) followed by a marked retarding action; it stimulates the vagal terminals and acts on the autonomic centres and muscle of the heart, to which it is less toxic than ergotamine.

(B) The differences in the actions of ergotamine and ergobasine on the heart are quant. and not qual.

XIX(q)

Action of ergotamine on the heart. L. DONA-TELLI (Arch. int. Pharmacodyn., 1938, 59, 345— 369).—The main action of ergotamine on the isolated heart of the frog, toad, and rabbit is a negative chronotrope and inotrope one. Small doses sometimes cause the opposite effects. D. T. B.

Protective action of 3-piperidinomethylbenzdioxan (F. 933), 3-diethylaminomethylbenzdioxan (F. 883), and yohimbine on chloroformadrenaline ventricular fibrillation. T. C. R. SHEN (Arch. int. Pharmacodyn., 1938, 59, 242-251).—Adrenaline given intravenously to chloroformed dogs under the influence of F. 933 or F. 883 or yohimbine causes a fall of blood pressure or a small rise. In all cases the CHCl₃-adrenaline fibrillation is prevented when the pressor action of adrenaline is annulled by the agents mentioned. D. T. B.

Effect of small amounts of yohimbine on the circulation. R. KAMEI (Tohoku J. exp. Med., 1938, 33, 419-429).—In rabbits under urethane anæsthesia yohimbine (0.5 mg. per kg.) injected slowly intravenously produces a slight rise of blood pressure due to increased heart action and constriction of the splenic and, occasionally, the renal vessels. The vessels of the skin, muscles, intestine, and brain dilate. F. JA.

Effect of intravenous injection of caffeine on arterial pressure in man. R. MARTINETTI (Arch. Farm. sperim., 1938, 66, 59—68).—Injection of 0.24— 0.48 g. of caffeine has a variable effect but the general tendency is to cause a transient fall in arterial blood pressure. F. O. H.

Influence of glucosides of Digitalis lanata on coronary blood flow and blood pressure in the trained dog. H. E. ESSEX, J. F. HERRICK, and M. B. VISSCHER (Amer. Heart J., 1938, 16, 143— 148).—A modified Rein's thermostromular was placed on the left circumflex coronary artery of the dog under anæsthesia. After recovery from the operation the coronary blood flow was measured before and after intravenous injections of several of the pure native glucosides of *D. lanata* in subnauseant doses. In general the flow was unaltered by the drug and there were no significant changes in blood pressure.

C. A. K.

Action of digitalis on the isolated heart. L. N. KATZ, M. MENDLOWITZ, and H. A. KAPLAN (Amer. Heart J., 1938, 16, 149—158).—The action of digitalis was studied in the isolated dog's heart, using a special circuit. The drug has no direct effect on the contractile power or mechanical efficiency of the muscle in the normal or the failing heart. Changes in conduction and ectopic rhythms were seen. C. A. K.

New methods for the assay of digitalis. I. SIMON (Boll. Soc. ital. Biol. sperim., 1938, 13, 28— 30).—The possibility is advanced of assaying digitalis by its action on the isolated guinea-pig's uterus, on the tonus and contraction of longitudinal fibres of isolated intestine, or on the diuresis and Cl' excretion of rabbits previously injected with aq. NaCl.

F. O. H.

True glucosides of *Digitalis lanata*. II. Accumulative action. III. Comparative toxicities in guinea-pigs. A. RABBENO (Boll. Soc. ital. Biol. sperim., 1938, 13, 169—171, 171—172).—II. With increasing rate of continuous intravenous injection into guinea-pigs, the min. lethal dose of total digilanid and digilanid-A and -B (cf. A., 1937, III, 28) firstly increases to a max., then decreases to a min., and finally slowly increases to a const. val. With -C, the max. and min. vals. are replaced by a range of rates of injection over which the min. lethal dose is const. This final const. val. is a criterion of the accumulative action, viz., -C, total digilanid, -A, and -B in descending order.

III. The min. lethal dose of total digilanid and digilanid-C, -A, and -B is 0.588, 0.596, 0.653, and 1.186 mg. per kg., respectively, *i.e.*, in the ratio of 1:1.01:1.11:2.02. The vals. are compared with those for cat and *Discoglossus pictus*. F. O. H.

Effect of digitalis and tobacco on frog's ventricle. M. POPESCO (Compt. rend. Soc. Biol., 1938, 128, 321—323).—Both digitalis and tobacco extracts increase the contractility of the isolated frog's ventricle kept in the cold until all spontaneous contractions have ceased. The action of the tobacco is quicker in onset and more pronounced. Neither drug affects excitability. P. C. W.

Respiratory acceleration by yohimbine in the morphinised rabbit. R. HAZARD, J. CHEYMOL, and A. QUINQUAUD (Compt. rend. Soc. Biol., 1938, 128, 391—392).—Subcutaneous injection of morphine slows the respiration in the rabbit to 4—10 per min. If yohimbine is injected intravenously (2 mg. per kg.) the rate immediately increases to 40—80 per min. P. C. W.

Action of theophylline on respiration. R. HAZARD and R. JEGUIER (Arch. int. Pharmacodyn., 1938, 59, 295—302).—Theophylline increases the rate and depth of respiration in the chloralosed dog, after an initial inhibition. In the non-anæsthetised rabbit it diminishes the rate and amplitude; large doses may have the opposite effect. It prevents the depressor action of morphine, evipan, chloralose, and somnifen on respiration. This effect is const.; the action on normal respiration is inconst. D. T. B.

Chemical structure and anthelmintic properties. L. LAUNOY (Biol. méd., 1938, 28, 349– 384).—A review. W. D'A. M.

Extin in urology. J. G. BECKER (Dtsch. med. Wschr., 1938, 64, 1045—1046).—Extin, a mixture of adipic acid, NH_4Cl , hexamethylenetetramine, and starch, produces diuresis and renders the urine acid. A. S.

Action of morphine on liver- and brain-lecithins in the guinea-pig. M. DELAVILLE (Compt. rend., 1938, 207, 94-96).4-31 daily injections of morphine increase brain-lecithins from 2.68 to 3.447%. Liver-lecithin falls from 1.583 to 1.027%. Histological examination of frozen sections of liver shows that after increasing injections the cells are charged with fat droplets. The drug probably combines with the liver-lecithin complexes, which break down to fats stainable with Sudan III. J. L. D.

Effect of morphine on blood-alcohol in normal subjects. C. BALLATORE (Boll. Soc. ital. Biol. sperim., 1938, 13, 152—153).—Subcutaneous injection of morphine reduces the level of blood-alcohol due to ingestion of alcohol (cf. Minz and Serianni, A., 1937, III, 137). F. O. H.

Intracisternal injection of papaverine hydrochloride. F. MERCIER and J. DELPHAUT (Compt. rend. Soc. Biol., 1938, 128, 907–910).—0.01 g. produces hypertension, polypnœa, and renal vaso-constriction in the chloralosed dog; larger doses are followed by hypotension and death from respiratory failure. These actions are abolished by adrenalectomy or previous intracisternal injection of a local anæsthetic. P. C. W.

Sigmodal analgesia in labour. F. V. EMMERT and S. GOLDSCHMIDT (Amer. J. Surg., 1938, 39, 581— 583).—The new barbiturate, Sigmodal, was used by rectal injection in 125 cases without danger to mother or child. It shortens the duration of labour with complete amnesia in 80% of cases. F. H. M.

Basal narcosis in tetanus. P. T. O'FARRELL (Brit. Med. J., 1938, II, 348).—A case of tetanus with 7-day incubation period was successfully treated with nembutal (given by mouth and intravenously) + anti-tetanic serum. C. A. K.

Analysis of 400 instances of chronic bromide intoxication. F. M. HANES and A. YATES (Sth. med. J., 1938, 31, 667-671).-400 cases with excess of blood-bromide (more than 50 mg.-%) were studied. Headache, weakness, lethargy, delusions, hallucinations, and vertigo occurred in these patients. A rash occurred in 25%. 5% of admissions to psychopathic institutions are due to bromidism. A. J. B.

Intravenous anæsthesia. B. M. CARRAWAY and C. N. CARRAWAY (Amer. J. Surg., 1938, 39, 576—580).—Intravenous anæsthesia was used in 1900 cases without mortality in a wide range of surgical cases. Administration should be by the fractional method with regard only to individual tolerance and not by wt., age, or size. Na pentothal is preferred to Evipal because of smoother and more prolonged anæsthesia, better relaxation, and less toxicity. Premedication should be given in each case. Electrocardiographic studies show that the heart is unaffected. F. H. M.

Cerebral asphyxia during nitrous oxide and oxygen anæsthesia. J. D. STEWART (New Eng. J. Med., 1938, 218, 754—757).—A case is described in which apnœa occurred for about 2 min. during N_2O-O_2 anæsthesia. Choreiform movements, excitation, incontinence of urine and fæces, maniacal delirium, stupor, flaccidity of muscles, absence of reflexes, and anæsthesia to pain followed and lasted about 48 hr. Death from pneumonia occurred on 13th post-operative day. The cerebral changes found are described. A. J. B.

Helium in anæsthesia. W. S. SYKES and R. C. LAWRENCE (Brit. Med. J., 1938, II, 448-449).—It is about twice as easy to breathe a mixture of He (79%) and O₂ (21%) as ordinary air. This mixture is therefore suggested in cases of respiratory obstruction or where economy of muscular effort is essential. C. A. K. Cumulative effects of pentothal sodium. J. R. VEAL and C. REYNOLDS (Sth. med. J., 1938, 31, 649—650).—Repeated doses of pentothal Na in cats and dogs produce narcosis of longer duration than the initial dose. A. J. B.

Pyrazoline local anæsthetics.—See A., 1938, II, 420.

Resistance of the cornea to cocaine anæsthesia. J. RÉGNIER and S. LAMBIN (Compt. rend. Soc. Biol., 1938, **128**, 884—887).—The rabbit's eye kept in contact with a 0.1% solution of cocaine hydrochloride is completely anæsthetised; a 0.005% solution produces no anæsthesia. Intermediate concns. only anæsthetise the cornea for a limited time in spite of the continued application of the solution.

P. C. W.

A. S.

Spinal anæsthesia with pantocain. R. HELL-MANN (Dtsch. med. Wschr., 1938, 64, 1000—1003; 1037—1040).—Report of 208 gynæcological and obstetrical operations where excellent results were obtained with intrathecal pantocain anæsthesia.

Action of naphthalene on the spinal cord of the frog. H. BURIAN (Pflüger's Archiv, 1937, 238, 651—664).—Naphthalene administered orally to frogs abolishes the reflex response to certain stimuli. The action of phenol on the spinal cord is not influenced but that of strychnine is completely inhibited by naphthalene, which probably acts on the same element of the reflex arc as does strychnine. M. A. B.

Action of β -phenylisopropylamine sulphate (Mecodrin). P. BAHNSEN, E. JACOBSEN, and H. THESLEFF (Klin. Woch., 1938, 17, 1074—1078).—10—20 mg. of Mecodrin administered to 65 men and 52 women produced conflicting results on emotional state, desire to work, and sense of fatigue.

E. M. J.

Properties of isosteric and structurally similar compounds. VIII. Narcotic properties of certain derivatives of 2:4-diketo-thiazolidine and -oxazolidine. H. ERLENMEYER (Helv. Chim. Acta, 1938, 21, 1013—1016; cf. A., 1938, ii, 34).—Of many similarly constituted substances 2:4-diketo-5:5diethylthiazolidine and the corresponding 5:5-dipropyl compound have the most marked narcotic properties similar in strength to those of diethylbarbituric acid. H. W.

New analeptic substance. O. BRUNS (Münch. med. Wschr., 1938, 85, 1153—1155).—Satisfactory results were obtained with Neospiran (o-phthalic acid diethylamide), a respiratory and circulatory stimulant. A. S.

Nervous lesions in experimental alcohol intoxication. J. LHERMITTE, AJURIAGUERRA, and GARNIER (Compt. rend. Soc. Biol., 1938, 128, 386— 388).—The intoxication and death produced in rabbits by ingestion of absinthe together with the degeneration of the central nervous system and viscera can be prevented by the daily injection of vitamin- B_1 or by giving a sufficiently varied diet.

P. C. W.

Effect of 2:4-dinitrophenol on energy exchange and oxygen consumption in healthy and infected mice. G. SCHEFF and F. RABATI (Biochem. Z., 1938, 298, 101—109).— O_2 consumption in mice is increased by intraperitoneal injection of harmless doses of 2:4-dinitrophenol and more slowly by infection with trypanosomes. In infected mice doses of 2:4-dinitrophenol, harmless to healthy mice, accelerate the onset of fatal asphyxia if given during the period of increased O_2 consumption. In vitro, non-toxic concess. of 2:4-dinitrophenol do not increase O_2 consumption by the trypanosomes; these act by consuming the O_2 in the blood whilst 2:4-dinitrophenol acts directly on the tissues which then consume increased amounts of O_2 . W. McC.

Chemical control of starfish. V. L. LOOSANOFF and J. B. ENGLE (Science, 1938, 88, 107–108).—CaO was successfully used to kill off starfish living in oyster beds. No effect was seen on oysters, clams, crabs, barnacles, or adult flounders. C. A. K.

Use of exvomit in hyperemesis gravidarum. H. NAHMMACHER (Dtsch. med. Wschr., 1938, 64, 1072).—Satisfactory results in the treatment of hyperemesis gravidarum was obtained with exvomit, a mixture of Ce salts with valerian. A. S.

Pharmacology of pyrrole derivatives. VIII. 2-Pyrryl isobutyl ketone. A. RABBENO, G. RAS-TELLI, and S. SACCHI (Boll. Soc. ital. Biol. sperim., 1938, 13, 167—169).—The ketone, b.p. 133—134°/13 mm. (Ag salt; nitrophenylhydrazone, m.p. 151°), occurs in ether extracts of Valeriana officinalis. The toxicity (min. lethal doses are tabulated) of the ketone and its homologues in frogs gives an ascending series of (pyrrole), methyl, ethyl, propyl, and isobutyl; with rats, the methyl and propyl are more toxic than the ethyl and isobutyl ketones, respectively. F. O. H.

Hydrocyanic acid content of syrup of almonds. M. F. SCHOOFS (Bull. Acad. Méd. Belg., 1938, 3, 89– 108).—The total titre of HCN in amygdalin syrups varies with the method of prep. and with the almonds used. The free acid exists only in traces. The titre of acid decreases on keeping. Amygdalin syrups are readily attacked by moulds, and ferment easily. Substitution of extracts containing HCN for amygdalin syrup increases toxicity. Extracts containing glucose part with HCN less easily than those containing only sucrose. H. B. C.

Extraction of alkaloids and other organic drugs from viscera. F. BAMFORD (Analyst, 1938, 63, 645—649).—Recent suggestions (cf. A., 1937, III, 479; 1938, III, 144) that the use of alcohol and Pb acetate in the extraction of viscera and purification of extracts should be abandoned are criticised, on the grounds that conditions in hot climates require the continued use of alcohol, and that the Pb acetate technique has proved rapid and satisfactory during 7 years' experience. Procedures for extraction of strychnine from viscera, and atropine and cocaine from urine, are described. E. C. S.

Effect on the activity of salts of alkaloids of the acid combined with the base. Comparison of the activity of salts of morphine (phenylpropionate, hydrochloride, citrate) administered in different ways. J. RÉGNIER and S. LAMBIN (Bull. Sei, Pharmacol., 1938, 45, 241-252; cf. A., 1938,

III, 230).-Morphine (less than 5 mg. per kg. intravenously or applied locally) does not depress the oculopalpebral reflex in the rabbit; it potentiates the local anæsthesia due to cocaine (cf. A., 1937, III, 350). The phenylbutyrate, propionate, and benzoate have a greater, whereas the gluconate and citrate have a smaller, effect than the hydrochloride. By determining the no. of equal stimuli necessary to elicit the reflex it is found that the citrate intravenously inhibits it more easily and the phenylpropionate less easily than the hydrochloride. The results are difficult to assess because they are irregular. The phenylpropionate is eliminated in the urine more rapidly than an equiv. amount of citrate after intravenous injection. The hydrochloride sometimes causes J. L. D. anuria and sometimes polyuria.

Action of paipu (Stemona tuberosa) on lice. L. S. WANG (Chinese Med. J., 1938, 54, 151—158).— An alcoholic extract of the raw drug kills body and pubic lice and the lice of animals; it also destroys the eggs. The drug is non-toxic in animals and nonirritant. W. J. G.

Therapeutic use of animal drugs. F. PEPEU (Dtsch. med. Wschr., 1938, 64, 1109-1111).--A review. A. S.

Kidney changes in oxalic acid poisoning. H. TÖBBEN (Virchow's Arch., 1938, **302**, 246-250).—In subacute oxalic acid poisoning in human beings and rabbits, degenerative changes occur in the tubular epithelium of the kidney with deposition of Ca oxalate crystals in the lumina of the tubules. H. W. K.

Spasmolytic esters of amino-alcohols. B. N. HALPERN (Arch. int. Pharmacodyn., 1938, 59, 149– 194).—Diethylaminoethyl α -phenylvalerate has low toxicity. It antagonises the action of acetylcholine and BaCl₂ on the intestine, uterus, and bladder *in vivo* and *in vitro*. It acts as strongly as atropine and more so than papaverine on the movements of the isolated gut. It is 2 or 3 times less active than atropine on acetylcholine spasm of the intestine, but is 200 times less active on the heart, and 5000 times less mydriatic. Na and diethylaminoethyl α -phenylvalerates have no spasmolytic properties, which are probably due to the amino-alcohol group. D. T. B.

Factors influencing the isolated melanophores of *Fundulus heteroclitus*. B. BOGDANOVITOH (Arch. int. Pharmacodyn., 1938, **59**, 227—231).— Atropine, pilocarpine, and eserine expand the melanophores of isolated scales of *F. heteroclitus*. Adrenaline, acetylcholine, mecholyl, and D₂O cause contraction. Adrenergic and cholinergic drugs, although both contracting the melanophores, can be differentiated by the sp. paralysants, ergotoxine and atropine. D. T. B.

Increased resistance of mated animals to toxic agents. I. Methyl alcohol. E. Agduff (Arch. int. Pharmacodyn, 1938, 59, 269—294).—Mice differ in their resistance to daily increasing doses of methyl alcohol. It is greatest during the period of rapid growth. It is increased during pregnancy, especially in the later stages. Mating causes an increase, especially in females. Of unmated mice the males are more resistant. D. T. B.

General effects of mustard gas poisoning. G. Maier (Z. ges. exp. Med., 1938, 103, 458-478).--Mustard gas (15 mg.) applied to the skin of guineapigs produces considerable loss of wt. and dehydration. The red cell count and hæmoglobin are diminished and the white cell count is considerably increased 48 hr. later. The neutrophils are increased for about a week; then a gradual diminution of the no. of neutrophils sets in and a lymphocytosis appears. The eosinophils disappear completely in the first week. Many degenerative forms of leucocytes were observed. The osmotic resistance of the red cells is at first increased, then reduced. Blood-sugar is increased in the first hr., then hypoglycæmia was observed up to 15 hr. after the poisoning; recovery then took place. Blood NaCl is at first increased, then normal (12-48 hr. after the poisoning), sometimes diminished.

A. S.

Pharmacology of germerine and its degradation products. I, II. H. T. A. HAAS (Arch. exp. Path. Pharm., 1938, 189, 397–410, 411–420).—I. Germerine, one of the alkaloids in Veratrum album, produces in frogs symptoms resembling those of poisoning with protoveratrine. 50% lethal dose for germerine in Rana esculenta is 0.9 mg. per 100 g., in R. temporaria 2.0 mg. per 100 g. In rats the lethal dose is 6 times as high as that of protoveratrine. The two degradation products germine and protoveratridine are less toxic; the symptoms of excitation are more, and those of paralysis less, marked than with germerine and protoveratrine.

II. Germerine in the intact animal stimulates the vagus centre; in the isolated organ it has a parasympathomimetic action antagonised by atropine and a sympathomimetic action reversed by ergotamine and increased by cocaine. H. BL.

Physiological effects of atasine. RAYMOND-HAMET (Compt. rend. Soc. Biol., 1938, 128, 479— 482).—Atasine, an alkaloid derived from Aconitum heterophyllum, injected in the chloralosed dog augments the pressor effect of adrenaline and diminishes the depressor action of faradic stimulation of the left vagus. This is not due to an atropine-like action since the depressor effect of acetylcholine is augmented. P. C. W.

Lesions in liver and kidneys produced by inhalation of carbon tetrachloride. P. VALLERY-RADOT, G. MAURIC, A. DOMART, and GAUTHIER-VILLARS (Compt. rend. Soc. Biol., 1938, 128, 482— 485).—Rabbits subjected for 20 min.—2 hr. to an atm. containing CCl_4 develop symptoms of liver and renal damage in the following week. Albumin, erythrocytes, and stones appear in the urine.

Hepato-renal syndrome in carbon tetrachloride poisoning. H. SCHUTZ (Arch. Gewerbepath. Gewerbehyg., 1938, 8, 469—500).—Work on clinical symptoms and pathological changes in blood and organs is reviewed. M. A. B.

Relations between constitution of organic compounds and their action on the organism. M. VANGHELOVICI (Bul. Soc. Chim. România, 1937, 19, 12-39).--A lecture. Action of fagarine-I on the isolated intestine. E. M. DE ESPANÈS (Compt. rend. Soc. Biol., 1938, 128, 309—311).—Fagarine has an irregular action on guinea-pig isolated intestine and no effect on the action of adrenaline or atropine. P. C. W.

Fate of ingested α -amino- α -methyl acids in dogs. M. POLONOVSKI, P. BOULANGER, and C. OUDAR (Compt. rend. Soc. Biol., 1938, 128, 604— 606).—The α -methyl group renders the amino-acid practically inutilisable by dogs. H. G. R.

Effect of sodium citrate and sodium bicarbonate on ethyl alcohol acidosis. B. B. CLARK and R. W. MORRISSEY (Proc. Soc. Exp. Biol. Med., 1938, 38, 734—736).—Administration of these salts decreased the blood-lactic acid and increased the CO₂ capacity of the plasma in dogs in which acidosis had been caused by the administration of 5 g. per kg. of alcohol. V. J. W.

Effect of mescal on skin colour in Carassius carassius, L. A. CHWEITZER and E. GEBLEWICZ (Compt. rend. Soc. Biol., 1938, 128, 867—868).— 3—6 mg. injected subcutaneously into the fish causes rapid blackening of the skin. Lower doses (0.09 mg. per g. body-wt.) increase the rate of colour adaptation to environment. P. C. W.

Electropyrexia. S. L. OSBORNE and D. E. MARKSON (Ann. int. Med., 1938, 12, 189—204).— The use of high-frequency diathermy in man is described. C. A. K.

Action of sodium thiosulphate in lead poisoning. F. SCHMITT and H. LOSSIE (Dtsch. Arch. klin. Med., 1938, 182, 200-203).—Satisfactory results in a case of Pb poisoning were obtained with $Na_2S_2O_3$. The Pb content of blood was reduced to normal.

A. S.

Some vegetable poisons of New Guinea. E. A. HOLLAND (Trans. Roy. Soc. trop. Med. Hyg., 1938, 32, 295).—A list of vegetable poisons used by the natives in New Guinea is given, with comments on their method of use. C. J. C. B.

Suicide by ingestion of *Derris* root species in New Ireland. E. A. HOLLAND (Trans. Roy. Soc. trop. Med. Hyg., 1938, **32**, 293—294).—Suicide is common from this root in New Ireland. The patients become collapsed with a feeble pulse and dilated pupils; post mortem the only changes found are those of acute congestive heart failure. The fresh root is used and the actual poison is unknown but it does not appear to be HCN. C. J. C. B.

New applications of *Chelidonium majus* preparations. K. DANIEL [with D. SCHMALTZ] (Pharm. Zentr., 1938, 79, 99–100).—New medical uses are described. E. H. S.

Dermatitic properties of tung oil. M. W. SWANEY (Ind. Eng. Chem., 1938, 30, 514-515).--A case of dermatitis resulting from exposure in the laboratory to the vapour of heated (Chinese) tung oil is reported; hip-injections (which produced intense reaction) of a dil. solution (in olive oil) of the pungent distillate obtained by heating raw tung oil afforded a cure. A further single exposure after 1 year to tung oil vapours caused a recurrence of the dermatitis,

P. C. W.

which, however, healed spontaneously after some 10 days. The literature on dermatitis from various fatty oils is briefly reviewed. E. L.

Human poisoning by nitrous fumes. A. HOLSTE (Zentr. Gewerbehyg. Unfallverhütg., 1936, 23, 183—186; Chem. Zentr., 1936, ii, 2565).—Of several cases of poisoning of firemen by nitrous gases, one developed ædema of the lungs and circulatory changes which proved fatal whilst an increase in hæmoglobin and red blood corpuscles was common to all. A. H. C.

Pathologic changes produced by subcutaneous injection of rattlesnake (*Crotalus*) venom into *Macaca mulatta* monkeys. H. K. FIDLER, R. D. GLASGOW, and E. B. CARMICHAEL (Proc. Soc. Exp. Biol. Med., 1938, 38, 892—894).—Death took place in 36 hr. and post mortem examination showed severe hæmorrhagic ædema with necrosis of walls of small blood vessels. There was dilatation of the sinuses of the lymphatic glands and some granular degeneration in the liver and kidney. V. J. W.

Venom of the genus Bothrops. V. Nitrogen and sulphur content of bothropotoxin. D. VON KLOBUSITZKY and P. KÖNIG (Z. physiol. Chem., 1938, 255, I—III; cf. A., 1935, 1394).—Substance IV, which is dialysable and precipitable by alcohol, has a min. lethal dose of 0.05 mg. in pigeons; it contains C 42.28, H 6.26, N 11.72%, S and P, nil. Substance V, which is pptd. during dialysis of a crude toxin (min. lethal dose 0.13 mg.), is completely non-toxic. P. G. M.

Venomous effects of some Arizona scorpions. H. L. STAHNKE (Science, 1938, 88, 166-167).—The venom of *Centruroides sculpturatus*, Ewing, is fatal to white rats and to children; in rats, that of *Hadrurus* hirsutus, Wood, and Vejovis spinigerus produces only a local swelling. L. S. T.

Electrophoresis of infusions of quinine, belladonna, and digitalis. L. CALLEGARI and G. GAR-BARINO (Boll. Soc. ital. Biol. sperim., 1938, **13**, 166— 167).—Using Dhéré's apparatus and a p.d. of 45 v., the alkaloids of quinine and belladonna migrate to the cathode. With digitalis infusions, the active principles migrate to the anode but isolated glucosides are not electrically charged. F. O. H.

Activation of ultrafiltrates of ragweed pollen extracts by means of colloidal substances. W. L. LONG and I. TELLER (J. Allergy, 1938, 9, 433—446).— Protein-free ultrafiltrates (through Cellophane discs 1200 and 600 at 60 lb. pressure) of ragweed pollen extracts were much less active than the original extract; the activity was not lessened by refiltration. The active substance can be adsorbed by protein and $Zn(OH)_2$, as is shown by the lowered activity after refiltration of ultrafiltrates to which these substances have been added. When adsorbed by $Zn(OH)_2$, it can be released from the latter by KH_2PO_4 . Ultrafiltrates are reactivated by the addition of proteins such as albumin or casein. Ultrafiltrates desensitised sites which had been sensitised with pollen extract but to a smaller degree than the extracts themselves. C. J. C. B.

Influence of epinephrine on antigen and antibody reactions. L. TUFT (J. Allergy, 1938, 9, 454-457).—The addition of adrenaline to antigen or antibody mixtures produced delay in absorption but did not interfere with their sp. immunological action. Such an addition is recommended when giving any sera or extracts. C. J. C. B.

Method for determining pollen concentration of air. E. C. COCKE (J. Allergy, 1938, 9, 458—463). —The gravity method for determining pollen concn. gives a true picture as shown by actual counting. For spiculated pollen such as ragweed the actual concn. is $\frac{1}{3}$ greater than the calc. concn. For pollen grains with air sacs or wings, 50% should be added to the calc. result. A table for calculating pollen circulation from the no. of grains caught on 1 sq. cm. in 24 hr. is given. C. J. C. B.

Antigens. I. Skin reaction curve obtained with serial dilutions of extracts. R. I. DORFMAN and B. G. EFRON (J. Allergy, 1938, 9, 464—474).— Skin reaction curves to house dust and grass pollen extracts were discontinuous, with plateaux in all ranges of concn. but especially in the higher ranges. Extreme caution should be taken in applying comparative skin tests to the quant. evaluation of antigenic activity. C. J. C. B.

Clinical use of phenylpropanolamine hydrochloride (propadrine) in the treatment of allergic conditions. W. E. BAYER (J. Allergy, 1938, 9, 509-513).—Propadrine is a satisfactory therapeutic agent in the treatment of allergy. There was no nervousness, insomnia, tachycardia, or palpitation, nor was there any restlessness or sleep-walking in children. Propadrine can safely be used in cases with prostatic hypertrophy. C. J. C. B.

Development of hypersensitiveness in man. F. A. SIMON (Ann. int. Med., 1938, **12**, 178–188).— A review. C. A. K.

Method of testing guinea-pigs for hypersensitiveness to Rhus toxicodendron. J. L. JACOBS and M. L. WELCKER (Proc. Soc. Exp. Biol. Med., 1938, 38, 726—727).—If 2% solution of poison-ivy extract in acetone is applied to the skin of a sensitised guinea-pig, and washed off after 5 hr. with a 2.5%solution of KMnO₄ containing 1 c.c. of N-NaOH per 100 c.c., the skin shows an inflammatory reaction next day. Normal guinea-pigs give no such reaction. V. J. W.

Pathology and mechanism of anaphylaxis. V. H. Moon (Ann. int. Med., 1938, **12**, 205—216).— Anaphylaxis in animals and man produces changes similar to those seen with peptone poisoning and in traumatic shock. The reaction is cellular, not humoral. C. A. K.

Calcium therapy in allergic conditions. P. KALLÓS and L. KALLÓS-DETNER (Arch. int. Pharmacodyn., 1938, 59, 253—268).—Treatment of sensitised guinea-pigs with Ca preps. prevents the usual action of the antigen on isolated uterus or lung. The antibody-containing cells are influenced, not the antigen-antibody reaction. Ca with atropine is recommended for the treatment of acute asthma, and large doses of Ca for prophylaxis. D. T. B. Content in spreading factor and toxins in organs and poisonous secretions of snakes. F. DURAN-REYNALS (Proc. Soc. Exp. Biol. Med., 1938, 38, 763—766).—Extracts of the poison glands of various snakes did not contain any more "spreading factor" and produced no more severe lesions than similar extracts of other organs of these, or of nonpoisonous snakes, provided that they were washed free from adherent venom. V. J. W.

Quinine as an abortifacient substance. Koop-MANN (Münch. med. Wschr., 1938, 85, 1344—1346).— A review. A. S.

Clinical experiences with ergometrine. K. SCHMIDT (Münch. med. Wschr., 1938, 85, 1029— 1031).—Ergometrine is preferred to other secale preps. in the treatment of gynæcological or obstetrical hæmorrhages. As it is water-sol. it can be given by mouth. A. S.

Action of egg white fractions on the sensitised uterus of guinea-pigs. A. NADEL (Z. ges. exp. Med., 1938, 103, 446—450).—Immature guinea-pigs were sensitised by subcutaneous injections of 0.2 or 0.4 c.c. of egg white diluted in 0.2 or 0.4 c.c. of physiological saline. The response of the excised uterus to various fractions of egg white exposed to pepsin and HCl for varying length of time was tested after sensitisation was complete. Addition of natural egg white did not produce uterine contraction. Egg white fractions which still contained 84% of undigested proteins produced uterine contraction. A. S.

Clinical use of allyldimethylbenzylammonium chloride (Zephiron). C. S. WHITE, J. L. COLLINS, and H. E. NEWMAN (Amer. J. Surg., 1938, 39, 607— 609).—Zephiron is a potent, non-toxic, and relatively non-irritant antiseptic giving striking results in a small series of cases and justifying an extended trial. J. H. W.

Mechanism of zinc sulphate prophylaxis in experimental poliomyelitis. E. W. SCHULTZ and L. P. GEBHARDT (Proc. Soc. Exp. Biol. Med., 1938, 38, 603-605).—Application of 1% ZnSO₄ causes acute inflammation and necrosis of the epithelial cells of the nasal mucosa after 24 hr. Within a few days the surface again appears normal, but the sense of smell is abolished for 2 weeks in children and several months in adults. V. J. W.

Biological properties of octopin. M. MOHR (Z. physiol. Chem., 1938, 255, 190—194).—17.7% of octopin injected subcutaneously in mice can be detected in the urine. Similar injection of 300 mg. per kg. in dogs produces no abnormal fluctuation of the blood-sugar; intravenous injection has no effect on blood-pressure. Octopin does not affect the motility of the gut. Bacterial decomp. of octopin gives rise to a small quantity of NH₃, but no urea can be detected and 79.6% can be recovered unchanged. P. G. M.

Pharmacology of ferro-tri-2: 2'-dipyridyl. I. General toxicity. II. Distribution in the organism. E. BECCARI (Boll. Soc. ital. Biol. sperim., 1938, 13, 6-8, 8-11).-I. The substance, (Fe^{II} dip₃)SO₄, diffuses rapidly in tissues, the distribution in blood finally being 63.5% in plasma and 36.5% in the corpuscles. In frogs, injection (dorsal sac) of 0.02— 0.1 mmol. per kg. produces paralysis whilst higher doses are lethal. The min. intravenous and subcutaneous, lethal dose in rabbits is 7.8 and approx. 35 mg. per kg., respectively; oral administration of 50 mg. per kg. is without effect, the substance being decomposed in the gastro-intestinal tract. The symptoms of toxicity indicate poisoning of the bulbar centres.

II. Intravenous injection into rabbits of doses calc. to give blood-conces. of 0.0147 and 0.125%, respectively, is followed by a disappearance of the substance from the blood within 5 min. and approx. 1 hr., respectively. Injection by various routes is followed by the occurrence of the substance in organs rich in reticulo-endothelial tissue but not in nervous tissues. F. O. H.

Death following treatment with bismuth. H. ARETZ (Dtsch. med. Wschr., 1938, 64, 815-818).---A woman died after intramuscular injection of 3 c.c. of bismogenol during anti-syphilitic treatment. A. S.

Treatment of tonsillitis with bismuth. F. IMHOF (Münch. med. Wschr., 1938, 85, 1028—1029).— An intravenous injection of a Bi prep. ("Casbis") is successful in the treatment of tonsillitis; the temp. becomes normal 12—24 hr. after the injection. A. S.

Toxicity of manganese chloride when fed to rats. J. E. BECKER and E. V. MCCOLLUM (Proc. Soc. Exp. Biol. Med., 1938, 38, 740-742).—Rats were kept on a diet containing about 63 mg. P and 72 mg. Ca per day. When MnCl₂ was added up to about 0.1 g. Mn per day no signs of toxicity or failure of reproduction occurred. V. J. W.

Action of ferrous sulphide and manganese sulphide in rabbits. C. G. SANTESSON (Skand. Arch. Physiol., 1938, 79, 169—192).—Oral administration of FeS and MnS in rabbits produced no pathological changes. Subcutaneous injections of FeS suspended in gum arabic produced capillary bleedings in the liver. Subcutaneous injection of MnO₂ produced capillary bleedings in liver and kidney, necrosis of liver cells and kidney tubules, and changes in the glomeruli. A. S.

Lead analyses of hair as an indication of exposure to lead. J. L. MELNICK and G. R. COWGILL (Proc. Soc. Exp. Biol. Med., 1938, 38, 899—902).— Administration of Pb salts to young rats for 3 weeks did not cause any increase in the Pb content of hair grown during the time. Hair analyses of 30 human subjects showed that hair of those exposed to Pb dust contained over 20 times as much Pb as that of non-leadworkers, presumably from external contamination which cannot be washed away from hair.

V. J. W. Colorimetric determination of arsenic as arsenious sulphide in toxicological cases. F. GAUDY (Anal. Asoc. Quím. Argentina, 1938, 26, 13-20).—Determination of As in viscera (cf. A., 1938, I, 44) gives high results due to Fe unless the material after calcination is distilled with HCl, the resulting AsCl₃ being determined colorimetrically as As_2S_3 . F. R. G. Anti-endotoxic action of certain organic sulphur derivatives. C. LEVADITI and A. VAISMAN (Compt. rend. Soc. Biol., 1938, **128**, 873–875).— If the endotoxin of the dysenteric bacillus Flexner is injected intravenously into mice, certain benzenesulphonamide, -sulphoxide, and -sulphone derivatives are still therapeutically active when given per os. P. C. W.

Effect of arsenic on the toxicity of seleniferous grains. A. L. MOXON (Science, 1938, 88, 81).— The feeding of As (as Na arsenite) to rats prevented the liver damage and other toxic signs produced by administration of Se in the form of seleniferous wheat. C. A. K.

Toxicity of selenium fed to swine in form of sodium selenite. W. T. MILLER and H. W. SCHOENING (J. Agric. Res., 1938, 56, 831–842).— Addition of Na_2SeO_3 to pig rations induced symptoms similar to those of alkali disease. Loss in wt. of treated pigs is partly due to diminished consumption of food, towards which a definite aversion was apparent. A. G. P.

Mercury poisoning. C. GOODMAN (Rev. Sci. Instr., 1938, 9, 233-236).—A review.

Effect of mercury vapour on cells grown in vitro. M. T. MARTINI (Boll. Soc. ital. Biol. sperim., 1938, 13, 138—140).—Hg, not in actual contact, produces degenerative changes (proportional to the amount of Hg vapour and to the duration of its action) in chick embryo cultured in vitro. Formation of vacuoles, retraction of pseudopodia, and pyknosis of the nucleus occur in the cell. F. O. H.

(r) INDUSTRIAL PHYSIOLOGY AND HYGIENE.

Silicosis in the South Wales coalfield. T. D. JONES (Proc. S. Wales Inst. Eng., 1938, 54, 95-160) .- Evidence is given of the high incidence of silicosis in South Wales generally, but particularly in the anthracite area, though there is little evidence that exposure to SiO_2 is greater here than in other coalfields. Reasons suggested for this discrepancy are the greater extent of shot-firing during coalfilling shifts, and exposure of the men to extremes of temp. in spakes. Preventive measures recommended include the use of engineering methods to diminish dust production, and the control of shot-firing; the new Mark IV respirator is described in detail, with tests for efficiency. In discussion it was stated that 50% of cases are "infective silicosis," and therefore men with any kind of pulmonary disease should not be employed. E. M. K.

Secondary silica as a probable factor in the incidence of silicosis in South Wales. A. H. Cox (Proc. S. Wales Inst. Eng., 1938, 54, 161—167).— Certain shales which have been subjected to geological compression contain finely-divided secondary SiO₂. Anthracite is formed as a result of similar secondary change after deposition of coal seams. The geological factors which produce anthracite may therefore produce also a shale with a relatively high SiO₂ content. This may explain the high incidence of silicosis in the anthracite area. E. M. K.

Nutrition in silicotics. G. SCHLOMKA, K. NAU-MANN, and A. BECHSTEIN (Klin. Woch., 1938, 17, 999-1003).—Examination of 4000 miners showed that silicosis is associated with excessive body-wt. even in cases with tuberculosis. E. M. J.

Basal respiratory exchange in silicosis. A. BöHME (Arch. Gewerbepath. Gewerbehyg., 1938, 8, 449—457).—In the resting, fasting subject respiratory exchange was, in most cases, not more than 10-15% above normal. The greater increases observed in a few severe cases were probably due partly to increased muscular work necessary to move the stiff thorax and partly to the increased strain on the whole muscular system due to lack of breath.

M. A. B.

Affections due to aluminium, especially lung affections. M. DOESE (Arch. Gewerbepath. Gewerbehyg., 1938, 8, 501—531).—Workers in bauxite and in Al-bronze spraying works contract no lung affection from inhaling the dusts but exhibit a characteristic affection of the upper respiratory tract due to attack on the mucous membrane of the nasal passages. M. A. B

Teeth affections in a zinc plating works. 0. GÜNTHER (Arch. Gewerbepath. Gewerbehyg., 1938, 8, 458—463).—The loss of enamel from the teeth of workers engaged in the electro-deposition of Zn from a ZnSO₄-H₂SO₄ bath may be due to attack on the enamel by the cloud of fine drops of solution above the bath.

M. A. B.

The machine and the worker : a study of machine-feeding processes. S. WYATT and J. N. LANGDON [with F. G. L. STOCK] (Industr. Health Res. Board Rep. No. 82, London, H.M.S.O., 1938) .- Fatigue and strain arise when operatives tend machines which are run at excessive speeds. Some reduction of these effects can be obtained by selecting only highly efficient workers, but the method is lengthy and uneconomical. Efficiency in machine-feeding operations varied between 52% and 86%. Low efficiencies were caused by enforced stoppages or by failure of the worker to keep pace with the machine. Improvement would be gained by adjusting the speed of each machine to suit the capacity of the operator, but even this would not allow for variations in working capacity through the day or week. A machine with variable speed is desirable. Workers do not want unduly slow speeds. Efficiency and comfort in machine-feeding also depend on the amount of feeding space and the apparent rate of movement of the feeding mechanism; this was shown by experimentally (a) increasing feeding space and (b) reducing the size of the dial of a dial-feed machine and increasing its angular velocity. Ability to withstand monotony is a desirable quality in machine-feeders. **T**. **B**. Rest pauses are necessary in this work.

Removal of spots of picric acid from the skin. J. F. DURAND (Bull. Soc. chim., 1938, [v], 5, 1227— 1228).—The spot is covered with a layer of collodion which is peeled off after 10 min., carrying with it a very thin section of the epidermis which contains all the dye. If difficulty is experienced, the spot may be washed with COMe₂. If the stain is deep, the process may be repeated on the following day. H. W.

(s) RADIATIONS.

Effect of visible and infra-red rays on the skin. G. MIESCHER (Strahlenther., 1938, 61, 578—585).— The effect of "white" (330—1000 mµ.), red (600— 1000 mµ.), short infra-red (750—1300 mµ.), and long infra-red (1500—4000 mµ.) rays of high intensity from an arc lamp with reflector on the skin was observed. Where heating was not prevented the effects corresponded exactly with those of warmth, but were painless. When heating was excluded by a water-in-quartz filter on the skin no effects were observed. S. H.

Effect of coloured light on growth. M. BAC-CINO (Compt. rend. Soc. Biol., 1938, 128, 767— 769).—Young rabbits, rats, and guinea-pigs placed in red light showed an acceleration in growth rate. Alternations of complementary coloured light produced variable changes in the growth rate.

P. C. W.

Influence of ultra-violet radiation on the antigen-antibody reaction in the skin. G. ALBUS and F. FELDERMANN (Klin. Woch., 1938, 17, 702-703).—The radiation diminishes the sp. antigenantibody reaction. E. M. J.

Effect of ultra-violet radiation on [human] skin and the properties of protective substances. C. F. HEBER (Svensk Kem. Tidskr., 1938, 50, 144— 158).—Erythema and pigmentation are discussed. Results obtained in laboratory tests are compared with those obtained in sunshine. Although the human skin is very sensitive to λ of 2950—3000 A., pigmentation without erythema is produced by longer λ of greater intensity. A no. of proprietary sun-protective agents have been examined.

M. H. M. A.

Differential susceptibility of a number of protozoans to ultra-violet radiations. A. C. GIESE (J. Cell. Comp. Physiol., 1938, 12, 129-138).--Several species were submitted to radiations of 2537 A. Resistance showed no correlation with shape or size, but was greater in species which absorbed less of the radiation, and in young cultures.

V. J. W.

Alteration of chromosome sensitivity to X-rays with ammonia. A. MARSHAK (Proc. Soc. Exp. Biol. Med., 1938, 38, 705—713).—Onion and bean seedlings were immersed for 30 min. in various concess of aq. NH_3 and then irradiated. The nos. of abnormal anaphases were counted and the plants which had been treated with aq. NH_3 showed a smaller no. than controls. V. J. W.

Mechanism of delayed killing of maize seedlings with X-radiation. L. R. MAXWELL (Physical Rev., 1937, [ii], 51, 375).—Dry seeds of maize show no decrease in germination after treatment with 60,000—100,000 r., but soon after the plumule has emerged growth ceases and the plant dies. The effect will also occur at 35,000 r. This result is interpreted on the view that a certain no. of collisions occur within a vital vol. or vols. of seed.

L. S. T.

Influence of X-rays in infantile epilepsy. E. WITTAMANN (Z. Kinderheilk., 1938, 60, 9-29).- Infantile epilepsy leading to dementia is favourably influenced by irradiation of the skull with X-rays, if the treatment is started before the onset of dementia or in its earliest stages. Even organic changes are reversible by X-ray treatment. H. R.

Progressive necrosis of plant epidermis caused by α -rays. F. HERČÍK (Protoplasma, 1937, 29, 172—179).—Exposure of epidermis cells of *Allium cepa* to α -rays results in the production of toxic substances, which diffuse freely through the longitudinal walls of the cells, but not through the transverse walls. M. A. B.

Moulting and radiosensitivity of the pelt in rabbits. G. GRICOUROFF (Compt. rend. Soc. Biol., 1938, 128, 496—499).—Small amounts of Ra inserted into the tongue in the rabbit cause depilation only in the following moulting season. This shows that the growing hair follicles are radiosensitive whilst the adult ones are not. P. C. W.

Effects of beryllium-deuteron radiations on Vicia faba. M. NAKATDZUMI and K. MURATI (Nature, 1938, 142, 534—535).—Data showing the marked retardation in growth of roots of V. faba when exposed in a cyclotron chamber to Be-D radiation (D current of 10 µ-amp.) are recorded. L. S. T.

Physical measurements concerning the biological action of neutrons. P. C. AEBERSOLD (Physical Rev., 1937, [ii], 51, 375).—The biological actions of neutrons produced by bombarding Be with high-voltage deuterons obtained from a cyclotron have been investigated. Several comparisons with X-rays are made. L. S. T.

Biological action of an ultra-high-frequency electric field. R.J. KOVDA and A. A. VOITKEVITSCH (Compt. rend. Acad. Sci. U.R.S.S., 1938, 18, 495— 496).—Rats and axolotls exposed to ultra-highfrequency radiation died after 3—4 min.; the rectal temp. of the rats was 41—42°. The effects on tadpoles depend on their stage of development; they are more resistant in early stages of development.

A. S. Secondary radiations emitted by filters used in Roentgen therapy. L. D. MARINELLI (Physical Rev., 1937, [ii], 51, 375).—Secondary emission from Al, Cu, Sn, and Pb has been investigated. Data relating to the satisfactory elimination of the softer part of the emission by primary filters of these metals and additional filters of celluloid are given.

L. S. T.

(t) PHYSICAL AND COLLOIDAL CHEMISTRY.

Optical polarisation in biological studies. W. J. SCHMIDT (Protoplasma, 1937, 29, 300—312).— A review. M. A. B.

Biophysical methods in studies of mammalian temperature regulation. A. HEMINGWAY (Physical Rev., 1937, [ii], 51, 377).—Electrical conductivity measurements of the tissues of warm-blooded animals have been made using a.c. of frequencies of 10³— 10⁸ cycles per sec. At the higher frequencies the phase angle of the tissues becomes zero, and the heat received by an animal heated from a high-frequency current can then be measured. The heat received by dogs from a diathermy current (10° cycles per sec.) and the changes in the physiological mechanism for heat dissipation have been measured. L. S. T.

Magnetic anisotropy of egg shells. P. NILA-KANTAM (Current Sci., 1938, 7, 48—49).—Data for hen's egg, duck's egg, and calcite are recorded and discussed. L. S. T.

Diffusion in non-ideal media. J. F. DANIELLI (Nature, 1938, 142, 479).—Formulæ for mols. diffusing in a concn. gradient and for ions in a potential gradient are given. They can be applied to the elucidation of membrane structure, and indicate that *Arbacia* egg membranes are probably homogeneous, but that red blood cell membranes are not. L. S. T.

Penetration of radioactive ions; their accumulation by protoplasm of living cells (*Nitella* coronata). S. C. BROOKS (Proc. Soc. Exp. Biol. Med., 1938, **38**, 856—858).—When these cells are placed in aq. K* salts, K* accumulates in the protoplasm but not in the sap. At first the intake is proportional to the K content of the cells, as shown by behaviour of cells previously immersed in K solutions. In a later stage no such relation exists, possibly because the K* enters the cell in exchange for metabolic products. K* enters the cell more readily than Rb* and this more readily than Na*. V. J. W.

Ion concentration and ion exchange at the boundary protoplasm-solution. H. LUNDE-GÅRDH (Biochem. Z., 1938, 298, 51-73).-Potential measurements at the boundary have been made by means of liquid electrodes. In absence of metal cations the max. H' charge corresponds with a concn. of 0.562×10^{-3} ($p_{\rm H}$ 3.25). Metal cations undergo rapid and energetic exchange with adsorbed H', in the order : Li < Na < K < Ca < Ba. The adsorption of these cations is influenced by the [H'] of the solution; the exchange can be expressed in terms of an adsorption equation. In neutral solutions of certain salts, marked exchange of metal cations for H occurs even at great dilution, and the $p_{\rm H}$ at the protoplasm surface rises. The min. $p_{\rm H}$ val. is not reached in the living cell, but can be obtained in acid solutions (e.g., HCl of $p_{\rm H}$ or buffer mixtures of $p_{\rm H}$ 3). The influence of anions on potential is insignificant.

E. S. H.

Complex systems of biocolloids. I, II.—See A., 1938, I, 572.

Protoplasmic potentials in *Halicystis*. VI. Rôle of ammonia in potential reversal by perfusion. L. R. BLINKS (Proc. Soc. Exp. Biol. Med., 1938, 38, 663-664).—Reversal cannot be produced by high $p_{\rm H}$ alone, but, if a weak base is present, raising the $p_{\rm H}$ causes reversal through penetration of undissociated weak base into the protoplasm.

V. J. W. Birefringence of chromatophores. W. A. BECKER (Protoplasma, 1937, 29, 203-205).—Birefringence of plastids is a fairly general phenomenon. Chromatophores of diatoms and blue algæ also have this property. A similarity in structure between these and the chloroplasts of the higher plants is indicated. M. A. B.

Birefringence of the chloroplasts of Anthoceros. F. WEBER (Protoplasma, 1936, 26, 312-314). M. A. B.

Water-permeability of isolated protoplasts in relation to volume change. J. LEVITT, G. W. SCARTH, and R. D. GIBBS (Protoplasma, 1936, 26, 237—248).—At normal to $\frac{3}{4}$ -normal vol. of the cell, permeability vals. are greater when determined by deplasmolysis than by plasmolysis. Below 40% of normal vol. plasmolysis and deplasmolysis give the same results. Increasing permeability with increasing degree of deplasmolysis is a mechanical effect of extension of the membrane. The normal rate of penetration of water into onion cells is about 20 μ . per hr. at 20° under a pressure difference of 1 atm. M. A. B.

Permeability and membrane structure in plant cells. H. ULLRICH (Protoplasma, 1936, 26, 183—191).—Studies of the penetration of different substances into the naked egg-cell of *Cystosira barbata* indicate that the cell membrane has normally a pore structure, but that, in the presence of certain lipinsol. substances, it may be broken down to a liquid film. M. A. B.

Vacuole contraction in plant cells. V. HART-MAIR (Protoplasma, 1937, 28, 582—592).—In Allium vacuole contraction is accompanied by a large decrease in osmotic pressure, which suggests that part of the cell contents have escaped through the tonoplast and plasma wall. In *Elodea* a transfer of water from the vacuole to the cytoplasm is probable. M. A. B.

Granulation of nuclear colloids by treatment with dyes after diffuse intravital staining. O. BANK and Z. SERY (Protoplasma, 1937, 28, 594– 596).—Inner epidermal cells of Allium cepa stained intravitally for 5—15 min. with 0.05% gentian, or crystal-violet in M-KCl, and then treated with certain other dyes (0.05% in M-KCl) for 6—7 min. showed granulation of the nuclear colloids, but not of the rest of the protoplast. Only certain dyes will produce this effect, which appears to be independent of their charge. M. A. B.

Cells of the Cyanophyceæ. B. J. VON CHOLNOKY (Protoplasma, 1937, 28, 524-528).-Staining of Oscillatoria limosa and Scytonema calcicolum with methylene-blue causes accumulation of the dye in the cell near the filament tip, in the form of fine lipin particles stainable with OsO4 and Sudan III. Methylene-blue probably causes separation of the lipin fraction of the plasma colloids. Treated cells die very rapidly. Similar behaviour is observed with other basic dyes. When treated with plasmolytic agents the cell plasm shows a much greater adhesion to the wall than in the higher plants. This effect is not due to greater η of the plasm, but to chemical and physiological differences in the wall. The cell wall is probably semipermeable. M. A. B.

Protoplasmic anatomy of fixed *Elodea* leaves. H. DRAWERT (Protoplasma, 1937, 29, 206-227).— Both living and fixed leaves show different degrees of staining in different parts, and the effect of variations in $p_{\rm H}$ and in the nature of the dye used is different in each part of the leaf. Results are explained on the basis of varying electro-chemical properties in the different parts of the leaf.

M. A. B.

Antigenic properties of nucleoproteins. G. Boxé (Arch. int. Méd. exp., 1938, 13, 177—182).— Nucleohistone derived from ox thymus has no antigenic properties and addition of aromatic radicals by diazotisation confers no such activity. Yeast-nucleic acid combined with serum-protein has no antigenic action. P. C. W.

Protein monolayers. Films of oxidised cytochrome-C. W. D. HARKINS and T. F. ANDERSON (J. Biol. Chem., 1938, **125**, 369—376).—Monolayers of cytochrome-C exhibit on water thicknesses from 3.5 A. at 0.5 dyne per cm. and $p_{\rm H}$ 10 to 50 A. at 18 dynes per cm. and $p_{\rm H}$ 5. The thinnest films were formed at the isoelectric point ($p_{\rm H}$ 10) and the thickest at $p_{\rm H}$ 5. The change in spreading with $p_{\rm H}$ may be influenced largely by the relative conces. of positive, negative, and zwitter ions of the protein and by the ions of salts in the subphase. T. F. D.

Surface denaturation of ovalbumin. H. B. BULL and H. NEURATH (J. Biol. Chem., 1938, 125, 113—114).—A reply to Wu and Wang (A., 1938, III, 526), maintaining that the two-phase character of surface denaturation can be demonstrated by the proper technique. P. G. M.

Cystine content of acid- and alkali-prepared glutenin. F. J. NEGLIA, W. C. HESS, and M. X. SULLIVAN (J. Biol. Chem., 1938, 125, 183—189).— The acid dispersion method for the prep. of glutenin from wheat flour is preferable to the alkali method, since it avoids the destruction of cystine which occurs in the latter. The glutenin prepared by both methods has the same total S content, but the acid-prepared protein contains less ash (0.27) than the alkali-prepared protein (4.3%), the cystine contents being 2.1 and 1.4%, respectively. P. G. M.

Carbohydrate in proteins. I. Carbohydrate component of crystalline ovalbumin. A. NEU-BERGER (Biochem. J., 1938, 32, 1435—1451).— A polysaccharide has been isolated from the products of tryptic digestion of cryst. ovalbumin; it has mol. wt. approx. 1200 and consists of 4 mols. of mannose and 2 mols. of glucosamine together with an unidentified N-containing compound. Glucosamine was isolated as 2 : 4-dihydroxybenzylidene-1-glucosamine, m.p. 116° (uncorr.) (monohydrate, m.p. 142°; monohydrate hydrochloride). P. G. M.

Electrophoresis of ovomucoid. L. HESSELVIK (Z. physiol. Chem., 1938, 254, 144—146).—The electrophoretic mobility of electrodialysed 0.75% ovomucoid (glucosamine content 12.5%) solution was measured at 0° and $p_{\rm H}$ 2—8 in the apparatus of Tiselius (A., 1937, I, 305). The isoelectric point is $p_{\rm H}$ 4.5. W. McC.

Polysaccharide content and reducing power of proteins and of their digest products. L. F. HEWITT (Biochem. J., 1938, 32, 1554—1560).—The glucosamine contents of pseudoglobulin, globoglycoid, and seroglycoid agree with the view that the polysac-

charide unit of proteins is glucose-galactose-mannose. Ovomucoid contains the mannose-glucosamine and ovalbumin the dimannose-glucosamine unit, whilst crystalbumin contains no polysaccharide. The reducing power of proteins with the Hagedorn-Jensen method has been traced to the presence of various amino-acids, e.g., tyrosine, tryptophan, and cystine, as well as to carbohydrates. The reducing power of many proteins is not increased after acid hydrolysis and the course of such hydrolysis cannot be followed by determination of reducing power. Peptides containing about 20% of carbohydrate were obtained by peptic hydrolysis followed by acetone pptn. of pseudoglobulin, seroglycoid, and ovalbumin, and a peptide containing 35% of carbohydrate was similarly obtained from globoglycoid. Peptic digestion of diphtheria antitoxin does not cause de-T. F. D. struction of flocculating power.

Columnar ion concentration and the biological effectiveness of X-rays, neutrons, and α -particles. R. E. ZIRKLE (Physical Rev., 1937, [ii], 51, 375–376).—The greater is the concn. of ions in the four types of columnar concns. investigated the greater is the biological effectiveness per ion. The magnitude of this effect varies markedly among the three different organisms used. L. S. T.

(u) ENZYMES.

Enzyme research in recent years. B. KRAUSE (Tids. Kjemi, 1938, 18, 105-112).—A review.

M. H. M. A. Sulphydryl groups and enzymic oxido-reduction. L. RAPKINE (Biochem. J., 1938, 32, 1729— 1739; cf. A., 1938, III, 846).—The enzyme which catalyses the oxido-reduction between pyruvate and triose phosphate can be reversibly inactivated by oxidised glutathione, I, or Cu₂O. The inactivation is probably due to oxidation or combination of the SH groups. H. G. R.

Respiratory enzyme systems of muscle, Jensen sarcoma, lung, and spleen. H. von EULER and H. HELLSTRÖM (Z. physiol. Chem., 1938, 255, 159—168).—The cytochrome-oxidase content of Jensen rat sarcoma is about 5% of that of heart muscle, which fact may account for the anomalies of oxidative carbohydrate metabolism in this tumour. Injection of the tumour tissue with dil. aq. CuSO₄ causes a slight increase in the cytochrome oxidase. Inhibition of succinodehydrogenase by $Na_2S_2O_4$ points to the existence of one or more SH groups in the active part of the mol. The diaphorase content of lung and tumour tissues is 10% of that of heart muscle, whilst that of spleen tissue is nil. P. G. M.

Distribution of the succinic oxidase system in animal tissues. K. A. C. ELLIOT and M. E. GREIG (Biochem. J., 1938; 32, 1407—1423).—The complete succinic oxidase system is very active in kidney, liver, and heart, but only moderately active in brain, testis, skeletal muscle, lung, adrenals, and retina. Thymus, pancreas, spleen, and blood are practically inactive. The ability of the same tissues to oxidise p-phenylenediamine is similar; although blood is active, the mechanism is different from that in other tissues and the addition of cytochrome has no effect. Cytochrome is a necessary link in the succinic oxidase system. P. G. M.

Oxidase of dihydroxymaleic acid. I. BANGA and A. SZENT-GYÖRGYI (Z. physiol. Chem., 1938, 255, 57-60).—The extracts of radish, horseradish, green paprika fruits, onions, onion leaves, asparagus, turnips, green grass, and cucumbers contain thermolabile dihydroxymaleic acid oxidase which specifically catalyses the aërobic oxidation of the acid, the effect being optimal at $p_{\rm H}$ 6·3. The oxidase is pptd. by excess of acetone or alcohol; its action is not affected by low concess. of KCN but is stimulated by high concess. The enzymic autoxidation of the acid is not affected by KCNS but the acceleration of autoxidation caused by Cu and Fe is inhibited by KCN and KCNS. Some of the plants contain also ascorbic acid oxidase and/or pyrocatechol oxidase.

W. McC.

Mechanism of oxidative processes. L. Mode of action of the dehydrogenating enzyme of yeast. H. WIELAND, O. PROBST, and M. CRAWFORD (Annalen, 1938, 536, 51-68; cf. A., 1933, 32).—The products of the dehydrogenation of lactic acid by beer yeast are pyruvic and acetic acid. Less succinic acid is produced than from acetate. Citric acid is not formed. The increase in the yeast is very small. Top yeast is much more rapidly impoverished than is beer yeast. After protracted treatment with oxygen its activity towards acetate is much diminished. Dehydrogenation of ethyl alcohol and acetaldehyde occurs about half as rapidly again with top yeast as with beer yeast. Succinic but not citric acid is formed from acetate and top yeast. Pretreatment of yeast with alcohol enables it to dehydrogenate acetate at much greater initial rate. It is not necessary that alcohol should be present simultaneously in the reaction solution and pretreatment with very small amounts of it suffices to bring the acetodehydrogenase into the active state. It is probable that the alteration of the enzyme is due to intermediatelyformed acetic acid but added acetic acid produces this effect only after some time. It is noteworthy that "nascent" acetic acid not only enters into reaction more rapidly than the usual material but also influences the enzymic system in an unexplained manner. Succinic, fumaric, malic, and citric acid do not cause any activation towards these substrates or towards acetic acid. Lactate gives a positive result; its dehydrogenation occurs through acetic acid. H. W.

Citrate dehydrogenase and cholic acid. T. ISHIHARA (Arb. med. Univ. Okayama, 1938, 5, 461—467).—The liver tissue of rabbits splits more citric acid in vitro than skeletal muscle, spleen, kidney, or testis; the best results are obtained at $p_{\rm H}$ 8·2. Cholic acid inhibits the citrate dehydrogenase of liver tissue, maximally at $p_{\rm H}$ 8·2. Liver tissue does not decompose acetonedicarboxylic acid, which, therefore, is not an intermediate metabolite during the enzymic destruction of citric acid. A. S.

Components of dehydrogenase systems. XXII. Enzymic degradation and synthesis of glutamic acid. III. In *Bacterium coli*. E. ADLER, V. HELLSTRÖM, G. GÜNTHER, and H. VON EULER. XXIII. IV. In yeast. E. ADLER, G. GÜNTHER, and J. E. EVERETT (Z. physiol. Chem., 1938, 255, 14—26, 27—35; cf. A., 1938, III, 757).— XXII. The sp. l(+)-glutamic acid dehydrogenase of *B. coli* consists of an apodehydrogenase supplemented with codehydrogenase II; the apodehydrogenase cannot be supplemented with cozymase. The rate of dehydrogenation (reversible) increases as the conces. of glutamic acid and codehydrogenase II increase. In the aërobic dehydrogenation of the acid by *B. coli* NH₃ is produced. The dehydrogenation is inhibited by NH₃, by ketoglutaric acid, or by both together. At $p_{\rm H}$ 7.6 *B. coli* suspended in a mixture of aspartic and ketoglutaric acid produces oxaloacetic acid. The mechanism of the dehydrogenation is the same as in animal tissues. *B. coli* also contains diaphorase.

XXIII. l(+)-Glutamic acid dehydrogenase is obtained from dried yeast by pptn. with acetone or from fresh top or bottom yeast by autolysis and pptn. with alcohol and ether and is purified by adsorption on Al(OH)₃ and elution with aq. Na₂HPO₄. The mode of action of the dehydrogenase (apodehydrogenase + codehydrogenase II) is the same as that of the dehydrogenase of *B. coli*. The dehydrogenase from higher plants (A., 1938, III, 438) also acts thus but the supplementing enzyme is, in this case, cozymase. W. McC.

Enzymic degradation and synthesis of glutamic acid. E. ADLER (Arkiv Kemi, Min., Geol., 1938, 12, B, No. 42, 7 pp.).—Glutamic acid is synthesised by "hydrogenative amination" of α ketoglutaric acid, the reverse reaction being one of "dehydrogenative deamination" of glutamic acid. The enzyme systems (e.g., iminoglutaric reductase) concerned in these changes and the physiological significance of the reactions are discussed. F. O. H.

adrenaline. K. Animal phenolases and BHAGVAT and D. RICHTER (Biochem. J., 1938, 32, 1397-1406).---A cryst. protein containing Cu (0.12-0.13%) from the plasma of Cancer pagurus resembled a hæmocyanin in its solubility in dil. salt solutions but was colourless and did not turn blue on shaking with air; it possessed a const. activity towards homocatechol on recrystallisation, but showed little activity with adrenaline as substrate and was inhibited by 1:2000 HCN (95%), cupferron (69%), etc. The leucocytes contained a powerful phenolase which was also active towards adrenaline. Cu was the most active of the heavy metals as a catalyst of the oxidation of phenols. The highest phenolase activity was found in the group of arthropods and P. G. M. molluscs.

Carboxylase enzyme system. H. TAUBER (J. Biol. Chem., 1938, 125, 191-199; cf. A., 1938, III, 529, 951).—The protective action of cryst. cocarboxylase on carboxylase cannot be imitated by adenosine triphosphate, hexose diphosphate, or reduced glutathione. The growth-promoting and carbohydrate metabolism accelerating activity of aneurin depends on its phosphorylation to cocarboxylase in the living cell. P. G. M.

Synthesis, isolation, and identification of cocarboxylase. J. WEIJLARD and H. TAUBER (J. Amer. Chem. Soc., 1938, 60, 2263—2264).—The cocarboxylase (cf. preceding abstract) is proved to be identical with the natural substance. R. S. C.

New activators of the carboxylase system and the function of cocarboxylase. H. TAUBER (Proc. Soc. Exp. Biol. Med., 1938, 38, 889–892).—The carboxylase-cocarboxylase system is best activated by Mg and Mn salts, but it can also be activated by NaCl, Na₂SO₄, KCl, and NaCN. If yeast, pyruvate, and cocarboxylase are mixed in a Warburg vessel and CO_2 output measured, it is found that free CO_2 production takes place, but if the cocarboxylase is not added till after the yeast has been shaken at 30° for 2 hr. hardly any CO_2 is produced. V. J. W.

Catalase from horse liver. K. AGNER (Biochem. J., 1938, 32, 1702—1706).—The prep. of catalase (containing N 15.5, Fe 0.085, and Cu 0.02—0.03%) from horse liver, with an activity of 55,000 to 60,000, is described. Data are given for the mol. absorption coeff. for various $\lambda\lambda$. During cataphoresis, the activity, accompanied by the Cu, migrated to the anode. The prep. contains two components, the Fe-porphyrin-protein having a sedimentation const. of $11\cdot 2 \times 10^{-13}$ whilst the Cu-protein, which represents about 15-20% of the total protein, has a const. of $3\cdot 2 \times 10^{-13}$. The diffusion const. is $4\cdot 3 \times 10^{-7}$, and partial sp. vol. is 0.715. The calc. mol. wt. is 225,000. J. N. A.

Properties of catalase of avocado seed. L. S. MALOWAN (Enzymologia, 1938, 5, 89-94).—The seed contains water, 62-67, ash 1.08-1.80, Fe 0.021, Mg 0.1, P 0.06, and Ca 0.03% and is rich in catalase, oxidase, and peroxidase. The yellowish-white pulp and its aq. extract become brown on exposure to air and the extract becomes blood-red if made alkaline and shaken with air. The catalase activity increases as the $p_{\rm H}$ is increased, max. being reached at $p_{\rm n}$ approx. 10.5. KCN in concns. not exceeding 0.1N, urethane, and barbiturates do not affect the activity but it is inhibited by CO and, less powerfully, by H_2S .

Mol. wt. of crystalline catalase. J. B. SUMNER and N. GRALÉN (J. Biol. Chem., 1938, 125, 33–36).— A detailed account of work already noted (A., 1938, III, 529). The sedimentation const. is now given as $11\cdot3 \times 10^{-13}$ and mol. wt. 248,000.

Mol. wt. of urease. J. B. SUMNER, N. GRALÉN, and I. B. ERIKSSON-QUENSEL (J. Biol. Chem., 1938, 125, 37-44).—A detailed account of work already noted (A., 1938, III, 706). The mol. wt. is now corr. to 483,000.

Enzymic synthesis and hydrolysis of organic esters. F. CEDRANGOLO (Enzymologia, 1938, 5, 1-11).-Preps. of dog's pancreas induce considerable synthesis from oleic acid + glycerol and, to a smaller extent, from oleic acid + butyl alcohol (the reverse is true for ox pancreas); the action on acetic acid + glycerol or + butyl alcohol is slight. Pig's pancreas induces a 47.3% synthesis of butyl acetate. Fatty tissue (dog, ox) has a synthetic lipase activity parallel to that of the corresponding pancreas. Dog's intestinal mucosa induces considerable synthesis of glyceryl oleate and acetate. The synthetic activity of the tissue preps. is inhibited by CaCl₂ or bloodalbumin (and especially by $CaCl_2 + albumin$) and accelerated by Na taurocholate. Quinine, F', and atoxyl, especially at low concns., inhibit synthesis. The tissues examined are characterised by different vals. of the ratio between rates of hydrolysis and synthesis. F. O. H.

Enzymic relationship to the synthesis of milk fat. P. L. KELLY (J. Dairy Sci., 1938, 21, 122— 123).—There are sufficiently large amounts of free fatty acids in the mammary gland to suggest that they contribute to milk-fat secretion and that they are the products of enzyme action on blood-fat. Mammary tissue was mixed with ethyl butyrate for 5 days, tissue heated to 75° being used as control. The unheated tissue showed much higher acid vals. than heated tissue or fresh tissue without butyrate and the results indicate that enzyme action is responsible for the presence of free fatty acids in the gland. W. L. D.

Sulphatase. S. TANAKA (J. Biochem. Japan, 1938, 28, 119—131).—Glycerol extract of rabbit's liver contains a sulphatase of $p_{\rm II}$ optimum approx. 6·1 (K *p*-nitrophenyl sulphate as substrate). Treatment of the extracts with Fe(OH)₃, BaCO₃, or, more especially, CaCO₃ increases the sulphatase activity. Aq. or aq. glycerol extracts of *Haliotis* liver show max. sulphatase activity at $p_{\rm II}$ 5·1. Sulphatase in taka-diastase is completely adsorbed by kaolin at $p_{\rm II}$ 4·0; elution with 0·1M-Na₂HPO₄ gives a sulphatase prep. practically free from glycerophosphatase. Sulphatase is inhibited by F' and, to a smaller extent, by SO₄" and oxalate; BaCl₂ and MgCl₂ are without effect. F. O. H.

Colorimetric determination of alanine and of serine plus aspartic acid in proteins applied to the protein of the yellow enzyme. P. DESNUELLE (Enzymologia, 1938, 5, 37–43).—A photometric modification of the method of Fromageot and Heitz is described and gives the following vals. for the protein of the yellow enzyme : alanine 8.2%; serine 1.7%; aspartic acid 3.0%. H. G. R.

Formation of enzymes from amino-acids. A. GURWITSCH and L. GURWITSCH (Enzymologia, 1938, 5, 17-25).—Mitogenetic irradiation of serum induces processes equiv. to the action of amino-acidases. A similar phenomenon occurs with aq. glycine, alanine, histidine, or glutamic acid, the enzyme being detected by spectral analysis. Heating or shaking with kaolin after the irradiation gives an inactive solution. Other enzyme-substrate systems, 30 min. after addition of amino-acids, give a high induction effect. The significance of the phenomena in enzymic reactions is discussed. F. O. H.

Factors influencing bacterial deamination. III. Aspartase II: its occurrence in and extraction from B. coli and activation by adenosine and related compounds. E. F. GALE (Biochem. J., 1938, 32, 1583-1599).-Cell-free juice from B. coli contains two deaminases, aspartase I and II. Aspartase I is unaffected by incubation with toluene or addition of adenosine, whilst aspartase II is inactivated by treatment with toluene, has its activity increased 5 times by addition of adenosine, and is pptd. by half-saturation with (NH₄)₂SO₄. Formate activates aspartase II aërobically but not anaërobically. The activity lost on keeping by washed suspensions of cells is restored by addition of boiled bacteria (co-enzyme effect) or by adenylic acid and its products of decomp. (e.g., adenosine). The aspartase II fraction also contains fumarase. P. G. M.

Nature of arginase from yeast and liver. S. EDLBACHER and H. BAUR [with M. BECKER] (Z. physiol. Chem., 1938, 254, 275-284; cf. A., 1936, 1420; 1938, III, 617).—Arginase from yeast or liver is almost completely inactivated by prolonged dialysis against water at 0°. Activity is restored by adding salts (Cl', SO₄") of Mn, Zn, Ni, Co, Cd, or V in 0.001M. concn., whilst MnSO4 (but not salts of the other metals) restores the activity at a concn. of 0.00001M. or less. Activity is not restored by salts of Fe, Ca, Mg, or Cu, by the dialysate after concn. at 35° in absence of O_2 , or by lactoflavin, aneurin, ascorbic acid, nicotinic acid, adenylic acid, dihydroxyacetone, or glyceraldehyde. Cysteine inactivates arginase, which probably consists of a protein carrier united to Mn as co-enzyme and possibly acts in the living organism by transferring NH2 from arginine to N-free, ketonic substances derived from carbohydrates (protein synthesis). O₂ inactivates arginase possibly by changing the valency of the Mn. Arginase of animal origin is much less readily inactivated by O₂ than is yeast arginase and loses its sensitivity to O2 when purified or subjected to dialysis. W. McC.

Specificity of arginase. K. FELIX and H. SCHNEIDER (Z. physiol. Chem., 1938, 255, 132-144; cf. Karashima, A., 1928, 1055; Müller and Bräutigam, A., 1938, III, 219).-Glycerol extract of liver (pig, wether, ox, rabbit, dog) hydrolyses &-guanidinovaleric acid, dl-a-N-methylarginine, a-amino-e-guanidinohexoic acid, and guanidinoacetic acid but not α-benzamido-δ-methylguanidinovalericacid, agmatine, creatine, or guanidine, optimal hydrolysis taking place at $p_{\rm H}$ 7.0–7.8. Hence arginase attacks only substrates containing free CO_2H and free guanidine residues. The presence of free NH_2 is not necessary; it may be replaced by NHCH3 or OH or may carry an acyl group or a peptide residue. Since the hydrolysis of δ -guanidinovaleric acid but not that of guanidinoacetic acid is accelerated by MnSO4, the hydrolysis of guanidinoacetic acid is probably due to a special enzyme not identical with arginase.

W. McC.

Effect of nucleophosphatase on "native" and depolymerised thymonucleic acid. G. SCHMIDT

and P. A. LEVENE (Science, 1938, **88**, 172—173).— Comparison of the behaviour of "native" and "b" nucleic acid in the ultracentrifuge showed that the "b" form does not sediment, whilst the "a" form, prepared by Neumann's method, gives a boundary indicating particles of mol. wts. between 2×10^5 and 1×10^6 . These results support the view (A., 1936, 244) that the enzymic transformation from the "native" acid into the "b" form is a depolymerisation. The "b" acid may represent a single tetranucleotide as its behaviour towards nucleophosphatase is different from the nucleic acids of higher mol. wt.

Enzymic histochemistry. XXX. Localisation of peptidase during the first cleavages of the egg of the sea urchin, *Psammechinus miliaris*. H. HOLTER, H. LANZ, jun., and K. LINDERSTRØM-LANG (J. Cell. Comp. Physiol., 1938, 12, 119—127).—After three cleavages the eight daughter cells were separated with a needle and the peptidase content of each was determined by observing the change produced by it in a solution of alanylglycine. No significant differences between the eight cells were found. V. J. W.

Dipeptidase. W. GRASSMANN, W. VOLMER, and V. WINDBICHLER (Biochem. Z., 1938, 298, 8-15).-Dipeptidase solutions lose part of their activity when shaken at $p_{\rm H}$ 5 with Al₂O₃ but the lost activity is partly restored by subsequently mixing the residual solution with that obtained on eluting the Al₂O₃ with PO_4''' buffer. The residual solution is activated by protein pptd. from yeast maceration juice by (NH4)2SO4, by boiled yeast extract, and by aminopolypeptidase and the eluate is activated by the protein and by aminopolypeptidase but not by the boiled extract. When yeast maceration juice is treated with (NH4)2SO4 part of the dipeptidase activity is found in the protein ppt. and part in the residual solution. The activity of the protein is greatly increased by adding boiled yeast extract, heatinactivated dipeptidase, or heat-inactivated extract of intestinal mucous membrane. Aminopolypeptidase from yeast acquires dipeptidase activity when mixed with the boiled extract or with dipeptidase inactivated by long keeping, but not when mixed with the protein. The results indicate that dipeptidase consists of a protein-like thermolabile constituent of high mol. wt. and a thermostable constituent of low mol. wt. Cryst. ovalbumin activates dried dipeptidase but not the protein or the boiled extract of yeast. W. McC.

Specificity of dipeptidase. F. SCHNEIDER (Biochem. Z., 1938, 298, 130–136; cf. A., 1934, 1403; 1937, II, 402).—Peptides of aminomalonic and of diaminopropionic acid are hydrolysed at varying rates by dipeptidase from yeast. Those in which carboxyl is close to α -C are hydrolysed with difficulty apparently because the spatial configuration, distorted by the polarity of the carboxyl group, is such as to render difficult production of enzyme-substrate complex. Free NH₂ has no such effect. *l*-Alanylaminomalonyldiamide is hydrolysed by dipeptidase and by aminopolypeptidase from yeast but the aminopolypeptidase does not hydrolyse other peptides of aminomalonic acid or of diaminopropionic acid. Peptides of both

L. S. T.

acids are hydrolysed by glycerol extract of pig's kidney. W. McC.

Antiglyoxalase as a proteolytic enzyme effect. A. PURR (Ezymologia, 1938, 2, 350—355).—Antimethylglyoxalase has its origin in a polypeptidase system, in which the proteolytic decomp. of the co-enzyme (glutathione) is effected by means of a new type of enzyme system (iminopolypeptidase).

Inflammation. III. Proteinase and peptidase activity of polymorphonuclear leucocytes, monocytes, and epitheloid cells of pleural exudates. C. WEISS, A. KAPLAN, and C. E. LARSON (J. Biol. Chem., 1938, 125, 247-256).-Polymorphonuclear leucocytes, monocytes, and epitheloid cells were produced experimentally in the pleural cavity of rabbits by injection of aleuronat and starch, light mineral oil, and a phosphatide (A3) derived from Mycobacterium tuberculosis H-37, respectively. These cells contain a cathepsin acting at $p_{\rm H}$ 1—5.5 with a max. at $p_{\rm H}$ 3 and also a dipeptidase hydrolysing dl-alanylglycine at $p_{\rm H}$ 8, but lack a carboxypeptidase capable of splitting chloroacetyl-*l*-tyrosine at $p_{\rm H}$ 8. The monocytes can be differentiated from the myelocytic type of leucocytes, since only the latter can split dl-alanylglycine at $p_{\rm H}$ 5.5 and hydrolyse gelatin and caseinogen at $p_{\rm H}$ 8. These enzymes do not require the addition of external activators. The significance of these findings with respect to the study of the immunology of experimental tuberculosis is discussed.

T. F. D.

Action of proteinases and polypeptidases on acropeptides. A. FODOR and S. KUK (Enzymologia, 1938, 5, 60—70).—The acropeptides (the structure of which is discussed) from gelatin, edestin, and caseinogen (A., 1932, 529) are readily hydrolysed by pepsin–HCl or non-activated papain but not by yeastpolypeptidase; the products of proteolysis are, however, hydrolysed by polypeptidase. The mechanism of the enzymic hydrolysis of acropeptides, especially that involving NH·CO groups, is discussed. F. O. H.

Reputed synthesis of protein by aëration of protein-proteinase digests. H. H. STRAIN and K. LINDERSTRØM-LANG (Enzymologia, 1938, 5, 86— 88).—No synthesis of protein occurs when mixtures of partly digested protein [caseinogen, fibrin (with and without glutathione), ovalbumin] and oxidised or reduced papain are shaken with O_2 at $p_{\rm R}$ approx. 7, even if digestion takes place in $\rm H_2S$ or if Fe^{II} or Cu salt is added before the treatment with O_2 . W. McC.

Synthetic action of pepsin. K. KUMAMOTO (J. Biochem., Japan, 1938, 28, 95–107).—The synthetic action (indicated by the decrease in the filtrate-N from 3% trichloroacetic acid) of pepsin on a conc. peptone solution (prepared by peptic hydrolysis of ovalbumin) at $p_{\rm H}$ 4 is max. at 37° and is not influenced by Cl', ${\rm SO}_4$ ", ${\rm PO}_4$ "', Ca", or Fe"... The action is most pronounced with the lower peptones and polypeptides separated by dialysis, alcohol pptn., or extraction with butyl alcohol; with the last, the fraction (amino-N 29.4% of total N, biuret and Millon tests negative, no ppt. with phosphotungstic acid) sol. in butyl alcohol and insol. in abs. ethyl alcohol gives a plastein

formation of 37% in 2 days. The importance of diand tri-peptides in plastein formation is discussed. F. O. H.

Kinetics of the formation of pepsin from pepsinogen of pigs and identification of an intermediate compound. R. M. HERRIOTT (J. Gen. Physiol., 1938, 22, 65—78).—The transformation of pepsinogen into pepsin is autocatalytic under all conditions studied. Evidence was found for the existence of an intermediate compound, a reversibly dissociable complex of pepsin with an inhibitor of low mol. wt. D. M. N.

Tryptic digestion of albumins from different sources. W. GIEDROYĆ, J. JANICKI, and J. CICH-OCKA (Enzymologia, 1938, 5, 81—85).—Uncoagulated serum-albumin (horse, ox, sheep), even if purified by removal of fat and by electrodialysis, is only very slowly or not at all attacked by trypsin but is readily digested (82—100% in 24 hr.) after coagulation. No species differences in the case of digestion are observed. W. McC.

Active group of papain. C. V. GANAPATHY and B. N. SASTRI (Nature, 1938, 142, 539; cf. A., 1935, 252).—Treatment of an ether extract of fresh papaya latex with H_2O_2 (to oxidise all SH to S·S) and pptn. with alcohol gives a prep. that is inactive towards peptone but retains its capacity to hydrolyse gelatin. Maleic acid is without effect on this latter activity, but iodoacetic acid inhibits it irreversibly. Hence the SH group is not necessary for the gelatinase activity of papain, but it is essential for the peptonase activity. L. S. T.

Papain. II. Purification of papain by takaamylase. S. OKOMURA (Bull. Chem. Soc. Japan, 1938, 13, 534—538).—Papain purified by the method of Akabori *et al.* (A., 1938, III, 760) coagulates readily. A more stable form is obtained by saturating the mother-liquor from the Al_2O_3 adsorption with $(NH_4)_2SO_4$, dissolving the ppt. in H_2O , dialysing, and pptg. with acetone. This gives a negative SHreaction with or without HCN, but hydrolyses gelatin more rapidly (after approx. 2 hr.) with HCN than without. A. LI.

Determination of pepsin, trypsin, papain, and cathepsin with hæmoglobin. M. L. ANSON (J. Gen. Physiol., 1938, 22, 79—89).—Modifications in previously described methods (A., 1937, III, 221) are given. D. M. N.

Proteins in liquid ammonia. IV. Enzymic hydrolysis of proteins reduced by metallic sodium in liquid ammonia. E. W. MCCHESNEY and R. G. ROBERTS (J. Amer. Chem. Soc., 1938, 60, 1935— 1937; cf. A., 1936, 492).—The digestibility of peptone by trypsin is unaffected by treatment with Na in liquid NH₃, whilst that of caseinogen is decreased, and that of ovalbumin is increased; that of silk fibroin and wool is increased to equal extents by treatment with Na in liquid NH₃ or with liquid NH₃ alone. R. S. C.

Mechanism of enzymic hydrolysis of starch. B. ÖRTENBLAD and K. MYRBÄCK (Svensk Kem. Tidskr., 1938, 50, 168-174).—Both dextrin (mol. wt. 1300) and its oxidation product (I-KI) when hydrolysed by takadiastase at 30° show a final reduction val. (corr. by reference to a blank experiment with maltose) corresponding with 55% hydrolysis to maltose. Hence the free CHO groups (if any) of dextrin do not influence the reaction. The reduction vals. of the products of hydrolysis by β -amylase and malt-amylase of starches and dextrins of known mol. wt. (the dextrins obtained by the action of HCl or glycerol on starch) have been determined. Hydrolysis of HCl-dextrins by either enzyme is very slight. A. Lr.

Micro-determination of diastase. M. SOMOGYI (J. Biol. Chem., 1938, 125, 399—414).—A saccharogenic micro-method applicable to 1 ml. of blood has been developed in which a standard starch paste is incubated with the enzyme. After a given time, inhibition of enzyme action and pptn. of protein are effected by addition of $CuSO_4$ and WO_4 ", respectively. The filtrate is heated with Cu reagent and the glucose equiv. determined by the Shaffer-Hartmann technique. A simpler and more rapid method, based on colour-reaction of starch with I and taking the red-brown colour of erythrodextrin as the endpoint, has also been devised ; this method is limited to colourless, transparent enzyme solutions.

T. F. D.

Enzymic studies on cereals. X. Separation of amylases in rice. G. YAMAGISHI (J. Agric. Chem. Soc. Japan, 1938, 14, 1001-1015; cf. A., 1938, III, 149).-When an extract prepared from rice which has sprouted for approx. one week at 30° is treated with $(NH_4)_2SO_4$, the ppt. obtained with 20-25% of the latter contains most of the liquefying and dextrinifying enzymes, whilst with 30-35% $(NH_4)_2SO_4$ most of the saccharifying enzyme is pptd. To obtain max. yields of the latter, extraction is carried out at a low temp., whilst a temp. of 40-50° is used for the prep. of dextrinifying and liquefying enzymes. Pptn. can also be effected by alcohol (max. with 60-70% alcohol), but is less satisfactory. The stability of the amylases to heat increases in the order liquefying, dextrinifying, saccharifying, whilst stability at 5-10° for 15 min. towards acidity is in the reverse order. For the separation of the three enzymes, $p_{\rm H} 2.5$ is most suitable. J. N. A.

Amylases of yeast and transformation of glucose-1-phosphoric acid by yeast extract. A. SCHÄFFNER and H. SPECHT (Naturwiss., 1938, 26, 494–495; cf. A., 1938, III, 343).—Dialysed extract of dried yeast yields two amylases. Acetic acid and acetate at $p_{\rm H}$ 5.5 ppt. the amylase requiring PO₄^{'''} for its action and producing hexose-6-phosphoric acid from starch, possibly by way of glucose-1-phosphoric acid. This amylase attacks Embden's ester only very slowly. The other amylase does not require the co-operation of PO₄^{'''}. W. McC.

Standardisation of β -glucosidase. S. VEIBEL and H. LILLELUND (Enzymologia, 1938, 5, 129– 136).—A method which avoids some of the disadvantages of Weidenhagen's (A., 1930, 372) is described and it is shown that glucosides (e.g., isopropylglucoside) other than salicin may be used for the purpose.] W. McC. Lacto-mannitic enzymes. VI. Independence of lactic acid of the products of fructose dissimilation. V. BOLCATO (Enzymologia, 1938, 5, 52—56; cf. A., 1938, III, 72).—The enzymic dissimilation of fructose into mannitol and acetic acid is almost invariably attended by formation of lactic acid. The differentiation of the enzymic system producing lactic acid from that producing mannitol is now demonstrated by the attainment of approx. theoretical yields of mannitol from fructose in presence of glucose. F. O. H.

Phosphoamidases in emulsin and trypsin. H. BREDERECK and E. GEYER (Z. physiol. Chem., 1938, 254, 223—226; cf. A., 1938, III, 343; Ichihara, A., 1933, 1203).—Sweet-almond emulsin hydrolyses phenylphosphoric anilide and *p*-chloroanilide at $p_{\rm H}$ 4.9 and at 2.15, the higher rate for the two substances being at 4.9 and 2.15, respectively. At $p_{\rm H}$ 8.5, emulsin exhibits phosphatase action but does not hydrolyse the anilides. Trypsin hydrolyses the chloroanilide at $p_{\rm H}$ 4.9 and 8.5. W. McC.

Phenazine compounds as carriers in the hexose monophosphate system. F. DICKENS and H. MCILWAIN (Biochem. J., 1938, 32, 1615—1625).— Some phenazine compounds and non-phenazine dyes have been used as substitutes for Warburg's yellow enzyme in the hexose monophosphate system. Oxidation-reduction potentials have also been measured. Like flavin, the phenazines form semiquinones, to which property their activity in this system may be ascribed. Phenazine methosulphate, methochloride, and ethosulphate are the most active compounds investigated, but are much less active than the flavin enzyme, particularly towards the Neuberg ester. P. G. M.

Oxidation of phosphohexonate and pentosephosphoric acids by yeast enzymes. I. Phosphohexonate. II. Pentosephosphoric acids. F. DIOKENS (Biochem. J., 1938, 32, 1626—1644).— I. An enzyme prep. can be made from Lebedev yeast maceration fluid which will oxidise phosphohexonic acid to 5-C phosphoric esters (? phosphopentonic ester etc.) which give the pentose reaction. A 4-C phosphoric ester, possibly phosphoerythronic acid, is also produced when an impure co-enzyme II is used.

II. A similar yeast enzyme prep. oxidises d-ribose-5phosphoric acid more vigorously than the corresponding d-arabinose- and xylose-phosphoric acids. A dialysed prep. can be made which is inactive without co-enzyme II. P. G. M.

Phosphatases. VI. Composite nature of enzymes. I. H. ALBERS, E. BEYER, A. BOHNEN-KAMP, and G. MÜLLER (Ber., 1938, 71, [B], 1913— 1926; cf. A., 1935, 1280).—Kidney-phosphatase has its optimal activity at $p_{\rm H}$ 9.25 and is completely stable in the alkaline region. At $p_{\rm H}$ 6 a pronounced decline in activity is observed and at $p_{\rm H}$ 4.5 phosphatase can scarcely be detected. The stability- $p_{\rm H}$ graph is not related to the known activity- $p_{\rm H}$ graph. The process of inactivation in the crit. region is accompanied by the production of reversible equilibria. Inactivation is shown to be due to the equilibrium, holophos-

phatase ⇒ cophosphatase + apophosphatase. It is established that kidney-phosphatase is composite in structure and that the sign of the charge of an enzyme can be of decisive importance for its tendency towards dissociation. Top yeast-phosphatase is also composite. It is shown that kidney-phosphatase and top yeast-phosphatase have the same, mutually exchangeable co-enzyme. The activation of kidneyphosphatase and restriction of top yeast-phosphatase by Mg" are due to the difference of the apo-enzyme. The increasing instability of phosphatases with increasing dilution of their solutions is due to the more extensive dissociation. If an acid solution of phosphatase is heated at 100°, a specifically active inhibitor is developed which appears to be also formed with great readiness at 35°. It is probably a transformation product of cophosphatase. Attention is directed to the possibility of frequent migration of a co-enzyme from one apo-enzyme to another and the possible physiological importance is discussed.

H. W.

Phosphorylation during degradation of glycogen. E. BAUER, H. VON EULER, and K. LUND-BERG (Z. physiol. Chem., 1938, 255, 89-103; cf. Kendal and Stickland, A., 1938, III, 473; Cori et al., A., 1938, III, 510).-Muscle-adenylic acid appears to be the chief agent causing phosphorylation of glycogen in muscle extract. Adenosine, yeastadenylic acid, and the dinucleotide from lactoflavindiphosphoric acid and adenylic acid do not cause phosphorylation and adenosinetriphosphoric acid and other nucleotides seem to act only when contaminated with muscle-adenylic acid or converted into it or when impure as a result of spontaneous or enzymic decomp. The phosphorylation, which is optimal at $p_{\rm H}$ approx. 7.3, is activated by Mg and Mn and is inhibited by phloridzin but not by 0.005M-iodoacetate or -NaF. The rate of phosphorylation decreases as the glycogen concn. increases. Hydrolysis of glycogen is not necessarily accompanied by phosphorylation but appreciable phosphorylation occurs only if accompanied by hydrolysis. The rate at which the capability of glycogen to undergo phosphorylation decreases during hydrolysis is much greater than the rate of production of reducing material and is not affected by addition of glucose or maltose. Dextrins of low mol. wt., but not those of high mol. wt., are capable of phosphorylation. W. McC.

Phosphorylation of adenosine by yeast and the importance of this process for alcoholic fermentation. III. Production of adenosine and degradation of nucleic acid in yeast. P. OSTERN, J. TERSZAROWEĆ, and S. HUBL (Z. physiol. Chem., 1938, 255, 104—125; cf. A., 1938, III, 343).—Fresh bottom yeast contains no adenosine but produces its 5-phosphoric acid from added adenosine and inorg. PO_4''' ; if glucose or (better) fructose diphosphate is added, adenosinetriphosphoric acid is produced. No phosphorylation occurs if the nutrient material of the yeast is removed by exhaustive dialysis. Yeast dried with acetone and freed from PO_4''' donators by dialysis phosphorylates added Embden's ester and produces adenosine from its 3- and more rapidly from its 5-phosphoric acid, adenosine accumulating because

yeast contains no deaminase of adenosine or adenvlic acid (amino-acid deaminases are present) and the rate of production exceeds that of degradation to adenine and *d*-ribose. The rate of production of adenosine is not affected by adding glucose (which is not phosphorylated) or Embden's ester although this ester is partly converted into fructosediphosphoric acid. During autolysis of the yeast the nucleic acid present breaks down, yielding preferentially adenosine. The results indicate that one of the functions of yeastnucleic acid is to produce adenosine-di- and -triphosphoric acid and that the following reactions occur : nucleic acid \rightarrow adenosine-3-phosphoric acid \rightarrow adenosine \rightarrow adenosine-5-phosphoric acid \rightarrow adenosine-di- and -tri-phosphoric acids. An enzymic method of determining adenosine and its 5-phosphoric acid in presence of each other is described.

W. McC.

Yeast-phosphatases. IX. A. SCHÄFFNER and F. KRUMEY (Z. physiol. Chem., 1938, 255, 145-158).—The α -glycerophosphatase of top yeast, which can be extracted from the dried yeast by water, exhibits $p_{\rm H}$ optima at 4-0 and 6-4. It is insol. in glycerol and is completely and irreversibly inactivated at $p_{\rm H}$ 7-6 in 20 min. at room temp., as are also the pyro- and tri-phosphatase. The component with an optimum at $p_{\rm H}$ 6-4 is inactivated by prolonged dialysis. Mg^{**} appears to be the essential factor. The α -glycerophosphatase of bottom yeast is destroyed by heating for 30 min. at 50°, but the β -glycerophosphatase is unaffected; the optimum $p_{\rm H}$ of the latter is displaced to the alkaline side ($p_{\rm H}$ 8-0) in the absence of Mg^{**}. P. G. M.

Prostate-phosphatase. III. W. KUTSCHER and J. PANY (Z. physiol. Chem., 1938, 255, 169—189).— The adsorbability of prostate-phosphatase by $Al(OH)_3$ varies inversely as the degree of purification. The N content of a purified prep. (method described) is 16%. The enzyme is very resistant to the action of proteolytic enzymes (e.g., papain). P. G. M.

Enzyme activity of protein fractions of bloodserum. C. CATTANEO (Enzymologia, 1938, 2, 356— 359).—The phosphatase activity of serum is associated exclusively with the albumin fraction, whilst the esterase is distributed between the albumin and globulin fractions. P. G. M.

Activation of tissue-phosphatases by magnesium. K. V. GIRI (Z. physiol. Chem., 1938, 254, 117—125; cf. A., 1936, 1153; 1937, 111, 431).—The activation of phosphatase from liver, kidney, or brain (sheep) by Mg increases if the purity of the enzyme is increased by ultrafiltration but decreases if the period of extraction is prolonged or if the enzyme is kept. Ultrafiltration does not increase the capability for activation of phosphatase from intestinal mucous membrane. W. McC.

Plant phosphatases. II. Relationships between vitamin-C and plant phosphatases. K. V. GIRI (Z. physiol. Chem., 1938, 254, 126—138; cf. A., 1937, III, 142; 1938, III, 238).—The degree of hydrolysis of Na β -glycerophosphate and Na₄P₂O₇ by purified phosphatase from germinating soya bean is not affected by vitamin-C but is diminished if substances [methylene-blue, K₃Fe(CN)₆, Cu^{*}, but not

3 x (A., III.)*

ascorbic acid oxidase] which oxidise -C are also present, the extent of diminution increasing as the oxidising power of the substances increases. KCN, H_2S , NaHSO₃, glutathione, cysteine, and cystine wholly or partly counteract the effect of Cu^{*}. $P_2O_7^{*'''}$ has a protective effect on -C and hence the -C-Cu complex restricts hydrolysis of Na₄ P_2O_7 by the phosphatase less than that of Na β -glycerophosphate. Dehydroascorbic acid alone or in presence of Cu^{*} has no effect on the activity of the phosphatase. W. McC.

Enzymic decomposition of triphosphoric acid. III. Animal enzymes. C. NEUBERG and H. A. FISCHER (Enzymologia, 1938, 2, 360—366; cf. A., 1938, III, 441).—Behaviour of triphosphoric acid towards the enzymes of various animal organ extracts is examined. Organs of the pig usually yield more potent enzyme preps. than those of the ox, whilst in the same animal kidney extracts are more potent than muscle extracts. P. G. M.

(v) MICROBIOLOGICAL AND IMMUNOLOGICAL CHEMISTRY.

Production of chemicals by minute organisms. A. W. HIXSON and R. R. ROGERS (J. Chem. Educ., 1938, 15, 357—364).—A summary of reactions that accompany the activities of bacteria, yeasts, and moulds. L. S. T.

Removal of glucose by baker's yeast under aërobic and anaërobic conditions. J. RUNN-STRÖM, E. SPERBER, and W. FELLER (Naturwiss., 1938, 26, 547—548).—The uptake of glucose by baker's yeast under aërobic conditions closely follows the equation $C = C_0 \cdot c^{-at}$ where C is the concn. at the time t of glucose outside the cell, C_0 the initial concn., and c the average concn. in the cell. The diffusion coeff. a is inversely proportional to C_0 , whilst under anaërobic conditions it is not const. throughout an experiment but is a function of C. The interpretation of these results is discussed. W. O. K.

Action of yeast on arginine and histidine. S. EDLBACHER, M. BECKER, and A. VON SEGESSER (Z. physiol. Chem., 1938, 255, 53—56; cf. A., 1938, 111, 617).—Yeast suspended in sugar solution consumes arginine and histidine without production of the corresponding alcohols. If NH_4 salt is present no consumption occurs. Yeast maceration juice contains arginase which converts arginine into ornithine (no conversion if O_2 is passed through the solution) but does not attack histidine, histamine, or ornithine.

W. McC.

Yeasts in "Miso." M. MOGI (J. Agric. Chem. Soc. Japan, 1938, 14, 951–988).—28 new strains of yeast belonging to the classes Saccharomyces miso- α , - β , and - γ , Zygosaccharomyces miso- α and - β , Debaryomyces miso, Hansenula anomala, Torulopsis miso- α , - β , and - γ , and Torulopsis albida, Lodder, have been isolated from 44 samples of "Miso." J. N. A.

Yeast growth-substance. F. BOAS (Angew. Bol., 1936, 18, 348-360).—Hop extracts contain alcohol-sol. substances stimulating growth and division of yeast. The effects of extracts of stems, leaves, and roots of a no. of plants on yeast growth are recorded. A. G. P.

Mode of action and determination of the growth-substance of yeast. C. ENDERS and M. HEGENDÖRFER (Biochem. Z., 1938, 298, 16-26).--The growth-substance of yeast is probably an activated form of the growth-substance of the medium. A modification of Nielsen's method of determining the substance in yeast and yeast extract is described. W. McC.

Use of yeast in removing factor Z and bios [from beer wort]. V. HARTELIUS and N. NIELSEN (Biochem. Z., 1938, 298, 125—129; cf. A., 1938, III, 344, 532).—Beer wort loses approx. 50% of its bios and factor Z when shaken with brewers' yeast. When press yeast is used almost all the bios is lost but only approx. 50% of the Z. During fermentation of the wort approx. 50% of bios and Z are lost. The loss of bios is partly reversed, but that of Z is unaffected, by adding amino-acid (e.g., β -alanine, asparagine).

W. McC.

Significance of iron porphyrins in cellular metabolism. II. Respiration and the catalytic properties of yeast cultured anaërobically or with cyanide addition. H. YOSHIKAWA (J. Biochem. Japan, 1938, 28, 69—83; cf. A., 1938, III, 74). —Yeasts grown in Fe-free and Fe- and Fe + Cucontaining media were examined. With all three, anaërobiosis decreases O_2 consumption and increases CO_2 production and rapidity of methylene-blue reduction; with the Fe + Cu yeast, the indophenoloxidase activity was increased and the catalase activity diminished. Treatment of the yeasts with CN' increases O_2 consumption and CO_2 production; the indophenol-oxidase and catalase activities are completely and partly inhibited, respectively.

Ў. О. Н.

Thermo- and photo-chemical phenomena during the death of cells. III. Vitaids in metabolism. V. V. LEPESCHKIN (Protoplasma, 1937, 28, 529-542).-The "death heat" of yeast cells killed by a mixture of HgCl₂ and octyl alcohol is greatly reduced by first keeping the yeast for 32 days without nutrients. Under these starvation conditions, the "vitaids" (complex substances containing proteins and lipins) are probably broken down in the cell. The heat of reaction between the HgCl, and the cell constituents is increased, indicating an increase in free proteins, which react with the HgCl₂. Decomp. of the "vitaids" is not inhibited by excluding air. Decrease in vitaids results in decreased resistance to poisons. Feeding the yeast with large amounts of sugar increases the "death heat." Alcoholic fermentation of the nutrient solution is probably necessary for synthesis of vitaids. M. A. B.

Fermentation of dextrin by Fusarium lini, Bolley. E. DAMMANN (Ber., 1938, 21, [B], 1865– 1868).—In addition to the enzymes previously detected, F. lini contains an enzyme capable of fermenting dextrin to CO₂ and alcohol. Addition of KCN is without influence on the course of the fermentation. It is not yet certain whether fermentation is direct or is preceded by fission into a simple sugar.

XIX(u, v)

Observations on the behaviour of dissacharides indicate the possibility of a direct action. H. W.

Effect of fungi on oxidation-reduction potentials of liquid culture media. D. F. MCALISTER (Amer. J. Bot., 1938, 25, 286—295).—The E_h of glucose media was lowered by growth therein of certain moulds. Spore production was unrelated to the E_h of the media. Changes in E_h and $p_{\rm H}$ were independent. A. G. P.

Vitamin- B_1 or its intermediate and growth of certain fungi. W. J. ROBBINS and F. KAVANAOH (Amer. J. Bot., 1938, 25, 229–236).—Certain saprophytic fungi grew satisfactorily on asparagine– glucose-mineral salt media and were unaffected by additions of vitamin- B_1 . In a similar medium a no. of parasitic fungi failed to grow unless $-B_1$ was added. Rhizopus nigricans grew well in synthetic media and was adversely affected by $-B_1$. Phycomyces nitens grew in media to which the thiazole and pyrimidine intermediates were added; neither alone was effective. Other organisms synthesised thiazole when grown in media containing the pyrimidine intermediate, and produced good growth.

A. G. P. Vitamin- B_1 in the nutrition of four species of wood-destroying fungi. N. L. NOECKER (Amer. J. Bot., 1938, 25, 345–348).—Vitamin- B_1 is essential for the growth of Stereum frustulosum (Pers.), Fr., Hydnum erinaceus, Bull., Polyporus Spraguei, Berk. and Curt., and Fomes igniarius, Fr. All the fungi utilise N in org. or inorg. forms although the more complex org. sources are the more effective. Glucose serves as a C source, but xylose is superior for S. frustulosum. A. G. P.

Effect of adrenaline on sclerotia and perithecia formation in the fungus *Neurospora*. F. MOREAU and (MME.) MOREAU (Compt. rend. Soc. Biol., 1938, 128, 819—820).—Adrenaline accelerates the growth of mycelium and production of sclerotia and perithecia in *N. sitophila*. P. C. W.

Potassium tellurite and copper sulphate in Sabouraud's medium for isolation of pathogenic fungi. T. L. CH'IN (Proc. Soc. Exp. Biol. Med., 1938, 38, 700—702).—The addition of K tellurite in a concn. of 0.015%, or of $CuSO_4$ in a concn. of 0.05%, to Sabouraud's medium prevented the growth of bacteria in cultures of various skin fungi taken directly from the lesions. V. J. W.

Differentiation of protoplasm in the plasmodia of slime fungi. H. BALBACH (Protoplasma, 1936, 26, 161—180).—By pressure on the cover-slip small globules of hyaloplasm can be pressed out from the plasmodia, granular plasm being retained against the plasmodium wall. In strongly hypertonic solutions the plasmodium becomes rigid, and no globules are formed by pressure. Separation of the plasm can also be produced by sprinkling Pt-black on the plasmodium, when alternating rings of clear and granular plasm are formed around each Pt particle. Normally the particles sink through the surface of the plasmodium, but not if this is first treated with water or salts of Ca or Al. M. A. B.

3 Y (A., III.)

Action of urea on gymnoplasts. H. BALBACH (Protoplasma, 1936, 26, 192—204).—Treatment of *Chondrioderma difforme* with 0.5—1.0N-urea causes cessation of protoplasmic streaming in the plasmodia, accumulation of granular plasma in the convex portions of the hyphæ, and various changes in form of the hyphæ. The different effects are due partly to mechanical and partly to osmotic action.

M. A. B.

Aneurin as growth factor in Strigomonas. M. LWOFF (Compt. rend. Soc. Biol., 1938, 128, 241–243).—Aneurin is an essential factor in the growth of cultures of S. oncopelti, S. fasciculata, S. culicidarum, and Glaucoma piriformis. Various similar compounds and degradation products are ineffective. P. C. W.

Effect of substituted thiazoles on the growth of leucophytic flagellates. A. LWOFF and H. DUSI (Compt. rend. Soc. Biol., 1938, 128, 238—241).— Various substituted thiazoles were tested as growth factors on *Chilomonas paramecium*, *Polytoma caudatum*, *P. ocellatum*, and *Polytomella caca*. 2:4-Dimethyl-5- β -hydroxyethyl-, 4-methyl-5-acetoxyethyl-, 4-methyl-5- β -hydroxypropyl-, 4-methyl-5- γ hydroxypropyl-, and 4-methyl-5-vinyl-thiazole were all active, the last-named three only in relatively large concn. P. C. W.

Effect of Trichomonas factus on tissue culture cells. M. J. HOGUE (Amer. J. Hyg., 1938, 28, 288— 298).—Using three pure cultures it was shown that when grown together with embryonic chick tissues in a medium consisting of one part of chicken serum to 10 parts of Schumaker's modified Ringer's solution, T. factus produced a substance which killed the tissue culture cells. Similar results were obtained with filtrates from a 17-day-old culture. Filtrates withstood storage at 12° for 178 days. The toxic substance was fairly thermo-stable at 55° for 15 min., but was destroyed at 60° for 20 min. It was not an enzyme. In neutral-red solution Trichomonas was killed while the tissue culture cells survived.

B. C. H.

Electrical stimulation of *Paramecium* with two successive subliminal current pulses. H. KINO-SITA (J. Cell. Comp. Physiol., 1938, 12, 103—117).— Passage of a sufficient current through *Paramecium* causes reversal of ciliary movements at the cathodal end. Two subliminal current pulses summate, and from their time-intensity curves it is possible to measure the development of the latent excitation as a fraction of one complete excitation. The latent excitation increases rapidly with duration at the beginning of the stimulation but then slows down. A prolonged current lowers the sensitivity.

V. J. W.

Blood picture in experimental infections and chemotherapy. A. FELDT and K. SCHÄFER (Z. Immunitätsforsch., 1938, 93, 170–183).—Mice infected with *Trypanosoma brucei* show no change in the red and white cells except for a slight myelocytosis and transitory monocytosis. Salvarsan treatment does not change the blood picture. In mice infected with *Spir. recurrens* the neutrophils decrease continuously after initial rise; the monocytes and eosinophil cells increase up to 49% and 14% respectively. The erythrocytes are slightly diminished. Salvarsan and Solganal restore both the red and white cells to normal, whilst in normal mice Salvarsan diminishes and Solganal increases the erythrocytes. G. W.

Ingestion of red blood cells by Endamæba coli and its significance in diagnosis. E. E. TYZZER and Q. M. GEIMAN (Amer. J. Hyg., 1938, 28, 271— 287).—A study was made of the amœbæ present in the discharge from a case of brief intestinal obstruction. E. histolytica was absent but red cells were found ingested by E. coli. The presence of amœbæ with ingested red cells is not sufficient for a diagnosis of amœbic dysentery without further morphological study. B. C. H.

Chemistry of cell division. VII. Distribution of thiol in Amæba proteus in interkinesis and mitosis, as shown by the nitroprusside test. H. W. CHALKLEY (Protoplasma, 1937, 28, 489– 497).—A. proteus gives a positive nitroprusside reaction in both cytoplasm and nucleus. During interkinesis the reaction is more intense in the nucleus. In mitosis it disappears with the breakdown of the nuclear membrane at metaphase, but returns after fission is complete and the nucleus is re-organised. In young cells the reaction is as intense in the cytoplasm as in the nucleus. Traces of a substance giving the reaction can be extracted from the cell with trichloroacetic acid, and larger amounts with half-saturated $(NH_4)_2SO_4$, but the bulk is fixed in the cell structure. The reaction is weaker in moribund cells. There is probably a cycle of storage of thiol compounds in the nucleus during interkinesis and release into the cytoplasm at mitosis, followed by further storage. M. A. B.

Ecology of the Tamar estuary. II. Underwater illumination. L. H. N. COOPER and A. MILNE (J. Marine Biol. Assoc., 1938, 22, 509—527).— A. D. H.

Enzyme formation and polysaccharide synthesis by bacteria. III. Polysaccharides produced by "nitrogen-fixing" organisms. E. A. COOFER, W. D. DAKER, and M. STACEY (Biochem. J., 1938, 32, 1752—1758).—Media for large-scale prep. of the polysaccharides from Azotobacter chroococcum and Rhizobium radicicolum (clover strain) are described. The former contains glucose units (90%) and uronic acid residue (3-4%) resembling that from *R. radicicolum*. They probably belong to the same class as the sp. polysaccharides of pneumococcus types II and III. H. G. R.

Fermentation of phosphate esters by propionic acid bacteria. H. G. WOOD, W. P. WIGGERT, and C. H. WERKMAN (Enzymologia, 1938, 2, 373–376).— α -Glycerophosphoric acid and glycerol are converted into propionic acid by fermentation with *Propionibacterium pentosaceum*, some propyl alcohol being also formed. Hexosediphosphoric, diphosphoglyceric, and pyruvic acids and glucose similarly yield propionic and acetic acids and CO₂; in the case of glucose succinic acid is also formed. The phosphorylated esters are probably intermediates in the dissimilation of glucose. P. G. M. Vitamin- B_1 in bacterial metabolism. M. SL-VERMAN and C. H. WERKMAN (Proc. Soc. Exp. Biol. Med., 1938, **38**, 823—827).—Addition of vitamin- B_1 to $-B_1$ -deficient media stimulated the growth and O_2 consumption of *Propionibacterium pentosaceum* and *P. peterssonii*, but not of *Aërobacter indologenes* or of *Escherichia coli*. V. J. W.

Oxidative assimilation of lactic acid by Escherichia coli. C. E. CLIFTON and W. A. LOGAN (Proc. Soc. Exp. Biol. Med., 1938, **38**, 619–622).— O_2 consumption by suspensions in lactate media normally ceases when about two thirds of complete combustion has occurred. If NaN₃ is added up to 0.005 m, complete combustion takes place. Cessation of O_2 consumption is accompanied by cessation of growth. V. J. W.

Production of indole by *B. coli* suspensions. P. FILDES (Biochem. J., 1938, **32**, 1600—1606).— *B. coli* suspensions are 25 times as active when grown in the presence of tryptophan in oxidising this aminoacid to indole, which is also produced from indolylacrylic acid, probably via tryptophan. P. G. M.

Desulphuration of cysteine by fermentation. C. FROMAGEOT and R. MOUBASHER (Enzymologia, 1938, 2, 331—341).—Production of H₂S from cysteine by means of a prep. from *B. coli* takes place in presence of formic, lactic, fumaric, aspartic, and glutamic acids and glucose; this effect is generally inhibited by toluene, CHCl₃, NaF, KCN, and thymol. The optimum conditions are 45° and $p_{\rm H}$ 6·4—6·6.

P. G. M. Desulphuration of thiolactic acid by fermentation. A new enzyme, sulphurase. C. FROMA-GEOT, R. MOUBASHER, and P. DESNUELLE (Enzymologia, 1938, 2, 344—349).—The desulphuration of thiolactic acid by means of an enzyme prep. from *B. coli* differs from that of cysteine (see preceding abstract) in that it is unaffected by the presence of citric acid or a H donator. Of the products of desulphuration by sulphurase, 95% appear in the medium as lactic acid or acetaldehyde. Extracts of the enzyme prep. are inactive. P. G. M.

Enzymic transformation of cysteine into alanine. C. FROMAGEOT and P. DESNUELLE (Enzymologia, 1938, 5, 57-59).—Enzymic production of H₂S from cysteine in presence of *B. coli* and a H donator is accompanied by simultaneous production of alanine. H. G. R.

Metabolism of adenine compounds by B. coli. M. STEPHENSON and A. R. TRIM. Micro-determination of ribose. A. R. TRIM (Biochem. J., 1938, 32, 1740—1751).—Muscle-adenylic acid is dephosphorylated and then deaminated by B. coli, the latter process being completely inhibited by treatment with 1% phenol. The rates of deamination of adenosine, adenylic acid, and adenine are $Q_{\rm N} = 100, 20,$ and 5 respectively, the rate for adenine being increased 6—7 times by adenosine. Ribose is fermented and disappears from adenosine and inosine with B. coli, the rate of fermentation being 10 times that in the free state. The Ce(SO₄)₂ titration method of Giragossintz (A., 1937, III, 4) is modified for micro-determination of ribose in bacterial suspensions, the bacteria being removed with 0.2N-HCl. H. G. R.

Synthesis of chenodeoxycholic acid from dehydrochenodeoxycholic acid by *B. coli communis.* T. S. SIHN (J. Biochem. Japan, 1938, 28, 165-168).—The synthesis occurred in cultures of *B. coli* kept for 6 months at 37-38°. F. O. H.

Increase and maintenance of virulence, variation in agglutination titre, increase in rate of motility, and "spread" of *B. coli* by passage. 0. S. Gwan (Proc. K. Akad. Wetensch. Amsterdam, 1938, 41, 524—537).—By serial passage of 3 strains of *B. coli* through rabbits, virulence was increased and the agglutination titre for homologous strains and, with one serum, for heterologous strains was maintained; with another serum a progressive fall in titre was obtained. Rate of motility was increased by passage. A formula was evolved for determining the rate at which the organisms spread through a semisolid agar medium. This rate was increased by passage. G. P. G.

Anthrax infections and immunity. II. Specificity of immune sera with coupled azoproteins. G. IVÁNOVICS and V. BRUCKNER (Z. Immunitätsforsch., 1938, 93, 119-136).-Azo-proteins of d(-)-glutamic acid give a sp. ppt. with immune sera against these azo-proteins and with anthrax immune sera containing anticapsular bodies. They are not pptd. by immune sera containing antibodies against the body of B. anthracis only. Immune sera in which the anticapsular bodies have been adsorbed by the purified capsular substance do not react with azo-proteins of glutamic acid. Antisera of these azo-proteins do not ppt. the capsular substance nor do they agglutinate capsulated anthrax bacillus. Prep. of the azo-proteins is detailed. G. W.

Proteinase secretion and growth of Clostridium histolyticum. W. KOCHOLATY, L. WEIL, and L. SMITH (Biochem. J., 1938, 32, 1685-1690; cf., A., 1937, III, 397).-In cultures of Cl. histolyticum both bacterial growth and proteolytic activity (with and without addition of an activator, such as Fe" + cysteine) reach a max. 24 hr. after inoculation. Beyond 24 hr. there is a rapid decrease in activity, which is related to autolytic processes. The medium has very little effect provided the $p_{\rm H}$ is about 7. The proteinase secreted by the cells can be activated in filtrates from 6-hr. cultures when practically no autolysis has taken place. This proteinase appears to be identical with that obtained by destroying the bacteria and can be activated in a similar manner. Cell-free filtrates obtained after 12 to 48 hr. hydrolyse clupein and gelatin. The bacteria also contain a poly- and di-peptidase which are liberated only on autolysis, and are not secreted by young cells under conditions in which the proteinase is secreted. The results and conclusions are not in agreement with those of Maschmann (A., 1938, III, 440). J. N. A.

Endo-enzymes, particularly peptidases of Clostridium histolyticum. W. KOCHOLATY, L. SMITH, and L. WEIL (Biochem. J., 1938, 32, 1691–1695).—Young cultures of Cl. histolyticum contain a poly- and a di-peptidase with $p_{\rm H}$ optima at 8.7 and

7.6 respectively. The former is activated considerably by Mg^{**}, whilst the latter is unaffected. No carboxypeptidase is present. The bacteria also contain deamidases which attack *l*-leucine, *d*-alanine, glycine, *l*-tryptophan, and *d*-glutamic and *l*-aspartic acids. All the above are endo-enzymes and are not secreted by intact bacteria. J. N. A.

Enzymic adaptation in Clostridium histolyticum. W. KOCHOLATY and L. WEIL (Biochem. J., 1938, 32, 1696-1701; cf. A., 1938, III, 347).-The proteinase secreted by Cl. histolyticum grown at $p_{\rm ff}$ 7.2-7.4 on protein media has optimum $p_{\rm H}$ 7.0. When the bacteria are grown on a medium containing 3% of casein and 1% of glucose the $p_{\rm H}$ decreases from 7.4 to 5.8, and the proteinase in solution has optimum $p_{\rm H}$ 6.0. If the culture obtained on this medium be grown on a 3% casein medium, the proteinase secreted has optimum $p_{\rm H}$ 7.0. The proteinase secreted by bacteria grown on gelatin or casein attacks these two substrates to approx. the same extent. By repeatedly transferring bacteria from gelatin to gelatin, and from casein to casein, enzymes are finally obtained from gelatin cultures which will only hydrolyse gelatin and are inactive to casein, whilst the reverse is true for the enzyme from casein cultures. The specificity can be reduced by Fe" + cysteine, in presence of which the enzyme which hydrolyses only gelatin will also attack casein, and similarly for the "casein" enzyme. Also the "gelatin" enzyme can be activated towards casein by addition of those NH2-acids missing from casein, but present in gelatin. A similar condition holds for the "casein" enzyme. The mechanism of bacterial enzyme formation is discussed. J. N. A.

Effect of certain bacterial toxins on some respiratory mechanisms of animal tissues. W. R. WOOLDRIGE and C. HIGGINBOTTOM (Biochem. J., 1938, 32, 1718—1728).— α -Toxin of *Cl. welchii* inhibits aërobic oxidation of succinate in animal tissues, the inhibition being reduced by substances neutralising the toxin, *e.g.*, antisera or by heating at 80° for 15 min. The effect is sp., not being observed with toxins of *Cl. adematiens*, *septique*, or *tetani*, and is probably due to an action on some unidentified, intermediate catalyst carrier. H. G. R.

Diphtheria toxin. II. Action of keten and formaldehyde. A. M. PAPPENHEIMER, jun. (J. Biol. Chem., 1938, 125, 201–208; cf. A., 1937, III, 434).—Diphtheria toxin contains histidine 2·3, arginine 3·8, and lysine 5·3%. Detoxication occurs with a low concn. of formaldehyde in alkaline solution or by brief acetylation with keten, a similar reduction in amino-N occurring in either case. Prolonged treatment with keten acetylates the OH-groups of the tyrosine mol. and destroys its ability to flocculate with antitoxin. The possible effect on tissue enzyme systems is suggested as a cause of the toxicity.

P. G. M.

Abnormal flocculation reactions with diphtheria toxoid. M. BARR and A. T. GLENNY (J. Path. Bact., 1938, 47, 27–33).—Slowly flocculating diphtheria antitoxins of serum ratios (*in vivo* val./*in vitro* val.) of 3.14 and 5.06 were encountered. By pptn. with $(NH_4)_2SO_4$, a fraction with a serum ratio of 18.9 was prepared. When certain slowly flocculating high-ratio sera were mixed with formol toxoid, more of the antitoxin entered into the flocculation reaction than when mixtures were made with unmodified toxin. Thus the antitoxic val. obtained by flocculation with toxoid may be from 5 to over 30% higher than with toxin. C. J. C. B.

Activity of nicotinic acid derivatives as essential growth-factors for the dysentery bacillus. A. DORFMAN, S. A. KOSER, and F. SAUNDERS (J. Amer. Chem. Soc., 1938, **60**, 2004—2005).—The following had growth-promoting activity for bacteria of the dysentery group in a synthetic medium at concns. of 10^{-7} — 10^{-4} M.: nicotinic acid and its amide and methyl and ethyl esters, trigonelline amide, nicotinuric acid, ethyl nicotinoacetate, nicotinic acid N-methylamide, nicotinonitrile. Picolinic and quinolinic acids (possibly containing nicotinic acid) were active. Pyridine-2-sulphonic, 6-methylnicotinic, nipecotic, and *iso*nicotinic acid, trigonelline, 3-acetylpyridine, β -pieoline, and pyridine were inactive. R. S. C.

Effects of the X factor, of sodium chloride, and of the composition of the nutrient medium on growth of the fowl coryza bacillus *Hæmophilus* gallinarum. J. P. DELAPLANE, L. E. ERWIN and H. O. STUART (J. Agric. Res., 1938, 56, 919—926).— The Rhode Island strain of the bacillus failed to grow in media containing yeast unless the X factor was added, e.g., in autoclaved blood extract. The factor is less conc. in blood-serum of horse, cow, sheep, etc. than in that of chicken and turkey. Boiling the serum lowered but did not entirely destroy its potency. NaCl is an important factor in the growth of the organism. A. G. P.

Optical properties of fermentation lactic acids. VII. Effect of the form of nitrogen [in the medium] on optical properties. H. KATA-GIRI and K. KITAHARA (J. Agric. Chem. Soc. Japan, 1938, 14, 1072—1074; cf. A. 1938, III, 759).—When *Lactobacillus sake* and *L. casei* are grown on solutions of glucose in koji extract, bouillon, or fresh yeast extract, large amounts of *d*-lactic acid are produced, whilst the *dl*-acid is always obtained when glucose in autolysed yeast extract is used. Racemisation of lactic acid does not occur even when cells cultivated on koji extract are grown on a solution of Na *d*-lactate in autolysed yeast extract. J. N. A.

Influence of glucose on injection-malaria. W. DE PAY (Klin. Woch., 1938, 17, 703-706).-Intravenous injection of 100-300 c.c. of 30% glucose inhibits the development of therapeutic malaria even after injection of a virulent strain and cuts short an attack of malaria in 90% of cases. Oral administration of sugar has no effect. Injection of an 8.8%saline solution also aborts the attack. E. M. J.

Bacterial infection in presence of various sugars. V. CIANOI (Boll. Soc. ital. Biol. sperim., 1938, 13, 130—131).—Injection of B. paratyphosus-B in aq. glucose suspension proves less lethal in rabbits than does that of the same dose of bacilli in aq. arabinose suspension. This is due to the more rapid assimilation of glucose and consequent lower multiplication in vivo of the bacilli, a phenomenon related to

the lower operation risk of diabetics when treated with insulin. F. O. H.

Effect of a stimulating dose of pertussis vaccine on children previously immunised. J. P. WU and F. CHU (Proc. Soc. Exp. Biol. Med., 1938, 38, 693—695).—If children are given a course of 3 injections of vaccine the agglutinins so developed decline after about 4 weeks. A dose of vaccine at this time causes a very much larger output of agglutinins than was caused by the original dose. V. J. W.

Influence of keten on the potency of antipneumococcus serum. J. T. TAMURA and M. J. BOYD (Proc. Soc. Exp. Biol. Med., 1938, 38, 909— 911).—Serum through which keten had been bubbled for 35 min. was rather more effective in protecting mice against pneumococcal infection than untreated serum. V. J. W.

Nucleic acid and nucleoprotein from pneumococci. R. H. S. THOMPSON and R. J. DUBOS (J. Biol. Chem., 1938, 125, 65-74; cf. A., 1938, III, 700).—Pneumococci kept in acetate buffer for 12-24 hr. at $p_{\rm H}$ 4.2 and 37° and then suspended at $p_{\rm H}$ 7 in 0.4% aq. NaCl do not disintegrate. The solution, after removal of the cells, yields a ribonucleoprotein (N 14-15, P 3.79-4.4%) when adjusted to $p_{\rm H}$ 4.2, and, subsequently, a nucleic acid (N 13.04-13.92, P 7.26-7.78%) when adjusted to $p_{\rm H}$ 2.5. The nucleoprotein and nucleic acid each constitute (usually) approx. 2-5% of the wt. of the cells but when the yield of nucleoprotein is low that of nucleic acid is high. The protein of the nucleoprotein, which does not coagulate on heating and has relatively low mol. wt., probably belongs to the protamine or histone group. W. McC.

Ultra-violet absorption spectra of fractions from pneumococci. G. I. LAVIN, R. H. S. THOMP-SON, and R. J. DUBOS (J. Biol. Chem., 1938, 125, 75—78).—Filtered solutions in which pneumococci have become Gram-negative contain substances having a broad, diffuse band at 2500-2700 A., but filtrates from suspensions in which the cells remain Gram-positive show no absorption in this zone. The absorption curve for the nucleoprotein has a max. at 2600 A. Max. at this λ also appear on the curves for yeast-nucleic acid and for the nucleic acid of pneumococcus. The nucleoprotein does not exhibit absorption bands in the region in which aromatic amino-acids (tryptophan, tyrosine) exhibit them.

W. McC.

Serum treatment of pneumonia in children. R. L. NEMIR (J. Pediat., 1938, **13**, 219–235).—151 infants with pneumonia treated during 1932—1936 with anti-pneumonia serum were compared with 253 untreated controls. Type 1 was the predominating organism in children over 2 years and type 14 below this age. The mortality rate was low in both groups and showed no reduction in the serum-treated group, but the incidence of empyema in types 1, 14, and 5 receiving serum early in the disease was reduced. A dramatic precipitation of the crisis was observed in the majority of patients receiving serum, within 12—18 hr. after the first treatment. C. J. C. B.

XIX (v) A., III.—MICROBIOLOGICAL AND IMMUNOLOGICAL CHEMISTRY.

Contagious hovine pleuro-pneumonia: use of new antigens for complement-fixation and agglutination tests. A. D. CAMPBELL (J. Counc. Sci. Ind. Res. Australia, 1938, 11, 112—118).—Preps. of antigens for diagnosis and for the agglutination test are described. The agglutination test is much less sensitive than the complement-fixation test even during the clinical phase and is negative in chronic cases. A. G. P.

Immunological properties of a sonic extract of pneumococci. L. A. CHAMBERS and A. J. WEIL (Proc. Soc. Exp. Biol. Med., 1938, 38, 924—927).— Pneumococci were disintegrated by exposure to vibrations of 9000 per sec. for 60—75 min. The opalescent solution obtained by centrifuging gave the infiltration reaction when injected intradermally into rabbits, and gave type-sp. pptn. with antisera, but caused no antibody formation. V. J. W.

Negative effect of colloidal carriers on enhancement of antigenic and sensitising properties of polysaccharides. S. C. WONG and T. T'UNG (Proc. Soc. Exp. Biol. Med., 1938, 38, 668— 669).—Adsorption of polysaccharides of *B. rhinoscleromatis* to various colloidal carriers did not increase their antigenic or sensitising power in rabbits and guineapigs. V. J. W.

Preparation of a staphylococcus toxin and anatoxin in a medium of known composition. G. RAMON, A. BOIVIN, and R. RICHOU (Compt. rend., 1938, 207, 466—468; cf. A., 1936, 898; 1937, III, 275, 317).—Staphylococcus is grown on a hydrolysate (prep. described) of gelatin to which tyrosine, cystine, tryptophan, KH_2PO_4 , Na_3 citrate, $MgSO_4$, nicotinic acid, and vitamin- B_1 are added. The toxin is produced in the absence of a peptone, but a good yield of bacteria is not necessarily accompanied by the formation of much toxin. Incubation of the toxin with a little formaldehyde until the toxin is not longer in evidence gives rise to an antigen with a loss not exceeding 30%. J. L. D.

Control of types of organisms in high-temperature starters. D. NUSBAUM and W. V. PRICE (J. Dairy Sci., 1938, 21, 152—153).—The difficulty of carrying pure cultures of *S. thermophilus* and *L. bulgaricus* by the usual 5% inoculation and 30-hr. incubation at 37° can be simplified by using lighter inoculations and shorter incubation periods. While the former method favours rods at the expense of the cocci, the latter method changes the culture almost to one of pure cocci. W. L. D.

Factors affecting resistance of animals to mastitis. L. A. BURKEY, E. B. MEIGS, G. P. SANDERS, and M. ROGOSA (J. Dairy Sci., 1938, 21, 124—125).—A large leucocyte content in milk indicates injury to the udder but not necessarily the presence of infection. The germicidal property of milk varies with the cow and the udder quarter and increases with the severity of disease and with increased leucocyte content until acute mastitis is reached. Bovine blood serum contains a factor inhibitory to the growth of *S. mastiditis* ineffective after 4—5 days and when added to milk from a cow other than the one providing the serum. This power of serum decreases rapidly with increasing mastitis symptoms. The combined action of milk and of serum produces a greater retardation of growth of *S. mastiditis in vitro* than each separately. Injury to the udder resulting in the entry of more Cl' into milk may increase the flow of blood serum into the udder. W. L. D.

Nutritional requirements of hæmolytic streptococci. I. Effect of various substances isolated from liver extract. L. RANE and Y. SUBAR-ROW (Proc. Soc. Exp. Biol. Med., 1938, 38, 837— 839).—A culture medium which contains glutathione, thiochrome, flavin, nicotinic acid, betaine, glucosamine, and a Ca-alcoholic ppt. of liver extract is more favourable to the growth of Dochez NY 5 strain of streptococci than one which lacks any one of these substances. V. J. W.

Therapeutic value of various chemical elements in rabbit syphilis. F. JAHNEL (Z. Immunitätsforsch., 1938, 93, 184—196).—Rb, Cs, Be, Mg, Yt, Si, Zr, Hf, P, S, F, B, Br, Rh, and Er had no healing effect in experimental rabbit syphilis.

Ide reaction. Colour reaction for syphilis. S. IDE and T. IDE (Klin. Woch., 1936, 15, 973—975; Chem. Zentr., 1936, ii, 1396).—A colour reaction equiv. to the Wassermann reaction but simpler to carry out has been worked out. It is also applicable to serum, cerebrospinal fluid, and the content of blisters.

L. S. T.

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Framework substance of tubercle bacilli. M UMEZU and T. WAGNER-JAUREGG (Biochem. Z., 1938, 298, 115-124).-Fresh human tubercle bacilli extracted according to Bloch's procedure (A., 1937, III, 36) yield phosphatides, polysaccharides, an un-saponifiable wax, m.p. 57-58°, and a wax which gives phthiocerol on alkaline hydrolysis. The material remaining after extraction contains Mg, NH_4 salts, $PO_4^{\prime\prime\prime}$, and lipins including a wax, m.p. approx. 200°. After this material has been digested successively with water, aq. NaOH, and 0.5N-HCl and washed with alcohol and ether there remains a residue which gives a wax, m.p. 50°, and a substance yielding a Ba salt when boiled for 8 hr. with N-H_SO4. If, however, the residue is boiled instead with 5% aq. NaOH and the product is treated with Ba(OH)₂, carbohydrate, hexonic acid, and amino-acid fractions are obtained. The carbohydrate fraction contains d-arabinose, mannonic acid, and tyrosine. W. McC.

Rôle of centrifuging in the search for tubercle bacilli by homogenising processes. P. E. DAVY and J. C. LEVADITI (Ann. Inst. Pasteur, 1938, 61, 300—312).—The relation between rate and duration of centrifuging of homogenised tuberculous sputum and the concn. of tubercle bacilli in the deposit was determined. Centrifuging for 1 hr. at 5000 r.p.m. gave max. concn. Homogenisation by NaOH (method of Bezançon and Philibert) was preferable to that by antiformin. A greater no. of tubercle bacilli and a higher % of positive results were obtained by this method than by prolonged and repeated observations on untreated sputum. G. P. G.

Chemistry of the lipins of tubercle bacilli. III. Phosphatide of the human tubercle bacillus.

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F. J. ANDERSON, W. C. LOTHROP, and M. M. CREIGH-TON (J. Biol. Chem., 1938, **125**, 299–308).—The phosphatide of the human tubercle bacillus contains (1) a mannose-glyceroldiphosphoric acid giving a water-insol. Pb salt, and (2) a glycoside, manninositosephosphoric acid, not pptd. by Pb acetate, giving H_3PO_4 and manninositose on heating to 170° with NH_3 . Hydrolysis of manninositose with dil. H_2SO_4 yields mannose and inositol in the approx. ratio 2:1 and it is hence a triglycoside. T. F. D.

Arresting the slow growth of Proteus (P. vulgaris, Hauser) on solid differential media for the stomach typhoid group. I. E. MINKE-VITSCH and D. J. RABINOVITSCH (J. Microbiol. Epidemiol. Immunobiol. U.S.S.R., 1935, 14, 240— 246).—Growth of P. vulgaris on Endo's medium was arrested in nearly all cases by 0.8% of chloral hydrate, and on Padlevsky's medium by bile-lactose-malachite-green-Na₂SO₃. Typhoid and paratyphoid organisms were unaffected by any media examined except Endo's nutrient with 3% bile which restricted growth of dysentery bacilli. CH. ABS. (p)

Use of Endo's nutrient with trypaflavine for isolation of typhoid-paratyphoid bacilli. I. MINKEVITSCH and D. J. RABINOVITSCH (J. Microbiol. Epidemiol. Immunobiol. U.S.S.R., 1935, 14, 390— 394).—Addition of trypaflavine (1:40,000) to Endo's medium arrests growth of *Proteus* in most cases and strongly inhibits growth of *E. coli* and *Alcaligenes facalis* without affecting typhoid-paratyphoid organisms. CH. ABS. (p)

Effect of photosensitisation on immunological and chemical properties of antibodies. S. H. ZIA, B. F. CHOW, and T. T'UNG (Proc. Soc. Exp. Biol. Med., 1938, **38**, 688—690).—Antisera for *B. typhosus*, pneumococcus, and diphtheria were exposed to light for 2 hr. in the presence of 1% eosin. Their immunological activities were reduced from 4 to 10 times but the chemical properties of the serumproteins were very little altered, the main change being that pptn. of antibody began at 20% (NH₄)₂SO₄ instead of at 38%. V. J. W.

Protective action of typhoid phage on experimental typhoid infection in mice. R. T. FISK (Proc. Soc. Exp. Biol. Med., 1938, 38, 659-660).---Mice infected with 1000-100,000 fatal doses of *E. typhi* recovered when bacteriophage was administered intravenously up to 4 hr. after infection. V. J. W.

Growth-stimulating effect of bacteriophage. H. W. CROWE and H. COKE (J. Path. Bact., 1938, 47, 157-160).—Evidence is produced suggesting that a powerful and extremely sp. bacteriophage for *Str. zymogenes* can enhance the growth of that organism before lysing it. C. J. C. B.

Morphological study of the virus of lymphogranuloma inguinale (climatic bubo). G. M. FINDLAY, R. D. MACKENZIE, and F. O. MACCALLUM (Trans. Roy. Soc. trop. Med. Hyg., 1938, 32, 183— 188).—Large and small forms of the virus of lymphogranuloma inguinale are described and figured. The small are probably derived from the large bodies and a developmental cycle occurs. The presence

of a majority of large forms may interfere with the successful filtration of the virus. C. J. C. B.

Phenol-sodium chloride solutions for preserving the fixed virus of rabies. G. OLAH (Z. Immunitätsforsch., 1938, 93, 44—56).—Brains of rabbits infected with rabies were emulsified with pure glycerol, aq. phenol-NaCl-glycerol, and aq. phenol-NaCl. After storage for various times and at various temp. the virulence was highest in 1 : 1 phenol-NaCl emulsions and lowest in pure glycerol emulsions. G. W.

Disintegration of tobacco mosaic virus preparations with sodium dodecyl sulphate. M. SREENIVASAYA and N. W. PIRIE (Biochem. J., 1938, 32, 1707-1710).-The rate of action of Na dodecyl sulphate increases with concn. of the reagent, temp., and $p_{\rm H}$. The latter must be greater than 7.0, and preferably 8.0. During disruption of the virus, the intensity of anisotropy of flow of the solution falls off rapidly and finally disappears, and the products are nucleic acid and a protein which is too large to pass through Cellophane but too small to sediment in a few hr. in a centrifugal field 17,000g. The protein, which shows max, absorption at 275-280 mµ. and general absorption below 250 mµ., is unstable and pptn. several times with (NH4)2SO4 converts it partly into an insol. protein, and partly into a protein which is easily pptd. by $(NH_4)_2SO_4$. The insol. protein is readily hydrolysed by trypsin, but the original protein is resistant towards this enzyme. J. N. A.

Purification of the tobacco mosaic virus. V. L. RISCHKOV and E. P. GROMIKO (Compt. rend. Acad. Sci. U.R.S.S., 1938, **19**, 203—205).—The method is based on adsorption of the virus by benzoic acid which is pptd. in the prepared plant extract. The ppt. is dissolved in aq. Na₂HPO₄ and colouring matter is removed by activated C. The final crystallisation of the virus protein is effected by Stanley's method. A. G. P.

Physical properties of bushy stunt virus protein. A. S. McFARLANE and R. A. KEKWICK (Biochem. J., 1938, 32, 1607—1613).—The partial sp. vol., sedimentation const., mol. wt., electrophoretic mobility, isoelectric point, and sp. refraction increment of the cryst. nucleoprotein of bushy stunt disease of the tomato have been determined. There is no evidence of asymmetrical mol. shape. P. G. M.

New micro-organism producing panagglutination of human erythrocytes. N. Kossovitch and A. CHABAND (Compt. rend. Soc. Biol., 1938, 128, 851—853).—The organism is an immobile coccobacillus, Gram-negative, producing a greenish-yellow pigment and liquefying gelatin. A cell-free filtrate of the culture is also active, the activity being adsorbed on the red blood cells. Injected into laboratory animals it has no pathogenic properties. P. C. W.

Bactericidal activity of crotonaldehyde. R. L. INGERSOLL, R. E. VOLLRATH, B. SCOTT, and C. C. LINDEGREN (Food Res., 1938, 3, 389-392; cf. A., 1937, 111, 277).—The bactericidal effect of onions and garlic is similar to that of approx. 1% aq. acraldehyde or crotonaldehyde. Since the characteristic sulphides present in these tissues are bland, it is suggested that the irritating effect of the vapour of an onion is due to acraldehyde, whilst the pungent taste of garlic is due to crotonaldehyde. These vapours give the test for unsaturated aldehydes with piperidine and Na nitroprusside. E. C. S.

Comparison of metal and glass Petri dish covers. H. JENKINS (J. Dairy Sci., 1938, 21, 171).— Al covers were preferred owing to lightness, resistance to corrosion and discoloration, permanency, and low cost. The covers had no effect on plate counts as compared with glass. W. L. D.

Delayed sedimentation in antihæmocyanin systems. S. B. HOOKER (Proc. Soc. Exp. Biol. Med., 1938, **38**, 911—914).—When hæmocyanins of *Limulus* or *Fulgur* were mixed with their antisera sedimentation generally occurred throughout the whole vol. simultaneously, but at certain dilutions sedimentation began at the top and spread down with a sharp margin, the whole process being greatly prolonged as compared with the usual duration.

V. J. W.

Flocculation of therapeutic sera in buffer solution. A. BOUTARIC and M. ROY (Ann. Inst. Pasteur, 1938, 61, 319—324; cf. A., 1938, III, 782).— When sera were diluted with 0.0006M-PO₄^{'''} buffer at $p_{\rm H}$ 5.3, flocculation was observed similar to that occurring in distilled water. The product of the max. density of flocculation, as determined by spectrophotometer in monochromatic light, and the degree of dilution is const. for any one dilution and increases progressively up to a limit with the degree of dilution. Considerable differences in density of flocculation were found between antisera against 12 different organisms or toxins. Such differences did not depend on differences in physical or optical density or η . G. P. G.

Ultracentrifuging of immune bodies and normal bactericidal substances. A. GRATIA and L. GORECZKY (Z. Immunitätsforsch., 1938, 93, 18— 26).—Rabbit antiserum and normal serum were sedimented with the Gratia ultracentrifuge. In rabbit antiserum the hæmolysins increased in the lowest part of the sediment. Agglutinins showed little differences in the different layers. The content of α - and β -lysins in normal serum diminished after initial increase in the middle layer, probably due to destruction by pressure. γ -Lysins were not affected. G. W.

Photometric investigations on bacteria agglutination. L. HÄNTSCH (Z. Immunitätsforsch., 1938, 93, 154—169).—Agglutination of various types of bacteria was investigated with the Zeiss nephelometer. The resulting curves are typical and permit exact determination of the immune titre. G. W.

Group-specific substances in human salivary glands. K. TASIRO (Z. Immunitätsforsch., 1938, 93, 110—118).—The iso-hæmagglutination of A, B, and AB groups is inhibited specifically by aq. extracts of the salivary glands. The sublingual contains the highest, and the parotid the lowest, amount of antiagglutinin. The mucin is probably the carrier of the anti-agglutinin. G. W.

Stabilising oversensitive complement. L. FLECK (Z. Immunitätsforsch., 1938, 93, 71-79).--

Complements that are oversensitive to alcoholic antigens as used in the Wassermann reaction may be selectively stabilised by adding inactivated human serum, ascitic fluid, or neutral broth to the antigencomplement system. Active human serum, glucose, and peptone solutions are not effective. G. W.

(w) PLANT PHYSIOLOGY.

Necrosis in vegetable protoplasm. H. BAL-BACH (Protoplasma, 1937, 29, 228—245).—When necrosis was produced by treatment with various acids four different zones were distinguishable between the dead and the living tissue. A zone of vacuoles was observed next to the living tissue, and these disappeared and reappeared rhythmically as the necrosis proceeded. M. A. B.

Electric impedance of Nitella during activity. K. S. COLE and H. J. CURTIS (J. Gen. Physiol., 1938, 22, 37-64).-The changes in the a.c. impedance during activity of Nitella cells were measured with current flow normal to the cell axis, at 8 frequencies from 0.005 to 20 kc. per sec., and with simultaneous records of the action potential under the impedance electrodes. At each frequency, the resting cell was balanced in a Wheatstone bridge with a cathode-ray oscillograph, and after electrical stimulation at one end of the cell, the changes in the complex impedance were determined from the bridge unbalance. The normal membrane capacity of 0.9 µF. per sq. cm. decreases about 15% without change of phase angle, whilst the membrane resistance decreases from 10⁵ to about 500 Ω . per sq. cm. during the passage of the excitation wave. This membrane change occurs during the latter part of the rising phase of the action potential, and the membrane e.m.f. remains unchanged until nearly the same time. The part of the action potential preceding these membrane changes is probably a passive fall of potential ahead of a partial D. M. N. short-circuit.

Nature of the action current in Nitella. IV. Production of quick action currents by exposure to sodium chloride. S. E. HILL and W. J. V. OSTERHOUT (J. Gen. Physiol., 1938, 22, 91–106).— Treatment of Nitella with NaCl greatly reduces the time required for the action current and produces an action curve with one peak instead of two. This might be expected if the treatment increased the conductivity of the aq. part of the protoplasm. This effect is prevented by Ca. That penetration is an important factor is indicated by the fact that salts expected to penetrate rapidly have the most effect. Thus NaCNS is more effective than NaCl, but Na₂SO₄ has little effect. The action of NH₄Cl and LiCl is similar to that of NaCl. D. M. N.

Delayed potassium effect in Nitella. S. E. HILL and W. J. V. OSTERHOUT (J. Gen. Physiol., 1938, 22, 107—113).—In normal Nitella cells, replacement of NaCl by KCl makes the p.d. much less positive. Cells may lose this response to K as the result of soaking in distilled water or at certain seasons, but under these conditions delayed K effect is sometimes seen. This delay may be due to the time required for K to combine with an org. substance, forming a compound which sensitises the protoplasmic surface to the action of K. D. M. N.

Pacemakers in Nitella. II. Arrhythmia and block. W. J. V. OSTERHOUT and S. E. HILL (J. Gen. Physiol., 1938, 22, 115—130).—Many forms of irregular rhythm and of partial block occurring in the vertebrate heart can be duplicated in Nitella. In order to observe these phenomena, the cells are kept for 6 weeks in a nutrient solution. They are then exposed for 3 hr. to 0.01M-NaCl, -NaSCN, or -guanidine hydrochloride, which reduces the time required for the action current to about 1 sec. A pacemaker is established at one end of the cell by placing it in contact with 0.01M-KCl. Action currents at the rate of about 1 per sec. are produced, but some parts of the cell are unable to follow this rapid pace and fall into irregular rhythms and fail to register all impulses.

Ď. M. N.

Water intake by discs of potato tuber tissue. D. E. REINDERS (Proc. K. Akad. Wetensch. Amsterdam, 1938, 41, 820—831).—The increase in wt. of potato discs when placed in water is due only to intake of water. The intake increases with temp., but ceases in the absence of O_2 . Heteroauxin accelerates both respiration and water intake. A. G. P.

Embryo abortion in peach in relation to chemical composition and season of fruit ripening. H. B. TUKEY and F. A. LEE (Bot. Gaz., 1937, 98, 586-597).—Embryos of early-ripening varieties were abortive and contained less fat, N, reducing sugars, and sucrose, but more water, than normal embryos of late-ripening varieties. A. G. P.

Vernalisation of excised embryos. F. G. GREGORY and R. S. DE ROPP (Nature, 1938, 142, 481—482; cf. A., 1936, 1431).—Photographs reproduced of rye plants obtained from embryos excised from seeds and grown after keeping at 1° on nutrient agar, with and without the addition of 3% sucrose, show that in absence of carbohydrate during the lowtemp. exposure almost complete failure of vernalisation results. L. S. T.

Contact effects between plant roots and soil colloids. H. JENNY and R. OVERSTREET (Proc. Nat. Acad. Sci., 1938, 24, 384—392).—Experimental evidence supports the conception of a direct ion exchange between soil colloids and roots in contact with them. The intake of ions by plants is a reversible process. A. G. P.

Influence of hydrogen-ion concentration on growth rate of the Avena coleoptile. A. M. A. VAN SANTEN (Proc. K. Akad. Wetensch. Amsterdam, 1938, 41, 513—523).—The growth- $p_{\rm H}$ curve of excised Avena coleoptiles in PO₄^{''} buffer solutions coincides in part with the dissociation curve of auxin. The latter is active only in the form of the undissociated acid. Effects of $p_{\rm H}$ and of auxin on growth of the coleoptile are additive. A. G. P.

Critical periods in the mineral nutrition of plants. L. G. DOBROUNOV (Compt. rend. Acad. Sci. U.R.S.S., 1938, 19, 215-218).—A résumé of recent work. A. G. P.

Condition of protoplasm in nutrient-deficient plants. Z. KALCHHOFER (Protoplasma, 1936, 26, 249—281).—In *Elodea canadensis* in water culture, growth was arrested in 3—4 weeks in the absence of N, Ca, or P. Absence of K increased elongation. Characteristic changes in the protoplasts were produced. Starch content was reduced slightly by K-deficiency and greatly by N-, Ca-, or P-deficiency. Osmotic pressure was increased in Ca-deficiency. Vital staining gave different colours characteristic of N-, Ca-, P-, or K-deficiency. Type and rate of plasmolysis of cells by KCl, CaCl₂, or urea and sensitivity to alcohol, acids, and heat varied with the nutrient omitted. Ca- and N-deficiency caused bleaching in certain plants. M. A. B.

Potassium deficiency and enzyme content [of plants]. G. DE V. DAVIS (J. Austral. Inst. Agric. Sci., 1938, 4, 104—105).—Recent work is considered in relation to observations in Queensland. A. G. P.

Influence of mineral nutrition on anthocyanin formation in young barley plants G. GASSNER and W. STRAIB (Angew. Bot., 1937, 19, 225-245).--Deficiency of N favours production of anthocyanins, the amount formed being progressively lowered as the supply of N is increased. The action of N is independent of that of P supplied simultaneously, and within wide limits is unaffected by the K supply. With pronounced K deficiency the repressive action of N is more marked than when the supply of K is adequate. With normal N supply K deficiency diminishes anthocyanin formation but no effect is apparent if the N supply is also small. Increased [CO₂] in the air surrounding plants favours the production of anthocyanin, which is probably dependent on the balance between the amount of carbohydrate formed in the leaves and the rate of protein A. G. P. synthesis.

Relation of nutrition of tomato to disposition to infectivity and virulence of Fusarium lycopersici. W. S. COOK (Bot. Gaz., 1937, 98, 647— 669).—In plants grown with deficiency of NO_3' , resistant and susceptible varieties showed high frequency of infection (recovery of fungus from stem bases) but low frequency of external symptoms. With high N supplies symptoms and infection were frequent in nearly all cases. A. G. P.

Application of the petiole injection method for diagnosis of mineral deficiency to a eucalypt. J. HEARMAN (Australian Forestry, 1937, 2, No. 2, 23— 24).—Distribution of a dye solution injected into a petiole stump is described. A. G. P.

Micro-elements in culture solutions for higher plants. D. I. ARNON (Amer. J. Bot., 1938, 25, 322— 325).—Addition of a mixture of B, Mn, Cu, and Zn salts to culture media improved the growth of lettuce and asparagus. A mixture of Mo, V, Ti, W, Cr, Ni, and Co salts was even more beneficial. A. G. P.

Potassium and calcium in relation to nitrogen metabolism [in plants]. G. T. NIGHTINGALE (Bot. Gaz., 1937, 98, 724—734).—A résumé. A. G. P.

Influence of mineral manuring on properties and nitrogen economy of barley. W. PRÖPSTING

(Angew. Bot., 1936, 18, 408-450).-Excess or deficiency in the N supply of barley diminished the grain yield and increased the sol. N fraction in the grain. N deficiency also increased the residual N fraction whereas excess of N raised the amide-N content. The sizes of the aleurone cells and starch grains were inversely related to the level of N supply. Grain yields increased with the supply of K. Deficiency of K restricted the intake of N by the plants and increased the proportion of total and sol. N in the grain. Increasing supplies of K corresponded with increase in the protein-/total N ratio, and with larger aleurone cells and starch grains. Response to CaO differed with variety but excessive liming was unfavourable in all cases. The general effects of Ca on growth and N distribution in the grain were opposite to those of K. The action of Mg resembled but was less intense than that of Ca. A. G. P.

Seasonal cycles of ash, carbohydrate, and nitrogenous constituents in terminal shoots of apple trees : effects of five vegetatively propagated rootstocks on them. I. Total ash and ash constituents. V. G. VAIDYA (J. Pomology, 1938, 16, 101-126).-The ash Ca, Mg, K, P, Na, Fe, Al, Mn, and SiO₂ contents of wood, bark, and leaves of shoots collected at intervals over 1 year are recorded. Seasonal variations in the principal ash constituents of all three parts of the shoots, together with an autumn migration of dry matter and ash (notably P and K) from leaves, are demonstrated. The nature of the rootstock influences the ash composition of the shoots and, to some extent, the period of the seasonal variations. A. G. P.

Relation of ear survival to nitrogen content of certain varieties of barley. H. HUNTER. Statistical study. H. O. HARTLEY (J. Agric. Sci., 1938, 28, 472—502).—Early application of NaNO₃ to barley increased yields without lowering the quality of the grain. Late applications increased the N content of the grain without affecting the yield. Yield increases due to N manuring arose by increase in the no. of surviving tillers rather than by increase in grain per ear. Removal of tillers resulted in increased N contents and 1000-grain wts. in the grain of the main stem. High 1000-grain wt. may coincide with high or low total N content. A. G. P.

Excretion from leguminous root nodules. G. BOND (Nature, 1938, 142, 539).—Further experiments (A., 1938, III, 356) with soya bean, pea, and broad bean grown in sand cultures failed to confirm appreciable excretion of N substances from the root nodules. L. S. T.

Diffusion of nitrogenous compounds from healthy legume nodules or roots. C. A. LUDWIG and F. E. ALLISON (Bot. Gaz., 1937, 98, 680-695).--Inoculated legumes when grown in mixed sand cultures with non-legumes failed to furnish any N to the non-legumes and usually showed poorer growth and N intake. No sol. N appeared in the medium. A. G. P.

Absorption and transport of asparagine in leaves of Vallisneria. W. H. ARISZ and J. OUDMAN (Proc. K. Akad. Wetensch. Amsterdam, 1938, 41, 810—819).—Absorption of asparagine takes place more actively from dil. than from more conc. solutions, and is accelerated by evaporation of moisture from the free surface of the leaf. Absence of O_2 restricts the intake of asparagine by leaves placed in solutions or in agar media; the intake of caffeine is unaffected. Absorption of asparagine probably depends on respiratory processes whereas that of caffeine occurs even in anaërobiosis. A. G. P.

Physiology of the nitrogen-fixing alga, Nostoc muscorum. F. E. ALLISON, S. R. HOOVER, and H. J. MORRIS (Bot. Gaz., 1937, 98, 433—463).— N. muscorum, isolated from soil, is able to obtain both N and C from the air. When the alga is grown in darkness on a glucose medium chlorophyll is formed and N fixation proceeds slowly. A mineral salt- K_2HPO_4 buffer medium free from CO₃" and sugar is satisfactory for unaërated culture, but growth is accelerated by aëration, especially with air containing 1% of CO₂, by addition of sugar, and by NO₃', NH₄', or asparagine. Ca and Sr are not necessary for growth but are essential for N fixation. Natural humic acid increases both growth and N fixation probably by reason of its Fe content. A. G. P.

Nutritional levels in the peanut plant. R. H. MOORE (Bot. Gaz., 1937, 98, 464—490).—Nutritional conditions favourable to vegetative growth of peanut plants are also those favouring fruitfulness. Both high-N and high-carbohydrate plants were weak and unproductive. High-N plants had low dry matter and carbohydrate and high sol. solid contents. The proportions were reversed in high-carbohydrate plants. Effects of varying levels of N supply on the structural development of gynophores were examined.

A. G. P.

Ripening process in Bosc pears. W. E. MARTIN (Bot. Gaz., 1937, 99, 42—68).—The fructose content of pears increases steadily through the ripening period; sucrose increases for 6—8 days and then diminishes : glucose remains at a const. level during the formation of sucrose but later increases as sucrose disappears. The pears contain sorbitol in amounts which diminish as ripening advances. The sucrose content of earlypicked remained lower than that of late-picked pears throughout ripening. A. G. P.

Rubber accumulation in kok-saghyz as a function of its maturing process. A. A. NICHI-POROVITSCH and V. N. BOUROVAJA (Compt. rend. Acad. Sci. U.R.S.S., 1938, **19**, 311—314).—During the early vegetative growth of the plants N assimilation and protein synthesis are rapid and carbohydrate accumulation is small. As plants mature protein synthesis slackens and carbohydrates and nonprotein-N accumulate. The subsequently accelerated root growth is accompanied by translocation of carbohydrates and protein decomp. products from leaves to roots, and the rapid formation of rubber. The bearing of these observations on the best period of collecting is discussed. A. G. P.

Influence of certain environmental conditions on congestion of starch in tomato plant stems. A. C. FOSTER and E. C. TATMAN (J. Agric. Res., 1938, 56, 869-881).—Starch accumulation in the stems is associated with deficiency of N rather than of K. In plants grown in unmanured soils decrease in temp. favours increased starch content of stems. Manurial treatment and the water content of the soil may also be influential factors. A. G. P.

Action of alcohol on living plant cells. W. MÜLLER (Protoplasma, 1936, 26, 204—236).—Treatment with alcohol or alcohol-pyridine increases the η of the protoplasm and its resistance to NaOCI, and alters the type of plasmolysis. These changes are reversed by treatment with water, and are more pronounced when plasmolytic agents are added to the alcohol. Cell division and movement of chloroplasts are interrupted. The red colour of the anthocyanin disappears and the cell sap becomes blue. M. A. B.

Nature of substances inducing polyploidy in plants. A. SCHMUCK (Compt. rend. Acad. Sci. U.R.S.S., 1938, **19**, 189—192).—Treatment of wheat seeds with colohicine or acenaphthene induced formation of short rootlets and embryos of abnormal thickness. Fluorene and naphthalene had no effect. The ability of chemical substances to cause polyploidy in plants is related to the presence of a 5-C with 6-C ring systems in the mol. and is comparable with the activity of similarly constructed mols. of sex hormones and carcinogenic hydrocarbons. A. G. P.

Effect of colchicine on microspore mother cells and microspores of *Tradescantia paludosa*. R. I. WALKER (Amer. J. Bot., 1938, 25, 280-285).—When placed in 0.05-0.20% aq. colchicine flowering stems of *T. paludosa* show suppression of the spindle mechanism in mother cells during meiotic division or inhibition of formation of cell walls after division. Diploid and tetraploid microspores are formed. A. G. P.

Effect of colchicine on mitosis in the roots of Allium cepa and Hyacinthus orientalis. G. MAN-GENOT (Compt. rend. Soc. Biol., 1938, **128**, 501— 504).—The action is confined to the splitting and orientation of the chromosomes since the prophase of the mitosis is not interfered with but the later phases are rapidly disorganised. P. C. W.

Anatomical and cytological study of the changes produced by a mixture of an organforming substance and colchicine. T. SOLACOLU, D. CONSTANTINESCO, and M. CONSTANTINESCO (Compt. rend., 1938, 207, 246-249; cf. A., 1938, III, 858).-Colchicine applied to the cut surface of decapitated shoots of *Vicia faba* produces no external changes in 30 days. The multiplication of the meristematic cells is completely inhibited. The nuclei are much enlarged, lobed, and granular. A paste of equal amounts (0.25-0.50%) of colchicine and β -indolylpropionic acid similarly applied causes a swelling over a zone of 10 mm. The zone (1-3 mm.) under the paste remains unchanged in form under the influence of colchicine. The cambial cells are markedly elongated and the nuclei acquire many lobes some of which break off to give multinucleate cells. The accessory nuclei show no mitotic division, are vacuolated, and contain enlarged nucleoli. The next zone (5-7 mm.) shows over-developed meristem with cells

containing normal nuclei which show mitotic division only in the early stages of proliferation. J. L. D.

Leaf-epinasty tests with volatile products from seedlings. F. E. DENNY (Contr. Boyce Thompson Inst., 1938, 9, 431-438).—Young seedlings of 19 species, growing in flasks which were closed for 2-4 days to permit accumulation of gases, formed volatile products which caused epinasty of potato leaves. The effective constituent (presumably ethylene) was not absorbed by water, 20% NaOH, or 87% H₂SO₄, but was absorbed by a Hg(NO₃)₂-HNO₃ reagent, from which combination it was released by HCl. With seven other species the volatile products of seedling growth in a single flask were incapable of inducing epinasty but this result was obtained if the air from several flasks was absorbed in a single sample of the Hg reagent and then released from it. With various species of the Cruciferæ, especially radish, the seedlings produced, in addition to the epinastyinducing product, another gas which killed the potato test-plants. This appeared to be a mustard oil released by hydrolysis of glucosides of the seeds during germination. Methods for separating these two gases and demonstrating their actions separately were found. AUTHOR.

Formation of β -(β -chloroethyl)-*d*-glucoside by gladiolus corms from absorbed ethylene chlorohydrin. L. P. MILLER (Contr. Boyce Thompson Inst., 1938, 9, 425—429).—The acetylation of purified preps. from gladiolus corms which had been treated with ethylene chlorohydrin gave cryst. β -(β -chloroethyl)-*d*-glucoside tetra-acetate. The β -glucoside formed by the tissue from the absorbed chlorohydrin is thus β -(β -chloroethyl)-*d*-glucoside. Plant tissue can thus form glucosides from introduced aglucones even if such aglucones are substances which do not normally occur in plants. Glucoside formation may thus serve as a detoxication mechanism in plants.

AUTHOR.

Combining treatments for disinfecting potato tubers with treatments for breaking dormancy. F. E. DENNY (Contr. Boyce Thompson Inst., 1938, 9, 397-402).—The germination of recently-harvested potato tubers, after disinfection with HgCl₂, yellow HgO, or formaldehyde, was hastened by treating the disinfected intact tubers with ethylene chlorohydrin vapour. Tubers previously disinfected with HgCl₂ or HgO were unsuitable for use with the chlorhydrin "dip" method (by which the tubers are cut into pieces before being treated), but pretreatment with formaldehyde gave good results. Soaking the cut tubers for 1 hr. in solutions of either 1% NaCNS or 2% thiourea hastened germination. AUTHOR.

Prolonging, then breaking, the rest period of gladiolus corms. F. E. DENNY (Contr. Boyce Thompson Inst., 1938, 9, 403-408).—Gladiolus corms were held in a dormant condition for 6 months or longer after harvest by storing the recentlyharvested corms in moist soil either at room temp., or preferably at 27°. Corms of which the dormancy had been maintained for 7 months in soil at room temp., when removed from the soil and treated with ethylene chlorohydrin vapour, germinated promptly and produced blooms before the untreated control corms showed any emergence of sprouts. AUTHOR.

Breaking the dormancy of seeds of Cratagus species. F. FLEMION (Contr. Boyce Thompson Inst., 1938, 9, 409-423) .--- Hawthorn embryos require an after-ripening period at low temp. before germin-ation can occur. There is a great range of dormancy among the various species. When planted in cold frames in autumn, seeds of C. cordata and C. coccinea germinate the first spring, whilst seeds of some of the other species such as C. flava, C. punctata, C. crusgalli, and C. rotundifolia germinate only after the second spring. This prolonged dormancy was caused by the hard outer coats. Periods at high temp. in a moist medium, treatments with conc. H2SO4 combined with a short period at high temp., or removal of the carpels overcame the seed coat effect. The subsequent period required at low temp. prior to germination was about the same as for seeds of C. cordata. Seeds of other species such as C. arnoldiana, C. carrerei, C. mollis, C. sanguinea, and C. tomentosa germinate after a period at low temp., but the % germination can be increased by a short pretreatment at high temp. Longer periods at high temp. or treatment with acid should be applied to seeds of C. oxyacantha prior to the period at low temp. Seedlings of all the Cratægus species investigated can be obtained on a large scale the first spring. AUTHOR.

Correlative effects of environmental factors on photoperiodism. K. C. HAMNER (Bot. Gaz., 1938, 99, 615-629).—A résumé. A. G. P.

Photosynthesis. W. M. MANNING (J. Physical Chem., 1938, 42, 815—854).—A review. Experimental methods and the effect of various factors on the efficiency of the photochemical process are summarised. Kinetic mechanisms suggested for this process are discussed. J. W. S.

Limiting factors in photosynthesis: light and carbon dioxide. E. L. SMITH (J. Gen. Physiol., 1938, 22, 21—35).—Measurements were made relating (a) photosynthesis and light intensity for a large range of $[CO_2]$ and (b) photosynthesis and $[CO_2]$ at different light intensities. From these families of curves, the limiting factor relationship can be secured for any val. of the photosynthetic rate. An equation was derived for describing these relationships between the intensity and $[CO_2]$ necessary to produce a definite amount of photosynthesis. The nature of the two equations suggests that a simple first-order reaction determines the velocity of the light process at low photosynthetic rates, but that at high rates the mechanism is complicated by another factor.

D. M. N.

Relation between fluorescence and assimilation [of carbon dioxide] in photosynthesising cells. E. C. WASSINK, D. VERMEULEN, G. H. REMAN, and E. KATZ (Enzymologia, 1938, 5, 100— 109; cf. Kautsky and Hormuth, A., 1937, III, 444).— The proportionality between intensity of chlorophyll fluorescence (in *Chlorella*) and the intensity of incident light is not affected by change of temp. $(14-30^{\circ})$, by partial inhibition of assimilation of CO₂ with KCN or ethylurethane, or by change in the composition of the gaseous phase (N_2, O_2, air) . W. McC.

Relation between chlorophyll fluorescence and photosynthesis in green plant cells. L. S. ORNSTEIN, E. C. WASSINK, G. H. REMAN, and D. VERMEULEN (Enzymologia, 1938, 5, 110—118).— Mathematical consideration of the relation shows that experimental results can be described by formulæ. It is concluded that chlorophyll is only active in absorbing light and transferring the energy of light to reacting mols. W. McC.

Responses of tomato plants to artificial illumination. J. W. MITCHELL (Bot. Gaz., 1937, 99, 412-419; cf. A., 1937, III, 235).—Plants illuminated by a C arc grew less in height but synthesised twice as much dry matter and 4 times as much acid-hydrolysable substance and sugars as did those receiving the same intensity of total radiant energy from an incandescence lamp. When the two light sources were balanced by means of a photronic cell, the gains in dry wt. and carbohydrate were more nearly equal although the arc-lit plants still produced shorter thicker stems. A. G. P.

Formaldehyde formation in the photo-oxidation of organic compounds and the formaldehyde theory of carbon assimilation.—See A., 1938, II, 430.

Effect of the anterior pituitary growth-hormone on germination. R. DAVID (Compt. rend. Soc. Biol., 1938, 128, 569—572).—The hormone inhibits root growth and the formation of lateral roots, but increases the formation of pigment in the hypocotyl of the mustard plant. H. G. R.

Change in polarity of germinating pea by indolylbutyric acid. R. CASTAN (Compt. rend. Soc. Biol., 1938, 128, 399-401).—If the acid is applied to the growing shoot of a 6-day germinating pea, roots develop at this point and if the original root is cut off and the new roots are placed in water a new shoot develops in place of the old root. P. C. W.

Rôle of growth hormones in form-building processes. II. Yarovisation and formation of growth-hormones. III. Effect of heteroauxin treatment of seeds on growth and development of plants. M. C. TSCHAJLACHJAN and L. P. SHDANOVA (Compt. rend. Acad. Sci. U.R.S.S., 1938, 19, 219-224, 303-306).-II. Yarovisation of wheat and oats causes diminution in the growth-hormone content of the plants. This corresponds with the form of growth of the seedlings.

III. Application of heteroauxin to plants has no direct influence on the formation of buds and flowers. A. G. P.

Anatomical changes in *Tradescantia flumin*ensis, Vell., after treatment with growth-substances. R. BLOCH (Contr. Boyce Thompson Inst., 1938, 9, 439—454).—The effects of synthetic growthsubstance-lanolin mixtures, in particular, of the indolylbutyric and naphthylacetic compounds, applied externally in comparatively high concns. either to the intact stem or wounded portions of *T. fluminen*sis were studied. In intact stems, responses and histological changes are comparable with those reported for dicotyledons, viz., epinastic bending of leaves, meristematic activity, and abnormal root production. The anatomical changes are detailed. AUTHOR.

Combined effect of light and gravity on the response of plants to growth-substances. P. W. ZIMMERMAN and A. E. HITCHCOCK (Contr. Boyce Thompson Inst., 1938, 9, 455-461).—Responses by naphthylacetic, indolyl-acetic induced and -butyric acids were greatly modified if tomato plants were allowed to make natural tropic responses before the growth-substances were applied. When known growth-substances were applied opposite the side on which natural hormones were assumed to accumulate, the degree of response was greatly reduced; applied on the other side, the response was greatly accelerated. In the first case it was assumed the applied growthsubstance worked in opposition to the natural hormones and in the latter case with them. This combined effect of light and gravity was shown also in the case of the natural response of plants placed horizontally while exposed to unilateral lighting. Indolyl-acetic and -butyric acids applied at distal parts of tomato stems were extracted and identified by the colorimetric method as indole derivatives. Indolylbutyric acid applied to the basal end of a horizontal stem was unequally distributed, more going to the lower than the upper sides as determined by the indole colorimetric test and the relative difference in physiological activity (induced epinasty) of the extracts from the lower and upper sides of the treated stems. These facts suggest that the indolylbutyric acid mol. might have remained intact in the tissue. AUTHOR.

Parthenocarpic fruits induced by spraying with growth-promoting compounds. F. E. GARDNER and P. C. MARTH (Bot. Gaz., 1937, 99, 184—195; cf. A., 1937, III, 502).—Repeated spraying of *Ilex opaca* with dil. solutions was more effective than a single treatment with a more conc. solution. Strawberry, apple, and grape flowers did not respond satisfactorily to the spraying. A. G. P.

Intercellular wound hormones produced by heteroauxin. J. R. LOOFBOUROW and C. M. DWYER (Science, 1938, 88, 191—192).—Heteroauxin is toxic to yeast over a wide concn. range, and when yeast is subjected to it in toxic concns. wound hormones are produced. The effect of heteroauxin on yeast is consistent with the mode of action suggested by Leonian and Lilly (A., 1938, III, 248) for its effect on plant tissues. L. S. T.

Rôle of salts, hydrogen-ion concentration, and agar in the response of the Avena coleoptile to auxins. K. V. THIMANN and C. L. SCHNEIDER (Amer. J. Bot., 1938, 25, 270—280).—When agar blocks are soaked in aq. indolyl-3-acetic or -butyric acids the conen. of auxin in the agar does not attain that in the aq. phase. Addition of KCl or other salts increases the conen. in the block. In the Avena tests the above acids are not less active than their K salts; at high aq. conens. the salts are the more toxic owing to the higher rate of entry into the cells. The growth of immersed coleoptile sections is proportional to the osmotic gradient between their contents and the external solution. A. G. P.

Responses of bean and tomato to Phytomonas tumefaciens, extracts of P. tumefaciens, β -indolylacetic acid, and wounding. G. K. K. LINK, H. W. WILCOX, and A. D. LINK (Bot. Gaz., 1937, 98, 816—867).—P. tumefaciens produces β -indolylacetic acid on glucose-tryptophan media. Gall formation in plants inoculated with the fungus results from the action of heteroauxin. A. G. P.

Effect of indolylacetic acid on growth and composition of etiolated bean plants. J. W. MITCHELL and W. E. MARTIN (Bot. Gaz., 1937, 99, 171—183).—When applied to the first internode of etiolated bean plants, 3% indolylacetic acid in lanolin caused the formation of galls and roots at the treated area, restricted the increase in wt. and height of plants, and retarded the transport of carbohydrates and N from the cotyledons and the intake of water by the plants. Respiration was unaffected. A. G. P.

Stimulating effect of β -indolylacetic acid on synthesis of solid matter by bean plants. J. W. MITCHELL and C. L. HAMNER (Bot. Gaz., 1938, 99, 569—583).—Application of the acid in concus. exceeding 0.00185%, to decapitated bean stems retarded development of axillary buds and caused formation of tumours and roots at the cut surface. Lower concus. had smaller effects on axillary buds and tumour growth; no roots were formed. In plants denuded of axillary buds the acid caused increased gains in dry wt., the effect being more marked in light of high than of low intensity. A. G. P.

Hormones and root formation. W. C. COOPER (Bot. Gaz., 1938, 99, 599-614).—Lemon and apple cuttings treated at base or apex with indolylacetic acid showed much auxin in the bark for a short time after treatment; 90% of this disappeared within 24 hr. More auxin was recovered from the base of cuttings treated at the apex than from the apex of those treated at the base. The function of the acid in root formation is primarily the mobilisation of naturally occurring root-forming substances. Leaves of lemon cuttings supply a substance necessary for the differentiation of root primordia, and another for the outgrowth of the primordia. The former is transported rapidly and the latter more slowly to the base under the influence of indolylacetic acid. A. G. P.

Histology and microchemistry of reactions of tomato plants to indolylacetic acid. H. A. BORTHWICK, K. C. HAMNER, and M. W. PARKER (Bot. Gaz., 1937, 98, 491—519).—Treatment of stems of decapitated tomato seedlings with indolylacetic acid resulted in decreased NO_3' contents in stems and increased protein concn. in areas in which cell division was most active. Starch disappeared from treated stems as tumours developed but remained in untreated controls. Corresponding histological changes are recorded. A. G. P.

Extensibility of cell wall material in indolylacetic acid. W. S. STEWART (Amer. J. Bot., 1938, 25, 325–328).—Indolylacetic acid has no sp. action on the extensibility of cell walls. Artificial silk fibres are rendered more extensible by the acid and also by other org. acids which have no growth-promoting function. A. G. P.

Histological responses of Iresine lindenii to indolylacetic acid. B. F. HARRISON (Bot. Gaz., 1937, 99, 301–338). A. G. P.

Activity of the potassium salt of indolylacetic acid in the Avena test. D. M. BONNER (Bot. Gaz., 1937, 99, 408—411).—Indolylacetic acid and its K and Na salts in equimol. solutions and buffered to the same $p_{\rm H}$ exhibit the same potency in Avena tests. Recorded differences in activity are attributable to differences in $p_{\rm H}$ of the solutions. A. G. P.

Absorption and translocation of auxin. F. Skoog (Amer. J. Bot., 1938, 25, 361-372).—In tomato and squash plants auxin produced in the plants is transported basipetally through parenchymatous or vascular tissue but not through the xylem. Auxin applied externally to roots passes upward through the xylem but may move into surrounding tissues and thence be translocated in the normal way. The intake of auxin from external solutions by roots is proportional to the concn. supplied, is accelerated by rapid transpiration, and is influenced by the p_{π} and salt concn. of the medium. High concns. of auxin thus applied are transported to and act on aërial tissues. Low concns. do not reach the aërial portions but act on roots. A. G. P.

Interdependence of auxin and sugar for growth [of plants]. C. L. SCHNEIDER (Amer. J. Bot., 1938, 25, 258—270).—Experimental evidence confirms that the effects of auxin and sugar on plant growth are interdependent. With sub-optimal concess of both an increase in concess. of either increases the growth-rate of the plant. A. G. P.

Auxin in isolated roots growing in vitro. J. VAN OVERBEEK and J. BONNER (Proc. Nat. Acad. Sci., 1938, 24, 260—264).—Isolated *Pisum* roots cultivated in vitro contained auxin-a for at least 3 weeks after removal of tips. When grown under sterile conditions isolated roots showed a steep auxin gradient (max. at tip). After 2 weeks' cultivation the whole root contained less auxin than did the original tip. A. G. P.

Ascorbic acid in Avena coleoptiles. W. G. CLARK (Bot. Gaz., 1937, 99, 116—124).—Ascorbic acid is present in considerable amounts in etiolated Avena coleoptiles. It does not occur in germinating seed but is formed in the coleoptile from a precursor present in the seed. Reduced ascorbic acid predominates in the base and the oxidised form in the apex of the coleoptile. Reduced acid is oxidised more readily by extracts of basal than by those of apical tissues. Ascorbic acid is not a cell-elongating substance and does not contribute to the action of auxin. A. G. P.

Use of green tissue test objects for determining the physiological activity of growth-substance. A. E. HITCHCOCK and P. W. ZIMMERMAN (Contr. Boyce Thompson Inst., 1938, 9, 463-518).-Substances highly active for root formation in intact plants and in cuttings of more than 100 species of herbaceous and woody plants were tested for rootforming activity in tomato leaf cuttings. Root formation depended on concn. and kind of growthsubstance, species or variety of cutting, time of year, condition of tissue, relative leaf area, and the atm. conditions during and after treatment. Indolylbutyric and naphthylacetic acids were more effective than indolylacetic acid. Phenyl compounds were much less effective. Results relating to retreatment of cuttings after 24 hr. confirm those of Hellinga et al. in showing increased root formation (additive effect) but disagree with Cooper's results and are opposed to the "local mobilisation" hypothesis. In contrast, retreatment after several weeks or months (deferred treatment) showed no additive effect. The increased rooting caused by the delayed treatment with growthsubstance confirms the results of Stuart and Marth (deferred treatment) but differs from the results of Cooper and Went which showed increased rooting only for cuttings treated initially with growth-substance. Salts and esters of indolyl-butyric and -acetic and naphthylacetic acids were of nearly the same activity as the acids for root formation. These three acids were active for growth promotion and root formation in tomato shoots at concns. of 1 mg. per 1. or less in solutions of $p_{\rm H}$ 4.2-7.2. Simple acids (acetic, citric, sulphuric) were not active. These results oppose the dissociation hypothesis and the claims that green tissue test objects such as the tomato require the use of excessively high or "unphysiological " concns. of growth-substance. Direct evidence that applied growth-substances move upward and downward from regions treated, and are distributed unequally in geotropically stimulated shoots, was furnished by the detection of the applied growthsubstance, as an indole derivative, in different parts of the treated shoot or plant (even in newly-formed parts) up to 24 days after treatment. The fractions containing indole derivatives were active physiologically for growth promotion and root formation in non-treated tissue. Fractions from plants treated with indolylbutyric acid contained a cryst. substance which gave an X-ray diffraction pattern characteristic of commercial preps. of indolylbutyric acid. By direct methods of detecting (indole nucleus test) and identifying (X-ray analysis) the applied growth-substance, previous data have been confirmed. These results lend support to the Fitting stimulus concept and definitely disprove the polarity and specificity concepts of the Went school with respect to the action of growth-substances such as indolyl-acetic and -butyric acids. These acids were more stable than other workers have assumed. AUTHOR.

Photokymograph for analysis of the Avena test [for growth-substances]. C. L. SCHNEIDER and F. W. WENT (Bot. Gaz., 1938, 99, 470—496).— Appropriate apparatus is described. Following unilateral application of auxin to decapitated coleoptiles Mechanism and application of the pea test [for auxin]. J. VAN OVERBEEK and F. W. WENT (Bot, Gaz., 1937, 99, 22—41).—In Went's pea test (1934) the curvature of the split stems results from the ability of auxin to penetrate the epidermis but not the cut surface of the stem. Curvature is influenced by the $p_{\rm II}$ of the auxin solution. The sensitivity of the stems to auxin shows a daily and a seasonal variation. A. G. P.

Effect of extracts of maize plants on growth of excised root tips. W. J. ROBBINS and V. B. WHITE (Bot. Gaz., 1937, 98, 520—534).—Growth of the excised root tips was improved by addition to the medium of diffusate from germinating grain, extracts of seedling roots, or autolysed yeast. Milk from immature grain was injurious or without action, A. G. P.

In vitro cultivation of excised pea roots. J. BONNER and F. ADDICOTT (Bot. Gaz., 1937, 99, 144—170).—Excised roots grow well in media containing glucose provided yeast extract is supplied after the first transfer. Cryst. vitamin- B_1 partly replaces yeast but is not, by itself, capable of maintaining optimum growth. A mixture of aminoacids replaces that fraction of the active matter of yeast extract which is not $-B_1$. A. G. P.

Growth-substances and the rooting of cuttings.—See B., 1938, 1208.

Copper deficiency in plants at Robe, South Australia. I. Effect of copper and other elements on growth of plants in a "coasty" calcareous sand. D. S. RICEMAN and C. M. DONALD. II. Occurrence of "reclamation disease" in cereals in S. Australia. C. S. PIPER (Counc. Sci. Ind. Res. Australia Pamph., 1938, No. 78, 7–23, 24–28).—I. "Coast" disease occurring on these sheep pastures is identical with "reclamation disease" (Urbarmachungskrankheit) in Europe. Application of CuSO₄ improved the condition of the grass although development did not become normal. In pot cultures CuSO₄ produced normal growth of subterranean clover.

II. A disease of oats resembling reclamation disease was controlled by $CuSO_4$. A. G. P.

Selenium as a stimulating and possibly essential element for indicator plants. S. F. TRELEASE and H. M. TRELEASE (Amer. J. Bot., 1938, 25, 372— 380; cf. B., 1938, 560).—Se (as Na_2SeO_3) in conces. between 1 and 27 p.p.m. stimulated the growth of *Astragalus racemosus* and *A. pattersonii*. The tolerance of these plants for Se was approx. 10 times that of wheat and buckwheat. Accumulation of Se by *Astragalus* was proportional to the concent applied and was inversely related to the [SO₄] in the medium. A. G. P. Absorption of selenium by tobacco and soya beans in sand cultures. A. L. MARTIN and S. F. TRELEASE (Amer. J. Bot. 1938, 25, 380–385).— Tobacco plants were more susceptible to Se $[Na_2SeO_3]$ than were soya beans. Toxicity was lowered but not eliminated by SO₄". A. G. P.

(x). PLANT CONSTITUENTS.

Oxalate content of Chinese leaf vegetables. H. L. YEH and W. H. ADOLPH (Chinese J. Physiol., 1938, 13, 209—212).—12 leaf vegetables and the tomato were studied. Spinach and Acorus calamus contained most oxalate, more than equiv. to their Ca content. In celery cabbage, Ca and oxalate were present in approx. equiv. amounts. N. H.

Identification and determination of ethylene in volatile products of ripening bananas. J. B. NIEDERL, M. W. BRENNER, and J. N. KELLEY (Amer. J. Bot., 1938, 25, 357-361).—Ethylene is determined by absorption in cooled Br, and conversion of the resulting ethylene dibromide into acetylene by alcoholic KOH and thence into Ag acetylide. The yield of acetylene is approx. 0·1-0·2 ml. per 100 lb. of fruit during the ripening period. A. G. P.

Distribution of acetylcholine in potato plants. Z. M. BACQ (Bull. Acad. roy. Belg., 1938, [v], 24, 545—547; cf. A., 1938, III, 250).—No acetylcholine occurs in the expressed juice of the leaves or stems; that of the tubers (especially when young) contains up to 20 μ g. per c.c. (biological assay). F. O. H.

Presence of anhydro-*I*-galactose in agar-agar. --See A., 1938, II, 430.

"Block" structure of starch grains. N. P. BADENHUIZEN, jun. (Protoplasma, 1937, 29, 246– 260).—The blocks of material described by Hanson and Katz in starch grains do not exist in the normal grain, but result from disintegration of the homogeneous resistant layers of the grain, which are caused to split by the swelling of the soft layers, when the grain is treated with certain reagents. M. A. B.

Chemistry of the plant cell wall. VII. Cellulose in rhizomes of brake fern (*Pteris aquilina*). W. M. HARLOW and L. E. WISE (Amer. J. Bot., 1938, 25, 217-219).—Cellobiose octa-acetate can be obtained from cotton and from the primary wood of the fern. The cellulose of the latter probably contains the same anhydrocellobiose units as does the cellulose of higher plants. A. G. P.

X-Ray diffraction analysis and its application to the study of plant constituents. W. A. SISSON (Contr. Boyce Thompson Inst., 1938, 9, 381—395).— The principles of crystal structure, X-ray diffraction technique, and the interpretation of diffraction patterns are outlined. The applications and limitations of X-ray analysis are illustrated by several examples. AUTHOR.

Isolation of the soporofic substance from Kawa-Kawa or Wati. A. G. VAN VEEN (Proc. K. Akad. Wetensch. Amsterdam, 1938, 41, 855-858).--
The active substance "marindinine" is a lactone, m.p. 60° . Fresh but old stems of Piper methysticum contain 0.2% of marindinine. A. G. P.

Mol. wts. of canavalin and concanavalin A and B. J. B. SUMNER, N. GRALÉN, and I. B. ERIKSSON-QUENSEL (J. Biol. Chem., 1938, 125, 45-48).— Details of results previously given (A., 1938, III, 706) are recorded.

Presence of *l*-sesamin in Asarum sieboldi, Miquel, var. seoulensis, Nakai. T. KAKU and H. RI (Keijo J. Med., 1938, 9, 1—4; cf. A., 1937, II, 259).—*l*-Sesamin (Br_2 -derivative, m.p. 182— 183°) is isolated by separation from *l*-asarinin and stearin. F. R. S.

Nobiletin.---See A., 1938, II, 374.

Preparation of citrin. A. SZENT-GYÖRGYI (Z. physiol. Chem., 1938, 255, 126—131).—Two methods of isolating citrin from lemon peel (15 g. from 70 kg.) are described. Since citrin but not hesperidin or eriodictin (the glucoside of eriodictyol) lowers blood pressure, citrin probably contains also a pigment similar to or identical with quercitrin. The citrin content of an alcoholic solution is approx. determined by adding HCl and Mg and comparing the colour produced with that of a standard citrin solution. Lemon juice contains 5 times as much ascorbic acid as citrin. W. McC.

Composition and biogenesis of original resin acids.—See A., 1938, II, 448.

Solutions of chlorophyll-protein compounds (phyllochlorins) extracted from spinach. E. L. SMITH (Science, 1938, 88, 170-171).-The prep. of aq. digitalin solutions of the green pigments which show characteristic protein properties and which resemble the pigments in the leaf is described. The absorption bands of the phyllochlorin resemble those of the leaf and, compared with the natural mixtures of chlorophyll-a and -b, are shifted towards the longer *\lambda \lambda*. Boiling a neutral digitalin extract shifts the red absorption band towards the shorter $\lambda\lambda$. Phyllochlorin solutions show little or no red fluorescence when irradiated with blue light, and are stable towards visible light. High centrifugal fields sediment the phyllochlorin completely, and two boundaries corresponding with particles of mol. wt. $>7 \times 10^4$ have been observed. Some chemical L. S. T. properties of the solutions are recorded.

Structure of chlorophyll granules. A. WIELER (Protoplasma 1936, 26, 295—311).—The grains consist of a homogeneous mass surrounded by a hull, with a layer of vacuoles, containing chlorophyll dissolved in an ethereal oil, immediately inside the hull. Starch grains occur only in the interior of the mass. Assimilation processes and starch formation take place at different points in the granule. The relation of the structure to the various chemical functions of the granule is discussed. M. A. B.

Structure of chlorophyll granules. A. FREY-WYSSLING (Protoplasma, 1937, 29, 279-299).—A review of work on the constituent substances of the chlorophyll granule and their arrangement within the granule. M. A. B.

Carotenoids. V. Gazaniaxanthin.—See A., 1938, II, 436.

Photosynthesis and the absorption spectra of plant pigments. G. R. BURNS (Amer. J. Bot., 1938, 25, 166—174; cf. A., 1937, III, 285).—The primary absorption curve and the photosynthesis curve for white pine coincided over the range λ 520— 68 mµ. A. G. P.

Keto-phenols, a new class of compounds in Australian essential oils.—See A., 1938, II, 446.

Curarine from calabash carare.—See A., 1938, II, 463.

(y) APPARATUS AND ANALYTICAL METHODS.

Simple recorder for physiological volume changes. H. LAWSON (Science, 1938, 88, 173— 174).—A new vol. recorder, of the Brodie type, incorporating an inelastic balloon made from sheep's cæcum is described. The membrane can be easily replaced. C. A. K.

Substitute for Cargile membrane in the construction of Brodie bellows. J. R. DI PALMA and J. R. JOHNSON (Science, 1938, 88, 113—114).—The use of Japanese tissue paper (used in model airplane construction) in the construction of Brodie bellows is described. C. A. K.

Practical bellows recorder. W. L. MENDEN-HALL (Science, 1938, 88, 193—194).—A modified form of the Brodie bellows recorder is described.

W. F. F.

Manometric determination of amino-acids. D. D. VAN SLYKE (Biochem. J., 1938, 32, 1614).— A claim to priority (cf. Mason, A., 1938, II, 252). The method is the most sp. yet devised for determination of amino-acids in biological mixtures.

P. G. M.

Spectrographic analysis of pathological material. W. GERLACH, W. ROLLWAGEN, and R. INTONTI (Virchow's Arch., 1938, 301, 588-601).—An apparatus for the spectrographic examination of pathological material is described. Particular attention is paid to the identification of Pb and Th. The sensitivity is 0.5 µg. in both instances. H. W. K.

Sugar determination by copper reduction methods.—See A., 1938, II, 465.

Toxicological analysis of viscera. II. Extraction of alkaloids from viscera. C. G. DAUB-NEY and L. C. NICKOLLS (Analyst, 1938, 63, 560— 566; cf. A., 1938, III, 144).—The proteins, coagulated with $(NH_4)_2SO_4$, are macerated at 65—70° with successive quantities of 0.5% aq. acetic acid. The filtered extracts are made alkaline with NH_3 and extracted 5 times with $CHCl_3$. The filtered extract is re-extracted with H_2SO_4 and finally with water, the aq. solutions being neutralised with NH_3 and re-extracted with CHCl₃. The CHCl₃ solutions are evaporated to dryness in a flask and weighed. The residue is dissolved in dil. acid and filtered. The residue is re-dissolved by washing with acetone and then CHCl₃, returned to the flask, evaporated, and weighed. The difference in wts. observed represents the wt. of alkaloid. In presence of morphine, alcohol is added before the acetic acid extracts are rendered alkaline, and extraction is repeated with CHCl₃ and alcohol. The method is suitable for determining quinine, strychnine, cocaine, atropine, and aconitine. J. W. S.

Microchemical demonstration of cocaine in chemico-legal examinations. M. D. SCHVAIKOVA (Sudenbn. Med., 1934, 1, 74—103).—A drop of cocaine hydrochloride solution is evaporated to dryness at room temp., and 1 drop of 1% KMnO₄ is added. In 0.5—2 min. a characteristic sediment of reddishviolet angular plates and squares forms. Free acid does not interfere. Alkaloids such as aconitine, scopolamine, and tropacocaine show quite different crystals. CH. ABS. (e)

Determination of sulphanilamide [in blood and urine]. E. K. MARSHALL, jun., and J. T. LITCHFIELD, jun. (Science, 1938, 88, 85–86).— Improvements in the method described previously (A., 1937, III, 334) consist in destroying the excess of HNO₂ (by NH₄ sulphamate) after diazotisation and buffering the solution before coupling with dimethyl- α -naphthylamine. More rapid development of colour and more permanent colours are obtained, and the destruction of some of the azo-dye by NaCl etc. is avoided. L. S. T.

Determination of cholic acid.—See A., 1938, II, 444.

Direct determination of creatine. I. C. F. SCHAFFER (J. Amer. Chem. Soc., 1938, 60, 2001— 2002).—Urine is treated successively with phosphotungstic acid (to remove protein), Pb acetate (to remove excess of the acid), H_2SO_4 (to remove excess of Pb), and finally Folin's reagent (A., 1929, 714) and 20% NaOH; the colour developed is determined colorimetrically (cf. Larson, A., 1932, 283). The small amount of allantoin present does not interfere. Glucose, if present in more than traces, must be first removed by fermentation. This direct method is more accurate ($\pm 5\%$) than the usual indirect method. R. S. C.

Determination of thiocyanate in organic secretions by a double distillation procedure. P. R. ORELLA (An. Farm. Bioquim., 1935, 6, 41–51; Chem. Zentr., 1936, ii, 2186).—HCN is distilled (apparatus described) and determined as Prussianblue; SCN' in the residue is then converted into CN' by distilling with H_2SO_4 - $K_2Cr_2O_7$ and determined separately. SCN' occurs in the saliva of the horse and man (greater for smokers), in human urine and cow's milk, but not in human milk. A. H. C.

[Determination of] total chlorine [in plant products]. H. L. WILKINS (J. Assoc. Off. Agric. Chem., 1938, 21, 353—354).—The vols. of reagents may be reduced to 10% of those specified in the tentative method (cf. *ibid.*, 1937, 20, 335) without loss of accuracy. E. C. S.

Micro-determination of iodine [in biological material]. A. ITANO, Y. TSUJI, T. HASEGAWA, and T. MORIYA (Ber. Ohara Inst. landw. Forsch., 1938, 8, 97—101).—Combustion is carried out in a gas-heated tube, the products being carried over an electrically-heated Pt wire and absorbed in aq. K_2CO_3 .

E. C. S.

Micro-determination of sulphate. S. TANAKA (J. Biochem. Japan, 1938, 28, 37–49).—The sample [e.g., 2 c.c. of serum (at $p_{\rm H}$ 5 and to which a small amount of NaF is added)] is deproteinised and freed from PO₄^{'''} by UO₂(NO₃)₂, SO₄^{''} pptd. from the filtrate by benzidine, the ppt. washed with acetone and dissolved in aq. borax, and the benzidine content determined colorimetrically by β -naphthaquinonesulphonate reagent. F. O. H.

Photometric determination of sodium. L. JENDRASSIK and M. HALÁSZ (Biochem. Z., 1938, 298, 74-80).—Na (e.g., in serum, urine, cerebrospinal fluid) is pptd. as $NaZn(UO_2)_3(OAc)_9, 6H_2O$, the ppt. is dissolved in 20% aq. Na citrate, and the depth of colour of the yellow complex produced is measured photometrically or colorimetrically. Protein is first removed from serum with trichloroacetic acid and $PO_4^{\prime\prime\prime}$ and protein (if present) from urine with UO_2 acetate. When the photometric procedure is used the accuracy of the results is checked, using standard aq. NaCl. The precipitant is kept in the dark. W. McC.

Colorimetric determination of sodium [in urine and blood-serum] as uranyl manganese sodium acetate.—See A., 1938, I, 582.

Modification of the Titan-yellow method for the determination of small amounts of magnesium in biological fluids. V. G. HAURY (J. Lab. clin. Med., 1938, 23, 1079—1084).—The method is described and the results given for the Mg content of the sera of guinea-pigs, monkeys, dogs, cats, and rabbits. The results compare favourably with those obtained by the gravimetric method of McCrudden. C. J. C. B.

Micro-determination of copper, lead, and zinc in biological material with dithizone (diphenylthiocarbazone). J. SCHWAIBOLD, B. BLEYER, and G. NAGEL (Biochem. Z., 1938, 297, 324—331).— A modification of the procedure of Strohecker and Riffart (B., 1938, 1371) is described. Hg, if present, interferes with the Cu determination and the Hgdiphenylthiocarbazone complex must be decomposed with 5% aq. KI. The limits of error are approx. $\pm 10\%$. W. McC.

Application of diphenylthiocarbazone method to determination of lead in biological materials. E. P. LAUG (J. Assoc. Off. Agric. Chem., 1938, 21, 481—487).—Phosphates are almost completely removed and Sn^{II} is oxidised to Sn^{IV} prior to extraction with diphenylthiocarbazone. Solutions of dithizone and its Pb compound in CHCl₃ are stable in absence, but not in presence, of light. The method described is accurate for 1—100 µg. of Pb.

E. C. S.