BRITISH CHEMICAL AND PHYSIOLOGICAL ABSTRACTS

A., III.—Physiology and Biochemistry (including Anatomy)

FEBRUARY, 1940.

(i) GENERAL ANATOMY AND MORPHOLOGY.

Pigments and colour of living human skin. E. A. Edwards and S. Q. Duntley (Amer. J. Anat., 1939, **65**, 1—33).—The distribution of pigments responsible for skin colour in various body regions of young adults of both sexes is recorded. The pigments responsible are: melanin in the deeper layers of the epidermis, melanoid throughout the epidermis, carotene in the stratum corneum, fat of the dermis and subcutaneous tissue, and reduced and oxy-hæmoglobin in the vessels. Carotene dissolved in the intercellular fluid appears to be transmitted through the stratum mucosum to the stratum corneum. Sweat, sebum, and glands contribute little to skin colour. The whiter skin of females contains less melanin and blood than in the male, but has more carotene. Spectrophotometry was employed for accurate determination of colour. W. F. H.

Relations of inferior thyroid artery. T. di Giulio and M. Tondo (Boll. Soc. ital. Biol. sperim., 1939, **14**, 543—544).—Variations in the position of the recurrent laryngeal and cervical sympathetic nerves relative to the inferior thyroid artery are discussed. F. O. H.

Umbilical artery at different ages. F. Bellelli (Arch. ital. Anat. Embriol., 1939, **41**, 410—412).—The histological structure of the umbilical arteries is described in fœtal, new-born, and adult material. The obliterated artery is a muscular-elastic rather than a fibrous cord. J. D. B.

Abnormalities of human dura mater. M. Iso (Folia anat. japon., 1939, **18**, 407—412).—Description of a case with two paramedian falces cerebelli and cristæ occipitales internæ. The cerebellar hemispheres showed considerable atrophy. W. J.

Thoracic walls and organs in sheep. S. Iwanoff (Z. ges. Anat., I., Z. Anat. Entw. Gesch., 1939, **109**, 544—585).—A topographical description. W. B.

Comparative anatomy of ducts of kidney. F. Kozlik (Z. ges. Anat., I., Z. Anat. Entw. Gesch., 1939, **109**, 624—648).—Mainly a description of development of nephric ducts in selachian fishes. W. B.

Structure of extremities of *P rataxidea crassa*, Zdansky. J. A. Orlov (Compt. rend. Acad. Sci. U.R.S.S., 1939, **22**, 527—529).—The specialisation of the fore and hind extremities of the badger is discussed relative to the habits and the origins of the species. W. F. F.

Structure of extremities of *Crocuta eximia* Roth et Wagner. J. A. Orlov (Compt. rend. Acad. Sci. U.R.S.S., 1939, **22**, 533—535). W. F. F.

Dentition and extremities of *Ictitherium hipparionum*, Gervais. J. A. Orlov (Compt. rend. Acad. Sci. U.R.S.S., 1939, **22**, 530—532).—A morphological discussion. W. F. F.

Cervical region of the *Lacertilia*. W. E. Adams (J. Anat., 1939, **16**, 57—71).—A description is given of the thyroid and thymus gland in *Lacertilia* together with the "epithelial bodies," and of cells corresponding with the carotid paraganglion. E. E. H.

Occurrence of lemurine form of ectotympanic in a primitive marsupial. F. W. Jones and V. F. Lambert (J. Anat., 1939, **16**, 72—75). E. E. H.

Medullary canal of long bones during growth. A. de Santis (Boll. Soc. ital. Biol. sperim., 1939, **14**, 540—542).—Observations (by the epimicro-stereoscopic method of Virno) on humerus, radius, and ulna of fœtuses of 5—9 months and children up to 4 years are discussed. F. O. H.

Cervical rib in early life. D. B. Davis and J. C. King (Amer. J. Dis. Child., 1938, **56**, 744—755).—The cases of 3 children with cervical rib which produced symptoms are reported. The incidence, embryology, anatomy, symptomatology, diagnosis, and treatment of cervical rib are discussed. 1·2% of 1000 consecutive *X*-ray photographs made on children under 13 years of age showed a cervical rib. C. J. C. B.

Growth of mandible in pig. H. A. Harris (Nature, 1939, **144**, 552—553).—*X*-Ray photographs support Hunter's description of the growth of the mandible. W. F. F.

Epiphyses in *Sphenodon* and primitive form of secondary centre. R. W. Haines (J. Anat., 1939, **16**, 80—90).—The secondary centres are composed of masses of calcified cartilage that are later destroyed and replaced by marrow and bone probably derived from the tissues of the shaft that perforate the growth cartilage. The longitudinal trabeculæ of the endochondral bone radiate towards the growth cartilage. E. E. H.

Experimental fracture and vitamin-*C*. I. Vitamin-*D*. II. Parathyroid gland. III. Reticulo-histocytic system. G. Giangrasso. IV. Hypervitaminosis-*C*. G. Giangrasso and L. Gangitano (Boll. Soc. ital. Biol. sperim., 1939, **14**, 522—524, 525—527, 528—530, 531—533; cf. A., 1938, III, 927).—I. Callus formation at bone fractures

(rabbit) is accelerated by administration of vitamin-*C* but not by that of -*D*.

II. Healing of fractures is retarded in thyroparathyroidectomised rabbits in which, however, the acceleration of healing by -*C* is still evident.

III. The healing of fractures by -*C* is accompanied by increased proliferation of reticulo-histocytic elements at the site of bone formation.

IV. Administration of large doses (50—100 mg. daily) of -*C* has an inhibitory effect on callus formation which persists for approx. 20 days; after 30 days, the healing tends to return to normal although deposition of Ca salts is deficient. F. O. H.

X-Ray method for estimating degree of mineralisation of bones. P. B. Mack, A. T. O'Brien, J. M. Smith, and A. W. Bauman (Science, 1939, **89**, 467). W. F. F.

Mottled enamel in rat molars. G. J. Cox, M. C. Matuschak, S. F. Dixon, and W. E. Walker (Science, 1939, **90**, 83).—A high F dosage is required in the rat to produce fluorosis. W. F. F.

Distribution of fluorosis in India and England. D. C. Wilson (Nature, 1939, **144**, 155).—The areas of occurrence of dental fluorosis in India (the Punjab) and in England are stated. W. F. F.

(ii) DESCRIPTIVE AND EXPERIMENTAL EMBRYOLOGY. HEREDITY.

Development of intrahepatic bile ducts. E. Horstmann (Arch. EntwMech. Org., 1939, **139**, 363—392).—The development of the intrahepatic bile ducts starts in immediate contact with the thin wall of the branches of the portal vein. The network of liver cells arranges itself into a system of anastomosing tubuli which eventually give rise to the bile ducts. W. J.

Transplantation of tooth germ elements to marrow cavities of tibias of kittens. C. J. Sutro and L. Pomerantz (Arch. Path., 1939, **28**, 199—206).—Tooth germ elements of kittens regenerate after autogenous transplantation into the tibial marrow cavity. Which of the various germ elements will proliferate and to what extent depend on the degree of preservation of the enamel–dentine relationship. (8 photomicrographs.) C. J. C. B.

Fibre-follicle terminology in mammalia. A. B. Wildman and H. B. Carter (Nature, 1939, **144**, 783—784).—A discussion on terminology for developing fibre follicles in the skin of lambs. W. F. F.

Pseudo-amnion, pseudo-chorion, and pseudo-placenta in viviparous cyprinodont fishes. C. L. Turner (Science, 1939, **90**, 42—43). W. F. F.

Origin of pigment in eye of chick embryo. T. Sin-iké (Folia anat. japon., 1939, **18**, 371—377).—Pigment granules appear first in 4-day old embryos. On the 3rd day colourless granules can be seen in the cytoplasm. Occasionally these granules can be stained *in vivo* with Janus-green or neutral-red. From this observation it is concluded that pigment granules arise from transformed mitochondria. W. J.

Plane of bilateral symmetry of eggs of *Rana fusca*. I—III. P. Ancel and P. Vintemberger (Compt. rend. Soc. Biol., 1939, **131**, 528—531, 531—533, 534—537).—I. Previous findings on fertilised eggs are expanded in answer to criticisms.

II. Experiments show that the localisation of the plane of bilateral symmetry by the spermatazoon in the fertilised eggs of *R. fusca* is overcome by the localisation due to the direction of the rotation of orientation.

III. The factors responsible for the plane of bilateral symmetry in the eggs of *R. fusca* activated by the piqure in the presence of blood are the same as those responsible in the normally fertilised egg. P. C. W.

Experimental conditions permitting rotation of orientation in unactivated egg of *Rana fusca*. R. Stoll (Compt. rend. Soc. Biol., 1939, **131**, 537—539).—Orientation occurs in the unactivated egg in aq. NaCl (0·01—0·5%). The unactivated egg when oriented remains susceptible to the influence of activating electric currents. P. C. W.

Analysis of morphogenetic factors in amphibian development. II. Processes occurring in rudiments of some mesodermal organs. J. Holtfreter (Arch. EntwMech. Org., 1939, **139**, 227—273; cf. A., 1939, III, 1022).—Presumptive pronephros material, isolated before gastrulation, tends to form tubular structures and to stretch longitudinally. Presumptive mesodermal material from the region of the dorsal lip, when isolated *in vitro*, will give rise to mesenchyme cells. Presumptive mesodermal material of the lateral zone of the blastopore, when explanted, may form epithelial cells, resembling those of the coelomic epithelium, and mesenchyme. Isolated presumptive notochord material shows the tendency to linear stretching if mesenchyme cells have formed a primitive sheath around the rudiment; it may also develop into muscle tissue. Isolated presumptive myogenic material may differentiate into cross-striated muscle fibres or form notochord cells. A metameric differentiation of the myogenic material is dependent on the presence of the notochord. Explants of the dorsal lip containing both presumptive mesoderm and endoderm will show *in vitro* a line separating the two types of cells, as it appears during normal development. W. J.

Neural tube induction with a water-soluble hydrocarbon. S. C. Shen (J. exp. Biol., 1939, **16**, 143—149).—The water-sol. carcinogenic substance 1 : 2 : 5 : 6-dibenzanthracene-αβ-*endo*succinate was implanted into gastrulæ of *Triton alpestris*. An optimum dose for neural tube formation was found at 0·0125 μg. per embryo, and for palisade inductions at 0·000125 μg. per embryo. It is suggested that the action of the compound is a direct one, imitating the action of the naturally occurring organiser substance. J. M. R.

Effect of eyes on induction and respiration in amphibian gastrula. R. A. Beatty, S. de Jong, and M. A. Zieliński (J. exp. Biol., 1939, **16**, 150—154).—Pieces of presumptive epidermis, when isolated into dil. solutions of several dyes, undergo neural differentia ion. This effect is produced by dyes

(*e.g.*, Janus-green and neutral-red) which are not known to accelerate cell respiration, as well as by methylene-blue, which accelerates cell respiration. Measurements of the O_2 consumption of isolated pieces of the gastrula by the Cartesian diver method show that methylene-blue, if in a low concn., has an accelerating action of about 45%; in higher concns. it is inhibitory. J. M. R.

Oxygen uptake of "organiser" of *Bufo vulgaris* and *Rana esculenta*. A. Stefanelli (Arch. Fisiol., 1939, **39**, 176—209).—The O_2 uptake of single gastrulæ or portions from them was measured by means of a specially devised micro-respirometer (cf. J. exp. Biol., 1937, **14**, 71). Until the formation of the neural plate and tube begins, the O_2 uptake of the dorsal lip of the blastopore is not higher than that of other embryonal areas; this shows that increased metabolism occurs only after onset of the morphogenetic changes. S. O.

Action of sodium thiocyanate on the development of frog embryos. S. Ranzi and E. Tamini (Naturwiss., 1939, **27**, 566—567).—Eggs and embryos of *Rana esculenta* exposed for 12—72 hr. to 0·5—1·0% aq. NaCNS develop more slowly until gastrulation begins than do unexposed eggs or embryos. The rate of development then increases and exceeds the initial rate after development of the plug of the yolk. Development is inhibited by NaCNS in structures (*e.g.*, the medullary tube) in which protein metabolism preponderates but is stimulated or unaffected in those (*e.g.*, lips of the blastopore) in which carbohydrate metabolism preponderates. Hence the chordæ in the exposed organisms are larger and the medullary tubes smaller than those of unexposed organisms. W. McC.

Effect of localised increased temperatures on frog egg. S. Margen and A. M. Schechtman (Proc. Soc. Exp. Biol. Med., 1939, **41**, 47—48).—Local warming (27—36°) of the surface causes acceleration of development of the warmed region but does not induce formation of neural plates in ectoderm. V. J. W.

Anus formation in a frog egg. A. M. Schechtman (Proc. Soc. Exp. Biol. Med., 1939, **41**, 48—50; cf. A., 1939, III, 443).—Removal of the entoderm of the ventral lip of the gastrula does not prevent formation of a proctodeum, but removal of the mesoderm does. V. J. W.

Order of magnitude of morphogenetic forces. C. H. Waddington (Nature, 1939, **144**, 637).—The forces of gastrulation were studied by the insertion of steel balls in *Triton alpestris* and the use of magnetic fields. The breaking strain of the blastocœl roof was of the order of 7 mg. wt. per sq. mm. of hemispherical surface in contact with the tissues. Gastrulation forces are much less than the breaking strains of tissues. W. F. F.

Mathematical biophysics of growth. N. Rashevsky (Bull. Math. Biophys., 1939, **1**, 119—127).—Equations for cell growth are developed in terms of the glycolytic coeff. W. F. F.

Nucleoli, satellites, and sex chromosomes. R. R. Gates (Nature, 1939, **144**, 794—795).—A review. W. F. F.

Symphogenetic development. W. P. Chase (Nature, 1939, **144**, 445).—The term symphogenetic development is suggested to include environmental factors with genetic factors in discussing organic structure and behaviour. W. F. F.

(iii) PHYSICAL ANTHROPOLOGY.

Presacral vertebræ of American white and negro males. R. R. Lanier (Amer. J. phys. Anthrop., 1939, **25**, 341—420).—The presacral vertebræ of 100 white and 100 negro males were studied and the measurements statistically compared. These revealed significant differences between the two races. W. F. H.

Condylo-diaphysial angle of humerus. J. K. Bodel (Amer. J. Phys. Anthrop., 1939, **25**, 333—339).—Pecos Pueblo Indians had humeri with condylo-diaphysial angles very similar to those of the Paltacolo series and not greatly different from the means of Tierra del Fuegian material. The averages show a clear increase over the means recorded for European series. W. F. H.

Growth of human tibia. C. C. Francis (Amer. J. phys. Anthrop., 1939, **25**, 323—331).—Measurements of the left tibia in white children of both sexes ranging in age from 3 months to 13 years and an *X*-ray of the same bone were made. The rate of growth obtained by the two methods was comparable and there was no evidence that the radiographic method is superior. W. F. H.

Measurements of Oxfordshire villagers. L. H. Buxton, F. C. Trevor, and B. Blackwood (J. Roy. Anthrop. Inst., 1939, **69**, 1—10).—The people of the Southern Midlands are to-day of essentially the same racial type as their forbears in Saxon, Romano-British, and probably also early iron age times. The measurements taken were principally cranial and all under 20 years of age and those of known Irish, Scottish, Welsh, Channel Islands, and foreign ancestry were rejected. In a large no. of cases pedigrees were made. W. F. H.

Dental caries among eskimos of Kuskokwim area of Alaska. I. Clinical and bacteriologic findings. T. Rosebury and L. M. Waugh. **II. Biochemical characteristics of stimulated saliva correlated with dental caries and occurrence of salivary calculus.** M. Marschan, T. Rosebury, and L. M. Waugh. **III. Dietary study of three eskimo settlements.** T. Rosebury, M. Karshan, and C. Lowenberg (Amer. J. Dis. Child., 1938, **57**, 871—893, 1026—1034, 1343—1362).—I. Dental caries is distinctly more prevalent among natives from settlements in which contact with white men is relatively unrestricted and least prevalent among more primitive groups with a min. of such contact. The bacteriological findings are similar to those in white people.

II. Analysis of the stimulated saliva of 49 eskimos yielded higher vals. for the groups free from dental

caries, as compared with the group having active caries, for the total Ca content, the inorg. PO_4''' content, the CO_2 capacity, and the % of Ca removed after the specimen was shaken with Ca_3PO_4, as well as a lower average val. for the group without caries for P removed after the same procedure. Wt. is added to the evidence for the inverse relationship between caries and salivary calculus previously noted on clinical grounds.

III. The diets and the dietary habits of eskimos at 3 Alaskan settlements are described. One (Kepnuk) is primitive and isolated and has little dental caries; another (Eeek) is primitive, but has a resident white trader, and has much dental caries, while a third (a Moravian orphanage), despite more extensive influence of the white man's diet than is present at either of the others, has an intermediate incidence of dental caries. Dietary conditions commonly held to be responsible for dental caries or its absence cannot be correlated with the incidence of dental caries at the 3 settlements. These uncorrelated conditions include dietary carbohydrate in general, cereal and grain foods, dietary protein and fat, Ca and P, and probably vitamin-*D* and the potential reaction of the diets. These conditions consequently either lack influence on, or play secondary rôles in, the causation of dental caries among these people.

C. J. C. B.

(iv) CYTOLOGY, HISTOLOGY, AND TISSUE CULTURE.

Anatomy and pathology of skin appendages. I. Wall of intra-epidermal part of the sweat duct. H. Pinkus (J. invest. Dermat., 1939, **2**, 175—186).—The ducts of the sweat glands do not lose their walls where they enter the epidermis, but are lined by their own epithelium through all the strata of the skin. The significance of this fact is discussed in regard to various pathological conditions. (8 photomicrographs.) C. J. C. B.

Vascular system of fatty tissues. A. Bini (Boll. Soc. ital. Biol. sperim., 1939, **14**, 368—369).—Histological observations on the arrangement of capillaries and reticular capsules of adipose tissue cells (man, dog, rat, rabbit, guinea-pig) are discussed. F. O. H.

Cells of lymph glands. S. de Renzi and A. M. Michelazzi (Boll. Soc. ital. Biol. sperim., 1939, **14**, 449—450).—The cellular elements present in fluid from lymph glands (50 normal and pathological cases) were determined: their significance is discussed. F. O. H.

Structure of Fabricius' sac and reticulo-endothelial system. M. Valenti (Boll. Soc. ital. Biol. sperim., 1939, **14**, 521—522).—Histological observations of the (lymphoid) sac in the fowl are discussed. F. O. H.

Mucous and mucoid cells. C. Bignardi (Arch. ital. Anat. Embriol., 1939, **42**, 389—409).—Metachromatic staining is obtained with true (mucine-containing) mucous cells but not with mucoid cells; hence the method can be applied to their histological differentiation. Using thionine or toluidine-blue as metachromatic dyes, it was found that whereas in the hedgehog there is no metachromatic staining of the cells of Brunner's glands, in the guinea-pig the majority of them give a metachromatic staining. S. O.

Growth of gastric epithelium *in vitro*. A. V. Zubareva (Compt. rend. Acad. Sci. U.R.S.S., 1939, **23**, 183—184).—Cells of the fundus of the stomach of new-born rabbits were grown by the hanging drop method in a medium of chicken embryonal extract and heparinised rabbit plasma. Gastric epithelium possesses all the properties of the endodermal group of tissues, viz., horizontal anisomorphy, unilaminar distribution, presence of prismatic elements, intercellular bridges, and closing bands. W. F. F.

Effects of some tissue extracts on growth of periosteal fibroblasts. O. A. Trowell and E. N. Willmer (J. exp. Biol., 1939, **16**, 60—70).—The growth-promoting properties of extracts from tissues of growing and adult fowls are most pronounced in brain extracts and diminish in the sequence: thyroid, thymus, testis, ovary, bone marrow, liver, kidney and muscle extracts. Extracts from the spleens of adult cocks were far more efficient growth-promoters than extracts from the spleens of young rats. J. M. R.

Nature of growth-accelerating substance of cells. A. Fischer (Nature, 1939, **144**, 113.)—The growth-promoting activity occurring in *in vitro* cultures of tissue cells is associated with culture medium fractions containing the ribose nucleotides. The active principle has a high mol. wt. as determined by centrifuging. W. F. F.

Growth activation of cell colonies *in vitro* by extracts of adult tissues. R. S. Hoffman, E. Tenenbaum, and L. Doljanski (Nature, 1939, **143**, 764—765).—Extracts of tissues of adult chickens, including mitotically inactive tissues, markedly increase the rate of growth of cell cultures, fibroblast colonies in Carrel flasks being used for testing. W. F. F.

Preservation of trypan-blue and neutral-red within cells of loose connective tissue. T. Snook (Stain Tech., 1939, **14**, 139—142).—Trypan-blue granules in histiocytes and neutral-red-stained granules in mast cells can be preserved by fixing in 10% formalin for 12—24 hr., rinsing in distilled water, taking through two changes of dioxan 5—10 min. each, and mounting in diaphane in dioxan or in balsam through xylene. Fast-green (1% aq. + 0·2% acetic acid) can be used as a counterstain. E. E. H.

Iron–hæmatoxylin stain containing high concentration of ferrous iron. W. R. Earle (Science, 1939, **89**, 323—324).—A combination of highly conc. Fe^{II} and Fe^{III} salts maintains an oxidation–reduction equilibrium in solution which is well suited to the formation and preservation of the blue hæmatoxylin–Fe salt obtained with a modified Janssen's stain. The stain is highly selective. Full details are given for prep. W. F. F.

Staining method for anterior hypophysis of the rat. W. R. Fair and J. M. Wolfe (Stain Tech., 1939, **14**, 143—145).—Small pieces of tissue are fixed in Champy's fluid, and then chromated or osmicated.

After imbedding in 60° paraffin sections are cut at 3 μ. Staining is with 7% Altmann's acid-fuchsin followed by 2% orange C in 1% phosphomolybdic acid. After 10 sec. in 0·1% K_2CO_3 the sections are stained from 10—30 min. in Goodpasture's acid polychrome methylene-blue. Mitochondria stain brilliant fuchsin, eosinophil granules orange-red, and basophil granules deep blue. E. E. H.

Differential stain for cell types in the pancreatic islets. G. Gomori (Amer. J. Path., 1939, **15**, 497—499).—A modified hæmatoxylin–eosin method is described. (5 photomicrographs.) C. J. C. B.

Effect of certain factors on the results of silver impregnation for reticulum fibres. G. Gomori (Amer. J. Path., 1939, **15**, 493—496).—The effects of different fixatives, of the length of time of fixation, and of thickness of sections on the results are described. C. J. C. B.

Silver impregnation method for nerve cells and fibres. H. R. Debauche (Stain Tech., 1939, **14**, 121—124).—Fresh fragments are fixed for as long as possible in either 10% formol or picric acid 2 g. + 100 c.c. of 80% ethyl alcohol + 10 c.c. of acetic acid +40 c.c. of formaldehyde. After washing for 6 hr. in distilled water + 30 drops of conc. aq. NH_3 per 100 c.c., sections are cut frozen at 25 μ., bleached in ammoniacal water, and treated with 20% $AgNO_3$ at 45° until brown. Aq. NH_3 is then added until the Ag is pptd. and then redissolves, and the solutions and sections are poured into distilled water. The sections are then transferred to distilled water, and toned and fixed in the usual way. Nerve cells and neurofibrillæ appear dark blue on a pink ground. E. E. H.

Adaptation of the Rolls razor to new type of microtome blade. J. M. Feder (J. Lab. clin. Med., 1939, **25**, 202—204). C. J. C. B.

Sumac wax as embedding material in biological technique. J. Hsü and P. S. Tang (Stain Tech., 1939, **14**, 151).—Sumac wax is a very suitable substitute for paraffin wax as imbedding material: it is readily sol. in $CHCl_3$ and in castor oil. Its only disadvantage is brittleness, but this can be overcome by mixing 9 parts with 1 of beeswax, or 3 parts with 7 of paraffin wax. E. E. H.

Compact dehydrator; a new device for dehydrating and embedding tissues. G. Lubinsky (Arch. Path., 1939, **28**, 538—540). C. J. C. B.

Sealing of museum jars. M. H. Book and M. W. Sullivan (J. Lab. clin. Med., 1939, **25**, 197—198). C. J. C. B.

"Safe" fluid for museum use. A. D. Imms (Nature, 1939, **144**, 599—600).—Pampels' fluid is superior to ethyl alcohol, and non-inflammable. W. F. F.

(v) BLOOD AND LYMPH.

Instrument for obtaining bone marrow. G. O. Favorite (J. Lab. clin. Med., 1939, **25**, 199—201).—The instrument consists of a No. 11 gauge cannula, a trocar, and a small drill which fits the cannula. The skin is penetrated by the cannula and trocar and then the trocar is replaced by the drill. The tip of the drill is so grooved as to retain the bone marrow in the grooves. The instrument is a worthy compromise between a needle and trephine. C. J. C. B.

Effect of avitaminosis-*A* on human blood picture. O. D. Abbot, C. F. Ahmann, and M. R. Overstreet (Amer. J. Physiol., 1939, **126**, 254—260).—In 157 vitamin-*A*-deficient individuals the const. changes found were: mild leucopenia, decrease in polymorphs, relatively large lymphocytosis with a corresponding drop in small lymphocytes, occurrence of degenerate polymorphs, and an increase in young leucocytes. This is similar to the findings in -*A*-deficient rats. Addition of large amounts of -*A* produced a gradual improvement both in symptoms and in the blood picture. M. W. G.

Mean red cell diameters: standard curves for a Bengalee population. L. E. Napier, G. Sankaran, S. Swaroop, and M. N. Rao (Indian J. Med. Res., 1939, **27**, 253—278).—The mean of the mean diameters of 500 red cells of each of 50 different individual healthy male Bengalee Indians was 7·288 μ. (Price Jones 7·202 μ.). Using a 1% level of significance the ideal distributions for the smallest and largest mean diameters within normal limits gave 6·644 and 7·932 μ. (Price Jones, 6·686 and 7·718 μ.). H. B. C.

Regeneration of blood. III. T. Kubota (Folia endocrinol. japon., 1939, **15**, 3—4).—Administration of Fe and Cu causes quicker regeneration of erythrocytes and greater reticulocyte rise after bleeding than Fe or Cu alone. Average erythrocyte vol. increases for some days after bleeding but is not influenced by Fe or Cu. The colour index is the same as when Fe is given alone. The return of the serum-protein to normal val. is equally accelerated by Fe and Cu as by Cu alone. E. R.

Effect of cobalt on erythropoiesis in anæmic rabbits. W. Kleinberg, A. S. Gordon, and H. A. Charipper (Proc. Soc. Exp. Biol. Med., 1939, **42**, 119—120).—In rabbits made anæmic by bleeding or benzene, daily injection of 50 mg. of $Co(NO_3)_2,6H_2O$ hastened recovery, and in the benzene-treated animals the red bone marrow showed hyperplasia instead of atrophy. V. J. W.

Rôle of the sympathetic nervous system in blood regeneration. J. C. Somogyi (Magyar Orv. Arch., 1939, **40**, 195—203).—Ergotamine (0·2 mg. per kg. daily) inhibited blood regeneration after hæmorrhage in cats. Partial sympathectomy caused a decrease of red corpuscles and hæmoglobin, and an increase of leucocytes. Cervical sympathetic stimulation increased the red corpuscles and the hæmoglobin, the latter effect disappearing when stimulation followed thyroidectomy. A. W. M.

New carbohydrate for prevention of nutritional anæmia in infants. C. L. Wilbar (Amer. J. Dis. Child., 1939, **58**, 45—60).—In 242 plantation children the mean vals. for hæmoglobin were 62% (9·8 g.-%) and red cell count 3,700,000. A new carbohydrate was administered obtained by concentrating the juice of sugar cane. It contains sufficient available Fe and Cu to prevent nutritional anæmia in young infants. After a year's use of the carbohydrate, children aged

from 3 days to 3 years (168 children) showed a mean val. for hæmoglobin of 74% (11·8 g.). The following year the mean val. for hæmoglobin of 171 children in this age group was 80% (12·6 g.). C. J. C. B.

Effects of vitamin-*C* deficiency and diphtheria toxin on blood cells of guinea-pig. A. Sigal (Proc. Soc. Exp. Biol. Med., 1939, **42**, 163—167).—Scurvy was accompanied by decrease in hæmoglobin and red cells. Diphtheria toxin caused chromatophilia and poikilocytosis, which were less in animals receiving 3 mg. daily of vitamin-*C*. V. J. W.

Effect of severe hæmorrhage on concentration of copper in blood of sheep. A. T. Dick (Austral. J. Exp. Biol., 1939, **17**, 271—274).—The anæmia resulting from loss of large vols. of blood is not followed by any disturbance of the blood-Cu. D. M. N.

Radioactive iron and its metabolism in anæmia. P. F. Hahn, W. F. Bale, E. C. Lawrence, and G. H. Whipple (J. Exp. Med., 1939, **69**, 739—753; cf. A., 1939, III, 228).—Studies with radioactive Fe in dogs show that the amount of Fe absorbed from the intestine depends on the demand in the body. Fe is transported in the blood plasma and may appear in the red cells within a few hr. of ingestion. Storage of Fe in the liver and spleen can be demonstrated. A. C. F.

Bile pigment and hæmoglobin interrelation in anæmic dogs. W. B. Hawkins and A. C. Johnson (Amer. J. Physiol., 1939, **126**, 326—336).—Dogs were prepared with gall-bladder renal fistulæ or sterile closed bag fistulæ. The diet consisted of a special salmon bread and 50 c.c. of ox bile or dog bile were added daily. The dogs were rendered anæmic by bleeding. Care was taken to exhaust the stores of hæmoglobin-building materials in the early weeks of the severe anæmia. Intravenous injection of 42 g. of hæmoglobin in 3 g. daily doses over a fortnight after a hæmoglobin level of 50% had been reached was followed by an excess synthesis of 38 g. of hæmoglobin and a simultaneous increased output of bile pigment amounting in the fortnight to 1·29 g. It is considered that the excess bile pigment results from the splitting off of the pyrrole aggregate; the increase in hæmoglobin is due to the retained Fe and possibly globin fractions from the injected hæmoglobin combined with newly formed pigment radicals. M. W. G.

Red blood cell as source of plasma-iron and -bilirubin. G. Barkan and B. S. Walker (J. Biol. Chem., 1939, **131**, 447—454).—Fe and bilirubin are transferred from red cells to plasma in amounts of the same magnitude. No sp. inhibition of this transference by CN′ or quinine is observed. E. M. W.

Blood content of inactive hæmoglobin and hæmoglobin standardisation. E. Ammundsen and M. Trier (Acta med. scand., 1939, **101**, 451—460).—Discrepancies between gasometric and colorimetric determination in 14 persons amounted to 13%. After reduction by $Na_2S_2O_4$ the discrepancy was reduced to 6%, and was probably due to methæmoglobin. C. A. A.

Biological control of antianæmic liver preparations. M. T. Capsoni (Biochim. Terap. sperim., 1939, **26**, 449—460).—Methods of assay are reviewed. The use of rabbits in which anæmia is induced by repeated injection of Pb acetate in doses increasing up to 1 mg. daily is recommended (cf. Loureau *et al.*, A., 1938, III, 866). F. O. H.

Hæmoglobin production factors in liver, fish, frogs, and turtle compared with domestic animals. F. S. Robscheit-Robbins and G. H. Whipple (Amer. J. Physiol., 1939, **126**, 142—147).—Reptilian liver (turtle) contains a liberal amount of hæmoglobin-producing factors as tested in the standard anæmic dog. It contains more of the potent hæmoglobin-building factors than does ox liver; bull frog liver contains less and is about equal to ox liver. Fish liver is lower than ox liver and shows wide variations in the content of these factors; these variations may be due to post-mortem digestion or to high fat content which dilutes the protein contained in hæmoglobin-building factors. Shark liver was more uniform compared with liver derived from market fish but the content of these factors is below that of ox liver. M. W. G.

Influence of liver extract on oxygen consumption of mammalian erythrocytes. I. Properties of the constituents of the system. II. Influence of cyanide and narcotics. G. A. Overbeek (Rec. trav. chim., 1939, **58**, 1018—1032, 1033—1039).—I. Aspects of the reaction of Michaelis *et al.* (increased O_2 consumption of mammalian erythrocytes after addition of liver extract; cf. A., 1930, 1053) are compared with methylene-blue respiration of the erythrocytes. Each individual component of the system can be made a limiting factor by increasing the concn. of other components; in methylene-blue respiration both components are limiting factors at all concns. Erythrocytes of man and rabbit react with liver extract; those of pigs do sometimes, but of rats do not. The blood-catalase index shows a correlation with this effect. No difference is observed in the behaviour of erythrocytes from rabbits and rats with methylene-blue as activator. No abnormal reaction of erythrocytes of patients suffering from pernicious anæmia is found. Intactness of the cell proved to be unnecessary. Hæmolysed erythrocytes, freed from cell-remnants, react like a suspension of erythrocytes, provided the hæmoglobin concn. is of the same magnitude. Methylene-blue does not increase O_2 consumption of hæmolysed cells. The active principle of the liver extract is destroyed by boiling or by irradiation with ultra-violet light. Anti-anæmic liver preps. are inactive. The respiration-increasing principle is not identical with the anti-anæmic. O_2 consumption increases in the presence of NaF, owing to inhibition of glycolysis; this suggests consumption of carbohydrates. The respiratory quotient is ~0·9.

II. Low concn. of KCN inhibits the liver acid respiration; this is considered to be a sp. inhibition of an enzyme. No further inhibition is noted with increasing concn. of KCN. The cell-free system, hæmolysed erythrocytes–liver extract, is similarly inhibited. Methylene-blue respiration is inhibited

only by a large concn. of KCN, too high to be a sp. inhibition. Only slight inhibition is observed by phenyl- and ethyl-urethane, either in presence of erythrocytes or in the cell-free system. Dehydrogenases are probably involved in only a small part of the reaction. Methylene-blue respiration is strongly inhibited by narcotics. A. T. P.

Anti-anæmic substance of liver. O. Schales and L. Reimer (Arch. exp. Path. Pharm., 1938, **190**, 550—559).—The commercial liver extracts pernaemyl, hepracton, campolon, hepatopson, pernaemyl forte, and hepatopson forte showed the same dry residue and N content in each extract made in 1935 and 1937. Analytical data are given for the fraction of liver extracts sol. in dil. alcohol but insol. in 90% alcohol. Quant. standardisation of liver extracts could not be performed on an artificial collargol–saponin anæmia of Esthonian rabbits. H. H. K.

Relationship between erythrocyte sedimentation rate and plasma-proteins. M. W. Ropes, E. Rossmeisl, and W. Bauer (J. clin. Invest., 1939, **18**, 791—798).—Erythrocyte sedimentation rate and plasma-protein fractions were determined in 89 blood samples from various diseases. There is no abs. correlation between sedimentation rate and any of the plasma-protein fractions. One third of the findings were not consistent with a linear relationship between fibrinogen concn. and sedimentation rate. Marked changes in sedimentation rate occur without alteration of plasma-protein concn. Variations in sedimentation rates are attributed to variations in the colloidal state of the plasma with consequent changes in the electric charges on the proteins and red cells. Variations in concn. of fibrinogen, globulin, and other constituents affect the rate through their effect on the colloidal state of the plasma. C. J. C. B.

Cause of increased fragility of erythrocytes in congestive heart failure. J. Waller (Proc. Soc. Exp. Biol. Med., 1939, **42**, 64—66).—Resistance to hæmolysis by hypotonic NaCl is lowered in red cells from the finger tip when the circulation is stopped by compression of the arm. V. J. W.

Total differential and absolute leucocyte counts and sedimentation rates of healthy children 4 to 7 years of age. E. E. Osgood, R. L. Baker, I. E. Brownlee, M. W. Osgood, D. M. Ellis, and W. Cohen (Amer. J. Dis. Child., 1939, **58**, 61—70).—There are no significant age or sex differences in the total, differential, or abs. leucocyte counts or in the sedimentation rates for children 4—7 years of age. (Cf. A., 1939, III, 812.) C. J. C. B.

Effect of potassium salts of dibasic fatty acids on phagocytosis *in vitro*. N. Fethke (Compt. rend., 1939, **209**, 250—252; cf. A., 1939, III, 812).—K oxalate (1 in 2000) is toxic to horse leucocytes suspended in isotonic fluid containing rice starch grains at p_H 7·3. The K salts of dibasic acids from C_3 to C_{12} have no appreciable effect, but the higher homologues are markedly toxic. Phagocytosis is completely inhibited by 1 in 50,000 of the C_{18} acid. The homologues higher than C_{12} form colloidal solutions and markedly lower the surface tension, the toxic effect of the former completely overcoming the favourable effect of the latter on phagocytosis. J. L. D.

Lymphocyte in acute inflammation. F. Kolough (Amer. J. Path., 1939, **15**, 413—428).—The initial response of the rabbit in acute inflammation is the transformation of clasmatocytes to histogenous macrophages. Most macrophages in the acute inflammatory exudate are of hæmatogenous origin. The lymphocyte–macrophage transformation occurs early in the course of the inflammation. By the 14th hr. the lymphocytic origin of many mononuclear cells in an inflamed area is largely obscured. In studies made 18 hr. or later after the onset of an acute inflammation in a tissue, cell lineage cannot be traced. (12 photomicrographs.) C. J. C. B.

Leucocytosis following parenteral administration of liver extract in man. H. D. Bruner (Amer. J. Physiol., 1939, **127**, 58—63).—Normal men injected with various sterile liver anti-anæmic preps. developed a leucocytosis which was non-sp. and similar to that produced by inactive kidney extracts. The response is less with more purified active liver extracts. M. W. G.

Histoplasmosis in infancy. A. L. Amolsch and J. H. Wax (Amer. J. Path., 1939, **15**, 477—482).—Report of a case. (4 photomicrographs.) C. J. C. B.

Case of aleukæmic lymphatic leukæmia with specific localisations and symptomatic pernicious anæmia. J. F. Touw and C. A. Graafland (Acta med. scand., 1939, **102**, 124—131).—The findings in this case of a 74-year-old woman support the blastoma theory of leukæmia. C. A. A.

Homologous transmission of lymphoblastic leukæmia in calf. J. Stasney, W. H. Feldman, and W. C. Popp (Amer. J. Cancer, 1939, **37**, 114—117).—Attempts were made to transmit lymphoblastic leukæmia of a calf to 2 other calves of the same breed. Blood and emulsions prepared from hyperplastic lymph nodes of the diseased calf were injected into the recipients intravenously and subcutaneously. The spleen of one recipient was irradiated with a large dose of *X*-rays prior to injection. Except for a transitory but marked leucocytosis that subsided 10 days after the injections, no blood changes occurred. One calf was under observation for 283 days and the other for 346 days after injection. Subsequent histological study showed both to be normal. F. L. W.

Failure of wheat-germ oil to prevent lymphomatosis in chickens. L. W. Taylor and K. B. De Ome (J. Amer. Vet. Med. Assoc., 1939, **95**, 73—76).—Contrary to previous reports, the feeding of wheat-germ oil had no effect on the incidence, type, or age of onset of lymphomatosis in fowls. The differences in incidence were related to the genetic constitution of the stock. E. G. W.

Primary polycythæmia with leukæmic manifestations. L. Kellman (Amer. J. Dis. Child., 1939, **58**, 146—149).—A case of acquired primary polycythæmia with leukæmic manifestations in a child in the first decade is reported. An unusual

manifestation was the spontaneous remission that has lasted more than 3 years. C. J. C. B.

Myeloid leukæmia and non-malignant extramedullary myelopoiesis in mice. W. A. Barnes and I. E. Sisman (Amer. J. Cancer, 1939, **37**, 1—35).—8 transmissible strains of myeloid leukæmia had characteristics which, with rare exceptions, were unaltered in the course of successive subpassages. The malignant cells in 5 cases were myelocytes, in 3 myeloblasts maturing into promyelocytes or myelocytes. The individual cells resembled normal cells but differed from the latter in their ability to produce tumours, colour of the leukæmic infiltration, localisation in various tissues, and transmissibility to different stocks of mice. The infiltrations in non-malignant extramedullary myelopoiesis in mice may be as extensive as those in myeloid leukæmia. The non-malignant condition is frequent in apparently healthy old mice; it often accompanies suppurative inflammations, particularly those of long standing, and spontaneous and transmitted neoplasms. The differentiation from leukæmia is occasionally difficult. Features of the non-malignant disturbance include conspicuous maturation of myeloid cells, association with erythrogenesis, presence of megakaryocytes, absence of epicapsular and tumour-like infiltrations, and failure of transmission to other mice. Parenteral administration of *B. coli* is a simple procedure to stimulate extramedullary hæmatopoiesis in mice. Exposure of mice with spontaneous breast tumours to small doses of *X*-rays did not produce myeloid leukæmia, and failed to increase the extent of non-malignant extramedullary myelopoiesis. F. L. W.

Blood transfusion outfit. J. M. Vaughan (Brit. Med. J., 1939, II, 1084—1085).—Apparatus recommended by the Medical Research Council is described. C. A. K.

Placental blood for transfusion. F. E. Barton and T. M. Hearne (J. Amer. Med. Assoc., 1939, **113**, 1475—1478).—The technique of using placental blood for transfusion is described. C. A. K.

Transfusion with stored blood. J. C. Leedham-Green (Brit. Med. J., 1939, II, 849).—The results of 60 transfusions using blood stored for 5·5 days (average) are described. Reactions in 12 cases were slight rigors and pyrexia; no jaundice or hæmoglobinuria occurred. C. A. K.

Changes in stored blood. A. Macdonald and G. M. Stephen (Lancet, 1939, **237**, 1169—1172).—Changes in citrated blood stored at 2—4° are described. Diminution in the erythrocyte count is preceded by degenerative changes in the cells. The white cells decrease rapidly and at the end of 1 week small lymphocytes only are present. Platelets also disappear fairly quickly. Red cell fragility increases from the 8th—9th day and the sedimentation rate diminishes until at the 21st day it may be zero. C. A. K.

Preservation of stored blood. M. Maizels and N. Whittaker (Lancet, 1939, **237**, 1219—1221).—Most solutions used to prevent coagulation in stored blood are hypertonic when compared with fresh erythrocytes. A solution of 0·43% NaCl + 1·05% Na citrate is isotonic with fresh red cells. After addition of dextrin blood may be stored for 7 weeks, and hæmolysis is then less than half that in a simple citrate–saline control. C. A. K.

Stored blood for transfusion. J. L. H. Paterson (Brit. Med. J., 1939, II, 908—910).—Blood was used for transfusion after being stored for 3—33 days. There was one case of hæmoglobinuria, 2 cases had mild rigors, and slight rises of temp. were seen in some cases. C. A. K.

Biochemical changes occurring during storage of human blood. M. Bick (Austral. J. Exp. Biol., 1939, **17**, 321—331).—Storage of human blood is accompanied by decrease in glucose content and increase in reduced glutathione, uric acid, creatinine, non-protein-N, and inorg. PO_4'''. The onset of hæmolysis is associated with changes in the two last-named vals. Addition of glucose delays but does not prevent hæmolysis. Only a small part of the rise in non-protein-N is accounted for by the increase in urea, creatinine, and uric acid. Experiments on washed erythrocytes suspended in saline show that the cells are responsible for the chemical changes. D. M. N.

Rôle of liver in circulatory disorders due to shock produced by blood transfusion. M. N. Chanin (J. méd., Ukraine, 1939, **9**, 385—393).—Citrated rabbit's blood was transfused into dogs. Shock appeared as regularly in Eck fistula as in control animals. Further experiments showed that changes in the splanchnic circulation were unrelated to the shock. M. K.

Hæmoglobin solution as blood substitute. L. O'Shaughnessy, H. E. Mansell, and D. Slome (Lancet, 1939, **237**, 1068—1069).—5% hæmoglobin–Ringer's solution was tolerated in 4 patients given up to 600 c.c. The urine was previously made alkaline and only 1 case showed hæmoglobinuria. C. A. K.

Coagulation time of blood in normal and adrenal-demedullated rats. D. J. Ingle and W. C. Corwin (Proc. Soc. Exp. Biol. Med., 1939, **42**, 82—84).—In normal rats fright and struggling shorten the blood-coagulation time, and this effect is not modified by previous removal of the adrenal medulla. V. J. W.

Diffusible organic blood-clotting factor. A. J. Glazko and D. M. Greenberg (Proc. Soc. Exp. Biol. Med., 1939, **42**, 177—178).—Serum ultrafiltrate which causes coagulation in dialysed plasma acts as a thrombokinase and is destroyed by boiling (cf. A., 1937, III, 55). V. J. W.

Clinical studies on vitamin-*K*. E. T. Hansen (J. Amer. Med. Assoc., 1939, **113**, 1875—1876).—Oral, intramuscular, and intravenous modes of administration of vitamin-*K* are discussed. C. A. K.

Action of vitamin-*K* on coagulation time in cases of obstructive jaundice. F. Koller and F. Wuhrmann (Klin. Woch., 1939, **18**, 1058—1060.—Daily intramuscular injection of 250,000 units of vitamin-*K* in conjunction with duodenal administration of 1,000,000 units of -*K* reduced the coagul-

ation time in a case of carcinoma of the pancreas from more than 410 sec. (Quick's method) to normal. Similar good results were obtained in 8 other cases. E. M. J.

Nutritional deficiency of vitamin-*K* in man. R. Kark and E. L. Lozner (Lancet, 1939, **237**, 1162—1164).—3 patients with scurvy and one with pellagra also had low blood-prothrombin levels as shown by a modification of Quick's method. Ingestion of vitamin-*K* restored normal vals. There were no definite symptoms attributable to the -*K* lack, which was not so marked as in cases of obstructive jaundice. C. A. K.

Vitamin-*K* lack in infants. H. Dam, E. T. Hansen, and P. Plum (Lancet, 1939, **237**, 1157—1161).—Normal infants show a moderate vitamin-*K* lack during the first few days of life, *i.e.*, the time when hæmorrhagic diathesis is seen. Normal -*K* vals. occur after 1 week. In icterus gravis neonatorum, anæmia neonatorum, and hydrops congenitus there is a very considerable hypoprothrombinæmia which is corr. by ingestion of -*K* + bile salts. C. A. K.

Calcium and blood coagulation. J. Mellanby and C. L. G. Pratt (Proc. Roy. Soc., 1940, **B**, **128**, 201—213).—The Ca content of fowl serum equals that of plasma; Ca does not combine with fibrinogen in the formation of fibrin. Ca does not affect the rate of coagulation of plasma by thrombase. Only 8—9 mg.-% of Ca is readily pptd. from plasma by oxalate; great excess of oxalate ppts. the remaining Ca. Removal of the readily pptd. Ca prevents coagulation of plasma by thrombokinase. The rate of activation of prothrombase by thrombokinase is accelerated by $Ca^{\cdot\cdot}$. Spontaneous activation of prothrombase in presence of water, acetic acid, and oxalic acid shows that the Ca ion, although increasing the rate, is not essential to the reaction. D. M. N.

Examination of thrombocytes in dark field. A. Fonio (Schweiz. med. Wschr., 1939, **69**, 952—958).—Thrombocytes were examined in plasma made incoagulable by addition of 14% $MgSO_4$ or in a dark field. Granules were distinguished in the cytoplasm. The formation of pseudopodia in hæmophilic thrombocytes is deficient. A. S.

Chlorazol-fast-pink BKS as anti-coagulant. W. Modell (Science, 1939, **89**, 349—350).—The extraction of the substance from the crude dye (trade name: Fastusol Pink BBA) is described. The purified substance is non-toxic in doses of 1 g. per kg. body-wt., and is effective, in doses of 100 mg. per kg., in preventing clotting for many hr. Specimens of blood from treated animals do not clot for at least 12 hr. W. F. F.

Red cell volume. I. Effect of anticoagulants. A. D. Marenzi, E. Lida y Zulema, and G. de Cairo (Rev. Soc. argent. Biol., 1939, **15**, 173—177).—Na, K, NH_4, and Li oxalates, Heller and Paul's mixture of K and NH_4 oxalate, Na citrate, NaF, novirudin, heparin, Na polyanetholesulphonate (liquoid Roche), and chlorazol BKS were used as anticoagulants with dog and human blood. An anticoagulant unit is defined as the amount in mg. necessary to prevent coagulation of 1 ml. of blood kept in the ice box for 24 hr.; the activity is the no. of units in 1 mg. 2 units are added to assure a margin of safety. The most powerful anticoagulants were the heparins. The advantages of each type of anticoagulant is discussed. J. T. L.

Neutralisation of heparin by protamine. E. Jorpes, P. Edman, and T. Thaning (Lancet, 1939, **237**, 975—976).—60 mg. of protamine instantaneously neutralises the effect of 100 mg. of heparin in the rabbit and in man on intravenous injection. No toxic effects were seen. C. A. K.

Administration of heparin *per os*. A. Fischer and T. Astrup (Proc. Soc. Exp. Biol. Med., 1939, **42**, 81—82).—Heparin is not absorbed from the alimentary canal of mice. V. J. W.

Heparin in subacute bacterial endocarditis. M. Friedman, W. W. Hamburger, and L. N. Katz (J. Amer. Med. Assoc., 1939, **113**, 1702—1703).—Continuous intravenous drip administration of heparin to a case of subacute bacterial endocarditis was followed after 10 days by death from cerebral hæmorrhage. C. A. K.

Heparin and plasma-albumin in relation to thromboplastic action of trypsin, kephalin, and brain extracts. J. H. Ferguson (Proc. Soc. Exp. Biol. Med., 1939, **42**, 33—37).—Antiprothrombic effect of heparin is not due to alteration of prothrombin but to an antagonism between heparin and a thromboplastic factor or enzyme (cf. A., 1939, III, 1027). V. J. W.

Coagulant action of crystalline trypsin, kephalin, and lung extracts. J. H. Ferguson and B. N. Erikson (Amer. J. Physiol., 1939, **126**, 661—668).—Cryst. trypsin clots citrated plasma and activates prepared prothrombin without added Ca or kephalin, but is more potent in presence of $Ca^{\cdot\cdot}$. Excess of citrate inhibits the clotting activity of trypsin. Added kephalin promotes the optimal potency of trypsin in the presence of Ca. Boiled trypsin loses a little of its coagulant power if used alone or with kephalin but if Ca is added (especially in presence of kephalin) there is no loss. Neither Ca nor kephalin prevents the proteolytic action of excess of trypsin on thrombin. Clots obtained with trypsin–thrombin show syneresis (clot-retraction) and fibrinolysis in a few min. Ca-free trypsin retains its clotting power. Cryst. trypsin does not contain phospholipin. Fibrinogen free from prothrombin is not coagulated by trypsin, even when Ca and kephalin are added; hence trypsin is not a thrombin or a precursor of thrombin. The prothrombin solutions used contained 8—30 mg.-% of phospholipin of which 40—60% was kephalin. In spite of this Ca had little power to activate these preps.; trypsin may liberate the bound phospholipins and so activate the prothrombin. A "thromboplastic enzyme" is postulated which, under ordinary conditions of thrombin formation, contributes to the mobilisation of the essential phospholipin factor. M. W. G.

Clotting of hæmophilic plasma by thromboplastic enzyme. J. H. Ferguson (Amer. J. Physiol., 1939, **126**, 669—672).—Pure cryst. trypsin, optimally potentiated by Ca and kephalin, can

activate the prothrombin of hæmophilic "globulin substance" to normal thrombin and can coagulate hæmophiliac plasma (*in vitro*) exactly like normal plasma. On the view previously put forward (see above) that there exists a "thromboplastic enzyme," it is held that in hæmophilia there is a quant. deficiency of this enzyme in the plasma. M. W. G.

Kephalin and blood coagulation. H. Michimoto (J. Biochem. Japan, 1939, **30**, 147—153).—Kephalin is pptd. from alcoholic extracts of tissues on cooling to −10°. Kephalin separated by means of its Br derivative (insol. in ether, light petroleum, and benzene) accelerates blood coagulation. Kephalin associated with highly unsaturated fatty acids occurs to a greater extent in blood vessels and heart than in other tissues (rabbit). F. O. H.

Acceleration of hæmolysis in relation to chemical structure. II. Straight-chain alcohols. E. Ponder and C. Hyman (Proc. Soc. Exp. Biol. Med., 1939, **42**, 320—322; cf. A., 1939, III, 1026).—There is a logarithmic relation between no. of C atoms in an alcohol and its power as accelerator of hæmolysis. V. J. W.

Splenectomy in hæmolytic jaundice. J. C. Sharpe, C. W. McLaughlin, and R. Cunningham (Arch. intern. Med., 1939, **64**, 268—277).—In patients with familial hæmolytic jaundice splenectomy caused immediate large increases in red and white cell counts, attributable to compression of the spleen during removal. Subsequently the red cell count fell and then rose gradually to normal limits in 4—6 weeks, and the leucocyte returned to normal. No comparable blood changes occurred in splenectomy for atypical hæmolytic anæmia or splenectomised cases of familial hæmolytic jaundice undergoing cholecystectomy. C. A. K.

Coagulation defect in hæmophilia; clot-promoting activity associated with plasma-euglobulin in hæmophilia. E. L. Lozner and F. H. L. Taylor (J. clin. Invest., 1939, **18**, 821—825).—Dialysis of cell-free citrated normal human plasma yields a euglobulin ppt. containing practically all of the clot-promoting activity of the plasma for hæmophiliac blood. Unlike acid-pptd. "globulin substance" plasma-euglobulin resembles normal human plasma in its ability to maintain in hæmophilia a reduced blood-coagulation time when injected intravenously every 6 hr. C. J. C. B.

Storage of transfusion plasma. F. A. Knott and E. H. Koerner (Lancet, 1939, **237**, 1069—1071).—Group *O* plasma stored in the cold retains its agglutinins for many weeks and may act in high dilutions. It is suggested that the agglutinating effect of a 1 in 50 dilution of the plasma on the recipient's cells should be noted before administration. C. A. K.

Blood-grouping sera for emergency purposes. S. W. Challinor, J. C. J. Ives, and C. E. van Rooyen (Brit. Med. J., 1939, II, 850—851).—Blood to be used for providing standard human blood-grouping sera should be assessed according to the end-titre of agglutinins and by considering the character and size of clumps produced after a given time. The use of desiccated typing sera is described. C. A. K.

Iso-agglutinin anti-*M* present in human blood. P. Moureau and J. Lambert (Compt. rend. Soc. Biol., 1939, **131**, 819—820).—Further experiments (cf. A., 1939, III, 961) confirm the finding of iso-agglutinin anti-*M* in the blood of a man of type A_1BN; the property was not inherited. P. C. W.

Meinicke clearing reaction with dried blood. E. Meinicke and R. Fischer (Klin. Woch., 1939, **18**, 1060—1062).—A modification of the Meinicke clearing reaction II, using only one drop of blood, dried on a glass slide, is described. E. M. J.

Defence enzymes acting on proteins of endocrine secretions in serum of old rabbits. N. Medvedeva (J. méd., Ukraine, 1939, **9**, 7—22).—This was demonstrated by interferometric investigations. H. L.

Chronic hæmolytic anæmia with paroxysmal nocturnal hæmoglobinuria: immunological aspects of the hæmolytic mechanism with special reference to serum complement. T. H. Ham and J. H. Dingle (J. clin. Invest., 1939, **18**, 657—672).—In paroxysmal nocturnal hæmoglobinuria the red cells were more susceptible to hæmolysis when suspended in acidified plasma or serum from patients or compatible normal sera. The patients showed no increased susceptibility to hæmolysis in non-immunological hæmolytic systems (saponin, Na taurocholate, or hypotonic saline) but showed increased susceptibility to hæmolysis in immunological hæmolytic systems (anti-human rabbit serum or human isohæmolysins as antibody and human serum as complement). There is no antigenic difference between patient's and normal erythrocytes when used to immunise rabbits. No hæmolytic substance or antibody was found when patient's cells were treated by procedures known to dissociate antibody from antigen, nor was there any abnormality in the patients' serum. The serum factor essential for hæmolysis was closely associated with, if not indistinguishable from, complement or alexin of human serum. For this hæmolytic system, the addition of guinea-pig serum did not restore the thermolabile (but did restore the thermostable) components of human serum complement. The mechanism of this immunological hæmolysis is that of an abnormal red blood cell which was hæmolysed in the presence of human complement, the degree of hæmolysis varying directly with the susceptibility of the cell to lysis and the acidity of the serum. C. J. C. B.

Carcinolytic property of serum in certain visceral diseases. N. Kavetski (J. méd., Ukraine, 1939, **9**, 60—63).—The carcinolytic property of the serum is regarded as a sign of normal functioning of the active mesenchymal tissue; it is diminished in visceral cancer, various chronic and acute disorders of the gastro-intestinal tract, and in pneumonia. Its estimation is suggested for diagnostic and prognostic purposes. H. L.

Carcinolytic property of serum and of organ extracts in rats resistant to Jensen sarcoma. S. Mutschnik and M. Vourgaft (J. méd., Ukraine,

1939, **9**, 67—72).—Serum and extracts of liver and spleen had a carcinolytic property above normal. H. L.

Antigenic patterns in human sera: race-specific antigens. G. H. Smith (Yale J. Biol. Med., 1939, **11**, 629—643).—The precipitin reaction applied, in accord with the principle of optimum proportions, to human sera derived from the white, black, and red races gave results with anti-sera prepared in rabbits suggestive of the presence of race-sp. antigenic components. F. S.

Regulation of hæmolymph in saline water mosquito larva *Aedes detritus*, Edw. L. C. Beadle (J. exp. Biol., 1939, **16**, 346—362).—The larvæ of the mosquito *Aedes detritus* have been reported only from saline waters. In the laboratory they were acclimatised to distilled water, sea-water, and glycerol. They also show considerable resistance to 0·05N-NaOH but less to 0·02N-HCl. They are unable to live permanently in solutions of KCl, $MgCl_2$, and $CaCl_2$ of osmotic pressure equiv. to 3·5% NaCl. In sea-water of varying salinity they can regulate both the total osmotic pressure and the Cl′ content of the hæmolymph. In hypotonic solutions and distilled water much Cl′ is lost, but this is compensated by an increase in the non-Cl′ fraction. In hypertonic sea-water the rise in osmotic pressure is due to increase in the Cl′ fraction, the non-Cl′ fraction remaining const. It is concluded that the larva is permeable to salts and to mols. as large as glycerol, and that the regulatory mechanism in hypertonic saline is concerned with compensation rather for penetration of salts than for loss of water by osmosis. Ligature experiments suggest that this mechanism is the excretion of salt by the Malpighian tubes. Salt exchange with the environment takes place via the gut. The larvæ are able to concentrate Cl′ from hypotonic solutions. The osmotic pressure of the hæmolymph is trebled by treatment with glycerol, which must be mainly the results of penetration of glycerol. J. M. R.

Chemical considerations in toxic conditions. G. Fanconi (Schweiz. med. Wschr., 1939, **69**, 921—927).—A lecture. A. S.

Adsorption of methylene-blue by blood of infants and children. Mechanism of reaction and clinical application. C. H. Smith (Amer. J. Dis. Child., 1938, **57**, 1223—1245).—The rapid decolorisation of a dil. solution of methylene-blue in the cold by the blood of a healthy infant (Physiol. Abs., 1935, **20**, No. 2645) proceeded most actively during the first 4 months of life. A total of 576 tests on decolorisation of methylene-blue, with simultaneous determinations of the vol. of packed red blood cells and of the sedimentation rate, were carried out for 227 infants and children of 5 months to 14 years. The rate of decolorisation was moderate or marked in healthy children with a normal sedimentation rate and was diminished in disease with an increased sedimentation rate. Most marked decolorisation was noted in infants and children with uncomplicated nutritional anæmia who were receiving Fe therapy (regardless of their hæmatocrit levels or sedimentation rates). C. J. C. B.

Total sulphur, cystine, and methionine content of blood-globins of five mammalian species. E. F. Beach, S. S. Bernstein, F. C. Hummel, R. H. Williams, and I. G. Macy (J. Biol. Chem., 1939, **130**, 115—119).—Data are given for the amounts of cystine, methionine, and total S and N in the globins from horse, hog, ox, sheep, and human blood. Ox globin contains the least cystine, 0·38%. Sheep, hog, and horse globins contain approx. twice this amount, human blood-globin 1·21%. Horse and hog globins contain 0·75% of methionine, the other three globins an average of 1·24%. It is suggested that the specificity of hæmoglobins depends on differences in their amino-acid composition. J. N. A.

Clinical and therapeutic aspects of hypochloræmic azotæmia. C. C. Dimitriu, G. Comsa, T. Tanasoca, and L. Schwartz (Bull. Mém. Soc. méd. Hôp. Bucarest, 1939, **21**, 254—265).—9 cases are reported, 5 of which were of extrarenal origin and 4 of mixed character. Dehydration is regarded as the primary, and hypochloræmia as the associated, cause. In all cases the azotæmia disappeared after administration of large amounts of NaCl solutions. H. L.

(A) Physiological variation in English race-horses. (B) Speed and blood value of English race-horses. (C) Physiological variation in horse with age, breed, and performance. V. I. Patruschev (Compt. rend. Acad. Sci. U.R.S.S., 1939, **23**, 710—713, 714—717, 718—721).—(A) Large horses have high serum-protein and -globulin and high blood-glutathione. Reduced and total glutathione and serum-globulin are higher in eurosomal than leptosomal animals but oxidised glutathione, serum-albumin, and blood concn. are higher in the latter.

(B) Fast horses have high cell concn., oxidised and total glutathione, and sugar in the blood, and low sedimentation rate, pulse, and breathing. Stayers have higher total and oxidised glutathione than have fliers. Functional changes shown after a race are usually less marked in the winners.

(C) Blood vals. and respiratory and pulse rate are recorded for race-horses, trotters, and draft-horses. In general the vals. for trotters lie between those of the other two classes. E. M. W.

Blood plasma-protein production as influenced by amino-acids. S. C. Madden, W. A. Noehren, G. A. Waraich, and G. H. Whipple (J. Exp. Med., 1939, **69**, 721—738).—Health can be maintained for as long as a year in a hypoproteinæmic dog on a basal liver diet. Addition of gelatin to the diet does not enhance the rate of protein replacement. Further addition of cystine or tyrosine and tryptophan causes no improvement. Addition of cystine and tyrosine or tryptophan to the gelatin makes it equal to other proteins in plasma-protein-forming val. The effect of cystine and tyrosine appears to be sp. Laked red blood cells have little val. in replacement of plasma-protein. A. C. F.

Blood-"guanidine." R. H. Major, C. J. Weber, and M. J. Rumold (Arch. intern. Med., 1939, **64**, 988—993).—The compound found in blood and previously described as guanidine is probably a guanidine derivative of an anhydride type and may

be glycocyamidine.. It is increased in experimental renal insufficiency with or without hypertension. C. A. K.

Determination of serum-total protein, -albumin, and -globulin by the biuret reaction. G. R. Kingsley (J. Biol. Chem., 1939, **131**, 197—200).—The method described involves elimination of preliminary pptn. of the protein, the use of $CuSO_4$ and NaOH in such proportion that a ppt. is avoided, and the use of a photo-electric colorimeter. H. G. R.

Diazotisation of serum. A. Gigon and M. Noverraz (Schweiz. med. Wschr., 1939, **69**, 811—814).—4 drops of a 0·5% aq. solution of $NaNO_2$ were added to 5 c.c. of a solution containing 0·5% of diazosulphanilic acid and 1·5 c.c. of conc. HCl per 100 c.c. In the formula $R = t/(t + b)$, R represents the concn. of bilirubin diazotised in time t; b is a const. Serum-bilirubin was studied in various types of jaundice. Hæmolytic jaundice was characterised by retention of bilirubin in the protein ppt. in acetone solutions, by normal bile acid level in serum (below 0·9 mg. per 100 c.c.), and by the speed of diazotisation. A. S.

Non-protein-nitrogen in renal blood. F. Stefani (Arch. Sci. biol., Napoli, 1939, **25**, 409—418).—In dogs, cats, and rabbits the non-protein-N content in blood from the renal vein was the same as in arterial blood; this was the case whether the animal was or not in an absorptive condition, and after intravenous injection of heterologous protein or peptone. When the circulation through the kidney was temporarily stopped, the non-protein-N of the renal venous blood became lower than that of the arterial blood. S. O.

Lipolytic power of plasma and erythrocytes. Effect of citric and oxalic acid, hydrogen-ion concentration, and amount of blood used. G. Scoz (Enzymologia, 1939, **7**, 82—87).—Experiments with the blood of man, rabbit, guinea-pig, and dog show that the lipolytic power of plasma and erythrocytes (measured with tributyrin) is greatly increased by adding oxalate or citrate, the extent of the increase with citrate being up to 400%. The optimum p_H for the lipases is 8, the action of plasma-lipase, unlike that of erythrocyte-lipase, not being readily inhibited by deviations from this val. Formulæ expressing the relationships between amount of plasma and erythrocytes and lipolytic power are given. W. McC.

Separation of lipins in gravimetric acetone method for plasma-total protein. E. M. Boyd (Proc. Soc. Exp. Biol. Med., 1939, **42**, 263—264).—3 vols. of plasma should be added to 75 vols. of acetone instead of to 10 vols. in Bierry and Vivano's method, in order to secure complete removal of lipins. V. J. W.

Cholesterolysis in the blood plasma of individuals with mental disorders. P. G. Schube, N. Raskin, and E. Campbell (J. Lab. clin. Med., 1939, **25**, 142—149).—The rate of change of total plasma-cholesterol over 24 hr. of mentally ill persons shows positive and negative changes which are similar to those of normal individuals but on a lower plane. C. J. C. B.

Character of phospholipin (acetone-insoluble) fatty acids of serum in infantile eczema. A. E. Hansen (Proc. Soc. Exp. Biol. Med., 1939, **41**, 205—207).—In 7 eczematous children the acetone-insol. fatty acids of the serum were more unsaturated and had higher mol. wts. than the total fatty acids. The degree of unsaturation of all the acids was less than that previously (see A., 1939, III, 962) found in normal children. V. J. W.

Serum-lipins and proteins in lymphogranuloma venereum. I. Rosen, H. Rosenfeld, D. Bloom, and F. Krasnow (Arch. Dermat. Syphilol., 1939, **39**, 211—216).—Hyperglobulinæmia was found in all of 116 cases, being present during all stages and most marked in the late stage (rectal stricture and esthiomène). The serum-lipins (total lipins, total cholesterol, and P) were decreased. In chancroid there may be an increased globulin content but no decrease in the lipins. Treatment of lymphogranuloma venereum by intravenous injection of Frei antigen restored the lipin vals. to normal but left the globulin unchanged. C. J. C. B.

Blood-sugar estimation. H. R. Millar (Brit. Med. J., 1939, II, 1035—1036).—A simple modification of Folin and Wu's method is described. C. A. K.

Effect of carbon tetrachloride on serum-amylase of dogs. J. O. Hanson (Proc. Soc. Exp. Biol. Med., 1939, **42**, 21—22).—CCl_4 given by mouth to dogs in dosage of 2—20 c.c. every 3 days, which is known to cause hepatic injury, causes a fall of over 50% in serum-amylase. V. J. W.

Photo-oxidation of blood plasma and tissues in buckwheat disease. H. Smetana (Proc. Soc. Exp. Biol. Med., 1939, **42**, 60—64).—In guinea-pigs made photo-sensitive by eating buckwheat, irradiation of blood plasma or tissue slices causes no increase in O_2 consumption. V. J. W.

Determination of blood-acetone bodies. R. H. Barnes and A. N. Wick (J. Biol. Chem., 1939, **131**, 413—423).—Acetoacetic acid and β-hydroxybutyric acid in deproteinised [$Cd(OH)_2$] blood are oxidised with H_2SO_4–$K_2Cr_2O_7$ to acetone, which is pptd. as a Hg complex. The acetone set free from the complex by HCl is determined by the Messinger titration method. E. M. W.

Kinetics of choline-esterase in blood and spinal fluid. M. B. Bender (Amer. J. Physiol., 1939, **126**, 180—187).—The choline-esterase activity of human sera and c.s.f. was determined by Bender's method (cf. A., 1939, III, 36). The test object was the ear muscle of the cat after chronic denervation. Human c.s.f. contains choline-esterase in quantities 1—2% of those found in serum. *In vitro* experiments suggest that minute amounts of acetylcholine may circulate in the blood continually. M. W. G.

Hydrolysis of acetylcholine by turtle blood. J. M. Little (Proc. Soc. Exp. Biol. Med., 1939, **42**, 197—200).—Laked blood has considerable esterase activity which is inhibited by prostigmine, while serum has none. Unlaked blood has more activity than laked blood; this difference is not affected by

prostigmine, and is possibly due to surface catalysis on the corpuscles. V. J. W.

Blood-histamine during anaphylactic shock in horse and calf. C. F. Code and H. R. Hester (Amer. J. Physiol., 1939, **127**, 71—77).—Anaphylactic shock was produced in young calves and 2 horses. The symptoms in the horse were dyspnœa, increased peristalsis, and sweating; progressive respiratory difficulty was the dominant symptom. In the calves progressive distention of the abdomen was the outstanding feature. In both species the blood-histamine was reduced, in contrast to the increase found in dogs and guinea-pigs. M. W. G.

Histamine content of blood of guinea-pigs and dogs during anaphylactic shock. C. F. Code (Amer. J. Physiol., 1939, **127**, 78—93).—Blood-histamine was determined (using a modified Barsoum–Gaddum method) during severe anaphylactic shock in guinea-pigs and dogs. In guinea-pigs it rose 2—13 times; this was not due to the coincident anoxæmia. In dogs the blood-histamine rose 2—80 times. The fall in blood pressure which occurred in canine anaphylaxis was coincident with the rapid accumulation of histamine in the blood; the blood pressure recovers only with the disappearance of histamine from the blood. M. W. G.

Changes in blood-p_H in cancer. M. Pasternak (J. méd., Ukraine, 1939, **9**, 147—160).—In 53 cases of cancer the average val. for p_H was 7·45; in inoperable cases it was 7·53; dissolved CO_2 was diminished while combined CO_2 remained normal; CO_2 pressure in venous blood was also diminished. The same changes were seen in experimental cancer and in some precancerous conditions (mastopathy, intestinal polyposis, but not in gastric ulcer and erosion of uterine cervix). H. L.

Serum-electrolytes in catarrhal jaundice. E. Poli (Klin. Woch., 1939, **18**, 1084—1086).—10 cases of catarrhal jaundice and 10 of various other inflammatory conditions showed increased serum-K and -Na and diminished -Ca and -Mg. E. M. J.

Seasonal variations in electrolyte composition of serum and erythrocytes of mammals and birds. A. I. Safarov (Ukrain. Biochem. J., 1939, **13**, 331—345).—Considerable seasonal fluctuations in the Na, K, Ca, and Mg contents of the serum and erythrocytes of male and female rabbits, hedgehogs, pigeons, and sparrows are recorded. In view of this finding, the val. of tables of normal blood composition recorded in the literature is questioned. R. T.

Determination of copper in serum. H. G. Schmidt (Biochem. Z., 1939, **302**, 256—261; cf. Heilmeyer and Stüwe, A., 1938, III, 875).—Serum (4 c.c.) is mixed with 2 c.c. of 6N-HCl and, after 10 min., the mixture is deproteinised with 2 c.c. of 20% trichloroacetic acid. 1 c.c. of the filtrate is well mixed with 1·3 c.c. of alcohol, 0·2 c.c. of aq. NH_3 (sp. gr. 0·925) is added, the mixture is cooled, and a drop of 2% alcoholic solution of Na diethyldithiocarbamate is added. The depth of colour produced is measured, after a few min., with a step photometer. Traces of Cu in the reagents necessitate a blank determination. Healthy serum contains 110—140 μg.-% of Cu. The deproteinised serum serves also for determination of Fe. W. McC.

Determination of total base (sum of sodium, potassium, calcium, and magnesium) in blood. E. Leva and G. M. Guest (J. Biol. Chem., 1939, **130**, 777—785).—The material is deproteinised with trichloroacetic acid and the SO_4'' replaced by Cl′ by heating with N_2H_4,HCl, the cations being obtained as a mixture of Cl′ and H_2PO_4'. Cl′ is then determined by the Volhard method and the total Cl′ and PO_4''' by pptn. with $AgNO_3$ in Na acetate solution. A. L.

Phosphatase and inorganic phosphorus in plasma and whole blood of the fowl. W. J. Peterson and D. B. Parrish (Poultry Sci., 1939, **18**, 59—62).—In 5-month cockerels and pullets plasma-phosphatase was 21 and 33% respectively higher than the average vals. for whole blood. In 16-month birds plasma and whole blood vals. were not significantly different and were far smaller than in the younger birds. A. G. P.

Fluctuations of phosphatase and inorganic phosphorus in blood of laying hens during egg formation. W. J. Peterson and D. B. Parrish (Poultry Sci., 1939, **18**, 54—57).—During the 26-hr. period of the egg cycle, plasma-phosphatase and -inorg. P increased considerably, the effect being greater in pullets at first laying than in older birds. A. G. P.

Serum-phosphatase activity in rats fed on a poor South Indian diet variously supplemented. K. V. Giri and K. L. Shourie (Indian J. Med. Res., 1939, **27**, 153—158).—Serum-phosphatase activity of rats fed on a poor South Indian diet was higher than that of rats receiving the same ration supplemented with Ca lactate. Addition of extra fat to the basal diet increased serum-phosphatase activity. H. B. C.

Blood chemical changes in Boeck's sarcoid. G. T. Harrell and S. Fisher (J. clin. Invest., 1939, **18**, 687—693).—The blood changes found in 11 cases of generalised Boeck's sarcoid studied over a period of years are reported. Hyperproteinæmia and hyperglobulinæmia occur in active cases and disappear as the lesions heal. The serum-Ca usually rises. Ca-tolerance tests give variable results. The blood-phosphatase is raised in all active cases; blood-P is unchanged. These data indicate that the changes in the bones are not associated with hyperfunction of the parathyroid glands. Hepatic function is impaired as shown by abnormal bilirubin excretion, fractional pptn. patterns of the serum-proteins, and an increase in blood-phosphatase. C. J. C. B.

(vi) VASCULAR SYSTEM.

Physiological contraction of double hearts in rabbit embryos. L. A. Dwinnell (Proc. Soc. Exp. Biol. Med., 1939, **42**, 264—267).—In 9-day rabbit embryos the two primitive heart tubes contract at different rates and with different contraction waves. Contractions begin in ventricles, but later,

before fusion of the two tubes occurs, originate in the atria. V. J. W.

Choline-esterase activity in various portions of rabbit heart. W. Antopol, S. Glaubach, and D. Glick (Proc. Soc. Exp. Biol. Med., 1939, **42**, 280—282).—The auricles contain about 4 times as much esterase as the ventricles (cf. A., 1939, III, 870). V. J. W.

Monophasic action currents from uninjured turtle ventricle. R. Ashman and N. C. Woody (Proc. Soc. Exp. Biol. Med., 1939, **42**, 17—20).—By cooling the tip of the ventricle from which one lead is taken the electric response is made monophasic though no current of injury is produced. V. J. W.

Auricular fibrillation of 22 months' duration with return to normal sinus mechanism without the aid of quinidine. G. E. Burch (Amer. Heart J., 1939, **18**, 102—107).—A case report. G. Sch.

Relation between prolonged *P–R* interval and auricular fibrillation in patients with rheumatic heart disease. M. D. Altschule (Amer. Heart J., 1939, **18**, 1—7).—50% of patients with rheumatic heart disease exhibiting constantly and for several years a prolonged *P–R* interval developed auricular fibrillation. Over 75% of patients with rheumatic heart disease and auricular fibrillation had previously shown a prolonged *P–R* interval. G. Sch.

Analysis of the normal *T* wave. A. Hill (Lancet, 1939, **237**, 979—981).—The normal *T* wave of the e.c.g. develops in successive phases. It may be due to a wave of anabolism travelling inwards through the ventricular myocardium with the advance of the returning blood supply. The normal *U* wave may be a dicrotic *T* wave. The e.c.g. of bundle-branch block is discussed. C. A. K.

Multiple chest leads in right and left axis preponderance. J. Freundlich and E. Lepeschkin (Cardiologia, 1939, **3**, 331—352). G. Sch.

Value and significance of multiple chest leads in man. A. Bohning, L. N. Katz, M. Robinow, and G. Gertz (Amer. Heart J., 1939, **18**, 25—45).—The surface electrical field of the cardiac cycle is studied in normal hearts and in hearts with preponderant right or left ventricular hypertrophy. A distinct pattern, differing from the normal, is found in the latter. G. Sch.

Electrocardiogram in chronic aneurysm of heart. O. Nordenfelt (Acta med. scand., 1939, **102**, 101—123).—Large chronic aneurysms in the anterior wall of the ventricle modify the e.c.g. as follows: relatively low R_1, deep S_{11} and S_{111}, elevated *S–T* segment in all leads, negative T_1 and positive T_{11} and T_{111}. In lead IV *R* was absent, *S* deep, and *S–T* segment elevated. There was also a clear Q_1. C. A. A.

Electrocardiographic changes in ethylene glycol poisoning. O. L. Huddleston (Proc. Soc. Exp. Biol. Med., 1939, **42**, 312—315).—In dogs the heart became slow and showed an arrhythmia due to sinus arrhythmia and sino-auricular block. In adult dogs extra-systoles occurred in addition. The records showed deep *S* waves and diphasic *T* waves. V. J. W.

Electrocardiographic changes in acute pericarditis. J. B. V. Veer and R. F. Norris (J. Amer. Med. Assoc., 1939, **113**, 1483—1487).—The e.c.g. changes in acute pericarditis can be distinguished from those of acute myocardial infarction. C. A. K.

Electrocardiographic changes and concentration of magnesium in serum following intravenous injection of magnesium salts. P. R. Smith, A. W. Winkler, and H. F. Hoff (Amer. J. Physiol., 1939, **126**, 720—730).—$MgSO_4$ (0·154M.) was injected intravenously into dogs under local procaine anæsthesia. The heart rate immediately increases as the concn. of serum-Mg rises from 2 to 5 m-equiv. (per l.). The initial tachycardia gradually gives way to a bradycardia. Intracardiac conduction is depressed. The e.c.g. changes are: progressive increase in *P–R* interval beginning at a Mg concn. of 5—10 m-equiv. and continuing until death; widening of *QRS* complex beginning at 5—10 m-equiv. Natural respiration disappears at 17—27 m-equiv. The heart usually stops at concns. of 44 m-equiv. Normal systole is maintained till the end. Cardiac arrest never precedes respiratory arrest. Similar results are produced in cats. M. W. G.

Magnesium: effects of intravenous injections on human heart. M. Bernstein and D. Simkins (J. Lab. clin. Med., 1939, **25**, 131—141).—6 of 34 non-cardiac patients presented minor *T* and *QRS* changes during the injection of 10 c.c. of 10% $MgSO_4$; 4 showed similar changes 1 hr. after injection. 6 of 69 patients with cardiac disease showed similar changes during the injection period and 15 persons 1 hr. after injection. Intravenous Mg injections exert no deleterious effect on the human heart. The coincidental administration of digitalis yields no untoward effects. C. J. C. B.

Roentgen-kymographic studies of cardiac infarction. R. Gubner and J. H. Crawford (Amer. Heart J., 1939, **18**, 8—24).—*X*-Ray kymography can sometimes demonstrate an area of diminished or absent contractility of the ventricles when the e.c.g. has already returned to normal after coronary occlusion. G. Sch.

Myocardial infarction. A. M. Master, S. Dack, and H. L. Jaffe (Arch. intern. Med., 1939, **64**, 767—786).—Factors of age, sex, and hypertension in myocardial infarction due to coronary occlusion are discussed with reference to 500 cases. C. A. K.

Angina pectoris in xanthomatosis. C. Müller (Arch. intern. Med., 1939, **64**, 675—700).—Hereditary xanthomatosis produces a special form of arteriosclerosis which may involve the coronary arteries and cause angina pectoris. C. A. K.

Treatment of angina pectoris. R. B. Raney (J. Amer. Med. Assoc., 1939, **113**, 1619—1623).—Preganglionic section of the sympathetic nerve supply to the coronary arteries produced complete relief of anginal pain in 11 patients. C. A. K.

Use and limitations of electrocardiography in diagnosis of acute coronary occlusion. A. J. Geiger (Yale J. Biol. Med., 1939, **11**, 619—627).—

A review of 8 cases. E.c.g. changes may not appear for several days. F. S.

Innervation of coronary vessels of dog. L. N. Katz and K. Jochim (Amer. J. Physiol., 1939, **126**, 395—401).—The prep. used consisted of a head and isolated heart with fibrillating ventricles, both perfused with defibrinated dog's blood at const. pressure and temp. A modification of a previously described method (cf. A., 1939, III, 19) was used. Total coronary flow from the pulmonary artery was used as an index of the calibre of the coronary vessels. Stimulation of the peripheral end of the cut vagus gave rise only to coronary vasodilation (never vasoconstriction); the effect was abolished by atropine. Stimulation of the stellate ganglion (with vagi cut) gave rise to dilation (not abolished by atropine) or vasoconstriction. Vagotomy alone decreased coronary flow, indicating tonic central control. Sympathetic section in vagotomised preps. increased coronary flow. No evidence was obtained of cholinergic coronary vasoconstriction.

M. W. G.

Magnitude, adequacy, and source of collateral blood flow and pressure in chronically occluded coronary arteries. D. E. Gregg, J. J. Thornton, and F. R. Mautz (Amer. J. Physiol., 1939, **127**, 161—175).—Following occlusion of any of the major coronary branches in dogs a large collateral circulation is established. In 22 out of 23 dogs there was a large increase in retrograde arterial blood flow and in peripheral coronary pressure and slight scarring. From an analysis of coronary pulse patterns it was found that most of the collateral flow occurs in diastole. Much of the collateral blood flow cannot be removed by clamping the other coronaries. This potential extra-coronary retrograde flow was quite small in the right coronary but large in the descendens and circumflex. M. W. G.

Reflex coronary artery spasm. G. W. Manning, C. G. McEachern, and G. E. Hall (Arch. intern. Med., 1939, **64**, 661—674).—Sudden occlusion of the anterior descending branch of the left coronary artery in the anæsthetised dog killed less than 10% of animals. In the conscious dog the mortality was 40%. Corresponding figures for occlusion of the left circumflex branch were 25% and 75%. The increased mortality in conscious animals was attributed to reflex spasm of collateral arterioles and small arteries.

C. A. K.

Vasomotor changes in the coronary arteries. N. C. Gilbert (J. Amer. Med. Assoc., 1939, **113**, 1925—1927).—A review. C. A. K.

Estimation of cardiac output in man, and of abnormalities in cardiac function, from the heart's recoil and blood's impacts; ballistic cardiogram. I. Starr, A. J. Rawson, H. A. Schroeder, and N. R. Joseph (Amer. J. Physiol., 1939, **127**, 1—28).—A modification of the hanging table of Henderson is described for recording the forces set up by the heart's recoil and the blood's impact in man. New theoretical conceptions are developed of the forces involved and new formulæ derived for estimating cardiac output. The ballistocardiogram is particularly suited for estimating changes in the cardiac output of single individuals.

M. W. G.

Measurement of stroke volume of human heart from roentgenograms; simultaneous roentgen-kymographic and acetylene-rebreathing experiments. A. Keys and H. L. Friedell (Amer. J. Physiol., 1939, **126**, 741—752).—The stroke vol. of the human heart was estimated from measurements of the areas of the systolic and diastolic outlines of the heart in the frontal position on a roentgen-kymographic film. Roentgen-kymograms were made simultaneously with acetylene-rebreathing experiments. Results conform to equation: stroke vol. $= 0{\cdot}64[(\text{area in diastole})^{1{\cdot}45} - (\text{area in systole})^{1{\cdot}45}]$. The two methods give results differing by an average of $\pm 5{\cdot}1\%$. Similar results were obtained with patients suffering from various circulatory abnormalities other than valvular defects. Patients with valvular insufficiency always have stroke vols., measured by the kymograph, which are larger than the true stroke vol. and this discrepancy is parallel to the estimate of the leak from clinical studies. M. W. G.

Alterations of cardiac cycle and of polygrams produced by artificial fever. O. L. Huddleston, E. J. Baldes, and F. H. Krusen (Proc. Soc. Exp. Biol. Med., 1939, **42**, 1—4).—During the induction of artificial fever, the duration of the cardiac cycle is reduced by over 50%; inadequate filling due to shortened diastole and vasodilatation cause a severe fall of blood pressure. V. J. W.

Amplifier for recording heart sounds through use of the cathode-ray tube. B. R. Boone (J. Lab. clin. Med., 1939, **25**, 188—193). C. J. C. B.

Systolic clicks due to pneumothorax. J. G. Scadding and P. Wood (Lancet, 1939, **237**, 1208—1211).—Clicking sounds during cardiac systole were heard in 4 cases of left benign spontaneous pneumothorax and in 2 out of 4 cases of very shallow left-sided artificial pneumothorax. The causation of these sounds and their relation to systolic gallop rhythm are discussed. C. A. K.

Transport of air along blood-vessel sheaths. C. C. Macklin (Arch. intern. Med., 1939, **64**, 913—926).—Air from ruptured lung alveoli may travel along the pulmonary blood vessels to the mediastinum. It may impede the pulmonary circulation, spread infection, or may produce subpleural blebs which may lead to pneumothorax. C. A. K.

Experimental air embolism. J. Pines (Cardiologia, 1939, **3**, 308—330).—Injection of air into the right side of the circulation is fatal if and when the froth produced occludes the pulmonary circulation and causes the pressure in the aorta to fall to zero.

G. Sch.

Circulation time under conditions of work and rest in subjects with normal and abnormal hearts. E. F. Cannon, S. P. Lucia, and E. H. Benson (Proc. Soc. Exp. Biol. Med., 1939, **42**, 237—242).—Circulation time is decreased after 5 min. of exercise and is decreased more in cases of heart disease than in normal subjects. V. J. W.

Histological changes of peripheral vascular system in experimental lesions of the aortic valves. M. INOUE (Folia endocrinol. japon., 1939, **15**, 13—14).—The aortic valves of 45 rabbits were damaged by introduction of a needle through the right carotid artery. The veins and capillaries showed no changes. After 100 days thickening developed in the arterioles and in larger arteries of the lung; this occurrred in the media in the pulmonary arteries and mainly in the intima in the other arteries. The renal arteries are the first to show these changes. E. R.

Microscopic observation of circulation in frog's lung and bladder. S. DI NATALE (Arch. Fisiol., 1939, **39**, 422—430).—Some practical improvements for teaching purposes are described. S. O.

Simple method for recording splenic volume changes in intact, unanæsthetised dog. L. L. PALITZ (J. Lab. clin. Med., 1939, **24**, 1296—1301).—Continuous, uninterrupted records of spleen vol. changes can be repeatedly obtained in the intact, unanæsthetised dog. The subcutaneous spleen has more nearly normal surroundings than has the exteriorised spleen; once it is placed under the skin, extra care of the animal is unnecessary. Adrenaline and pilocarpine both contract the spleen. Atropine alone was without effect, but when injected after pilocarpine it accelerated the return to normal. Atropine, injected before pilocarpine, abolished completely the pilocarpine effect. Benzedrine caused a prolonged contraction of the spleen with relatively slow onset. C. J. C. B.

Measurement of blood flow of spleen. J. H. GRINDLAY, J. F. HERRICK, and F. C. MANN (Amer. J. Physiol., 1939, **127**, 106—118).—Blood flow was measured in the splenic artery or vein of trained dogs by means of a modified thermostromuhr. During rest or sleep, the blood flow in the artery was 97 c.c., and in the vein 91 c.c. per min. During digestion the arterial and venous flow rose for 3—5 hr. Shivering from cold and exercise increased the flow. Hæmorrhage lowered the arterial flow rapidly and the venous flow after a transitory rise. Massive increases of blood vol. caused prolonged increases in arterial and venous flow. Ether anæsthesia has little effect. Pentobarbital produced prolonged increase of flow. Adrenaline produced a temporary decrease of both flows after a transitory rise. M. W. G.

Rhythmicity of spleen in relation to blood flow. J. F. GRINDLAY, J. F. HERRICK, and E. J. BALDES (Amer. J. Physiol., 1939, **127**, 119—126).—Using the thermostromuhr rhythmic waves of blood flow (average period of 45 sec.) were observed in the splenic artery and vein of trained dogs. In anæsthetised dogs waves of arterial flow and splenic vol. were synchronous; waves of venous flow corresponded in period but lagged slightly behind waves of vol. and arterial flow. Denervation of the spleen did not abolish or disturb its rhythm. In the dog rhythmic blood flow is due to activity of blood vessels and not to rhythmic contraction of the splenic musculature. M. W. G.

Accuracy of clinical determinations of blood pressure in children; values under normal and abnormal conditions. M. ROBINOW, W. F. HAMILTON, R. A. WOODBURY, and P. P. VOLPITTO (Amer. J. Dis. Child., 1939, **58**, 102—118).—Arterial blood pressure in children was recorded directly by means of the hypodermic manometer; the vals. were compared with those obtained by the usual clinical methods. By using a cuff of the proper width it is possible to determine systolic pressure accurately by ordinary clinical procedures. Determinations of diastolic pressure by clinical methods are less accurate in children. Blood pressure increases less with age than is commonly stated; it is slightly increased by moderate excitement. Crying, coughing, retching, and straining may increase the blood pressure by as much as 60 mm. by raising the intrathoracic pressure. During *cyclo*propane anæsthesia a slight rise of blood pressure was usually noted. In a single case marked transient hypertension was observed. C. J. C. B.

Embolism and thrombosis of abdominal aorta. F. W. FREY (Amer. Heart J., 1939, **18**, 57—66).—In 3 cases complete thrombosis of the abdominal aorta, comprising the cœliac axis in 1 case, was compatible with survival of 1—5 years after the onset of the occlusive symptoms. No gangrene was present at death in 2 cases (aged 21 and 44), and dry gangrene of one foot in one case. G. SCH.

New method of plethysmometry. A. KOLIN (Proc. Soc. Exp. Biol. Med., 1939, **42**, 85—89).—Changes in vol. of one hand are determined by observing changes in wt. of a beaker of water in which the hand is immersed. V. J. W.

Cerebral arteriography in dog and man with a rapidly excreted organic iodide. S. W. GROSS (Proc. Soc. Exp. Biol. Med., 1939, **42**, 258—259).—Injection of 70% "diodrast," 3 : 4-di-iodo-4-pyridone-*N*-acetic acid–diethanolamine, is made into the carotid and gives *X*-ray shadows of the arteries of the head. V. J. W.

Surgical production of collateral intracranial circulation. W. J. GERMAN and M. TAFFEL (Proc. Soc. Exp. Biol. Med., 1939, **42**, 349—353).—Anastomosis was carried out in the monkey by placing the temporal or suboccipital muscle in contact with the pia mater and suturing the edge of the muscle to the dura. Continuity of the circulation was proved by injection of dye post-mortem. V. J. W.

Effect of ergobasine on carotid-sinus reflexes. L. DONATELLI (Arch. Fisiol., 1939, **39**, 327—366).—Ergobasine paralyses the vasomotor reflexes arising in the carotid sinus in dogs (0·017—0·034 mg. per kg.), rabbits (0·1 mg. per kg.), and cats (0·02 mg. per kg.). The drug sensitises the receptive substance of smooth muscle to adrenaline-like drugs, and depresses the medullary vasoconstrictor centre. The latter effect is probably responsible for the action on the sinus reflexes, since the receptor nerve-endings in the sinus itself are not affected (respiratory and cardiac reflexes of sinusal origin are unmodified). S. O.

Influence of ephedrine and ephetonine on action of adrenaline and carotid sinus. W. H. HAUSS and T. C. R. SHEN (Arch. int. Pharmacodyn., 1939, **63**, 113—119).—Small doses of ephedrine in-

crease the vasomotor action of adrenaline. Depressor carotid sinus reflexes are diminished by ephedrine and ephetonine, the effect of the former outlasting that of the latter. D. T. B.

Vasomotor responses to adrenaline and to carotid sinus impulses in normal, skinned, and denervated legs. K. S. Grimson and T. C. R. Shen (Arch. int. Pharmacodyn., 1939, **63**, 95—102).—Vasoconstriction and vasodilatation produced by carotid sinus reflexes, direct sympathetic excitation, and injection of adrenaline occur in skinned limbs when due precaution is taken to keep them warm and moist. The blood vessels of the limb muscles can react by vasoconstriction and vasodilatation. D. T. B.

Surgical treatment of hypersensitive carotid sinus reflexes. W. McK. Craig and H. L. Smith (Yale J. Biol. Med., 1939, **11**, 415—422).—A report of 13 cases. F. S.

Location and function of chemoreceptors of aorta. J. H. Comroe, jun. (Amer. J. Physiol., 1939, **127**, 176—191).—In cats and dogs the cardio-aortic chemoreceptors are localised in the aortic body. In the dog most of the hypertension of acute systemic anoxia is due to aortic body reflexes; vascular reflexes from the carotid body are inconstant and relatively ineffective. The carotid body is mainly responsible for anoxic hyperpnœa in the dog, the aortic body component being insignificant. In the cat the carotid body chemoreceptors are relatively more important in vasomotor responses to anoxia than in the dog. The blood supply for the aortic chemoreceptors in the dog is from the transverse aorta, in the cat from the coronary arteries. In both cat and dog the nerve fibres reach the vagus trunk close to the recurrent laryngeal nerves. M. W. G.

Blood flow through muscle during sustained contraction. H. Barcroft and J. L. E. Millen (J. Physiol., 1939, **97**, 17—31).—The needs of strongly contracting muscle are met by a poor vascular response (studied by new method) in man but a liberal one in anæsthetised animals. Contractions, 0·05 and 0·1 max., of the plantar flexors of the human foot are accompanied by marked hyperæmia which gradually subsides during the recovery period. The length of time for which contractions of this strength can be maintained is much shortened by previous arrest of the circulation in the leg; therefore the hyperæmia normally accompanying them is of functional val. Contractions 0·2 and 0·3 max. are not accompanied by hyperæmia; the flow is probably arrested in the muscle; marked hyperæmia sets in a few sec. after relaxation. The length of time for which contractions of this strength can be maintained is unaffected by previous arrest of the circulation; therefore the blood flow through the active muscle, if any, is of negligible functional val. Compression of the potentially dilated vessels between the taut muscle fibres becomes a dominant factor when the strain on the Achilles tendon exceeds 100 kg. J. A. C.

Nervous control of blood-flow through skin studied by effect of adrenaline. R. H. Goetz (Quart. J. Exp. Physiol., 1939, **29**, 239—257).—An optical plethysmograph is described by which vol. changes in the skin vessels of the paw of the cat may be obtained without significant pressure on the paw. In the warm animal, adrenaline produced constriction of the skin vessels in doses which have a pressor or depressor effect. The blood pressure may become max. before the skin vessels contract. The first rise of blood pressure is not due to contraction of skin vessels. In the cooled animal the constriction does not take place and an increase in paw vol. may be registered. Adrenaline acts as a blood distributor rather than a pressure augmentor. The increase in paw vol. is not a cholinergic reaction; it is suppressed by ergotamine. Observations of skin temp. confirm the reactions registered by the plethysmograph. T. S. G. J.

Capillary blood pressure in man. Comparison of direct and indirect methods of measurement. L. W. Eichna and J. Bordley (J. clin. Invest., 1939, **18**, 695—704).—Only the direct method gives an accurate measurement. C. J. C. B.

Capillary permeability in skin of rabbit. R. H. Rigdon (Proc. Soc. Exp. Biol. Med., 1939, **42**, 43—45).—If local inflammation is caused in rabbit skin by application of xylol, intravenously injected trypan-blue becomes localised in that area if injection is made within 2 hr. of xylol application, but not if the interval is greater. V. J. W.

Comparative effects of benzedrine sulphate, paredrine, and propadrine on blood pressure. J. Loman, M. Rinkel, and A. Myerson (Amer. Heart J., 1939, **18**, 88—93).—Injected intravenously in man, benzedrine, paredrine (β-*p*-hydroxyphenyl*iso*propylamine), and propadrine (phenylpropanolamine) raise blood pressure rapidly with concomitant bradycardia but no disturbance of rhythm. 10—15 mg. of paredrine correspond in effect with 20—30 mg. of benzedrine and 50 mg. of propadrine. G. Sch.

Effect of fever on postural changes in blood pressure and pulse rate. I. Kopp (Amer. Heart J., 1939, **18**, 46—56).—Artificial fever (diathermy or radiant heat) impairs the adjustment of the circulation to postural changes and sometimes results in convulsive seizures due to cerebral anæmia on standing up. G. Sch.

Blood pressures in experimental hydronephrosis. L. Eichelberger (Proc. Soc. Exp. Biol. Med., 1939, **42**, 249—252).—Blood pressure in dogs is not significantly raised in 24 weeks if one kidney is made progressively hydronephrotic by ureteral obstruction and the other kidney is removed. V. J. W.

Carbon monoxide and essential hypertension [and hypertrophy of adrenal cortex]. M. Staemmler and G. W. Parade (Klin. Woch., 1939, **18**, 1049—1050).—A miner who had been working in air with a CO content of 0·14% for 4 years developed essential hypertension and hyperthyroidism. At his death 6 years later hypertrophy of the adrenal cortex up to 1 cm. thickness was found besides a mild arterio- and arteriolo-sclerosis. E. M. J.

Vasoconstrictor and hypertensive action of venous blood from kidney in acute incomplete

ischæmia. E. Braun Menéndez and J. C. Fasciolo (Rev. Soc. argent. Biol., 1939, **15**, 161—172).—A normal kidney was grafted into the neck of a dog by carotid–jugular anastomoses. Compression of the anastomotic artery to reduce the circulation by 90% produced within a few min. a rise of 10 mm. in blood pressure, which fell when the compression was removed. After 90 min. of ischæmia the kidney was grafted into a chloralosed nephrectomised dog; the blood pressure rose by 30 mm. in a few min. Citrated venous blood from such kidneys showed vasoconstrictor action on a toad Läwen–Trendelenburg prep.; the venous blood from a grafted kidney with normal circulation had no vasoconstrictor action. Defibrinated blood circulated through a heart–lung prep. lost its vasoconstrictor action in 30—60 min. A normal kidney grafted into a heart–lung prep. did not modify this, but when the artery was compressed so as to reduce the renal circulation by 50—80% marked vasoconstrictor activity appeared in the blood. The venous blood from an ischæmic kidney grafted into the neck or into a heart–lung prep. produced a marked rise in blood pressure when injected into a nephrectomised dog. The venous blood from a leg or a duodeno-pancreas maintained for 1 hr. with reduced circulation did not produce hypertension. The vasoconstrictor and hypertensive activities of the ischæmic kidney venous blood are not due to the substance appearing in serum and defibrinated blood.

J. T. L.

Economy of effort index for hearts of normal and hypertensive subjects. G. W. Wright, W. R. Hallaran, and C. J. Wiggers (Amer. J. Physiol., 1939, **126**, 89—96).—A method, based on a principle of Wiggers and Katz from animal experiments, is given by which the economy of effort during ejection of the normal human left ventricle can be expressed and compared with that of the left ventricle of a hypertensive subject. Reconstruction of the ejection phase of the intraventricular pressure curve is accomplished using the subclavian pulse curve for contour and applying simultaneously obtained brachial artery pressures for the ordinate (pressure) vals. The surface area of the curve above diastolic val. divided by that beneath this area offers a quotient expressing the economy of ventricular effort during ejection. Normal individuals show a wide variation in the quotient; it is greatest in subjects having a comparatively large pulse pressure and a low diastolic pressure. Individuals with chronic hypertension show an even greater range of quotient and the same relation to pulse pressure and disatolic pressure as was found in normal subjects. The left ventricle in hypertension maintains a quotient as good as or even better than that of the normal left ventricle by virtue of a large pulse pressure and in spite of a raised diastolic pressure. M. W. G.

Hæmodynamic effect of 933 F. on trained unanæsthetised normal and renal hypertensive dogs and its effect on pressor action of renin. L. N. Katz and L. Friedberg (Amer. J. Physiol., 1939, **127**, 29—36).—A method of studying the hæmodynamic action of drugs in trained unanæsthetised dogs is described. 933 F. (1—5 mg. per kg.) reverses or abolishes the pressor action of adrenaline; it produces a quant. similar depressor action in normal and hypertensive unanæsthetised dogs; the chemical mediator of experimental renal hypertension is not sympathomimetic in action. Renin has a quant. similar pressor action in normal and hypertensive dogs which is not inhibited, reversed, or abolished by 933 F.; it is thus not sympathomimetic in action. M. W. G.

Attempts to demonstrate vasopressor properties in serum of hypertensive dogs. M. F. Mason and J. D. Rozzell (Proc. Soc. Exp. Biol. Med., 1939, **42**, 142—144).—Renal venous blood serum from hypertensive dogs had no vasoconstricting effect when perfused through the peripheral circulation of frogs, bullfrogs, and toads. V. J. W.

Tachyphylaxis to renin. E. G. McEwen, S. P. Harrison, and A. C. Ivy (Proc. Soc. Exp. Biol. Med., 1939, **42**, 254—257).—One injection of renin renders dogs tolerant to a second, the tolerance persisting for 2—3 hr. V. J. W.

Production of sustained neurogenic hypertension of renal origin. K. S. Grimson, J. J. Bouckaert, and C. Heymans (Proc. Soc. Exp. Biol. Med., 1939, **42**, 225—226).—In dogs the whole sympathetic outflow, except the nerves to the kidneys, was divided, one vagus-sympathetic-depressor and the other sympathetic-depressor were divided in the neck, and the carotid sinuses excised. A rise of blood pressure to 170—225 mm. Hg followed, which returned to normal when the renal nerves were divided.

V. J. W.

Vascular changes in renal ischæmia: cell-mitosis in media of arteries. N. Goormaghtigh and K. S. Grimson (Proc. Soc. Exp. Biol. Med., 1939, **42**, 227—228).—In muscular coats of renal arteries and arterioles large non-fibrillar granular cells appear, with numerous mitotic figures, sometimes obstructing the glomerular arteries. V. J. W.

Ætiology of hypertension resulting from coarctation of the aorta. R. J. Brotchner (Arch. Path., 1939, **28**, 676—696; cf. A., 1939, III, 896).—Acute hypertension was produced in dogs by stenosis or occlusion of the aorta above the origin of the cœliac artery; the hypertension was independent of the kidneys. The similarity of this acute experimental hypertension to that accompanying coarctation of the aorta in adults is discussed. Evidence is reviewed to show that the hypertension associated with coarctation of the aorta is also due to mechanical obstruction and not to renal ischæmia with its "pressor substance." C. J. C. B.

Effect of blood pressure on constriction of abdominal aorta above and below site of origin of both main renal arteries. H. Goldblatt, J. R. Kahn, and R. E. Hanzal (J. Exp. Med., 1939, **69**, 649—674).—If the abdominal aorta of a dog is clamped just above the origin of the renal arteries, hypertension begins to develop after 24 hr. The pressure above and below the clamp rises until even the femoral pressure may be higher than normal. If the clamp is applied below the renal arteries, no elevation of pressure occurs. Sudden severe con-

striction of the aorta above the origin of the renal arteries causes the uræmic phase of hypertension. The cause of pressure changes following clamping of the aorta is always renal whether insufficiency is demonstrable or not. A. C. F.

Essential hypertension. H. A. Schroeder and J. M. Steele (Arch. intern. Med., 1939, **64**, 927—951).—A study of 218 cases of essential hypertension suggested 5 clinical types, (i) renal, (ii) nervous, (iii) endocrine, (iv) vascular, and (v) unclassified. C. A. K.

Medical treatment of arterial hypertension. C. Meili and F. Stocker (Schweiz. med. Wschr., 1939, **69**, 835—839).—Tonospasmin (papaverine nitrite 0·045, dichloral hydrate–hexamethylenetetramine 0·2, bromadalum 0·2) lowers systolic and diastolic blood pressure and improves or cures changes in retinal vessels in patients with beginning essential hypertension. The blood pressure is lowered, but no changes in the retinal vessels occur in chronic cases. The prep. was successfully used in angina pectoris. A. S.

Surgical treatment of hypertension. S. Braden and E. A. Kahn (Yale J. Biol. Med., 1939, **11**, 449—458).—Preliminary report of the method of study and the results in 264 cases. F. S.

Effect of pitressin in circulatory collapse induced by sodium nitrite. E. A. Stead, jun., P. Kunkel, and S. Weiss (J. clin. Invest., 1939, **18**, 673—678).—Pitressin in man was ineffective in experimental collapse induced by $NaNO_2$ + tilting as it did not increase venous tone; the arteriolar constriction produced by the drug further reduced tissue blood flow. Pitressin (0·5—1 c.c. to normal subjects in the horizontal position) decreases the blood flow in the hand at both 32° and 43°. It did not change venous tone in the hand, heart rate, or arterial pressure. It slowed the blood flow in the hand to such a degree that water at 43—45° felt uncomfortable, and in 1 case caused the skin to blister at 45°. $NaNO_2$ produced circulatory collapse and syncope in the upright position in 50% of a large group of subjects tested. C. J. C. B.

Effect of paredrinol (α-*p*-hydroxyphenylethyldimethylamine) on sodium nitrite collapse and on clinical shock. P. Kunkel, E. A. Stead, jun., and S. Weiss (J. clin. Invest., 1939, **18**, 679—685).—In 4 of 7 normal subjects the intramuscular injection of 25 mg. of paredrinol prevented the collapse induced in the upright position by $NaNO_2$. In 2 subjects with severe postural hypotension, symptoms of cerebral anoxia were prevented by paredrinol. In 7 of 10 cases in severe clinical shock from infectious disease, 15—50 mg. of paredrinol raised the arterial pressure, but only 2 showed clinical improvement. The responses of patients in severe collapse differed from normals as follows: (*a*) 2—4 times the amount of paredrinol was required to raise the blood pressure; (*b*) the heart rate was usually increased instead of decreased; (*c*) repeated doses of the drug, when given after the blood pressure had returned to normal, were less effective than the original injection. C. J. C. B.

Shock. L. Meyler (Arch. intern. Med., 1939, **64**, 952—970).—A review. C. A. K.

Epidemiology of epidemic dropsy. VII. Field studies and controlled experiments. R. B. Lal and S. C. Roy. **VIII. Nature and origin of certain (? toxic) substances present in supplies of mustard oil associated with outbreaks of epidemic dropsy.** R. B. Lal, S. P. Mukherji, S. C. Roy, and G. Sankaran (Indian J. Med. Res., 1939, **27**, 191—206, 207—224).—VII. As a result of further field observations and feeding experiments on human volunteers, the mustard oil theory of the ætiology of epidemic dropsy was confirmed.

VIII. One physical and two chemical tests were used to differentiate between supplies of mustard oil containing a toxic substance responsible for epidemic dropsy and those without it. The toxic substance is derived from seeds of *Argemene mexicana* (with which stocks of mustard seed are frequently adulterated), and yields a white cryst. org. compound. H. B. C.

Graphic registration of lymphatic heart in the toad. V. G. Foglia and E. Braun Menéndez (Rev. Soc. argent. Biol., 1939, **15**, 178—184).—The movements of the lymphatic hearts were registered with a Frank segment capsule (as is used in the optical registration of the heart sounds) connected with a small funnel that covers the heart or a needle introduced into its cavity. In the first case a vol. curve is obtained, in the second the intracardiac pressure. Systole has a const. duration; the pressure was 1—4 mm. of water in the cases observed; arrhythmia is usual, and due to the variable duration of diastole; asynchronism between the left and right sides is usual, but the arrhythmia in one heart is reproduced in the contralateral one, so that the no. of beats per min. is the same in both. The destruction of one of the posterior hearts does not modify the contraction of the contralateral heart. J. T. L.

Lymphatic absorption from nasopharynx. J. D. McCarrell (Amer. J. Physiol., 1939, **126**, 20—27).—A quant. method for the production of an even flow of cervical lymph in anæsthetised dogs is described; the method involves regular passive motion of the heart (diagram of apparatus given) and may be combined with perfusion of the nasopharynx in the study of lymphatic absorption from this area. Perfusion of the nasopharynx with distilled water results in extensive lymphatic absorption of fluid with consequent dilution of cervical lymph—believed to be due to osmotic pressure of body-fluid salts and proteins acting on the hypotonic distilled water. Lymphatic absorption from the nasopharynx during nasopharyngeal perfusion with Ringer's solution is too small to be measured quantitatively. During normal physiological conditions lymphatic absorption of fluid from the nasopharynx probably takes place to a very slight degree. M. W. G.

Cervical lymph pressure in dog. J. D. McCarrell (Amer. J. Physiol., 1939, **127**, 154—160).—A continuous flow of cervical lymph is produced in the anæsthetised dog by regular passive motion of the head; the effect of local heating can be determined by simultaneous irrigation of the nasopharynx with

warm saline solution. Lateral lymph pressures were −2·8 to +3·2 cm. of water, mostly +0·1 and +1·4. Venous congestion during the local application of heat to the nasopharynx produced a more striking increase in cervical lymph flow than in cervical lymph pressure. End pressures reached max. vals. of 21·0 and 44·5 cm. Venous congestion sufficient to produce an increased lymph flow in 2 cases caused a slight increase in cervical lymph pressure and in 3 cases a slight decrease, the latter being most evident when the negative thoracic pressure produced an aspirating effect on the cervical lymphatics. M. W. G.

Action of vegetative nervous system on cisterna chyli and thoracic duct. S. JAROSLAV, V. GLAGOLEV, and B. KREIMER (J. méd., Ukraine, 1939, **9**, 411—419).—In dogs (in some of which the stomach and intestine were removed) Ringer's solution was perfused through the cisterna chyli and thoracic duct at const. temp. and pressure. Variations in their calibre influence lymphatic flow; calibre is controlled by vasomotor nerves. Lymph pressure in the cisterna increases during inspiration but falls during expiration. Lymph flow is increased by abdominal massage and decreased by the ligature of gastric and intestinal arteries. M. K.

Lymph-flow from isolated testes after dilatation and constriction of the blood vessels. I, II. S. JAROSLAV, A. KOSTENKO, and V. GLAGOLEV (J. méd., Ukraine, 1939, **9**, 73—77).—I. Vascular dilatation of the perfused organ by $NaNO_2$ or histamine caused diminished lymph-flow which is attributed to compression of the interstitial spaces or to a constriction of the lymph vessels and diminished lymph-formation.

II. Vasoconstriction by adrenaline caused in most cases increased, in some cases diminished, lymph-flow, owing respectively to dilatation of lymph-vessels and increased lymph-formation, or to lymph-vessel constriction. H. L.

Neuro-humoral regulation of testicular lymph-spaces. III. S. JAROSLAV, A. KOSTENKO, and V. GLAGOLEV (J. méd., Ukraine, 1939, **9**, 87—92).—Pituicrine "R" constricts the lymph-spaces and diminishes lymph-flow. The opposite effect is produced by pilocarpine and is independent of dilatation or constriction of the blood-vessels. H. L.

(vii) RESPIRATION AND BLOOD GASES.

Nerve-supply of larynx by accessory nerve. V. STRUPPLER (Z. ges. Anat., I., Z. Anat. Entw. Gesch., 1939, **109**, 360—373).—In a case of torticollis all the root-fibres of the accessory nerve were cut. After the operation the normal function of the larynx was unaffected. Cutting the root-fibres of the accessory nerve in the dog gave no evidence for the supply of the larynx by that nerve. W. B.

Localisation of medullary respiratory centres in cat. R. F. PITTS, H. W. MAGOUN, and S. W. RANSON (Amer. J. Physiol., 1939, **126**, 623—688).—A region was localised in the ventral reticular formation of the medulla immediately overlying the cephalic four fifths of the inferior olive, stimulation of which produced max. inspiration involving both thorax and diaphragm. The chest and diaphragm remain fixed in max. inspiration and rhythmic respiration is abolished. The inspiration may be maintained until death by continued stimulation. Dorsal to, slightly cephalic to, and cupped over the cephalic end of the inspiratory reticular formation is a region of the dorsal reticular formation the stimulation of which produced expiration involving both thorax and diaphragm. These regions comprise the respiratory centre of previous workers. The responses described are attributed to stimulation of a closely interrelated neuronal field. Functionally the respiratory centre is divided into an inspiratory and expiratory centre. Caudal to these centres, which extend to slightly below the obex, responses were obtained consisting of inspiratory or expiratory hypertonus with superimposed rhythmic respiration little different from normal in rate and depth. These responses, it is suggested, are obtained from the descending pathways from the inspiratory and expiratory centres to the lower phrenic and thoracic cord nuclei. M. W. G.

Interrelations of respiratory centres in cat. R. F. PITTS, H. W. MAGOUN, and S. W. RANSON (Amer. J. Physiol., 1939, **126**, 689—707).—The neurones of the inspiratory and expiratory divisions of the respiratory centre are closely related synaptically. Excitation of a small part of one centre may lead to activity of the whole of that centre. Activity in either centre leads to inhibition of activity within the other. The afferent fibres of the vagus affecting respiration are centrally connected with the inspiratory and expiratory centres through the nucleus of the tractus solitarius. Weak central vagal stimulation facilitates the spread of impulses through the inspiratory centre; strong stimulation activates the expiratory centre, leading to inhibition of the inspiratory centre. The latter is probably the mechanism of limitation of inspiration by stretch in the lung. Apneusis results from maintained activity of the inspiratory centre freed from the inhibitory influence of vagal lung stretch reflexes and the "pneumotaxic" mechanism in the upper pons. An hypothesis is proposed in explanation of apneusis and normal respiration. M. W. G.

Respiratory and vasomotor effects of variations in carotid body temperature; mechanism of chemoceptor stimulation. T. BERNTHAL and W. F. WEEKS (Amer. J. Physiol., 1939, **127**, 94—105).—The carotid bodies of dogs, vascularly isolated from the carotid sinus pressoreceptors, were perfused under const. hydraulic conditions with normally aërated blood at temp. of 15—45°. Increased temp. reflexly increased breathing and blood pressure; decreased temp. had the opposite effect. Breathing was reduced by 34% on cooling the carotid body, indicating a chemoreflex tonic control of breathing in anæsthetised animals. M. W. G.

Carotid body [respiratory] reflexes in dog. C. F. SCHMIDT, J. N. COMROE, jun., and R. D. DRIPPS, jun. (Proc. Soc. Exp. Biol. Med., 1939, **42**, 31—32).—Since respiration can be depressed by cooling the carotid body or its nerves it must be continuously active (cf. A., 1938, III, 470) but it is much less sensi-

tive to changes in blood-CO_2 or p_H than is the respiratory centre. V. J. W.

Additional recordings obtained with oscillato-capacigraph. C. Fenning and B. E. Bonar (J. Lab. clin. Med., 1939, **25**, 175—179). C. J. C. B.

Recovery of carbon monoxide-poisoned rats after *X*-ray treatment. J. A. Cameron (Proc. Soc. Exp. Biol. Med., 1939, **42**, 29—30).—In 15 out of 41 experiments on pairs of rats made unconscious by CO inhalation, the rat which received 123 r. per min. for 5—10 min. of *X*-radiation recovered while the control died. V. J. W.

Action of drugs on isolated perfused lungs of pig. B. Petrovskaia (Quart. J. Exp. Physiol., 1939, **29**, 277—282).—Experiments were performed on the isolated lungs of the pig, under negative pressure ventilation, perfused at const. vol. inflow with defibrinated blood. Adrenaline reduces the pulmonary arterial pressure in fresh preps. and augments it during the later stages of the perfusion; ergotoxine reverses the pressor effect. Adrenaline dilates the bronchi. Small doses of acetylcholine tend to lower and larger doses to raise the pulmonary arterial pressure in ergotoxinised preps. The bronchi constrict. T. S. G. J.

Respiratory effect of lobeline. [Action of carotid body.] D. Mosco (Arch. Farm. sperim., 1939, **68**, 190—210).—Lobeline, intravenously injected into dogs, has no effect on respiration until it reaches the carotid body. F. O. H.

Neonatal asphyxia. W. C. Cole, D. C. Kimball, and L. E. Daniels (J. Amer. Med. Assoc., 1939, **113**, 2038—2046).—Prematurity is the most important single factor in neonatal asphyxia. Trauma of labour comes next and then sedatives which increase asphyxia in proportion to dosage, general anæsthesia having the most marked action. C. A. K.

Swim bladder gases. T. Miyazima, T. Aiki, and H. Kosaka (Arb. med. Univ. Okayama, 1939, **6**, 203—215).—The O_2 and CO_2 content of the swim bladder of sea and fresh-water fish was determined under varying conditions. The O_2 % decreased as the external pressure acting on the fish was lowered. After evacuation of the swim bladder the newly formed gas contained more O_2. The O_2-dissociation curve of carp blood is steep and readily influenced by CO_2; both gases diffuse readily through the wall of the swim bladder, thus influencing its internal composition. H. O. S.

Respiratory system of the chicken. W. M. McLeod and R. P. Wagers (J. Amer. Vet. Med. Assoc., 1939, **95**, 59—70).—Descriptive. E. G. W.

Air stream in lung of fowl. J. D. P. Graham (J. Physiol., 1939, **97**, 133—137).—The lungs of the anæsthetised fowl were insufflated with radio-opaque dust. The records indicate that air enters the air sacs by the primary ostium during inspiration and leaves again by the recurrent bronchi during expiration (confirming Juillet). Analyses of the contents of the air sacs prove that the major proportion of gaseous interchange takes place during expiration. J. A. C.

Oxygen therapy in pneumonia. M. A. Blankenhorn (J. Amer. Med. Assoc., 1939, **113**, 1410—1411).—A lecture. C. A. K.

Principles of artificial respiration. E. M. Killick, E. M. Cowell, and G. P. Crowden (Lancet, 1939, **237**, 897—899).—A review. C. A. K.

Two cases of asthma cured by insulin shock treatment. A. Paunescu-Podeanu and O. Carangiu (Bull. Mém. Soc. méd. Hôp. Bucarest, 1939, **21**, 280—285). H. L.

Lipin pneumonia. I. Due to cod-liver oil. II. Due to liquid petrolatum. I. Graef (Arch. Path., 1939, **28**, 613—667).—7 cases of cod-liver oil pneumonitis are described. The earliest response to the presence of the oil in the lungs is an exudate composed of plasma, polymorphonuclear leucocytes, and few mononuclear cells. This persists until the oil is encapsulated by acid-fast membranes or fibres. In the 15 cases of pneumonic lesions due to liquid petrolatum macroscopic lesions varied from small pseudotuberculous fibrous scars to lobar consolidation resembling grey hepatisation of the lung. Microscopic lesions varied from an acute macrophagic response to dense proliferative scars with imprisoned globules of oil. Diffuse formation of reticulum and collagen follows phagocytosis of this lipin and the oil is apparently eliminated from the lungs with the greatest difficulty. The lipophages may accumulate and become fixed in the alveolar walls and gradually diminish the air spaces. Clusters may become encapsulated in small or large paraffinomas and the fibrosis may produce visible or radiopaque masses. New formation of lymphoid follicles is common around lipin granulomas. (25 photomicrographs.) C. J. C. B.

Oxygen uptake of dried hæmoglobin. A. Hisey and D. B. Morrison (J. Biol. Chem., 1939, **130**, 763—775).—Dried active hæmoglobin when placed in micro-respirometers in an atm. of air or O_2 takes up more O_2 than can be accounted for by the oxidation of the Fe or by complete conversion into oxyhæmoglobin, which, in fact, is not present in the end product (methæmoglobin). The absorption is continuous, no max. is observed, and denaturation of the protein takes place. CO is first rapidly absorbed, then more slowly, but never to saturation point within the observation period. Methæmoglobin absorbs a negligible amount of CO. A. L.

Activity of protozoa at low oxygen tensions. J. A. Kitching (J. Cell. Comp. Physiol., 1939, **14**, 227—236).—Contractile vacuole of *Cothurnia* shows normal activity at 3 mm. O_2 tension but stops at 1·1 mm. In all organisms examined there was no correlation between sensitivity to CN' and that to O_2 lack. V. J. W.

Plasma-p_H, blood-CO_2, and "tissue gas" tensions during hibernation. R. T. Stormont, M. A. Foster, and C. Pfeiffer (Proc. Soc. Exp. Biol. Med., 1939, **42**, 56—59).—In hibernation the arterial CO_2 of the ground squirrel increases to 85·7 vol.-% from a normal of 45·5. Plasma-p_H changes from 7·43 to 7·10. CO_2 and O_2 tensions in peritoneal gas pocket are lowered. V. J. W.

Effects on blood-lipins of short exposure to low atmospheric pressure. P. L. MacLachlan (J. Biol. Chem., 1939, **129**, 465—469).—Exposure of cats to an O_2 tension of 7% for 3 hr. and dogs to an O_2 tension of 8% for 1·5 hr. does not affect the plasma-lipins either in the fasting state or during fat absorption. With rabbits subjected to an O_2 tension of 10% there is a decrease in plasma-lipins after 3 hr., with a return to the initial level after 6 hr., the decrease being due to a decrease in neutral fat. J. N. A.

Oxygen poisoning in cardiac tissue. D. F. Bohr and J. W. Bean (Amer. J. Physiol., 1939, **126**, 188—195).—Normally beating frog hearts were isolated and suspended in a compression moist chamber from an open glass cannula inserted into the bulbus arteriosus. Pressures within and without the ventricle were equal. The gauge pressures of O_2 used were 70 and 80 lb. At the above pressures O_2 caused an initial increase and a slight delayed decrease in the strength of the ventricular contraction, a delayed slowing in frequency after 3—6 hr., and an eventual complete cessation of automaticity. The heart muscle remained responsive to electrical stimulation long after automaticity had failed; the pace-maker is thus more sensitive to the poisoning action of O_2 than is the ventricular muscle. Decompression begun after the onset of the slowing, but before the cessation of the beat, was often followed by recovery or a stoppage of further fall in frequency; after cessation of the beat decompression failed to bring about recovery. Single shock stimuli after decompression induced recovery of automaticity. In applying these results to the known cardiac effects in intact animals exposed to high pressures of O_2 for long periods, the authors consider them less significant than the disturbed CO_2 transport. M. W. G.

(viii) MUSCLE.

What is physical fitness? D. Burns (J. Soc. Arts, 1939, **87**, 1224—1239).—A lecture.

(A) **Biochemical changes caused in muscle tissue by freezing.** S. S. Drozdov and N. S. Drozdov. (B) **Autolytic changes in muscle tissue at low temperatures.** N. S. Drozdov and S. S. Drozdov (Ukrain. Biochem. J., 1939, **13**, 405—424, 679—692).—(A) Ox muscle was subjected to rapid (3·5 hr. at −21°) or slow (2 days at −10°) freezing. The p_H of the rapidly thawed tissue fell, and the lactic acid, glucose, and acid sol. and inorg. P contents rose. The d, conductivity, and viscosity of the aq. extracts rose, and their surface tension fell. Only slight changes were found in the nitrogenous constituents. The enumerated changes were more pronounced with slow than with rapid freezing. Their similarity to autolytic changes is pointed out.

(B) Meat frozen as above was stored at −10° for 2—4 months, and analysed at intervals. The changes found were identical with those appearing immediately after freezing, except that the glucose content fell progressively. The tissue-proteins showed a shift in their isoelectric point in the direction of higher p_H. The effects found were more pronounced in the case of rapidly than of slowly frozen meat. R. T.

Histological changes in skeletal muscles of paralysed suckling young of [vitamin]-*E*-low rats. I. R. Telford, G. A. Emerson, and H. M. Evans (Proc. Soc. Exp. Biol. Med., 1939, **41**, 291—295).—The muscle fibres undergo a hyaline degeneration followed by an invasion of leucocytes and connective tissue. V. J. W.

Effect of age on cellular phases of skeletal muscle. H. M. Hines and G. C. Knowlton (Proc. Soc. Exp. Biol. Med., 1939, **42**, 133—135).—Concns. of fat, Cl, and water in muscles and serum of rats reach adult vals. at the age of 90 days. V. J. W.

Effect of work at high environmental temperatures on lactic acid and glycogen content, reducing power, and p_H of rabbit muscles. L. I. Palladina and L. A. Dubovtzeva (Ukrain. Biochem. J., 1939, **13**, 475—493).—The changes occurring in rabbit muscles following work at a temp. of 50° do not differ qualitatively or quantitatively from those found at room temp. R. T.

Recovery heat in muscle. A. V. Hill (Proc. Roy. Soc., 1939, **B**, **127**, 297—307).—In the frog's sartorius at 0° the ratio of total to initial heat is const. for a single isometric tetanus or for a series of isometric tetani during a steady state, and for a single tetanus with max. work or for a series of such tetani during a steady state. The rate of production of recovery heat is nearly const. during a steady state and may be very high compared with the resting rate. These facts make it impossible to regard recovery heat merely as an altered level of resting metabolism. F. B. P.

Seasonal variations in the phosphatide content of frog muscles. M. A. Josifova (Ukrain. Biochem. J., 1939, **13**, 495—513).—The lipin-P content of male frog's biceps femoris muscle rises from 0·20% of the dry matter in winter to 0·26% in spring, and remains at this level until the autumn, when it again rises to 0·27%. With females, the val. falls from 0·24% in winter to 0·22% in summer, rising in the autumn to 0·30%. The lipin-P content falls in female summer frogs during fasting, and rises following subjection to winter conditions (cold, darkness, and fasting). R. T.

Mechanical efficiency of frog's muscle. A. V. Hill (Proc. Roy. Soc., 1939, **B**, **127**, 434—451).—A theoretical discussion is given of the mechanical efficiency of muscle, based on the dynamic consts. a (the shortening heat per cm. of shortening), and b (the increase of energy rate per g. decrease of load), the isometric tension P_0, and the heat of maintenance k. Equations are given relating the efficiency to the speed in a contraction at const. speed, and the efficiency to the load in an isotonic contraction. Experiments on frog's muscle at 0°, using a " protected " thermopile and a Levin–Wyman ergometer, show that the relationship between efficiency and speed is of the predicted form, and that the max. efficiency and optimum speed are close to the predicted vals. At a given speed, the observed efficiency is independent of the duration of stimulus and therefore of the amount of shortening. In isotonic contractions, the optimum load agrees with that predicted, but the max. efficiency

is less. The observed max. efficiency of the initial process is 40%, and this corresponds with an efficiency of 20% for the muscular cycle including recovery. The max. efficiency depends only on a/P_0 and K/P_0, where $K = k/b$. In frog's muscle at 0°, $k = ab$ approx., *i.e.*, the heat required to maintain a contraction is about equal to the extra heat associated with shortening at velocity b. Approx. estimates are given of the vals. of a and b for human muscle; they seem to be similar to those for frog muscle at 0°.

D. M. N.

Variations in intramuscular pressure during postural and phasic contraction of human muscle. F. A. Hellebrandt, E. F. Crigler, and L. E. A. Kelso (Amer. J. Physiol., 1939, **126**, 247—253).—Intramuscular pressure was determined in frog and human muscles by the technique described by Henderson and his co-workers (cf. Physiol. Abs., 1936, **21**, No. 2060). Precision was increased by incorporating a Hg reservoir supported on a rack and pinion for the production of smooth and rapid changes in pressure in the saline-containing glass capillary to which the needle entering the muscle is attached. Gross changes in tonus are reflected in significant changes in intramuscular pressure. Intramuscular pressure is lowest in the relaxed muscle, higher during postural contraction, and max. during voluntary effort. It is relatively const. in the relaxed muscle in contrast with the marked, rhythmic variation which occurs during postural contraction. There is a rhythmic variation in intramuscular pressure in the human gastrocnemius during comfortable relaxed standing: this is possibly due to a shift in the incidence of tension between different antigravity groups of muscles.

M. W. G.

Action of lead on phosphocreatine in muscular paralysis of lead poisoning. S. E. Steiman (Amer. J. Physiol., 1939, **126**, 261—269).—Frogs were poisoned with Pb by keeping them in 0·01—0·02% $PbCl_2$ solution, changed daily. After 12—14 days they had lost wt., were sluggish, and moved about with difficulty. Frogs exercised by repeated prodding developed these symptoms in 2—5 days. Average val. of phosphocreatine in normal unstimulated frog muscle is 54·6 mg.-% as P; inorg. P was 32·7 mg.-%. 2 min. tetanus leads to hydrolysis of 50% of the phosphocreatine and in 1 min. of recovery 6% of the hydrolysed phosphocreatine is resynthesised. After 30 min. recovery re-synthesis of the whole of the hydrolysed phosphocreatine is complete. In Pb-poisoned frogs the muscle-phosphocreatine was 37—38 mg.-% and the inorg. P 43—45 mg.-%: in the exercised poisoned frogs the phosphocreatine was still lower and the inorg. P higher; in neither poisoned group was there resynthesis of the phosphocreatine in 30 min. after 2 min. stimulation. Muscles immersed in O_2-Ringer's solution containing Pb have a lower phosphocreatine and a higher inorg. P content than controls. Pb appears to be capable of hydrolysing phosphocreatine.

M. W. G.

Iodoacetic acid and anaërobic muscular contraction. J. Sacks (Amer. J. Physiol., 1939, **126**, 388—394).—Frogs were injected with 0·11 mg. of iodoacetic acid per g. body-wt., which inhibits lactic acid formation in contracting muscle without producing too rapid onset of rigor. The cord was transsected; when spontaneous rigor appeared in the forelegs, one gastrocnemius was frozen (CO_2 and ether) and the other attached to an isometric lever and stimulated through the sciatic with condenser discharges (1 per sec.). The effects of 20 twitches, stimulation to contracture, and stimulation to complete rigor were studied. In these approx. anaërobic conditions the formation of hexose monophosphate from phosphocreatine and glycogen takes place directly. Hexose diphosphate is formed only after the onset of irreversible changes. The formation of hexose monophosphate is independent of lactic acid formation, which serves as a substitute source of energy under anaërobic conditions when lactic acid is inadequate or inhibited. Triose phosphate is not present in poisoned muscles in rigor which contain large amounts of hexose diphosphate. The lactic acid-inhibiting action of iodoacetate is not due to inhibition of the oxido-reduction of triose phosphate. The reactions in anaërobic contraction of poisoned muscle are not necessarily the same ones which are found in muscle extract under comparable conditions.

M. W. G.

Diffusion of chloride and glucose into frog muscle. R. B. Fisher and V. Subrahmanyan (J. Physiol., 1939, **97**, 233—237).—The diffusion *in vitro* (gastrocnemii, Hungarian frogs) occurs in stages which are similar in magnitude for the two substances but separated in time. The Cl′ permeation of the muscle is always greater than the glucose permeation.

J. A. C.

Effect of ions and veratrine substances [on muscle]. Z. M. Bacq (Arch. int. Pharmacodyn., 1939, **63**, 59—87).—Veratrine sensitises striated and smooth muscle to the action of the ions K, Na, Rb, Cs, NH_4, and Ba. Ca, Sr, and Mg antagonise the action of K and Ba on veratrined muscle in the ratio of one Ca ion or 3 Mg or Sr ions to one K ion. The action of Li and H is not modified by veratrine. Aconitine and delphinine sensitise to the action of K. The properties of veratrine are mostly explained by its sensitisation to K ions.

D. T. B.

Study of veratrine contraction with special reference to action of quinine [on muscle]. Y. Miyake (Arb. med. Univ. Okayama, 1939, **6**, 230—264).—The contraction of the veratrinised frog's sartorius was studied in relation to various other drugs. The veratrine contraction consists of a "twitch" and a "veratrine" (contracture) component, which is abolished by repetitive stimulation but reappears on resting; analogous effects are produced by glycerin and formaldehyde. The threshold of the veratrine effect is lowered by increase in temp. and slight alkalinity and is increased by excess of K, Ca, and acidity. Quinine increases the "twitch" and depresses the "veratrine" component; it also antagonises glycerin and fatigue contracture. The "veratrine" component is also inhibited by atropine, eserine, and to a certain extent by ergotoxine; it is unaffected by iodoacetic acid and acetylcholine and markedly enhanced by adrenaline. A chemical interaction probably occurs between veratrine and

some constituent of muscle. It is concluded that veratrine contraction has nothing to do with parasympathetic transmitter. H. O. S.

Influence of temperature on oxidation-reduction processes of frog muscle at different seasons. O. J. Schwartz (Ukrain. Biochem. J., 1939, **13**, 347—358).—The intensity of redox processes taking place in frog muscle varies according to the season and to the environmental temp., being lowered in winter frogs when these are heated at 37° or cooled at 3°, or by heating summer frogs to 37°. It is raised slightly in the latter by cooling. R. T.

Separation of resting and activity oxygen consumptions of frog muscle by means of sodium azide. J. N. Stannard (Amer. J. Physiol., 1939, **126**, 196—212).—O_2 consumption and glycolysis were measured in Fenn differential volumeters producing sufficient sensitivity to measure the respiration of intact frog muscle in the resting state without long periods of observation or large amounts of tissue. Several muscles were used, the sartorius most often. Both winter and summer frogs showed the phenomena recorded. NaN_3 in concns. of $2{\cdot}2—4{\cdot}1 \times 10^{-3}$M. over a p_H range of 4·6—7·4 has no immediate inhibitory effect on the O_2 consumption of resting muscle. On the other hand NaN_3 in concns. of $2—5 \times 10^{-3}$M. completely eliminates in a few min. the increment in O_2 uptake caused by electrical stimulation, KCl, or acetylcholine contracture or by treatment with sub-contracture doses of caffeine. The effects on the O_2 consumption in caffeine indicate that the resting respiration continues unhampered in the presence of the much higher rates associated with caffeine treatment. The oxidation of *p*-phenylenediamine is largely inhibited by azide; the increased O_2 consumption produced by methylene-blue or pyocyanin is not prevented by azide until secondary effects supervene. This indicates that NaN_3 inactivates the Warburg–Keilin O_2 transport system. NaN_3 does not inhibit glycolysis. The effects of CN' on resting and caffeinised muscle indicate that it may be affecting two different enzyme systems. M. W. G.

Vegetative theory of functions of striated muscles. N. M. Schtscherbakov (J. méd., Ukraine, 1939, **9**, 436—461). M. K.

Nerve impulses and responses in mammalian striated muscles. J. C. Eccles and W. J. O'Connor (J. Physiol., 1939, **97**, 44—102).—A nerve impulse exerts two excitatory actions at the neuro-muscular junction (soleus, tibialis anticus, peroneus tertius; cat; nembutal anaesthesia). (i) Newborn muscle impulses are set up by a brief excitatory action probably no more than 1 msec. in duration and analogous to the detonator action described for synaptic transmission. (ii) The much more prolonged end-plate potential is set up independently of the newborn impulses, but, if the growth of these impulses is sufficiently delayed, it appears to aid in their growth to the fully propagated size. It is analogous to the *N* wave and the associated central excitatory state of synaptic transmission, and analogous responses have also been described at the neuro-muscular junction of smooth muscle (cf. A., 1939, III, 127, 566). J. A. C.

Fifth stage of neuro-muscular transmission. A. Rosenblueth and J. V. Luco (Amer. J. Physiol., 1939, **126**, 39—57).—The responses of gastrocnemius-plantaris and soleus to several hr. stimulation of the popliteal nerve with frequencies from 25 to 300 per sec. were studied in cats. The period of neuro-muscular fatigue (4th stage) is followed by a later rise of tension which can reach high vals. and can be sustained for many hr. (5th stage). The 4th and 5th stages are not influenced by dial anæsthesia, previous sympathectomy, or the load applied to the muscles. They are influenced by frequency of stimulation. They are different for gastrocnemius-plantaris and soleus. The changes of tension are not correlated with corresponding changes in the motor nerve impulses. The changes in tension and in muscle action potentials are roughly parallel. Irregularities in the mechanograms during the 4th and 5th stages are due to alternation of the muscle fibres. The effects of rest periods of different durations are described; the 5th stage subsides progressively. The muscle does not revert to the 4th stage during this subsidence. It is inferred that the 4th and 5th stages are synaptic phenomena and are due to different and independent factors. Two types of fatigue are recognised: a contraction fatigue and a transmission fatigue. M. W. G.

Neuro-muscular "transmission-fatigue" produced without contraction during curarisation. J. V. Luco and A. Rosenblueth (Amer. J. Physiol., 1939, **126**, 58—65).—A motor nerve was continuously stimulated in cats with a frequency of 60 per sec. after an intravenous paralysing dose of curare. When the control muscle of the opposite side, periodically tested, showed complete decurarisation, the muscle on the continuously stimulated side was usually not contracting. A renewal of the prolonged stimulation after a rest of 1 min. revealed marked transmission-fatigue. The same results were obtained in cats anæsthetised with dial and decerebrate prep. Previous removal of the abdominal sympathetic chains and ligation of the adrenals did not influence the phenomenon. Transmission of the motor nerve impulses may thus be fatigued in conditions in which neither the nerve spike-potentials nor the electrical excitability of muscle are impaired; this is readily accounted for by the chemical theory of mediation by acetylcholine. M. W. G.

Inhibition following eserine-potentiated and post-tetanically facilitated responses of mammalian muscles. T. P. Feng, T. H. Li, and Y. C. Ting (Chinese J. Physiol., 1939, **14**, 337—356).—The electric responses of 3 cat muscles were recorded as described previously (A., 1939, III, 662). After a tetanus at 330 per sec., a max. nerve volley caused repetitive discharges and a 2nd twitch 25 m-sec. later was inhibited. Post-tetanic after-discharge and inhibition were more marked in soleus than in gastrocnemius or tibialis anticus, as was also their intensification and appearance without tetanus after 0·01—0·8 mg. of eserine. The eserine effects were abolished by curare. After-discharge and inhibition did not vary together; 2 shocks in the inhibitory

phase had no more effect than one. An extra shock 7½ m-sec. after the first usually had no effect on after-discharge or inhibition, though it might increase the former after eserine. It is suggested that the results are due to a prolonged depolarisation of the neuro-muscular junction. N. H.

Mechanism of [skeletal muscle] sensitisation to acetylcholine by denervation. L. Y. Lee (Chinese J. Physiol., 1939, **14**, 357—374).—K began to decrease in the rectus abdominis of the toad 7 days after denervation and in 21 days was reduced by 17%; the muscle at the same time became more sensitive to acetylcholine. Sensitivity to nicotine also varied inversely with K content. After 4 hr. soaking in K-free Ringer's solution, K leaked out and 20—30% was lost in 22 hr., when the muscle was much more sensitive to acetylcholine; it became normal after 2 hr. in Ringer's solution. In Ringer's solution + 60 mg.-% $CaCl_2$, the K content increased and sensitivity decreased. Sartorius and gastrocnemius do not respond to acetylcholine and they contain more K than rectus abdominis. N. H.

Development of after-discharge at amphibian neuro-muscular junctions treated with eserine. T. P. Feng, T. H. Li, and Y. C. Ting (Chinese J. Physiol., 1939, **14**, 329—336).—On oscillograph records, the eserinised sciatic–gastrocnemius prep. of the toad with circulation intact gave a repetitive after-discharge to the second of two stimuli <20 m-sec. apart. The isolated nerve–sartorius prep. soaked in 1/5000 eserine for 15 min. showed more after-discharge from the 2nd stimulus than from the 1st. N. H.

Case of myasthenia gravis improved after administration of thyroid and adrenal extract. S. Inui and H. Morikawa (Folia endocrinol. japon., 1939, **15**, 1—3). E. R.

Drugs in myotonia. E. Guttmann and A. B. Stokes (Lancet, 1939, **237**, 879—881).—Quinine produced marked improvement in a case of myotonia congenita. Prostigmine and benzedrine caused no improvement. C. A. K.

(ix) NERVOUS SYSTEM.

Propagation and extension of excitatory effects of nerve action potential across non-responding internodes. E. A. Blair and J. Erlanger (Amer. J. Physiol., 1939, **126**, 97—108).—Two successive nodes of Ranvier depressed by anodal polarisation can be so conditioned by a blocked nerve impulse that a second impulse will pass both nodes. The extrinsic potential from a nerve impulse blocked at the anode of a const. current can be made to stimulate the fibre at the cathode, thus re-initiating the impulse across an inactive gap of one or two internodes. A method is described of determining experimentally the stimulating val. of the action potential; the val. accepted amounts to about 2·5 thresholds. The significance of the findings is discussed in relation to temporal summation and impulse transfer at a synapse and to saltatory progression of the nerve impulse. M. W. G.

Stimulation produced by alternating impulses of high frequency and short duration. P. Fabre (Compt. rend. Soc. Biol., 1939, **131**, 453—455).—When rectangular waves of short duration and alternate sign are applied to the sciatic–gastrocnemius prep. at intervals equal to the duration of each wave the following excitation law holds: $(Q - q)/q = HN$, where Q is the quantity of electricity of each charge necessary to stimulate at frequency N, q and H being consts. The frequencies over which the law was tested were 10,000—130,000 per sec. The const. H is approx. 40×10^{-3} sec., which is higher than the equiv. const. K in the law for single alternate waves (cf. A., 1939, III, 900). P. C. W.

Conduction velocity and diameter of nerve fibres. J. B. Hursh (Amer. J. Physiol., 1939, **127**, 131—139).—The conduction velocities in the fastest fibres in various nerve trunks of the cat and kitten were correlated with the external diameters of the largest fibres in those trunks. The velocities measured ranged from 8 to 117 m. per sec. The best curve relating velocity and diameter is a straight line. Curves drawn in accord with the hypothesis that the velocity varies as the square or square root of the diameter vary widely from the observed points. Comparative data relating internodal length to fibre diameter are plotted for nerve fibres from cats and kittens. M. W. G.

Properties of growing nerve fibres. J. B. Hursh (Amer. J. Physiol., 1939, **127**, 140—153).—Preps. of the saphenous and of the cervical sympathetic trunk were made from kittens. 3 groups of fibres are referred to, A, B, and C: A, myelinated fibres of the somatic nerves and fibres in visceral nerves having similar properties; B, B_2 of Bishop and Heinbecker; C, unmyelinated fibres, velocities 2 m. per sec. and slower. Immature A fibres conducting at B velocities have a positive after-potential with a duration characteristic of A fibres. The amplitude is greater than that of A, but less than half that of B. Immature B fibres conducting at C velocity have a positive after-potential differing from that of adult C fibres. The after-potentials depend more on the type of fibre than on the fibre size. The abs. refractory period of nerve fibres is not determined by the group to which they belong. Immature A fibres may have refractory periods as long as adult B fibres (1·0—1·2 m-sec.). B fibres conducting at C velocities may have refractory periods as long as or longer than adult C fibres (1·8—2·0 m-sec.). M. W. G.

Electrolytes in axoplasm of giant nerve fibres of squid. R. S. Bear and F. O. Schmitt (J. Cell. Comp. Physiol., 1939, **14**, 205—215).—K ion concn. in these axons is 18 times that in blood. Concn. of known ions is 63% of that in blood and 71% of that in sea-water. Cation concn. is 4—5 times as great as concn. of known anions, and it is suggested that the axon contains a no. of unknown org. anions. V. J. W.

Neuro-muscular chronaxie in Abkhazians of extreme old age. B. Kraiuchin and N. Schtscherbakov (J. méd., Ukraine, 1939, **9**, 117—128).—Measurement of chronaxie and rheobase of biceps, triceps, and gastrocnemius in 21 individuals, aged

90—135, revealed in most cases initial muscular degeneration with predominance of the first phase of degeneration. H. L.

Intravenous sodium salicylate and sodium iodide in sciatica. H. B. Sutton (Lancet, 1939, **237**, 1168—1169).—Intravenous injection of 1 g. of Na salicylate or NaI (5% solution) rapidly and permanently relieved pain in 20 cases of primary sciatica, but produced only temporary relief in 12 cases of secondary sciatica. C. A. K.

Flaccid paraplegia following diagnostic use of Frei antigen. H. L. Keim and R. F. Wakefield (Arch. Dermat. Syphilol., 1939, **40**, 709—725).—A case of flaccid paralysis which began 11 days after the intradermal diagnostic use of commercial mouse brain Frei antigen is recorded. It is suggested that after an incubation period following non-sp. trauma (*e.g.*, vaccination, exanthemas) the patient responds with an interruption of his immunity by a reactivation of latent viruses, leading to the production of paralysis or other symptoms. C. J. C. B.

Afferent impulses from teeth due to pressure and noxious stimulation. C. Pfaffmann (J. Physiol., 1939, **97**, 207—219).—Fuller details are given of results already recorded (cf. A., 1939, III, 568). Frequencies as high as 1200 per sec. in a single fibre from the tooth were recorded with very rapid applications of pressure. The touch endings of the mucous membrane (tongue) respond with short bursts of impulses to changes in pressure, but not to steady deformations. Noxious agents, *e.g.*, extremes of temp. or fracture of the tooth, give rise to impulses typically of lower voltage and slower conduction rate than those initiated by pressure on the intact tooth. J. A. C.

Different impulses from teeth and vibratory stimuli. C. Pfaffmann (J. Physiol., 1939, **97**, 220—232).—Fuller details are given of results already recorded (cf. A., 1939, III, 568). The upper limit of "frequency following" for the whole nerve is 1500 cycles. Different endings, as indicated by single fibre responses, have different max. frequencies of response to the oscillating source (80—900 cycles). Single fibres when stimulated at rates higher than their optimal frequency show various types of fractional response, 1 : 2, 1 : 3, etc. In some cases, the endings may be activated at frequencies overlapping the relative refractory period of the nerve. J. A. C.

Conduction of pain in the fifth nerve and its bearing on treatment of trigeminal neuralgia. O. Sjöqvist (Yale J. Biol. Med., 1939, **11**, 593—600).—Fibres conducting pain and temp. in the 5th nerve are scattered evenly in the sensory root, but form the majority of fibres in the bulbospinal tract, section of which can be used for relief of trigeminal neuralgia. F. S.

Exercise in sympathectomised cat. R. Hodes (Amer. J. Physiol., 1939, **126**, 171—179).—Max. performance in the treadmill and the heart rates after work were compared in partial and completely sympathectomised cats before and after operation. The completely sympathectomised cat runs less rapidly and for much shorter periods; this impairment may last as long as 3 months; apparent regrowth of some sympathetic fibres restores the running ability to some extent. Adrenaline (0·02—0·04 mg. per kg.) may markedly improve the sympathectomised cat's performance. The observed cardiac acceleration produced by work or emotion in the sympathectomised and in sympathectomised atropinised cats is attributed to accessory vagal accelerators. The cardiac acceleration after exercise in the sympathectomised cat is 30% less than in the normal cat. M. W. G.

Vascular changes and transmission of nerve impulses. E. Bülbring and J. H. Burn (J. Physiol., 1939, **97**, 250—264).—Fuller details are given of results already recorded (cf. A., 1939, III, 566). The muscles of the dog's hind leg are perfused with defibrinated blood; the contractile response to stimulation of the motor roots gradually fails. The transmission of impulses can be restored by stimulating the sympathetic chain, and improvements can be observed within 20 sec. of applying such a stimulus. The restoration so produced long outlasts the effect of the stimulation on the blood flow. J. A. C.

Nature of pilomotor response to acetylcholine. J. M. Coon and S. Rothman (Proc. Soc. Exp. Biol. Med., 1939, **42**, 229—231).—Intradermal injection of acetylcholine causes in man or cat an erection of hairs which is not modified by atropine or eserine. This response is abolished by sympathetic degeneration, or by novocaine which is less than the amount needed for cutaneous anæsthesia. It is presumably due to an axon reflex which is elicited by the nicotine-like action of acetylcholine, the efferent endings being adrenergic. V. J. W.

Nature of sweat response to drugs with nicotine-like action. J. M. Coon and S. Rothman (Proc. Soc. Exp. Biol. Med., 1939, **42**, 231—233).—Intradermal acetylcholine in high concns. (10%) stimulates sweat glands directly. In low concns. (1 : 40,000) it causes sweat secretion by a local axon reflex comparable with the pilomotor reflex (see preceding abstract) except that the efferent endings are cholinergic. V. J. W.

Sympathetic nervous system and segmental pain. W. G. Campbell (Lancet, 1939, **237**, 930—932).—Injection of the lumbar sympathetic chain with procaine relieved pain in the feet and legs of patients with vascular disease or injuries, *e.g.*, sprains or fractures. C. A. K.

Cerebellum of anamniotes. A. Stefanelli (Arch. ital. Anat. Embriol., 1939, **42**, 1—45).—A phylogenetic study of the cerebellum in cyclostomata, fishes, and amphibia. The cerebellum first appears in *Petromyzonta* as an extension of the lateral line areas containing a pair of nuclei of the lateral line nerves; this cerebellum lacks Purkinje cells and receives no propioceptive spinal tracts. The appearance of these tracts in fishes results in the development of a cerebellum proper (corpus cerebelli) in which, however, the lateral line connexions are predominant. The lateral line system gradually disappears in amphibia whereas the olivo- and spino-cerebellar tracts increase in importance and there is a great development of the vestibular connexions. S. O.

Cerebellar agenesia. L. B. Sholl, E. K. Sales, and R. Langham (J. Amer. Vet. Med. Assoc., 1939, **95**, 229—230).—Absence of the cerebellum is recorded in a 4-month old puppy, in a 7-day old lamb in which the vermis of the cerebellum was absent, and in a 14-day old kitten which had a hypoplastic cerebellum failing to cover the corpora quadrigemina. E. G. W.

Cerebral visual pathways. M. Minkowski (Schweiz. med. Wschr., 1939, **69**, 990—995).—A review. A. S.

Effect of hypothalamic lesions on fever induced by intravenous injection of typhoid–paratyphoid vaccine. S. W. Ranson, jun., G. Clark, and H. W. Magoun (J. Lab. clin. Med., 1939, **25**, 160—168).—Of 21 cats with chronic lesions of the hypothalamus (and in a few cases prechiasmatic region) only one showed a typical fever response to the intravenous injection of typhoid–paratyphoid vaccine. 12 showed marked and prolonged temp. falls (3—11° F.) which lasted for 20 hr. or more. Animals showing this reaction still responded to the intravenous injection of α-dinitrophenol with a typical febrile response. C. J. C. B.

Effects of morphine sulphate on hypothalamus of cat. J. H. Masserman (Proc. Soc. Exp. Biol. Med., 1939, **42**, 315—317).—Morphine caused no changes in the effects produced by electrical stimulation of cortex or hypothalamus. V. J. W.

Myelination of lateral geniculate body in newborn infants. G. Brugi (Boll. Soc. ital. Biol. sperim., 1939, **14**, 325).—The fibres of the optic tract are completely myelinated at birth. Myelination in the geniculate body is not completed during intrauterine existence. F. O. H.

Structure of human metathalamus. G. Brugi (Arch. ital. Anat. Embriol., 1939, **42**, 439—453).—Two fœtuses of 6 and 7 months were studied. There is a system of association fibres between the external geniculate body and neighbouring nuclei of the thalamus and subthalamus. In the external geniculate body the characteristic disposition of the nerve elements in concentric cell strata begins to appear by the 7th month of intrauterine life; the ventral ilus was still absent in the two cases studied. S. O.

Picrotoxin–barbiturate antagonism in decorticated animals. H. R. Miller and E. A. Spiegel (Yale J. Biol. Med., 1939, **11**, 497—500).—15 rats were decorticated by suction, 9 incompletely and 6 completely except for a small medial strip of the pyriform lobe. Picrotoxin injected intraperitoneally in doses of 1—5 mg. per 100 g. body-wt. could awaken the rats from sleep induced by 2—4 mg. of nembutal per 100 g. body-wt. F. S.

Chordotomy for thalamic pain. F. Turnbull (Yale J. Biol. Med., 1939, **11**, 411—414).—When the lesion is extensive and pain is referred to both extremities and the face bilateral chordotomy may be necessary. Unilateral chordotomy is sufficient when only the area representing one limb is involved. F. S.

Quick component of nystagmus. A. K. McIntyre (J. Physiol., 1939, **97**, 8—16).—Under light ether narcosis, a tonic discharge of impulses is present in the 6th cranial nerve (cat). No change can be detected in the tonic discharge after cutting the nerve distally. The motor impulses in the 6th nerve accompanying both phases of horizontal nystagmus are characteristic. After cutting the 3rd, 4th, and 6th nerves on both sides and extirpating the retractor bulbi muscles, labyrinthine stimulation still produces in the central stump of the 6th nerve motor impulses characteristic of normal nystagmus. The contention of de Kleyn that the rhythm of normal nystagmus is entirely central in origin and independent of impulses from ocular muscles is confirmed. J. A. C.

Oscillographic analysis of spontaneous and sensory activity of visual cortex in non-anæsthetised cat. E. Claes (Arch. internat. Physiol., 1939, **48**, 181—237).—The reactions of the visual cortex in cats with the "isolated brain" (Bremer) were studied with a Matthews oscillograph. During wakefulness, the visual cortex showed irregular waves of frequency 70 per sec. During sleep spontaneous synchronous discharge of cortical neurones was indicated by intermittent periods showing large waves of low frequency. Spontaneous discharge of visual cortex neurones is influenced by the activity of the cerebral cortex, activity of the retina (apart from sensory stimulation), and activity of the opposite visual cortex. Visual cortex activity is synchronous on the two sides, but not after section of the corpus callosum. The visual cortex in the non-anæsthetised cat shows more complex sensory reactions than those of the anæsthetised animal. Retinal adaptation to light showed a decrease of the "on" effect and an increase of the "off" effect in the visual response. The cortical "off" effect is attributed to activation by darkness of certain retinal neurones. W. Bu.

Functions of frontal lobe based on observations in 48 cases of pre-frontal lobotomy. W. Freeman and J. W. Watts (Yale J. Biol. Med., 1939, **11**, 527—539).—The frontal lobes are concerned with the projection of the individual into the future. Many of the symptoms of frontal lobe disease can be explained on the basis that the individual has lost his self-critique, is more easily satisfied, is lacking in "social sense," and has had an impairment of his imagination as related to himself. F. S.

Increased spontaneous activity produced by frontal lobe lesions in cats. D. R. Langworthy and C. P. Richter (Amer. J. Physiol., 1939, **126**, 158—161).—Quant. studies (using a cyclometer) show that frontal lobe extirpation increases spontaneous activity in cats more than in monkeys or rats. Some of the cats reached peaks of activity 100 times above preoperative levels and even died from exhaustion. Removal of one frontal lobe increased the average daily activity 3-fold; subsequent removal of the other pole increased the activity about 15-fold. Hyperactivity occurred in some animals within 48 hr. after removal of the 2nd frontal lobe; in others the activity did not reach highest levels for several months. Removal of one frontal lobe did not noticeably affect behaviour; removal of both poles produced marked changes (abnormal excitability and hunger). M. W. G.

Athetosis [treated by chordotomy]. T. J. Putman (Yale J. Biol. Med., 1939, **11**, 459—465).—Treatment by chordotomy of the extrapyramidal tracts gave relief in a large proportion of 35 cases. F. S.

Impulses in pyramidal tract. E. D. Adrian and G. Moruzzi (J. Physiol., 1939, **97**, 153—199).—Fuller details and extensions are given of results already recorded (cf. A., 1939, III, 572). With convulsant drugs sensory stimulation produces high-frequency outbursts before they begin to occur spontaneously (cat). High-frequency outbursts in the pyramidal fibres, when fully developed, produce convulsive movements except in very deep anæsthesia. Electrical stimulation of the motor cortex may produce movement because each shock sets up a brief high-frequency discharge. Following electrical stimulation there may be an after-discharge of high-frequency outbursts, associated with clonic movements if the anæsthesia is not too deep. J. A. C.

Sensory cortex of chimpanzee. J. G. Dusser de Barenne and W. S. McCulloch (Proc. Soc. Exp. Biol. Med., 1939, **42**, 27—29).—By local application of strychnine and recording of cortical electric changes the sensory cortex was mapped out. Individual variations were large but the general arrangement was similar to that already described for *Macacus* (cf. A., 1938, III, 385, 994). V. J. W.

Pre-imaginal olfactory conditioning in insects. W. H. Thorpe (Proc. Roy. Soc., 1939, **B**, **127**, 424—433).—Although *Drosophila melanogaster* is normally repelled by the odour of peppermint, flies which have been reared on a medium containing 0·5% of peppermint essence are attracted by its odour in an olfactometer. The conditioning is extinguished in 6 days if the insects are isolated. It is reduced but not eliminated by washing the fully fledged larvæ or newly formed puparia. This indicates that a change in the responses of the adult can be brought about by an influence which operates only during larval life. F. B. P.

Electro-encephalographic studies in relatives of epileptics. H. Strauss, W. E. Rahm, jun., and S. E. Barrera (Proc. Soc. Exp. Biol. Med., 1939, **42**, 207—212).—23% of parents and 28% of siblings of epileptics gave records having 3—6 cycles per sec. of an amplitude of at least 50 μv. V. J. W.

Prevention of fear in cardiazol therapy. W. L. Neustatter and H. Freeman (Lancet, 1939, **237**, 1071—1072).—Preliminary anæsthesia with *cyclo*propane or N_2O abolishes fear produced by cardiazol therapy. C. A. K.

Variations in blood gases produced by injection of insulin in schizophrenia. I, II. M. Mereshinski, L. Tscherkasova, and J. Sasanski (J. méd., Ukraine, 1939, **9**, 395—400, 403—410).—I. Insulin usually increases the O_2 content of venous blood; an injection of glucose decreases it.

II. Insulin diminishes the arterio-venous O_2 difference in schizophrenics during the phase of shock. M. K.

Experimental shock from protamine–zinc–insulin. J. W. Sherrill and E. M. Mackay (Arch. intern. Med., 1939, **64**, 907—912).—Administration of conc. glucose solutions to rats and dogs in shock from protamine–Zn–insulin for several hr. often produces convulsions and sudden death. Water may have the same effect, which is attributed to a sudden electrolyte shift + hypoglycæmic degenerative changes. Hypoglycæmia for 3—5 days produces permanent sensory and motor disturbances. Therapeutic insulin shock should be as brief as possible. C. A. K.

Central nervous system stimulant effects of *d*-amphetamine sulphate. M. Prinzmetal and G. A. Alles (Proc. Soc. Exp. Biol. Med., 1939, **42**, 206—207).—*d*-Benzedrine is 2—4 times as effective as the *l* isomeride as determined by min. effective dose in narcolepsy or Parkinsonism. V. J. W.

Psychic seizures as focal manifestations in post-traumatic brain disease. L. M. Davidoff (Yale J. Biol. Med., 1939, **11**, 557—559).—A case report. F. S.

Experimental induction of neurotic reactions in man. L. S. Kubie (Yale J. Biol. Med., 1939, **11**, 541—545).—Patterns of neurotic behaviour have a sp. ideational source and content and can be set off artificially by stirring these ideas into action by presenting the appropriate stimulus. (3 cases.) F. S.

Factors in neural bases of intellect and emotion. [Rôle of frontal lobes.] R. M. Brickner (Yale J. Biol. Med., 1939, **11**, 547—556).—A general discussion on the effects of unilateral and bilateral frontal lobectomy. F. S.

Adenosinetriphosphoric acid content of the brain at various stages of embryonic and post-embryonic development. B. I. Chaikina and S. E. Epelbaum (Ukrain. Biochem. J., 1939, **13**, 261—274).—The amount of H_3PO_4 liberated by hydrolysis of protein-free brain extracts with N-HCl (7 min. at 100°), corr. for H_3PO_4 eliminated from hexosediphosphoric acid, is less than is obtained by the action of Jacobsen's liver extracts, containing adenosinetriphosphatase. It is concluded that Jacobsen's extract also acts on substrates other than adenosinetriphosphoric acid. These substances are absent from the ppt. obtained by adding Ba salts to brain extract. The adenosinetriphosphoric acid content of chicken and rabbit brain falls rapidly during embryonic growth, and gradually during post-embryonic life. R. T.

Chemical pacemakers [in brain]. I. Catalytic brain-iron. II. Activation energies of chemical pacemakers. Z. Hadidian and H. Hoagland (J. Gen. Physiol., 1939, **23**, 81—99).—Fe pigment spicules in the brains of general paretic patients are formed from endogenous Fe normally present in another form. This supports the view that the μ val. of 16,000 found in advanced paretics for α brain wave frequency results from the slowing of an Fe-catalysed link in cortical respiration. This might be brought about by a change in the available cytochrome and its oxidase, the link in the respiratory chain thus being a chemical pacemaker. The μ val. of the succinic dehydrogenase and cytochrome oxidase systems working together is 11,200 cal.; the addition of a crit. amount of CN' shifts the μ val. to

16,000 cal., presumably by partly inhibiting the cytochrome oxidase and making it the limiting factor. Addition of SeO_3'', a sp. poison for the dehydrogenase, stops respiration without changing μ; addition of a crit. amount of SeO_3'' to the CN′-inhibited system brings back the μ to 11,000 cal. 11,000 cal. is probably the energy of activation of the succino-dehydrogenase-catalysed step, and 16,000 cal. that of the cytochrome-oxidase-catalysed step. D. M. N.

Relations between function and combustion processes in nerve cell. G. Mansfeld, I. Scheff-Pfeifer, and F. von Tyukody (Arch. exp. Path. Pharm., 1938, **190**, 572—584).—The relation between paralysis of function and oxidation processes was investigated in nervous and non-nervous organs. The concn. of narcotic which completely paralyses the isolated frog's medulla (Baglioni) has no effect at all on oxidation, which is only inhibited by a concn. 10—20 times stronger. A cerebral hemisphere extirpated before or during deepest narcosis shows no difference in the O_2 uptake. Brain slices synthesise the same amount of acetylcholine before and during deep narcosis. Central stimulants, *e.g.*, strychnine, caffeine, or cardiazol, also produce no change in the O_2 uptake in brain cells. Narcosis of muscle, however, shows a parallelism between diminution of function and depression of respiration. H. H. K.

Blood–cerebrospinal fluid barrier of normal children as determined by bromide permeability quotient. F. A. Mettler, M. Robinow, W. R. Brown, and C. McK. Burpee (Psychiat. Quart., 1939, **13**, 639—680).—The permeability quotient (concn. of Br in blood ÷ concn. in c.s.f.) after administration of NaBr was determined in 50 children who were non-syphilitic but were convalescent from various illnesses. It was 3·0—3·5 in white children and 2·5—3·0 in negro children. It increases with age and is low in children recovering from fevers. The permeability quotient for Cl′ is approx. the same in white and negro children. G. D. G.

Histologic changes following vascular spasm in central nervous system (pitressin episodes). A. J. Nedzel (Arch. Path., 1939, **28**, 697—711).—Transient vascular spasms induced by injections of pitressin cause changes in the central nervous system. The early changes consist of swelling of the endothelium of the capillaries and small hæmorrhages. The leucocytes (mostly polymorphonuclear) increase in no., glial cells accumulate among the blood vessels, and the perivascular spaces become œdematous. Later thrombosed blood vessels are observed, composed largely of fibrin. Swollen myelin sheaths and axons are found in scattered patches. Gliosis is noted. Changes occur in nerve cells, ranging from simple hydration to necrobiosis. C. J. C. B.

Cranial meningiomas. D. Mosto and C. H. Dickmann (Rev. Medicina, 1939, **1**, 37—56).—A clinical and histological study of 10 cases with 21 original photo-micrographs. S. O.

Penetration of antiserum into central nervous system of monkeys infected with poliomyelitis. II. J. E. Kempf and M. H. Soule (Proc. Exp. Biol. Med., 1939, **42**, 136—139; cf. A., 1939, III, 971).—If rabbit serum hæmolytic to sheep corpuscles is injected into the cisterna of infected monkeys, hæmolysin passes into the blood within 6—12 hr. and none enters the nervous tissues. V. J. W.

Drainage of the third ventricle by transfrontal approach in obstructive hydrocephalus. J. C. White (Yale J. Biol. Med., 1939, **11**, 431—432).—A report of 3 cases. F. S.

Cranial and intracranial procedures for control of intradural hypertension during operations for infiltrating brain tumours. W. G. Crutchfield and J. M. Meredith (Yale J. Biol. Med., 1939, **11**, 437—442).—A description of surgical procedures. F. S.

Goblet cells in colloid cyst of the third ventricle. E. Campbell and J. L. Schwind (Yale J. Biol. Med., 1939, **11**, 501—506).—Report of a case. The presence of goblet cells casts further doubts on the paraphysial origin of such tumours. (1 photomicrograph.) F. S.

Method of ventricular puncture and studies in cerebral pneumography. A. S. Crawford (Yale J. Biol. Med., 1939, **11**, 473—478).—From a series of 360 pneumograms a method is described to facilitate more accurate location of the atrium of the cerebral ventricles for ventriculography. F. S.

***X*-Ray diffraction and polarised light studies of fibre structure of dura and of meningioma.** L. Reynolds, K. E. Corrigan, and H. S. Hayden (Yale J. Biol. Med., 1939, **11**, 479—483).—The structure of the dura is oriented and that of meningioma shows no orientation. (4 photomicrographs.) F. S.

Explanation for ribbing seen in walls of dilated cerebral ventricles. C. G. Dyke and L. M. Davidoff (Yale J. Biol. Med., 1939, **11**, 485—486).—The ridges are caused by the greater resistance of blood vessels to stretching. F. S.

Surgical treatment of hydrocephalus associated with spina bifida. A. D'Errico (Yale J. Biol. Med., 1939, **11**, 425—430).—In 10 consecutive cases of myelomeningocele hydrocephalus developed. Loss of fluid from below the malformation precipitates hydrocephalus whereas tension is relieved on withdrawal of fluid from above. F. S.

Production of immunity to poliomyelitis virus in motor cells of monkey's spinal cord. H. A. Howe and D. Bodian (Proc. Soc. Exp. Biol. Med., 1939, **42**, 346—349).—In monkeys in which one sciatic nerve was cut, inoculation with poliomyelitis virus producing paralysis 6 days later caused no destruction of anterior horn cells of the cut nerve. If paralysis occurred 3—4 days after nerve section the cells were not immune. V. J. W.

Influence of the central nervous system on inflammatory reactions. IV. Influence of cord-section on non-specific inflammation. N. Lauer (J. méd., Ukraine, 1939, **9**, 29—38).—In mammals, but not in lower vertebrates, the intensity of inflammatory reactions is diminished after section of the cord. As the change in reaction is the same in areas above and below the injured segment, it is

impossible to ascribe it to the separation of the organ from its nervous centres or to loss of pain sensation. H. L.

Intracranial causes of headache. H. Cohen (Brit. Med. J., 1939, II, 713—716).—A lecture. C. A. K.

Technical suggestions in neurosurgery. R. U. Light (Yale J. Biol. Med., 1939, **11**, 467—468).—Descriptions of simple exciter, surgical headrest, and instrument for aligning the head during radiography. F. S.

(x) SENSE ORGANS.

Clinical experiences with vitamin-*C* in eye diseases. M. Mieses-Reif (Acta ophthal. orient., 1939, **1**, 170—173).—The vitamin-*C* content of the urine in 80 cases of various eye diseases was lower than normal. In certain forms of cataract -*C* seemed to be of therapeutic val. M. C. B.

Light-pituitary reflex. I. Pigmentary response. H. C. Chang and Y. M. Lü (Chinese J. Physiol., 1939, **14**, 249—258).—Melanophores in the snakefish are controlled by the sympathetic nerve and by the pituitary. Enucleation of the eyes affects the pituitary and thus the melanophores. In the frog the pituitary alone controls the melanophores. A. Gl.

Relation of eyes to integumentary colour changes in catfish *Ameiurus*. G. H. Parker (Proc. Nat. Acad. Sci., 1939, **25**, 499—502).—In one-eyed fresh-water catfish, *A. nebulosus*, the animals are at first dark and then become of variable tint from pale to very dark. The same melanophore responses are found whether the fish is made one-eyed by enucleation of an eye or by section of the optic nerve. W. F. F.

Development of eye colours in *Drosophila*. Bacterial synthesis of v^+ hormone. E. L. Tatum (Proc. Nat. Acad. Sci., 1939, **25**, 486—490).—Synthesis of a substance having v^+ activity by an unidentified aërobic bacillus in presence of tryptophan is reported. H. G. R.

Human cyclopia with associated ocular anomalies. I. E. Wilber (Amer. J. Ophthal., 1939, **22**, 1120—1125).—Description of a case of cyclopia, type synophthalmia bilentica, in an 8-months premature female infant. D. Wh.

Inhibitions of autonomic nervous system by eye stress. E. L. Jones (Amer. J. Ophthal., 1939, **22**, 887—890). D. Wh.

Registering deviometer. Instrument to measure degree of squint. M. E. Smukler (Arch. Ophthal., N.Y., 1939, **22**, 881—882).—The degree of squint is measured by the distance between 2 adjustable dials which are joined to a moulded piece of dental rubber and are fixed over the outer limbus of the squinting eye when its visual axis is directed first to a fixation point and again after return to its usual position. H. L.

Double vision after squint operation. A. Sternberg-Raab (Brit. J. Ophthal., 1939, **23**, 568—573).—Two cases are described in which a divergent squint of 10° resulted after correction of convergent squint. Diplopia followed in both cases. By training and glasses in one case, and exercises to overcome suppression in the other, fusion was restored. In cases of under-correction with residual convergent squint greater than 8°, reoperation is suggested, as even normal eyes can only diverge 4—6°. Other possible courses of post-operative squint, abnormal retinal correspondence, and aniseikonia are discussed. D. Wh.

Paralyses of associated movements of eyes. P. V. Morax (Ann. Oculist., Paris, 1939, **176**, 337—376).—In the study of supranuclear lesions causing ocular paralyses the complete paralysis of voluntary and reflex movement is distinguished from dissociated paralysis of the former alone. It is concluded that dissociated paralyses are based on lesions destroying the prerolandic psychomotor centres or their connexions in the pyramidal tract to oculomotor nuclei. Complete paralyses are due to lesions near the oculomotor nuclei at the level of the white posterior commissure. Complete abolition of elevation is due to a mesocephalic lesion destroying the posterior white commissure near the corpora quadragemina. There is almost const. involvement of neighbouring pupillary centres. Complete paralysis of lateral movements is due to destruction of the posterior longitudinal bundle near the nucleus of the VIth nerve. D. Wh.

Application of cytotoxic antireticular serum in certain eye diseases. P. A. Diban (J. méd., Ukraine, 1939, **9**, 463—469).—Small doses of this serum are harmless. The serum is effective in cases where an increased reaction of the physiologic system of the conjunctival tissue is desired. A positive effect has been observed in 50 out of 65 cases. The action of cytotoxic serum explains to a certain extent the effect of an injection of hypertonic solution into the blood (osmotherapy), which probably acts as a stimulant on the reticulo-endothelial system. M. K.

Culture *in vitro* of corpuscles of trachoma. L. Poleff (Brit. J. Ophthal., 1939, **23**, 738—740).—Description of various stages in the evolution of trachomatous corpuscles cultivated *in vitro*. (Photomicrographs.) A. Gl.

Spectroscopic power of human eye due to injury. K. Grant (Nature, 1939, **143**, 726—727).—A case of eye injury, in which bright lights show spectral colours. A series of tests is described. W. F. F.

Structure and function of certain capillaries in inner ear and eye. S. Montis (Boll. Soc. ital. Biol. sperim., 1939, **14**, 423—424).—The smaller glomeruli of the inner ear are surrounded by a fine network of fibrils. This perivascular tissue also occurs in the iris and its function appears to be one of regulating the capacity of the capillaries during movements of the iris. The capillaries of the iris remain of approx. const. diameter during myosis or mydriasis and the regulation is, therefore, probably one of blood pressure. F. O. H.

Essential progressive atropy of iris. M. Post (Amer. J. Ophthal., 1939, **22**, 755—759).—A case is described which has been observed since 1913. At

the onset there was eccentricity of the pupil and raised intraocular tension. A trephine operation gave no relief and progression to complete blindness occurred. Gonioscopically adhesions were seen between the iris and the posterior corneal surface. D. Wh.

Underlying causes of glaucoma. P. J. Evans (Brit. J. Ophthal., 1939, **23**, 745—783).—A review of various theories of glaucoma. It is maintained that the underlying cause is defective vascular nutrition involving the capillaries and veins, although there are other contributory factors. Photomicrographs showing vascular changes are given. K. T.

Congenital secondary glaucoma. Report of 2 cases syphilitic in origin. A. V. Hallum (Amer. J. Ophthal., 1939, **22**, 1262—1266).—In one of 2 infantile cases of congenital syphilis and glaucoma the latter rapidly disappeared under antisyphilitic treatment. A syphilitic low-grade cyclitis is regarded as probable cause of the secondary glaucoma. H. L.

Surviving lens according to the method of De Haan and Bakker. Composition of the perfusion fluid. R. Weekers (Ophthalmologica, 1939, **97**, 159—165).—A study of the physical properties and chemical composition of the fluid used by Bakker as a medium in which isolated lenses survived for several weeks. The fluid is similar to that described by De Haan for the culture of leucocytes, and is prepared by injecting Ringer's solution into the abdominal cavity of rabbits and withdrawing it by puncture after 2½ hr. M. C. B.

Carbonic anhydrase in normal and cataractous lenses. A. Bakker (Arch. f. Ophthal., 1939, **140**, 543—552).—Lenses of normal rats were rich in carbonic anhydrase. The amount present in galactose cataract was reduced and the lenses of rats with mature cataracts (spontaneously occurring) contained practically none. The amount of carbonic anhydrase in the lenses of different animals varied according to species. M. C. B.

Xylose as a cataractogenic agent. W. J. Darby and P. L. Day (Proc. Soc. Exp. Biol. Med., 1939, **41**, 507—508).—21-day-old rats given a diet containing 35% of sugar developed permanent cataract when this sugar consisted of xylose or galactose, but showed no ill-effects on glucose. V. J. W.

Pathogenesis of galactose cataract. A. Bakker (Arch. f. Ophthal., 1939, **140**, 531—542).—Slight cataractous changes were produced in isolated whole rat lenses surviving in a medium containing 600 mg.-% of galactose. With glucose instead of galactose, the surviving lenses remained perfectly clear. The author concludes that the cataract produced by galactose feeding cannot be entirely due to a direct toxic action of galactose on the lens. Serum-Ca of rats with galactose cataract was below normal. Administration of AT_{10} produced a slight inhibition in the development of galactose cataract. M. C. B.

Familial retinal degeneration leading to detachment and cataract formation. B. Friedman (Arch. Ophthal., N.Y., 1939, **22**, 271—273).—A mother and her 7 children were affected by a peculiar form of peripheral retinal degeneration and cataract. Where the fundi were visible large, irregular milky-white patches were seen on the retina. These were unattended by pigment formation and only the superficial layers appeared to be involved. The central ⅔ of the retina appeared to be free from pathological change. In all but 2 cases there were either complicating cataracts or retinal detachments or both. Clinical and biochemical examinations showed no abnormality, except that the affected individuals all showed certain physical characteristics common to hyperpituitarism. M. C. B.

Retinal circulation. A. Baillart (Bull. Acad. Méd., Paris, 1939, **122**, 204—208).—A general account of the hydraulics of the retinal circulation. D. Wh.

Temperature changes and changes in calibre of retinal blood vessels after short-wave diathermy. I. Puntenney and S. L. Osborne (Arch. Ophthal., N.Y., 1939, **22**, 211—227).—Cooling curves obtained with a thermocouple after local application of diathermy showed that the greatest heating effect occurred in the vitreous. In dogs under pentothal Na no vasodilation of retinal vessels was detected. Pathological changes included swelling of scleral and ciliary nerves, separation of the internal limiting layer of the retina, œdema of the cornea, and slight posterior subcapsular swelling of the lens. D. Wh.

Macular coloboma: histological report. A. Sorsby and J. O. Oliver (Brit. J. Ophthal., 1939, **23**, 724—729).—Description of a case of macular coloboma with restricted avascular zone in the chorioid associated with deficient choriocapillaris and secondary changes in the retina. Findings do not contradict the conception of Treacher Collins of macular coloboma as a localised choroideremia. A. Gl.

Retinal factors in visual acuity of vertebrates. M. L. Verrier (Compt. rend., 1939, **209**, 845—848).—The author does not believe in the duplicity theory but explains visual acuity in terms of the ratio of visual cells to ganglion cells and of the size of the visual cells. It is immaterial whether the visual cells are rods or cones. K. T.

Regeneration of visual purple in solution. A. M. Chase and E. L. Smith (J. Gen. Physiol., 1939, **23**, 21—39).—Visual purple solutions from *Rana pipiens* were exposed behind colour filters to a photoflood lamp. With 45 min. exposure the subsequent regeneration (measured as optical density at 500 mμ.) was 2·9, 2·4, 1·5, and 0·3% (mean) with Wratten filters 76 (440 mμ.), 75 (490 mμ.), 74 (525 mμ.), and 73 (575 mμ.) respectively. Samples which had been exposed to long λλ and had shown little regeneration could be made to show full amount by subsequent exposure to a short λ. Samples of a solution of visual purple, buffered to various p_H (5·09—9·25), were irradiated by a 500-w. lamp placed 10 in. from the solutions. Regeneration occurred in all samples with a max. at p_H 6·7. Absorptions were also measured at 4 λλ during regeneration for a period of 4 hr. The absorption spectrum of the regenerated substance was the same as that of visual purple except that the increase in absorption at shorter λλ was too great. The regenerated substance was again bleached and

irradiated; regeneration again occurred (about 2/3 original amount). The process of regeneration follows the equation for a reaction of the 1st order. There was no increase in O_2 consumption during regeneration. The substance of which irradiation initiates regeneration is not known. K. T.

Cataphoretic measurements on solutions of visual purple and indicator-yellow. E. E. Broda, C. F. Goodeve, R. J. Lythgoe, and E. Victor (Nature, 1939, **144**, 709).—Solutions of frog visual purple were dialysed long enough to remove most of the salts. The isoelectric point, measured in red light with an Abramson apparatus, was at p_H 4·47. After bleaching the visual purple with white light the isoelectric point had shifted to p_H 4·57. K. T.

Dark adaptation. R. J. Lythgoe (Brit. J. Ophthal., 1940, **24**, 21—43).—A crit. review of the subject of dark adaptation based on the latest published and some unpublished results. The duplicity theory is discussed and the simple form in which it is usually stated is criticised. It is suggested that "photopic" and "scotopic" vision cannot be considered as equiv. to pure cone and rod vision. The possible rôle of nervous interaction in the retina as a factor in adaptation is discussed and it is suggested that there may be more interaction between individual visual elements in scotopic than in photopic vision and that this might account for the increased sensitivity and decreased visual acuity which is characteristic of vision at low illuminations. K. T.

Pupil dilatation and dark adaptation. R. H. Brown and H. E. Page (J. exp. Psychol., 1939, **25**, 347—360).—Pupil diameter was measured during the course of dark adaptation, by infra-red photography, and a close correspondence found between pupil area and the abs. threshold during the initial or "cone" portion of dark adaptation. This is interpreted as showing that cone adaptation and pupil diameter are both signs of central changes in excitability after exposure to light. K. J. W. C.

Diet in relation to health. Dark adaptation as index of adequate vitamin-*A* intake. III. Relation of diet to rate and extent of dark adaptation. A. M. Thomson, H. D. Griffith, J. R. Mutch, D. M. Lubbock, E. C. Owen, and G. Logaras (Brit. J. Ophthal., 1939, **23**, 697—723; cf. A., 1939, III, 836).—Results of the testing of control and other groups to determine the extent of the association of poor dark adaptation with *A*-avitaminosis are described. Neither rate of dark adaptation, nor the light min. in the fully dark-adapted eye, is a clear index of -*A* intake in the diet. There is considerable variation in individuals in the results of -*A* therapy. It is suggested that a lack of precise information on the utilisation, absorption, and storage of -*A*, and its connexion with the regeneration of visual purple, adds to the difficulty of the subject. L. R. P.

Effect of anoxæmia on dark adaptation of normal and of vitamin-*A*-deficient subjects. R. McDonald and F. H. Adler (Arch. Ophthal., N.Y., 1939, **22**, 980—988).—Both vitamin-*A*-deficient diet and anoxæmia produce changes in dark-adaptation performance, but such changes are distinct and different, and are probably due to interference with the photoreceptor and nerve mechanisms respectively. L. R. P.

Dark adaptation, night blindness, and glaucoma. J. B. Feldman (Arch. Ophthal., N.Y., 1939, **22**, 595—607).—Clinical studies give evidence of the association of night blindness with glandular and hepatic disease, but results of vitamin-*A* therapy are sometimes unaccountably slow. Of 17 cases of glaucoma, 14 show pathologically abnormal dark adaptation, whilst 4 show a high cholesterol content. A possible connexion between glaucoma and sterol metabolism is noted. L. R. P.

Instantaneous visual threshold after light adaptation. N. T. Fedorov and V. I. Fedorova (Compt. rend. Acad. Sci. U.R.S.S., 1939, **24**, 692—695).—Two mathematical expressions, derived respectively from uni- and bi-mol. assumptions in visual purple regeneration, are obtained for the instantaneous visual threshold immediately following light adaptation. These expressions are then applied to the data of Blanchard, after these have been corr. for pupil diameter and the Stiles–Crawford directional sensitivity effect. The bimol. reaction formula fits the data well, and indicates the change from cone to rod function. Hecht's treatment of Blanchard's data is criticised. L. R. P.

Theory of the eye's photometric sensitivity. N. T. Fedorov (Compt. rend. Acad. Sci. U.R.S.S., 1939, **24**, 696—699).—Assuming that a perceptible brightness difference implies the decomp. of a const. amount of light-sensitive substance, that decomp. and regeneration are based on uni- and bi-mol. reactions, respectively, and that the visual cycle is very similar to that advanced by Wald, a theory of photometric sensitivity is advanced which is claimed to fit the experimental facts of contrast sensitivity variation. L. R. P.

Photometric sensitivity of eye. N. T. Fedorov and V. I. Fedorova (Compt. rend. Acad. Sci. U.R.S.S., 1939, **24**, 700—703).—The theory of Fedorov (see above) is applied to the experimental data of König and Brodhun, Hecht, Peskin and Patt, Graham and Kamp, Steinhardt, and Plakhov on contrast sensitivity variation. L. R. P.

Beths visual sensation and perception tests. L. Oak and A. E. Sloane (Arch. Ophthal., N.Y., 1939, **22**, 832—843).—Criticisms of the Beths telebinocular tests as criteria of optical deficiency in school children. L. R. P.

Theory and measurement of visual mechanisms. III. W. J. Crozier and A. H. Holway (J. Gen. Physiol., 1939, **23**, 101—141).—The just noticeable increase in illumination (ΔI) was measured for different (*a*) areas of test patch (A), (*b*) illuminations (I), and (*c*) $\lambda\lambda$ (3 filters). It was found that $\log \Delta I = -Z \log A + C$, where C and Z are consts., being independent of A and I. Equation is the same for different $\lambda\lambda$, and for monocular and binocular observation. The mean val. of ΔI for the 2 eyes used singly is 1·38 times that for binocular vision. Doubling the area of the test patch for one eye increases the threshold by a little less, viz., 1·21 times. K. T.

Flicker response for the crayfish. I. W. J. Crozier and E. Wolf (J. Gen. Physiol., 1939, **23**, 1—10).—The relation between the crit. frequency of flicker (F) and illumination (I) was measured for the crayfish *Cambarus bartoni*. The I on a revolving cylinder composed of black and white stripes was increased until the animal reacted by moving towards the cylinder. Up to 0·01 millilamberts (mL.), F increases slowly with log I, between 0·01 and 0·2 mL. it increases more rapidly, whilst between 0·02 and 50 mL. the curve tends to become asymptotic with $F = 50$ flashes per sec. The asymmetry of the curve is greater than for the honey bee or for the dragonfly nymph. Differences in curvature of the retinal surface are said to explain the result. K. T.

Perimetry. Data collected in London clinics. C. Chepens (Bull. Soc. belge Ophtal., 1939, **78**, 73—85).—Methods for the determination of the limits of the visual field for white and coloured stimuli on a black ground are described. L. R. P.

Attachment to Ferree–Rand perimeter for determining light and colour minima. C. E. Ferree and G. Rand (Arch. Ophthal., N.Y., 1939, **22**, 636—652).—An attachment, replacing the normal lamphouse of the Ferree–Rand perimeter, makes possible the measurement of the limits of the visual field at known illumination levels, and of the light min. at any point on the retina. The clinical val. of the attachment (which is calibrated in ft.-candles) is emphasised. L. R. P.

Inversion of limits of fields of vision for colours in quinine amblyopia. C. Dracontaidis (Ann. Oculist., Paris, 1939, **176**, 437—450).—8 cases of quinine poisoning are described. In 7 severely contracted fields of vision resulted. In 5 the limits of the fields of vision were white, red, blue, green, in one, white, red, green, blue, and in the other colour could only be appreciated centrally. These findings are not thought to be explicable on Hering's theory. All treatment was ineffective. D. Wh.

Relative size of ocular images of the two eyes in asymmetric convergence. K. N. Ogle (Arch. Ophthal., N.Y., 1939, **22**, 1046—1067).—Investigations with the haploscope show that differences in retinal image size during asymmetric convergence are in part modified by a compensating mechanism. Possible causal factors are suggested. L. R. P.

Induced size effect. III. The phenomenon as influenced by horizontal disparity of fusion contours. K. N. Ogle (Arch. Ophthal., N.Y., 1939, **22**, 613—635).—In binocular vision, the simple (haploscopic) and complex (inclined test surface) introduction of horizontal disparity of image size in fusion contours both produce a decrease in the induced size effect. This latter phenomenon is greatest when the horizontal disparity is roughly equal to the fixation disparity, *i.e.*, when the retinal elements involved are most nearly corresponding. L. R. P.

Observations relating to threshold of small figure within contour of closed-line figure. K. J. W. Craik and O. L. Zangwill (Brit. J. Psychol., 1939, **30**, 139—150).—The threshold for a patch of light within a closed black-line figure is higher than outside; this has been attributed by gestalt theories to the "figural character" and "cohesiveness" of the figure; it is shown, however, that an exactly similar rise is obtained by the proximity of black lines not forming a closed figure, and that the effect can be explained in terms of contrast or spatial effects of adaptation. K. J. W. C.

Ætiology of visual hallucinoses. C. H. Dejean and J. Ferrié (Arch. Ophtal., Paris, 1939, **3**, 511—516).—The term hallucinose rather than hallucination is used when the patient is aware of the unreality of the thing seen. 3 cases occurred in patients in whom there were no other lesions of the central nervous system nor of the cardiovascular system. Two of them followed post-operative bandaging of both eyes, and the 3 accompanied detachment of the retina in the only remaining eye. In all cases hallucinoses were abolished by the restoration of vision. Such hallucinoses must be due to disturbance and functional excitation of the cortex. D. Wh.

Syphilis of ear: histopathologic study. V. Goodhill (Ann. Otol. etc., St. Louis, 1939, **48**, 676—706).—Clinical and pathological description of aural lesions in 8 cases of acquired, and 8 cases of congenital, syphilis. The following findings were const.: productive periostitis leading to ossification of perilymph and endolymph channels; bony abnormalities of the stapes; atrophy of neuroepithelial elements of cochlear and vestibular systems; lymphocytic infiltration of cochlea and spiral ganglion; vascular changes. Only one case showed also otosclerotic lesions. Syphilis is not to be regarded as a possible cause of otosclerosis. H. L.

Development of exostoses of external meatus owing to irritation by cold water. P. H. G. van Gilse (Acta oto-laryng., 1938, **26**, 343—350).—Various, especially ethnologic and anthropologic, reasons are given supporting the view that these exostoses are mostly due to irritation by cold water; neither heredity nor infections play a rôle in their ætiology. H. L.

Impaired hearing for high tones. S. J. Crowe and S. R. Guild (Acta oto-laryng., 1938, **26**, 138—144).—Report of a case of tubal occlusion in whom hearing was more impaired for high than for low frequencies. H. L.

Greater disability for hearing high tones in cases of conduction deafness. A. G. Pohlman (Ann. Otol. etc., St. Louis, 1939, **48**, 596—599).—Report of two cases with normal bone conduction; the second one was due to ankylosis of the stapes. H. L.

Effects on hearing produced by experimental pressure on tympanic membrane. E. Lüscher (Acta oto-laryng., 1939, **27**, 250—266).—Conductive lesions were produced in normally hearing individuals by applying measured pressure on different parts of the tympanic membrane. Placing of wts. on the umbo produced slight hearing loss, especially for low and medium frequencies. Hg or water placed on the pars tensa affected hearing, especially for medium and high frequencies. H. L.

Camera for stereoscopic colour photographs of tympanic membrane. G. Dohlmann (Acta oto-laryng., 1938, **26**, 601—605).—The instrument can be fitted into a medium-sized aural speculum. H. L.

Mechanical aspects of hearing. G. von Békésy (Acta oto-laryng., 1939, **27**, 281—296).—A study based on recordings of oscillations of the tympanic membrane and the ossicles. The non-linearity of the tympanic membrane-oscillations was shown to be compensated by the elasticity of the air vol. in the middle ear. A small perforation of the membrane does not cause an alteration in the oscillatory amplitudes of the ossicles for frequencies above 400 Herz and therefore no diminution in auditory acuity for medium frequencies. The arrangement of the ossicles serves to protect the inner ear against excessive sound intensities as it allows alterations in the ossicular oscillatory forms. Pain in the middle ear on hearing sounds of excessive intensity is due to an alteration in the oscillatory form of the stapes whereby its limbs come in contact with the bony wall. H. L.

Use of monochord in routine tests of hearing. F. T. Hill (Laryngoscope, 1939, **49**, 666—674).—In measuring air and bone conduction for high frequencies the monochord is superior to other instruments. Its only drawback is the impossibility of measuring its sound-intensities. H. L.

Latent period of crossed stapedius reflex in man. H. B. Perlman and T. J. Case (Ann. Otol. etc., St. Louis, 1939, **48**, 663—675).—A method for recording action potentials of the contracting stapedius muscle is described. It was found by this method that the reflex contraction of the muscle to a loud tone of 1000 cycles was preceded by a latent period of about 10·5 m-sec. As protection of the inner ear against loud sounds depends on stapedius contraction, this latency of the reflex is regarded as responsible for the cochlear damage occurring, *e.g.*, in workers exposed to repeated loud sounds. H. L.

Electrophysiology of hearing. C. S. Hallpike (Acta oto-laryng., 1938, **26**, 145—160).—A method is described for observing the response of the auditory action potentials to a reversal in phase of a musical tone. The results support the view that the potential changes are initiated by resonant structures. Further evidence for the view that the response originates in Reissner's membrane, and not in the hair cells of Corti's organ, has been obtained from histological studies in cats; little or no reduction in cochlear response was found in animals showing degeneration of the hair cells following VIII nerve section while in some cases the response was absent in the presence of structurally normal hair cells. H. L.

"Frequency discrimination" in insects: new theory. R. J. Pumphrey and A. F. Rawdon-Smith (Nature, 1939, **143**, 806—807).—The tympanic organ and auditory nerve of a locust were connected to an amplifier. The prep. could be exposed to any frequency up to 10,000 c.p.s. modulated by a second frequency. The prep. was insensitive to pure tones 50—300 c.p.s. but gave a large random response to 8000 c.p.s. The latter modulated by a frequency up to 300 c.p.s. gave bursts of nervous discharge at the modulation frequency. In some insects the tympanic organ thus has a rectifying action, which permits the activity in the auditory nerve to be synchronous with the amplitude modulation imposed on a carrier frequency lying within the insects auditory spectrum. K. T.

Objections to accepted interpretation of cochlear mechanics. A. G. Pohlmann (Acta oto-laryng., 1938, **26**, 162—169).—Crit. review of recent work on cochlear mechanics (Herzog, von Békésy, Lurie, Hughson) which according to the author fails to confirm Weber's conception. H. L.

Eighth nerve high tone deafness from a nutritional standpoint. G. Selfridge (Ann. Otol. etc., St. Louis, 1939, **48**, 608—631).—Report on 7 cases in whom slight improvement in hearing was noted after prolonged parenteral administration of thiamin chloride and/or nicotinic acid. H. L.

Development of tonal sensation. H. D. Bouman (Arch. néerland. Physiol., 1939, **24**, 142—152).—The timbre of sounds is almost independent of their wave form when this is far removed from simple harmonic. Strength–duration curves are obtained which are independent of frequency. These results, together with those previously published on short tones, support the theory that the central nervous system plays a part in the determination of pitch. P. M. T. K.

Binaural localisation with two notes differing in phase by 180 deg. J. W. Hughes (Brit. J. Psychol., 1939, **30**, 52—56).—Little difference was found between the least perceptible variations in the relative phases and intensities of two notes differing in phase by 180° and 0°. P. M. T. K.

Head noises and deafness: peripheral and central. E. P. Fowler (Laryngoscope, 1939, **49**, 1011—1019).—A description of quant. measurements of tinnitus which allow differentiation between peripheral and central tinnitus and deafness, the latter being less easily masked than the former. The effect of both "subaudible" and audible tinnitus on masking sounds should be used for detecting potential tinnitus and deafness. H. L.

Effects of acoustic stimuli on waking human brain. P. A. Davis (J. Neurophysiol., 1939, **2**, 494—499).—Electrical on-effects and off-effects have been found, most prominently at the vertex, in both alpha and non-alpha types of individuals. "Anticipatory" on-effects appeared on unexpected alteration of the sequence of tones and when the condition of the subject shifted from alertness to sleep. H. L.

Electrical reactions of human brain to auditory stimulation during sleep. H. Davis, P. A. Davis, A. L. Loomis, E. N. Harvey, and G. Hobart (J. Neurophysiol., 1939, **2**, 500—514).—A detailed analysis of the *K*-complex (cf. Loomis *et al.*, A., 1938, III, 997) during different stages of sleep. It is elicited by auditory stimuli more effectively than by other external sensory stimuli, appears after an average latency of 100 m-sec., is most prominent over central and frontal areas, and consists of a fast

and a slow component. The waves become slower as sleep deepens and disappear in profound sleep. The slow component-response may produce a refractory state for several sec.; this component is probably analogous with the "secondary discharge" observed in cats under barbiturate anæsthesia following electric stimulation of the sciatic nerve. H. L.

Methods for acoustic stimulation of semicircular canals. P. Tullio (Acta oto-laryng., 1938, **26**, 267).—Description of a positional reflex in the pigeon and dog, elicited by a sound stimulus, after a small opening has been made into one of the semicircular canals. The reflex is abolished by cocainisation of the ampoule. H. L.

Tullio's acoustic reactions in man. C. E. Benjamins (Acta oto-laryng., 1938, **26**, 249—255).—Tullio's phenomenon could be elicited in a patient with cholesteatoma and fistula symptom; it had disappeared after radical operation which had produced neither impairment of cochlear function nor disappearance of the fistula symptom. H. L.

Comparative anatomical studies on pneumatisation. Eckert-Möbius (Acta oto-laryng., 1938, **26**, 115—126).—Anatomical and histological findings in various mammals and birds showed that intraosseous air spaces are formed only in areas devoid of static and dynamic functions and that the lining membrane does not play an active rôle in the process of bone resorption. H. L.

Origin and distribution of air cells in temporal bone. T. H. Bast and H. B. Forester (Arch. Otolaryng., Chicago, 1939, **30**, 183—205).—A study by serial histological sections of the fœtal and postfœtal development of pneumatisation of the middle ear and antrum, of the mastoid and antral bone, and of the various groups of air cells in the petrous bone (27 infants and 69 human fœtuses). A detailed account is given of these air cells, of their outlets and communications, of their relation to the bone marrow, and of the frequency of their presence. H. L.

Pathology and clinical signs of so-called zygomatico-mastoiditis. H. R. Gadolin (Acta oto-laryng., 1938, **26**, 492—520).—In 74 out of 957 cases of mastoiditis air cells were present in the zygomatic process and in the anterior portion of the squama. They were always involved in the inflammatory process but in 35 cases the clinical signs remained latent. The cells were found both in cases of extensive and of absent pneumatisation of the mastoid bone. In 11 cases they were isolated by compact bone from the periantral cells. The symptomatology, treatment, and prognosis are discussed. H. L.

Histological changes in temporal bones of a case of Ménière's disease. C. S. Hallpike and A. J. Wright (Proc. Roy. Soc. Med., 1939, **32**, 1646—1655).—The main post-mortem findings in a case who had died, 6 months after the onset of vertigo, from an intercurrent disease were distension of the scala media with formation of folds in Reissner's membrane, and absence of normal perisaccular connective tissue; inflammatory changes were absent. These findings are considered to support the view that the disorder is due to an obstructive distension of the endolymph system. H. L.

Intralabyrinthine pressure. C. S. Hallpike (Acta oto-laryng., 1939, **27**, 229—243).—The anatomical changes in the temporal bones of 2 cases of Ménière's disease who had died shortly after intracranial section of the vestibular nerve are fully described. If the endolymph spaces are dilated to the limits of their bony walls, a further small increase in endolymph vol. causes a rapid rise of fluid pressure, leading to bouts of labyrinthine asphyxia and thus to the clinical syndrome of Ménière's disease. H. L.

Histological findings in a case of otosclerosis after Holmgren's operation. F. R. Nager (Acta oto-laryng., 1938, **26**, 342).—Report on a case who had died from an intercurrent disease 4 weeks after operation. The surgical fistulas were partly open and partly bridged by proliferation from the periosteal capsule. No further changes were found in the semicircular canals nor in the perilymph and endolymph spaces. H. L.

Simplification of rules concerning planes and directional sense of any nystagmus consequent on rotation of the head; explanation of the purpose of nystagmus. E. R. Arellano (Acta oto-laryng., 1938, **26**, 367—376).—Instead of relating plane and direction of nystagmus to semicircular canals and endolymph currents, the following rules may be applied: (*a*) the plane of nystagmus is always parallel to that of the originally imposed rotatory movement; (*b*) the direction of the slow component is opposite to the direction of rotation in pre-rotatory, and coincides with the rotatory direction in post-rotatory, nystagmus. Owing to the appearance of nystagmus on ordinary head rotation the panorama can be perceived as stationary. H. L.

Counter-rotation of eyes and position of otoliths in man. K. Grahe (Acta oto-laryng., 1938, **26**, 268—275).—Counter-rotation was measured by observing the position of the optic discs through a Thorner ophthalmoscope. Max. rotation occurred on lateral inclination of the head by 60°, *i.e.*, in a position in which neither pressure nor pulsion is exerted on the utricle. In subjects possessing only one labyrinth, turning of the head towards the normal side was accompanied by a considerably diminished response; the main stimulus originates, therefore, in the contralateral labyrinth. H. L.

Cinematographic demonstration of apparatus for provoking rotatory nystagmus in experimental animals. F. Brunetti (Acta oto-laryng., 1938, **26**, 275—276).—An apparatus for tilting and rotating tests is described. H. L.

Rôle of perilymph in mechanism of caloric nystagmus. A. Rejtö (Acta oto-laryng., 1939, **27**, 270—280).—From a review of experimental work it is concluded that the endolymph currents are affected, if not caused, by the perilymph flow. Further physical data are needed for a quant. estimation of such an effect. H. L.

Influence of hyperventilation and of variations of oxygen and carbon dioxide tension in inspired air on galvanic nystagmus. E. Gellhorn and L. F. M. Storm (Acta oto-laryng., 1939, **26**, 387—403).—Data are given for the effects of O_2 deficiency, CO_2 excess, and hyperventilation in the normal and anæsthetised rabbit on the no. of nystagmic oscillations. H. L.

Paratympanic organ of Vitali (so-called organ of flight in birds) in penguin. C. E. Benjamins (Acta oto-laryng., 1939, **27**, 266—270).—The presence of the organ in this bird is regarded as further evidence against its connexion with the function of flight. H. L.

Anatomy of cranial blood sinuses with particular reference to the lateral. B. Woodhall (Laryngoscope, 1939, **49**, 966—1009).—Description of significant anatomic variations with particular reference to radiographic evidence. H. L.

Central pain. D. Kendall (Brain, 1939, **62**, 253—273).—The evidence for the existence of two conduction pathways for pain is reviewed and confirmed by personal observations. 4 cases are described in which there was over-reaction to pain, and to heat and cold, together with radiation and faulty localisation and delay in the appreciation of the stimulus. The lesions responsible were in the brain-stem and spinal chord. It is suggested that the impulses responsible for "first pain" produce a state of inhibition in the thalamus which modifies the effects produced by the impulses of "second pain." The condition described is held to be due to slowly conducted impulses acting alone. D. Wh.

Differential threshold for compression modulus. G. W. S. Blair and F. M. V. Coppen (Nature, 1939, **144**, 286).—A note on ability to judge softness of almost solid materials and statistical comparison of results with those for viscosity judgments. W. F. F.

(xi) DUCTLESS GLANDS, EXCLUDING GONADS.

Differential staining of anterior pituitary of cat. A. B. Dawson (Stain Tech., 1939, **14**, 133—138).—Details are given of the staining reactions of the various kinds of pituitary cells using a variety of special staining methods after different fixatives. Evidence favours the classification of the third type of chromophilic cell (differentiated by Heidenhain's azan technique) as a modified kind of acidophil. E. E. H.

Rôle of pituitary stalk in regulation of anterior pituitary. U. U. Uotila (Endocrinol., 1939, **25**, 605—614).—After section of the stalk the adrenals, unlike the thyroid, hypertrophy on exposure to cold. The damaging effect of cold on spermatogenesis is abolished by stalk section, although testes and seminal vesicles remain normal. V. J. W.

Experimental hypothalamico-hypophyseal obesity in the rat. A. W. Hetherington and S. W. Ranson (Proc. Soc. Exp. Biol. Med., 1939, **41**, 465—466).—Electrolytic lesions of the hypothalamus consistently cause obesity in rats though the hypophysis is uninjured. Chromic acid injection of the hypophysis only causes obesity if the hypothalamus is involved. V. J. W.

Extraction and separation of anterior pituitary hormones. A. J. Bergman, O. B. Houchin, and C. W. Turner (Endocrinol., 1939, **25**, 547—553).—Acetone-dried glands were extracted by methods already described. An almost pure lactogenic hormone was obtained, and a flavianic acid ppt. contained all the thyrotropic hormone, 50% of the gonadotropic, 30% of carbohydrate metabolism, and none of the fat metabolism hormones. V. J. W.

Morphological response of transplanted pituitary gland to castration and thyroidectomy. K. Z. Kan (Compt. rend. Acad. Sci. U.R.S.S., 1939, **23**, 499—502).—The pituitary gland was transplanted from and into castrated and normal rats. When castration alone is performed, the gland shows the normal, permanent, histological changes. In the transplantation experiments, no permanent histological changes were observed. Similar transplantations were carried out in normal and thyroidectomised rats. The implant responds differently from the pituitary gland of the host. W. F. F.

Source of moulting hormone in *Rhodnius* (Hemiptera). V. B. Wigglesworth (Nature, 1939, **144**, 753).—The dorsal half of the central mass of the brain is the site of origin of the moulting hormone. W. F. F.

Increased sensitivity of hypophysectomised rats to radiation. E. Anderson, J. H. Lawrence, M. Joseph, and P. C. Aebersold (Science, 1939, **89**, 588—589).—Hypophysectomised rats are very sensitive to irradiation, particularly when injected with radioactive isotopes (Na, K, and P). Adrenalectomised rats tolerate radioactive isotopes at dosages which are invariably fatal to hypophysectomised animals. W. F. F.

Effects of proteolytic enzymes on purified gonadotropic hormones. A. A. Abramowitz and F. L. Hisaw (Endocrinol., 1939, **25**, 633—637).—Pituitary extracts were incubated with various enzymes. Follicle-stimulating hormone (FSH), assayed by effect on rat's ovary, luteinising (LH), and pregnancy urine (PU) hormones assayed by effect on rat's seminal vesicle, are destroyed by trypsin at p_H 7·1 in 2 hr. Saliva at p_H 7·1 destroys FSH and PU slowly but does not affect LH. Papain at p_H 7·1 destroys PU completely and FSH partly but does not affect LH. V. J. W.

Gonadotropic principles in sheep pituitary substance. H. M. Evans, M. E. Simpson, S. Tolksdorf, and H. Jensen (Endocrinol., 1939, **25**, 529—546; cf. A., 1939, III, 905).—Follicle-stimulating hormone (FSH) (2—4 r.u.) or pregnant mare serum acts synergically with interstitial cell stimulating hormone (ICSH) (4—32 r.u.) on rats when the last is injected subcutaneously, but ICSH given intraperitoneally antagonises their effects. The effect of FSH is not affected when it is mixed before injection with casein or $ZnSO_4$, but the effect of ICSH is increased. Prolan, like ICSH, stimulates interstitial cell growth but is a more potent gonadotropic agent. V. J. W.

Effect of cysteine on gonadotrophic hormones. H. Fraenkel-Conrat, M. E. Simpson, and H. M. Evans (J. Biol. Chem., 1939, **130**, 243—249).—At p_H 7·7 and 23°, cysteine inactivates gonadotropic hormones (cysteine : hormone ratio 40 : 1) of pituitary origin (unfractionated gonadotropic hormones, follicle-stimulating and interstitial cell-stimulating fractions, prospermin from male urine, and gamone from female menopause urine). Hormones of placental origin (gonadin and gonadogen from serum of pregnant mares and antuitrin-S and follutein from human pregancy urine) are not affected. The pituitary hormones probably contain S·S linkings essential for activity whilst the placental hormones contain no S·S linkings or are equally potent before and after reduction of S·S to SH groups. W. McC.

Influence of hormones on excretion of creatine and creatinine. W. Lührs (Dtsch. Z. VerdauKr. Stoffw., 1939, **2**, 38—46).—Injection of gonadotropic anterior pituitary hormone in a case of progressive muscular atrophy increases urinary creatinine but the patient's temp. is also raised. Injection of lactation hormone increases creatinine and creatine in urine; oral administration lowers excretion of both. Ascorbic acid has no influence. Injection of thyrotropic hormone and simultaneous oral administration of vitamin-*C* lowers excretion of creatinine and raises that of creatine. A method for determining creatinine in the presence of ascorbic acid is described. E. M. J.

Early effect of gonadotropic hormone on the uterus of infantile mice. A. Szarka (Klin. Woch., 1939, **18**, 914—915).—0·2 rat unit from the serum of pregnant mares was the smallest dose to produce a significant increase in uterine wt.; doses of 10—30 r.u. have not much more effect than 5 units so that doses of 2—5 r.u. were most suitable for titration. E. M. J.

Progonadotropic sera of animals treated with hypophyseal extracts. P. A. Katzman, N. J. Wade, and E. A. Doisy (Endocrinol., 1939, **25**, 554—567).—Sheep were given daily doses increasing from 540 to 2200 mg. of dried sheep pituitary for up to 364 days. Their sera contain a substance which enhances the gonadotropic effect of sheep or rat pituitary on immature female rats but does not affect the action of pig or ox pituitary, or of pregnancy urine. Alone it causes no effects on rats or rabbits. The substance is associated with the euglobulin fraction and is non-dialysable. It is lost on keeping at p_H 2 but not at p_H 11. V. J. W.

Prolactin content of human pituitary gland. K. Vibe (Abh. Staatsuniv. Saratov, Biol. Ser., 1939, **1**, 69—84).—The prolactin content of the pituitary gland of non-pregnant women is greater than that of lactating women who have died of septic poisoning after abortion and much greater than that of men. Possibly much prolactin is lost in the blood after abortion and some is destroyed as a result of the infection. W. McC.

Suppression of lactation in acromegaly during œstrogenic therapy. D. J. Stephens (Endocrinol., 1939, **25**, 638—641).—In a patient with acromegaly accompanied with enlargement of breasts and milk secretion, this secretion was inhibited by weekly injections of 10,000 r.u. of œstradiol benzoate. V. J. W.

Stimulation of adrenal cortex of pigeons by anterior pituitary hormones and by their secondary products. R. A. Miller and O. Riddle (Proc. Soc. Exp. Biol. Med., 1939, **41**, 518—522).—The effect of pituitary extracts on adrenals of normal and hypophysectomised pigeons and of rats was compared. Results were concordant and independent of prolactin, follicle stimulation, and thyrotropin. Menopausal urine extract stimulates both cortex and medulla; œstrone and thyroxine stimulate cortex only. V. J. W.

Effects of anterior pituitary and adrenal cortical extracts on metabolism of adrenalectomised rats fed on glucose. J. A. Russell (Proc. Soc. Exp. Biol. Med., 1939, **41**, 626—628).—Anterior pituitary extract does not affect rate of oxidation of glucose but decreases liver-glycogen deposition. Cortical extract reduces glucose oxidation and increases liver-glycogen deposition. When both are given together glucose oxidation is reduced more than by cortical extract alone, and excess of glucose is deposited as muscle-glycogen. V. J. W.

Inhibiting effect of thyroidectomy on adrenal cortex hypertrophy following injections of anterior pituitary extract. S. H. Rosen and D. Marine (Proc. Soc. Exp. Biol. Med., 1939, **41**, 647—650).—Administration over 50 days of extract of 20 g. of dried ox pituitary caused much less adrenal hypertrophy in thyroidectomised than in normal guinea-pigs. V. J. W.

Preparation of pituitary growth hormone free from lactogenic and thyrotropic hormones. D. L. Meamber, H. L. F. Conrat, M. E. Simpson, and H. M. Evans (Science, 1939, **90**, 19—20).—Reduction of pituitary growth hormone with cysteine resulted in pptn. of the lactogenic and thyrotropic fractions. W. F. F.

Metabolism in pituitary tumours. P. Merlo and E. Fiaschi (Boll. Soc. ital. Biol. sperim., 1939, **14**, 452—453).—Acromegaly, due to pituitary tumour, is accompanied by diminished carbohydrate tolerance, increased lipin utilisation and basal metabolic rate, and a low R.Q. F. O. H.

Histological effects of diabetogenic anterior pituitary extracts. A. W. Ham and R. E. Haist (Nature, 1939, **144**, 835).—Histological examination was made of tissues in dogs receiving daily doses of anterior pituitary extract. Mitotic activity was found in thyroid, parathyroid, and adrenal cortex tissues, also in the ducts, acini, and islets of the pancreas. W. F. F.

Case of primary pinealoma in neighbourhood of the hypothalamus-infundibulum. H. Akamatu (Gann, 1939, **33**, 371—380).—Case report. E. B.

Effect of resection of olfactory, gustatory, and trigeminal nerves of water-drinking in dogs without and with diabetes insipidus. R. T. Bellows and W. P. Van Wagenen (Amer. J. Physiol.,

1939, **126**, 13—19).—Voluntary intake of water was observed in 3 groups of dogs: (1) in which the gustatory sense was abolished by bilateral division of the glossopharyngeal nerves and chorda tympani; (2) in which all sensations except taste were abolished from the buccal cavity by bilateral division of the trigeminal nerves; (3) the olfactory sense was abolished by resection of the olfactory tracts. Observations were made during a period of normal water intake and during polydipsia of diabetes insipidus. Water drinking in normal amounts or in the excessive amounts of diabetes insipidus was not altered in these dogs. M. W. G.

Blood-sugar in cats with diabetes insipidus before and after adrenalectomy. W. R. Ingram and C. A. Winter (Proc. Soc. Exp. Biol. Med., 1939, **41**, 449—452).—Diabetes insipidus was brought about by interference with the nervous connexions of the posterior pituitary. After removal of the adrenals some of these cats became hypersensitive to insulin, but their survival time is not correlated with this hypersensitivity or with blood-sugar. V. J. W.

Endocrine function of pineal gland. W. A. den Hartog Jager (Acta brev. neerl. Physiol., 1939, **9**, 1—4).—Histological changes in the pineal gland at various ages are described in rats, mice, and guinea-pigs. The cock is the most suitable animal for studying the endocrine function of the pineal gland. 50% of the patients suffering from pubertas præcox show tumours of the gland. A. S.

Effects of feeding thyroid to immature fishes. C. Grobstein and A. W. Bellamy (Proc. Soc. Exp. Biol. Med., 1939, **41**, 363—365).—Thyroid feeding of immature *Platypoecilus* fish caused exophthalmos, decreased growth-rate, and precocious sex maturation. V. J. W.

Goitre in the Tyrol. W. Baumgartner (Beitr. klin. chir., 1939, **169**, 573—623).—A report of the clinical findings. H. B. C.

Weight of thyroid gland in Switzerland. W. Risch (Wien. Arch. inn. Med., 1939, **33**, 1—12).—Enlarged thyroid glands were found in 90—100% of school children of certain Swiss districts. The average wt. of normal thyroid glands of adults is 25 g. A table gives the average wt. of normal thyroids from early infancy onwards. The wt. of the thyroid in 604 post-mortem observations in Zürich was increased in 65% of the cases up to 20 years of age and in 90—95% of the cases from 30 years upwards. A. S.

Respiration in Graves' disease. F. Grosse-Brockhoff and E. Mundt (Dtsch. Arch. klin. Med., 1939, **184**, 339—356).—Respiratory rate is higher and amplitude is lower in Graves' disease than in normal subjects. Air containing excess of CO_2 stimulates breathing more than in normals. Alveolar CO_2 is more const. in hyperthyroidism than normally. A. S.

Determination of iodine in thyroid gland. F. Reimers (Dansk Tidsskr. Farm., 1939, **13**, 237—252).—High vals. obtained by Hunter's method (U.S.P. XI) are due to ClO_3' in the NaOCl used, and cannot be corr. for by a blank test. The effect of ClO_3' is minimised by bringing the solution to p_H 2·2 before titration. Low vals. are found if the amount of NaOCl used is reduced. Modifications of Hunter's and Jensen's methods are described. M. H. M. A.

Chronic progressive thyrotoxic polyarthritis. K. Tschilow (Wien. Arch. inn. Med., 1939, **33**, 23—30).—Hyperthyroidism (basal metabolic rate +80%) and ankylotic polyarthritis developed in a woman of 26 after tonsillitis. A. S.

Morphology and nuclear structure of epithelium of human thyroid gland. G. Andreassi (Boll. Soc. ital. Biol. sperim., 1939, **14**, 534—535).—The nuclei of the epithelial cells form 3 types according to average diameter (3, 4·5—5·5, and 7·5—8·5 μ.). Histological characteristics and possible significance of these nuclei are discussed. F. O. H.

Antithyroid activity of vitamin-B_1 in treatment of cardiac deficiency. L. Scrutinio (Boll. Soc. ital. Biol. sperim., 1939, **14**, 563).—Administration (especially intravenous) of vitamin-B_1 (1000 i.u. daily) decreases basal metabolism and increases body-wt. of hyperthyroid patients. F. O. H.

Thyroid crisis. H. L. Foss, H. F. Hunt, and R. M. McMillan (J. Amer. Med. Assoc., 1939, **113**, 1090—1094).—A lecture. C. A. K.

Effect of thyroidectomy on reproductive system and hypophysis of adult male rat. G. K. Smelser (Anat. Rec., 1939, **74**, 7—16).—Marked reduction in the wt. of the accessory reproductive organs (seminal vesicles, prostate, Cowper's glands, and penis) and decrease in sperm production were observed. There was no decrease in gonadotropic potency of the hypophysis but the amount of gonadotropic hormone in the blood stream is probably decreased. W. F. H.

Relation between thyroid and autonomic nervous system. III. Influence of potassium iodide, di-iodotyrosine, and thyroxine on blood pressure, pulse and respiration rate, and pharmacodynamic reaction of rabbits. IV. Influence of potassium iodide and some organic compounds containing iodine, apparently related to the hormone of the thyroid gland, on the parasympatheticus of rabbits. Experiments with prolonged large doses. V. Influence of potassium iodide, di-iodotyrosine, thyroxine, and various thyroid extracts on the sympatheticus of rabbits. Experiments with large doses. S. Sayama (Folia endocrinol. japon., 1939, **15**, 5—6, 6—8, and 8—10).—III. KI, di-iodotyrosine, and thyroxine, equiv. to 0·01 mg. of I, were injected into rabbits daily for 21 days. The first two caused an increase in body-wt., slowing of pulse and respiration rate, and lowering of blood pressure. Thyroxine had no appreciable effect on body-wt. and respiration rate, but caused slowing of the pulse rate and lowering of blood pressure. In all cases the rabbit was more sensitive to pilocarpine, but there was no change in its reaction to adrenaline.

IV. KI, di-iodotyrosine, thyroxine, colloid extract, HCl–alcohol extract, epithelial cell extract, and saline extract of thyroid gland, equiv. to 0·2 mg. of I, were injected into rabbits daily for 5 days. KI caused no appreciable change of body-wt. Pulse rate slowly increased, but blood-pressure re-

action to pilocarpine did not change. Di-iodotyrosine, thyroxine, colloid, and HCl–alcohol extract of the thyroid of oxen caused a fall of body-wt., rise of pulse rate and blood pressure, but no change in the reaction to pilocarpine. 5—8 and 15—18 min. after the injection, however, pulse rate and blood pressure fell and there was increased reaction to pilocarpine. Epithelial cell and saline extract caused a gradual decrease of body-wt., rise of blood pressure and pulse rate, but no change of the reaction to pilocarpine. The same result was found from the 5th—8th and 15th—18th min. after each injection of the epithelial cell extract, while the saline extract caused also an increased reaction to pilocarpine in the 5th—8th min. after injection.

V. The same substances in equal amounts as in the previous experiments were used. KI cause a gradual increase in the sensitivity to adrenaline. Di-iodotyrosine, thyroxine, colloid, and HCl–alcohol extract of ox thyroid cause a slight increase in the sensitivity to adrenaline. This effect appears only after several injections and not 5—8 and 15—18 min. after injection. Epithelial cell and saline extract cause an increase in the sensitivity to adrenaline immediately after injection and after prolonged injection. E. R.

Influence of temperature and drugs on action of thyroxine on body temperature. R. Okumura (Folia pharmacol. japon., 1939, **27**, 8—9).—Thyroxine increases body temp. and CO_2 output in guinea-pigs. Increased external temp. or tetrahydro-β-naphthylamine increases this rise of body temp. and CO_2 output. Peptone increases the rise of body temp. Luminal decreases body temp. and CO_2 output in animals given thyroxine, but less than in normal controls. Thyroxine does not influence the action of quinine. E. R.

Migraine, epilepsy; their association with hypothyroidism. A. L. Rubenstone (Amer. J. digest. Dis., 1938, **5**, 295—296).—A woman suffering from migraine and epilepsy had 2 daughters subject to migraine, one with the abdominal type and the other the cephalic. Hypothyroidism, without the picture of myxœdema, was found in all 3. They promptly responded to thyroid replacement therapy. C. J. C. B.

Diffusion of calcium, magnesium, and phosphorus into peritoneum. Effect of intravenously injected calcium salts and of parathyroid hormone. A. Canterow and V. G. Haury (Amer. J. Physiol., 1939, **126**, 66—74).—A fluid consisting of 2·5% glucose in 0·9% NaCl was introduced into the peritoneum of normal, unanæsthetised dogs. Ca and P equilibrium between plasma and this fluid was reached in 4—5 hr. and was maintained for the following 19—20 hr. Artificially induced hypercalcæmia diminished the proportion of diffusible serum-Ca; as serum-Ca fell the diffusible Ca tended to return to normal. The Ca content of the serum ultrafiltrate increased steadily during the maintained hypercalcæmia. The increase in serum diffusible Ca is followed after ½—¾ hr. by a progressive rise in Ca in the peritoneal fluid. Following the administration of parathormone the ratio of peritoneal fluid-Ca to serum-Ca remained approx. const. for 5 hr. As serum-Ca falls this ratio increases, reaching a max. in 7—8 hr. Under certain conditions parathormone may produce hypocalcæmia. A significant increase in Ca in the peritoneal fluid ("diffused" Ca) may occur under circumstances in presence of a const. or falling serum-Ca. It is suggested that the fundamental effect of the hormone is to increase the diffusion of Ca from the blood into the interstitial fluids. M. W. G.

Dihydrotachysterol in parathyroid deficiency. E. Rose and F. W. Sunderman (Arch. intern. Med., 1939, **64**, 217—227).—Dihydrotachysterol was very effective in raising the concn. of serum-Ca and in relieving the symptoms of 5 cases of parathyroid deficiency. It raises equally the diffusible and non-diffusible fractions of serum-Ca, and in excessive doses may produce hypercalcæmia. C. A. K.

Pharmacognosy of parathyroid gland. I. H. W. Youngken (J. Amer. Pharm. Assoc., 1939, **28**, 638—643).—The microscopy of fresh and dried parathyroid glands (ox) and colour reactions of the dried gland with vanillin–HCl, NaOCl, and Millon's reagent are described. F. O. H

Cataphoresis of serum dialysate from parathyroidectomised dogs. G. Peretti and B. Manca (Arch. Sci. biol., Napoli, 1939, **25**, 105—116).—Ca and P migrate preferentially to the anode in the serum dialysate from both normal and parathyroidectomised dogs. In the latter, however, the anodic migration of Ca is decreased. S. O.

Thyro-parathyroidectomy and hyperglycæmia of hæmorrhage. A. Aggazzotti (Arch. Sci. biol., Napoli, 1939, **25**, 126—155).—The increase of blood-sugar, which normally occurs after bleeding, is absent or reduced in thyro-parathyroidectomised dogs. The operation is, by itself, without influence on the blood-sugar level. S. O.

Teeth from case of hypoparathyroidism. H. F. Humphreys (Proc. Roy. Soc. Med., 1939, **32**, 633—634).—Ground sections from the teeth of a case of hypoparathyroidism aged 23, with a history of tetany at 12, showed hypoplasia of the enamel dating from before the age of 6, but no evidence of disturbance of calcification of the dentine before the 9th year. Dentine calcified subsequently, especially after 12 years, showed changes resembling those in rats a long time after parathyroidectomy, *i.e.*, great exaggeration of the incremental lines and vascular inclusions in recent layers of dentine. These appearances are not necessarily sp. for parathormone deficiency but are probably a general reaction to any disturbance in the normal calcification. The forming dentine is a sensitive register of biochemical change. W. J. G.

Parathyroid insufficiency with cerebral calcification. I. M. Eaton and S. F. Haines (J. Amer. Med. Assoc., 1939, **113**, 749—753).—Symmetrical cerebral calcification, particularly of the basal ganglia, was detected radiologically in 3 cases of hypoparathyroidism. C. A. K.

Solubility and dielectric properties of insulin and its crystallisation with radioactive zinc. E. J. Cohn, J. D. Ferry, J. J. Livingood, and M. H. Blanchard (Science, 1939, **90**, 183—185).—Solubility

data for insulin, prepared from cryst. Zn insulin by dissolution in dil. HCl and electrodialysis, in water and in dil. glycine are recorded and discussed. The max. solubility occurring in approx. M-glycine indicates a large "salting-out" effect. The dispersions of dielectric const. of insulin at 25° in propylene glycol and in water + propylene glycol are represented graphically. Crystallisation from acetate buffers of electrodialysed insulin with radioactive ^{65}Zn gave a product containing 0·31% of radioactive Zn. L. S. T.

***In-vitro* action of insulin on minced avian and mammalian muscle.** E. Shorr and S. B. Barker (Biochem. J., 1939, **33**, 1798—1809).—The increased O_2 consumption by minced pigeon breast muscle due to insulin (cf. Krebs and Eggleston, A., 1938, III, 561) does not represent the general mechanism of insulin action on carbohydrate oxidation, since a similar effect is not obtained with chicken breast muscle, dog cardiac muscle, or a variety of skeletal muscles. Mincing alone, without added insulin, stimulates carbohydrate metabolism by intercellular disorganisation. P. G. M.

Effect of eserine on insulin hypoglycæmia. L. Liaci (Boll. Soc. ital. Biol. sperim., 1939, **14**, 461—463).—Small doses (0·05 mg. per kg.) of eserine significantly increase hypoglycæmia in rabbits due to 0·5—1·0 unit of insulin. F. O. H.

Changes produced in rats by pancreatectomy. C. P. Richter and E. C. H. Schmidt, jun. (Endocrinol., 1939, **25**, 698—706).—6 depancreatised rats which survived for 40 days became totally inactive though their food intake was enough for normal activity in the intact animal. Inactivity was presumably due to inability to metabolise carbohydrates. V. J. W.

***Beta* cell changes in guinea-pig pancreas in relation to blood-sugar.** G. Gomori, N. B. Friedman, and D. W. Caldwell (Proc. Soc. Exp. Biol. Med., 1939, **41**, 567—570).—Intraperitoneal administration to guinea-pigs of 2 g. per kg. of glucose caused a disappearance of granules from the islet cells of the pancreas, most marked 3—4 hr. after administration. V. J. W.

Clinical experience with crystalline insulin. A. Levitt and S. J. Jaskiewicz (Amer. J. digest. Dis., 1939, **6**, 110—112).—In general a larger amount of cryst. insulin was required to standardise a patient as compared with regular insulin, but the no. of injections were less and the blood-sugar levels approximated to the normal over a longer period of time. Protamine–insulin gave the best results. Smaller amounts were required and the blood-sugar was kept at a more normal level with less frequent injections. C. J. C. B.

Diet and insulin content of pancreas. C. H. Best, R. E. Haist, and J. H. Ridout (J. Physiol., 1939, **97**, 107—119).—Fasting or the feeding of diets rich in fats produces a definite decrease in the insulin content of the pancreas (male rat). Animals receiving a certain low caloric intake as fat show a greater decrease in insulin content than those provided with the same caloric intake in the form of carbohydrate. The insulin content depleted by fasting is restored within 6 days to a normal val. by feeding a well-balanced diet. Carbohydrate alone effects a partial restoration but fat produces no rise in insulin content. Short periods of anæsthesia and of vitamin-B_1 deficiency do not affect the insulin content. J. A. C.

Chemistry of aqueous extracts of sheep's adrenal cortex. H. H. Beard (J. Biochem. Japan, 1939, **30**, 1—10).—The main constituents of an aq. extract of the cortex are described. N is present as peptones and a small amount as proteoses; these were fractionated by alcohol and $(NH_4)_2SO_4$. The proteoses contained mainly arginine and histidine, whilst the peptones yielded arginine, histidine, glutamic acid, alanine, phenylalanine, leucine, and valine. The bearing of the data on amino-acid therapy of cancer is discussed. F. O. H.

Adenomata of the adrenal cortex in early castrated male guinea-pigs. A. Spiegel (Klin. Woch., 1939, **18**, 1068—1069).—The infantile penis of three male guinea-pigs completely castrated within a few days of birth started to grow several years later to normal size. The two eldest copulated, with the formation of a vaginal plug in the females. At post-mortem the genital tract was found to be developed to the stage of a normal male after puberty. There was present in each case a large adenoma of the adrenal cortex. E. M. J.

Relation of adrenal lipin–adrenaline complex to arteriosclerosis. W. Raab (Z. ges. exp. Med., 1939, **105**, 657—678).—Intravenous injection into rabbits of alcoholic extracts of ox adrenals or of serum of arteriosclerotic subjects raises blood pressure and blood-sugar, stimulates the central nervous system, and, in some animals, causes death from pulmonary œdema. In chronic experiments, it produces necrosis and calcification of the media of the aorta and thickening of the intima. The effects are attributed to an adrenaline–lipin complex in the extracts. A. S.

Tissue electrolytes in adrenal insufficiency. D. C. Darrow, H. E. Harrison, and M. Taffel (J. Biol. Chem., 1939, **130**, 487—502).—In skeletal muscle (dog, cat), an increase in intracellular water causes a decrease in P and protein but K remains const. No increase in the intracellular water of the heart occurs, but K increases irregularly. No change in the electrolyte or water content of the kidney or liver is observed. In nephrectomised rats, an increase in muscle- but not in liver-K accompanies the increased serum-K. H. G. R.

Progesterone-like activity of deoxycorticosterone. J. van Heuverswyn, V. J. Collins, W. L. Williams, and W. U. Gardner (Proc. Soc. Exp. Biol. Med., 1939, **41**, 552—554).—6—10 mg. of deoxycorticosterone produced in rabbits a progestational response equal to that given by 1 mg. of progesterone. A similar 10 : 1 ratio was found for the production of œstrus in spayed guinea-pigs after a preliminary 50 i.u. of œstrone. V. J. W.

Sex-specificity in action of progesterone on adrenalectomised cats. E. L. Corey (Proc. Soc. Exp. Biol. Med., 1939, **41**, 397—398).—2 male cats were maintained in normal health after adrenal-

ectomy, by progesterone injections, but 8 female cats died with the usual symptoms. V. J. W.

Effect of extracts of adrenal cortex on water-salt exchange. F. Addarii and F. Scarlini (Boll. Soc. ital. Biol. sperim., 1939, **14**, 563—565).—In approx. 50% of normal subjects, subcutaneous injection of the extract increases vol. of urine and diminishes total urinary excretion of $Na^{\cdot}$ and Cl'. F. O. H.

Effect of adrenal insufficiency on distribution of chlorides between plasma and erythrocytes. S. Karady, J. S. L. Brown, and H. Selye (Proc. Soc. Exp. Biol. Med., 1939, **41**, 640—642).—After adrenalectomy in rats, Cl' of red cells diminish more rapidly than chlorides of blood or plasma. V. J. W.

Survival of litters from adrenalectomised rats treated with cortico-adrenal substitutes. C. E. Tobin (Proc. Soc. Exp. Biol. Med., 1939, **41**, 599—602).—In adrenalectomised rats, lactation could not be maintained by treatment with NaCl, progesterone, antuitrin-S, or testosterone propionate. V. J. W.

Relation of adrenal hæmorrhage to loss of vitamin-*C* in experimental diphtherial intoxication. C. C. Torrance (Proc. Soc. Exp. Biol. Med., 1939, **41**, 421—423).—Adrenal hæmorrhage in guinea-pigs injected with a lethal dose of toxin is inversely proportional to the vitamin-*C* content of the gland after death; if -*C* is given with the toxin suprarenal hæmorrhage is greatly reduced. V. J. W.

Persistence of medullary tissue in homotransplanted adrenals. C. D. Turner, R. Haffen, and L. St. Amant (Proc. Soc. Exp. Biol. Med., 1939, **41**, 474—476).—Medullary tissue was present 60 days after transplantation into the anterior chamber of the eye in rabbits, and up to 4 months after transplantation into the kidney in mice. V. J. W.

Effect of adrenal cortex on sexual apparatus. I. Gonadotropic action of adrenal cortex of cattle. V. R. Kliatschko (Compt. rend. Acad. Sci. U.R.S.S., 1939, **24**, 91—94).—Alkaline extracts of adrenal cortex (cattle, pig), prepared by Hoffmann's method (A., 1938, III, 1005), when administered to immature female rats or mice induced opening of the vagina and the appearance of œstrus. When tested on ovariectomised mice, the extracts exerted no œstrogenic action. W. O. K.

Treatment of Addison's disease. F. Heni (Klin. Woch., 1939, **18**, 1052—1056).—A case of Addison's disease caused by tuberculosis of the adrenals improved temporarily with daily injections of 10 mg. of deoxycorticosterone, oral administration of 10 g. of NaCl, 5 g. of Na citrate, and a diet poor in K. E. M. J.

Effect of sympathol on pressor effect of adrenaline. M. Katoh (Folia pharmacol. japon., 1939, **27**, 18).—The pressor effect of adrenaline is increased by prior intravenous injection of sympathol, the increase being proportional to the amount of sympathol. For the same dose of the latter, the ratio of pressor effect of adrenaline after sympathol to actual dose of adrenaline is greater for small than for large doses of adrenaline. J. N. A.

Electrophoresis of adrenaline into skin in asthma. H. A. Abramson (Proc. Soc. Exp. Biol. Med., 1939, **41**, 375—378).—1% solution of adrenaline and H_3PO_4 of p_H 3—4 is carried into the skin by a current of 5 ma. for 30 min. Blanching of the skin persists for 5 hr. and a gradual release into the circulation occurs. V. J. W.

Influence of anoxia on glycogenolytic action of adrenaline. E. Gellhorn and A. C. Packer (Proc. Soc. Exp. Biol. Med., 1939, **41**, 345—346).—In rabbits, 1·9 μg. of adrenaline every 10 min. for 30 min. caused a 49% increase in blood-sugar. If this 30 min. were the second half of 1 hr. in which 7% O_2 was inhaled the increase in blood-sugar was 97%. If it was the last ½ hr. of 2 hr. of such inhalation the increase was only 3%, though the liver contained considerable amounts of glycogen. V. J. W.

(xii) REPRODUCTION.

Spring development of gonads of starling. W. S. Bullough and R. Carrick (Nature, 1939, **144**, 33—34).—A difference exists between the times of onset of sexual activity in British and continental starlings. W. F. F.

Neural mechanism of sexual behaviour in female cat. J. P. Maes (Nature, 1939, **144**, 598—599).—Trans-section of the spinal cord at the first cervical segment was made in ovariectomised and normal cats. Responses to sexual stimulation occurred as in the intact animal. W. F. F.

Infantile sexuality. L. Kanner (J. Pediat., 1939, **15**, 583—608).—A crit. review. C. J. C. B.

Changes of average maternal age. R. S. Barclay and W. O. Kermack (Nature, 1939, **143**, 804—805).—In England and Wales and in Scotland the fall in the birth rate has been accompanied by a fall in the average maternal age. W. F. F.

Tarsiers in captivity. H. R. Catchpole and J. F. Fulton (Nature, 1939, **144**, 514).—An account of food and female sexual cycle. W. F. F.

Anatomy and pathology of female genital tract. E. Held (Mschr. Geburtsh. Gynäk., 1939, **109**, 184—206).—A review of recent work. (B.) A. S.

Water-permeability of vitelline membrane of hen's egg. A. Orrù (Arch. Sci. biol., Napoli, 1939, **25**, 292—308).—Permeability to water is decreased by electrolytes; the salts of bivalent metals are most active. S. O.

Lethal action of alpha-rays on sea-urchin eggs. M. Miwa, H. Yamashita, and K. Mori (Nature, 1939, **144**, 378).—With increase in dosage there is more and more delay in incidence of cleavage of eggs of *Strongylocentrotus purcherrimus*, until some eggs stop dividing completely. W. F. F.

Reproductive cycle in *Salmo-salar* (Lin.). R. M. Neill (Nature, 1939, **144**, 332).—Report on the ovary of a female salmon containing aged and new ova. W. F. F.

Effect of irradiation on function of ovary in young girls. I. I. Kaplan (Amer. J. Obstet.

Gynec., 1939, **37**, 158—160).—Report on a 4-years old child who received both *X*-ray and Ra therapy for pelvic tumour over a long period but began to menstruate normally at 12 years of age. M. H.

Contractility of human ovary. P. Oreste (Arch. Fisiol., 1939, **39**, 415—421).—The contractions of strips of human ovaries were registered graphically. They contract under the influence of electrical stimuli and under the action of cholinergic drugs (pilocarpine, histamine, acetylcholine). Neither adrenaline nor ovary- or pituitary hormones had any effects. S. O.

Antigonadotropic activity of blood serum after injection of gonadotropic hormones. F. Guercio and D. Cazzola (Arch. Fisiol., 1939, **39**, 372—395).—Antigonadotropic serum was obtained by repeated injections of gonadotropic hormone (prolan) in rabbits and dogs. Whereas the antigonadotropic activity in rabbit's serum is accompanied by formation of antibodies, this is not so with dog's serum. S. O.

Effects of ovariectomy and splenectomy on properties of antigonadotropic rabbit's serum. F. Guercio and D. Cazzola (Arch. Fisiol., 1939, **39**, 396—406).—Ovariectomy does not interfere with the formation of either antibodies or antigonadotropic substances; splenectomy, while having no effect on the production of antigonadotropic substances, suppresses the formation of antibodies. S. O.

Antigonadotropic activity and zoological specificity. F. Guercio and D. Cazzola (Arch. Fisiol., 1939, **39**, 407—414).—Antigonadotropic dog's serum (obtained by injections of pregnant mare's urine) suppressed the gonadotropic action of human pregnancy urine in female rabbits. S. O.

Nature of ovarian granuloma. L. Castaldi (Boll. Soc. ital. Biol. sperim., 1939, **14**, 441—442).—Recent histological observations (*e.g.*, that the tissue is of a connective type) on the granuloma in various animals are discussed. F. O. H.

Ovarian function and pituitary activity in captive anura. P. A. Vunder (Abh. Staatsuniv. Saratov, Biol. Ser., 1939, **1**, 59—68).—When kept captive for not less than 30 days, female *Rana ridibunda* lose their capacity to ovulate on receiving injections of gonadotropic material from the pituitary gland but the material from the pituitary glands of males and females kept captive for 4—5 months has low gonadotropic activity. The season at which captivity begins does not affect the results. Possibly inadequate nutrition in captivity is responsible for the loss of capacity to ovulate. W. McC.

Relationship between yearly sexual cycle and function of ovary and pituitary gland in anura. P. A. Vunder (Abh. Staatsuniv. Saratov, Biol. Ser., 1939, **1**, 44—58).—Several months before the natural spawning period, the ovaries of *Rana ridibunda* contain many large, ripe eggs. Premature ovulation is brought about in the spring by injecting small amounts of gonadotropic material from the pituitary gland. The eggs deposited are rendered fertile by artificial treatment with semen. In autumn and winter much larger quantities of the material are required to cause the more difficultly achieved ovulation. Since the activity of the material is not subject to seasonal variations, the difference is due to seasonal variations in the sensitivity of the ovaries. W. McC.

Growth and transformation of follicular and tegumental cells of the ovary outside the organism. N. A. Kolesnikova (Compt. rend. Acad. Sci. U.R.S.S., 1939, **23**, 180—182).—Rabbit ovaries were cultivated by the hanging drop method for periods up to 26 days. W. F. F.

Effects of menopause urine extract on sexual organs of female kittens. W. F. Starkey and J. H. Leathem (Proc. Soc. Exp. Biol. Med., 1939, **41**, 503—507).—5 out of 8 kittens, of 6—13 weeks of age which were given 220—260 r.u. of extract showed follicle stimulation and one showed luteinisation in addition. Results differed in litter-mates and even between the ovaries of the same individual V. J. W.

Ovarian teratoma containing cerebellar tissue. R. A. Willis (J. Path. Bact., 1939, **49**, 571). (3 photomicrographs.) C. J. C. B.

Hypersecretion of follicle hormone and mammary insufficiency. R. Pagès (Rev. Méd., 1939, **56**, 387—391).—A review. H. B. C.

Quantitative results of ovariectomy in immature and adult albino rats. C. B. Freudenberger and E. I. Hashimoto (Proc. Soc. Exp. Biol. Med., 1939, **41**, 530—532).—26 physical measurements are given for rats spayed at 26 and 177 days and autopsied at 273 days. Differences were small. V. J. W.

Lithopædion developed from extrauterine gestation in intrauterine and extrauterine pregnancy. A. Mathieu (Amer. J. Obstet. Gynec., 1939, **37**, 297—302).—Case report and review of literature on lithopædions. M. H.

Effect of calcium on uterine contractions and on uterine response to intravenously injected oxytocics. D. N. Danforth and A. C. Ivy (Amer. J. Obstet. Gynec., 1939, **37**, 194—200).—A detailed account of work already noted (A., 1938, III, 808). The oxytocic action of pitocin, ergonovine, and histamine which are normally adequate for a uterine response is ineffective when the available Ca is diminished. M. H.

Hormonal factor in repair of uterine tissue in albino rat. C. E. Jett-Jackson (Anat. Rec., 1939, **74**, 78—89).—Uterine tissue from virgin mature rats consisting of normals, castrates, castrates receiving œstrin, and castrates receiving progesterone was studied at 5, 9, and 14 days. No discernible hormonal effect of acceleration or retardation of repair was revealed at any of the 3 periods. Uteri of animals injected with colchicine showed mitosis of smooth muscle cells. Complete repair, with disappearance of scar, was found at 21—25 days. W. F. H.

Effects of castration on seminal vesicles as influenced by age, considered in relation to degree of development of adrenal *X* zone. E. Howard (Amer. J. Anat., 1939, **65**, 105—149).—Reactions of the seminal vesicles in mice to castration vary according to age at time of operation and to the stage of development of the adrenal cortex. At 5 days when

the vesicles are relatively undifferentiated formation of columnar epithelium was observed. The reaction was preceeded by hypertrophy of the *X* zone. At 21 days when columnar epithelium had differentiated the *X* zone hypertrophied and the vesicles showed little change over long periods. After sexual maturity when the primary *X* zone had disappeared and the secondary *X* zone was differentiating, the vesicles underwent progressive degeneration. 100 days after castration the secondary *X* zone had disappeared and the vesicles were markedly and uniformly degenerated. Observations on the prostate are in accordance with the view that the adrenal may be a factor in prostatic hypertrophy. W. F. H.

Endometrial patterns in dysmenorrhœa. J. Kotz and E. Parker (Amer. J. Obstet. Gynec., 1939, **37**, 116—120).—Of 50 cases of functional dysmenorrhœa, 36% had normal endocrine function and 64% had some degree of ovarian failure. Of these failures, 60% were corpus luteum deficiencies; 40% showed associated excessive follicular activity. Only 4% showed deficiency of both hormones. Of the cases with normal hormone balance 20% had pelvic congestion, whilst 16% showed nothing to account for the dysmenorrhœa. M. H.

Effect of quinine–calcium on uterine motility. J. Raymond-Johnson (Amer. J. Obstet. Gynec., 1939, **37**, 94—100).—In the unanæsthetised non-pregnant rabbit exhibiting œstrin motility of the uterus, quinine–Ca produces a greater increase in uterine contractions than equiv. amounts of quinine or Ca given alone. The increase is due primarily to an increase in the amplitude of contractions, the rate remaining practically unchanged. The effect lasts for 1·0—1·5 hr. after slow intravenous injections and for 2—3 hr after intramuscular injections. M. H.

Cytology of human uterine gland cell. J. B. Gatenby and O. E. Aykroyd (Nature, 1939, **144**, 331—332).—There are two phases of secretion of the uterine gland cell, one just before or during menstruation, the other at pregnancy when a " solid " (possibly protein) secretion occurs. W. F. F.

Rôle of hysterectomy in production of menopausal symptoms. A. L. Dippel (Amer. J. Obstet. Gynec., 1939, **37**, 111—113).—Report on 42 hysterectomies on women who had no demonstrable pelvic pathology and were under 35 at the time of operation. 16·6% only developed menopausal symptoms. With 4 exceptions the operations were carried out on patients who were or had been pregnant. It is suggested that hysterectomy on such pregnant or puerperal uteri causes less injury to the ovarian blood supply, and that it is this latter factor, rather than the absence of the uterus *per se*, that brings about menopausal symptoms. M. H.

***X*-Ray demonstration of submucous myomas by combined use of hippuran and injection of carbon dioxide.** I. C. Rubin (Amer. J. Obstet. Gynec., 1939, **37**, 75—85).—Submucous myomas can be diagnosed roentgenologically by the intrauterine injection of hippuran in concns. of 80—100% followed by CO_2. The injection of CO_2 serves as a transparent contrast to the densely opaque hippuran outline. M. H.

Schick reaction and menstrual cycle. C. W. Jungeblut and M. D. Bailly (Proc. Soc. Exp. Biol. Med., 1939, **41**, 611—613).—At the beginning of the menstrual period 6 out of 9 Schick-positive individuals gave a severer reaction than before, and 1 out of 4 Schick-negative individuals gave a slight positive reaction. V. J. W.

Urinary excretion of œstrogenic hormones in pregnant women. E. Dingemanse, E. Laquer, and O. Mühlbock (Mschr. Geburtsh. Gynäk., 1939, **109**, 37—49).—15,000—80,000 i.u. of œstrogen per l. of urine were found in the second half of pregnancy, 97—98% being excreted in combined form. Urinary excretion may decrease during labour. The ratio of keto-compound (œstrone) to non-keto-compound (œstriol, œstradiol) varied from 1 : 1 to 2 : 5. The ratio in male and non-pregnant urine is 1 : 1. A. S.

Hormonal induction of abortion. F. F. Snyder and H. Coteen (Proc. Soc. Exp. Biol. Med., 1939, **41**, 432—434).—10 r.u. of pregnancy urine extract had no effect on pregnant rabbits when given on the 11th day of pregnancy, but usually caused abortion when given on the 17th day. V. J. W.

Aldehydic resorption [of fœtuses] in mice. C. Carruthers (Proc. Soc. Exp. Biol. Med., 1939, **41**, 336—340).—Feeding with heptaldehyde (40—50 mg. daily) caused fœtal resorption in mice up to the 5th day of pregnancy but had no effect on mouse carcinoma. V. J. W.

Successful termination of pregnancy following bilateral sympathectomy. J. M. Melick (Amer. J. Obstet. Gynec., 1939, **37**, 334—335).—Report of pregnancy and delivery of a normal baby in a patient 2 years after an extensive bilateral sub-diaphragmatic sympathectomy which included section of both splanchnic nerves on each side as well as of the two upper lumbar ganglia and partial resection of each adrenal gland. M. H.

Non-effect of ovariectomy during pregnancy in rhesus monkey. C. G. Hartman (Amer. J. Obstet. Gynec., 1939, **37**, 287—290).—A monkey ovariectomised on the 31st day of gestation furnished on the 140th day a vigorous fœtus removed by Cæsarean section. 4 additional experiments demonstrate the dispensability of the corpus luteum in the monkey after the first month of pregnancy. M. H.

Effect of quantitative reduction of renal blood flow on pregnant rabbit. L. V. Dill, C. E. Isenhour, and J. F. Cadden (J. clin. Invest., 1939, **18**, 641—647).—A quant. method for producing a relative reduction of blood flow through the kidneys by means of wire loops of known diameter is described. Pregnancy increases the susceptibility of the rabbit to renal ischæmia. Min. reduction of the blood flow to the kidney of the pregnant animal produces a clinical and pathological syndrome which simulates " toxæmia of pregnancy " in women. C. J. C. B.

Hormone from human corpus luteum of early pregnancy. J. Gillman and G. S. Smyta (Nature,

1939, **143**, 943—944).—In virgin rabbits, injection of the luteal fluid intravenously leads to gross enlargement of the uterus, follicular enlargement, and increase in interstitial cells. Ether extracts of luteal fluid have no action on follicles. The portion of the luteal fluid insol. in ether produces cystic enlargement of ovarian follicles and slight increase in size of uterus. W. F. F.

Effect of pregnancy and corpus luteum on bladder muscle. O. R. Langworthy and C. B. Brack (Amer. J. Obstet. Gynec., 1939, **37**, 116—125).—The effect of pregnancy and of ovulation on the vesical capacity has been studied by means of catheterisation through the urethra into the bladder, in rabbits anæsthetised with pentobarbital injected intravenously. It was found by 3 control readings of vesical capacity at 10-day intervals in normal animals that the vesical capacity remains relatively const. 10 days after the rabbits had been mated and thereafter through pregnancy and the puerperium the vesical vol. was increased. In ovariectomised rabbits the injection of antuitrin-S had no effect on the vesical capacity. Approx. half of the adult virgin rabbits injected with antuitrin-S showed a significant increase in vesical vol. after 10 days. It is concluded that a substance is elaborated by the corpus luteum which causes a decrease of tone in the vesical muscle. Microscopic study of the vesical muscle in 6 animals revealed no significant changes. M. H.

Biological diagnosis of pregnancy in cows. E. Cuboni (Boll. Soc. ital. Biol. sperim., 1939, **14**, 481—483).—Biological tests for gonadotropic substances in urine and serum of pregnant cows were negative. The Josef–Cuboni test for folliculin in the urine was superior to that of Ocariz and Gilsanz, but neither afforded a sp. diagnosis of pregnancy. F. O. H.

Hippuric acid excretion test in pregnancy. A. Hirsheimer (Amer. J. Obstet. Gynec., 1939, **37**, 363—376).—The excretion of hippuric acid after administration of Na benzoate by mouth was subnormal in more than half of a group of women with uncomplicated pregnancies; a smaller group of patients who developed toxæmia showed a somewhat higher incidence of the same depressed function. Post-partum the same test shows increased yields of hippuric acid in almost all cases. Hippuric acid was excreted rapidly when given intravenously as Na salt to normal pregnant women. 40% of a small group of toxæmic patients showed diminished excretion by this test. Renal function was checked by analysis of the urine for hippuric acid after giving Na hippurate intravenously. Ingestion of Na benzoate in pregnancy is followed by changes in the blood- and urine-uric acid levels similar to the changes so produced in non-pregnant individuals. M. H.

Factors affecting milk production of Simmenthaler grade cows under the pen keeping system. G. G. Carneiro (Iowa State Coll. J. Sci., 1939, **13**, 249—268).—The mean age of heifers at freshening is $38{\cdot}7 \pm 0{\cdot}3$ months. No relation exists between the month of the year in which heifers are born and their age at first calving or between the month of calving and the yield of milk. The total yield of milk increases with increase in the lactation period. Length of service period has little practical influence on yield of milk except in its connexion with the length of lactation period. The length of the lactation period decreases with increase in age of the cow. There is probably a tendency towards decrease in production due to increase in % of imported blood and the life of the cow tends to become a little shorter as the amount of exogenous blood increases. J. N. A.

Sex difference in response of the pigeon crop gland to prolactin. S. J. Folley (Nature, 1939, **144**, 834).—The sex difference in the response of crop glands in pigeons to prolactin is most marked in immature birds with undeveloped gonads. W. F. F.

Composition of crop secretion of pigeons after hatching. K. Bialaszewicz and M. Lewin (Acta Biol. Exp. [Warsaw], 1939, **12**, 265—270).—The secretion of the crop of pigeons feeding their young after hatching contains K 0·79—1·47% (average 1·0%), N 8·37%, Na 0·67%, Ca 0·42%, Mg 0·11%, and Cl 0·11%. The composition of the secretion remains unchanged for 9 days after hatching. A table compares the composition of the crop secretion with that of milk of various mammals. A. S.

Inhibition of lactation by gonadotropic hormone. S. E. de Jongh and L. A. van der Woerd (Acta brev. neerl. Physiol., 1939, **9**, 26—27).—Ovariectomised infantile guinea-pigs were treated with 1000 units of œstrone per day over 3 weeks, subsequently with prolactin. These animals and guinea-pigs ovariectomised post partum were treated with 20—100 r.u. of chorionic gonadotrophin. There was no action on lactation in either group of animals. A. S.

Mammary growth in male mice receiving androgens, œstrogens, and deoxycorticosterone acetate. J. Van Heuverswyn, S. J. Folley, and W. U. Gardner (Proc. Soc. Exp. Biol. Med., 1939, **41**, 389—392).—A large no. of synthetic substances were given to mice in 8 injections over 16 days. Max. responses were caused by total doses of 8 mg. of androstenedione, 4 mg. of deoxycorticosterone acetate, 0·5—1 mg. of 9 : 10-dihydroxy-9 : 10-di-*n*-propyl-9 : 10-dihydro-1 : 2 : 5 : 6-dibenzanthracene, or 5—10 mg. of triphenylethylene. Larger doses caused smaller responses without impairment of body growth. V. J. W.

Isolation of œstrone from adrenal gland. D. Beall (Nature, 1939, **144**, 76).—Œstrone was isolated from the adrenal gland as benzoate. W. F. F.

Œstrogenic substances in gastric juice. G Michetti and G. Beltrami (Boll. Soc. ital. Biol. sperim., 1939, **14**, 513—514).—Œstrogen could not be detected (Zondek extraction method and Allen–Doisy mouse test) in the gastric juice of pregnant (6—9 months) women. F. O. H.

Hydrolysis of conjugated œstrogens in urine of pregnant mares. M. Edson and R. D. H. Heard (J. Biol. Chem., 1939, **130**, 579—583).—Max. conversion of the biologically inactive water-sol. conjugated œstrogens in pregnant mare urine to the physiologically active, ether-sol. free hormones occurs when urine acidified with HCl to p_H 0·4—0·6 is main-

tained at room temp. for at least a month. The same optimum conditions apply to urines of early, middle, and late pregnancy. J. N. A.

Seasonal changes in sensitivity to œstrone. J. Duszyńska (Acta Biol. Exp. [Warsaw], 1939, **12**, 229—237).—Mice were ovariectomised at the age of 2 months. 0·1 g. of cryst. œstrone in olive oil was injected 3 weeks later 3 times per day for 3 weeks. The sensitivity of the mice is greatest during May and lowest during December (Allen-Doisy test). A. S.

Deoxycorticosterone acetate is œstrogenic to the human female. U. J. Salmon (Proc. Soc. Exp. Biol. Med., 1939, **41**, 515—517).—10 women whose vaginal smears showed œstrogen deficiency were given 5—10 mg. 3 times weekly. All showed a full œstrogen effect after 8 days. V. J. W.

Action of [urinary] gonadotrophic hormones in amenorrhœa as evaluated by vaginal smears. E. Shorr and G. N. Papanicolaou (Proc. Soc. Exp. Biol. Med., 1939, **41**, 629—636).—Pregnancy urine extract given in daily doses increasing from 20 to 1000 r.u. to a patient of 19 with amenorrhœa changed the vaginal smear from the atrophic to the follicular type. V. J. W.

Œstrous cycle in cat. H. Liche (Nature, 1939, **143**, 900).—The cat is diœstrual, the 1st cycle occurring in spring and the 2nd in early autumn. Climate greatly affects the incidence of œstrus. Ovulation occurs after coitus in 40 to 50 hr. Tube and uterine changes are described during anœstrus and œstrus periods. W. F. F.

Effect of ovarian hormones on genital tract of normal, castrated, and hypophysectomised bitches. R. Sammartino and N. Arenas (Rev. Soc. argent. Biol., 1939, **15**, 131—141).—Œstradiol benzoate injected during 5 to 33 days in 20, 200, and 3000 i.u. daily produced no effect on the ovaries of infantile and adult bitches. In normal, castrate, hypophysectomised, and hypophysectomised castrate bitches, 200 or more i.u. injected during 20—25 days produced hypertrophy of the uterus, vagina, and vulva and the behaviour of heat. Progesterone (5—67 i.u.) was injected during 5—27 days. Previous treatment with œstradiol was given in all cases. Out of 12 castrated, hypophysectomised, and hypophysectomised castrated animals only 3 castrates showed a response. The most marked results were obtained by injecting 1500 i.u. of œstradiol daily for 20 days before beginning the progesterone injections and continuing the œstradiol until the end of the experiment. In this species œstradiol produced marked proliferation and progesterone added only a slight degree of secretion. J. T. L.

Prolonged therapeutic effect of subcutaneously implanted crystals of ovarian hormone in women. U. J. Salmon, R. I. Walter, and S. H. Geist (Science, 1939, **90**, 162—163).—Crystals of α-œstradiol benzoate of size 4—7 mg. were implanted subcutaneously in the gluteal region in 10 menopausal women. Evidence of normal menstrual activity was obtained by vaginal smears, and the response persisted for periods up to 98 days after implantation. The response lasts only 7—14 days if the same dose of hormone is given by injection. W. F. F.

Œstrin excretion in psychotic patients. J. Lansbury and J. Hughes (Amer. J. Psychiat., 1939, **95**, 1119—1125).—Œstrin excretion in the urine was assayed in 7 female psychotics (5 schizophrenic, 1 manic-depressive, 1 unclassified). The variation of œstrin output during the menstrual cycle and the total monthly excretion of œstrin (assayed with and without preliminary acid hydrolysis) were normal. G. D. G.

Vaginal smears and œstrous cycle of cat and lioness. H. Liche and K. Wodzicki (Nature, 1939, **144**, 245—246).—The œstrous cycle is divided into 4 phases by vaginal smear studies: pro-œstrus, numerous nucleated epithelial cells; œstrus, variable, cornified cells non-nucleated, free nuclei; metœstrus, many leucocytes; anœstrus, various nucleated epithelial cells. W. F. F.

Synthetic œstrogens. P. Grumbrecht and A. Loeser (Arch. exp. Path. Pharm., 1939, **193**, 34—47).—The effects of equal doses of œstrone, œstradiol, 4 : 4′-dihydroxy-αβ-diethylstilbene and its propionate were compared. The drugs were administered orally to rats for periods of several weeks. The stilbene derivatives were the only ones to produce toxic degeneration of the liver and kidney; their action on the uterus, vagina, ovary, pituitary, and thyroid gland was similar to that of the œstrins, but they were less active in producing mammary proliferation. H. O. S.

Toxic action of large doses of diethylstilbœstrol on blood in dogs. R. Tislowitz (Acta brev. neerl. Physiol., 1939, **9**, 15—17).—Daily injections of 5 mg. of diethylstilbœstrol into dogs produces agranulocytosis and severe anæmia within 25—50 days. The toxic dose of stilbœstrol is 11·7—15·45 mg., that of œstradiol benzoate 10—16 mg. per kg. body-wt. A. S.

Action of diethylstilbœstrol on sex determination. J. H. Gaarenstroom (Acta brev. neerl. Physiol., 1939, **9**, 13—14).—300 μg. of diethylstilbœstrol (in 0·1 c.c. of oil) and of œstradiol benzoate were injected on the second day of hatching into eggs of white Leghorns (100 eggs each). In 82 and 84% hens developed. Müller's ducts were found in all animals. A. S.

Comparison of diethylstilbœstrol and other œstrogenic compounds. J. Freud (Acta brev. neerl. Physiol., 1939, **9**, 11—13).—The doses of œstrogenic compounds, on intravaginal or subcutaneous administration in rats, required to produce œstrus (vaginal smear method) were determined. Benzpyrene and *cyclo*pentenophenanthrene were ineffective in intravaginal doses up to 10 mg. A table summarises the results obtained with diethylstilbœstrol, œstradiol and its benzoate, œstrone, and dihydroxydipropyldihydrodibenzanthracene. The threshold dose for the last-named compound is the highest (50 mg. on subcutaneous, 12·5 μg. on intravaginal, administration). A. S.

Actions of diethylstilbœstrol. O. Mühlbock (Acta brev. neerl. Physiol., 1939, **9**, 7—10).—The action on comb growth in capons of a local application

of 0·4 μg. of testosterone is nullified by simultaneous administration of 500 μg. of œstrone or œstradiol, but not by diethylstilbœstrol up to 1 mg. Simultaneous injection of androsterone and œstradiol or diethylstilbœstrol inhibits comb growth. Local application of 200 μg. of diethylstilbœstrol does not change the colour of the feathers in brown Leghorn cocks and does not diminish the growth of the comb; both effects are produced by intramuscular injection of 200 μg. of diethylstilbœstrol. A. S.

Inactivation of diethylstilbœstrol in organism. B. Zondek and F. Sulman (Nature, 1939, **144**, 596—597).—In rats stilbœstrol is absorbed slowly from the site of injection and is only inactivated to a slight extent. W. F. F.

Sensitisation of uterus of infantile rabbits to progesterone with anol benzoate and diethylstilbœstrol. P. de Fremery and M. C. Geerling (Acta brev. neerl. Physiol., 1939, **9**, 17—19).—Infantile rabbits were treated with 3 mg. of anol benzoate per day for 8 days and with 1·5 μg. of œstrone for 8 days. Cryst. progesterone (3 mg.) was subsequently administered. The average wt. of the uteri treated with progesterone alone was 70 mg., that of sensitised animals 2100 mg. The average uterus wt. after treatment with 15 μg. of diethylstilbœstrol and progesterone was 3300 mg. Complete progestational proliferation of the endometrium and of the glands was found. A. S.

Ambisexual action of progesterone as observed in common Australian opossum. A. Bolliger and A. Carrodus (Nature, 1939, **144**, 671).—In the female progesterone increases the size of the pouch; in the male broadening of the neck and scrotum occurs, and descent of the testicles in immature animals. Prolonged administration to the male results in continued erection of the penis. W. F. F.

Seasonal changes in ovulation response of *Xenopus lævis* to methyltestosterone. H. A. Shapiro (J. Endocrinol., Lond., 1939, **1**, 1—6).—The test is 11 times as sensitive in the breeding season as during the period between the breeding seasons. The curve relating log dose to response is linear though displaced to the right between the breeding seasons. P. C. W.

Effect of testosterone on sensitivity of uterus to pituitrin. G. W. van Lommel (Acta brev. neerl. Physiol., 1939, **9**, 6—7).—Testosterone does not alter the threshold concn. of pituitrin required to produce uterine contractions in ovariectomised rabbits which were previously treated with 100 i.u. of œstrone per day. A. S.

Effect of testosterone propionate on behaviour of female canary. H. H. Shoemaker (Proc. Soc. Exp. Biol. Med., 1939, **41**, 299—302).—Daily injection of 0·076 mg. of testosterone propionate caused hen canaries, by the 9th day, to sing and become pugnacious. V. J. W.

Effect of testosterone propionate on Fallopian tube peristalsis. S. H. Geist, M. Mintz, and U. J. Salmon (Proc. Soc. Exp. Biol. Med., 1939, **41**, 556).—In normal women receiving 50 mg. 3 times weekly, tubal peristalsis was reduced after 200—300 mg. and abolished after 500 mg. V. J. W.

Effect of sex hormones on normal resistance of rats to *Cysticercus crassicollis*. D. H. Campbell (Science, 1939, **89**, 415—416).—The normal sex difference in resistance of rats to *C. crassicollis* is modified by injection of theelin and testosterone. W. F. F.

Influence of colchicine on sexually induced colour change of *Rhodeus amarus*. L. Havas (Nature, 1939, **143**, 809—810).—Colchicine produces effects like those of testis hormone, but they develop more slowly. W. F. F.

Hypospadias and non-descent of testes caused in rats by progesterone. H. Burrows (Nature, 1939, **143**, 858).—Hypospadias is reported in female rats and mice treated with œstrone and testosterone from birth. Males showed no malformation of the penis. Rats given progesterone showed hypospadias and males had undescended testes. W. F. F.

Influence of age on paradoxical actions of œstrone. S. E. de Jongh and L. A. van der Woerd (Acta brev. neerl. Physiol., 1939, **9**, 21—25).—The action of œstrone on seminal vesicles, ductus deferens, and prostate gland is more marked and metaplasia of the epithelium in seminal vesicles and prostate is more frequent if the rats were castrated in early life than at greater age. A. S.

Peripheral vascular action of œstrogen in human male. S. R. M. Reynolds and F. I. Foster (J. clin. Invest., 1939, **18**, 649—655).—Of 20 adult males, 13 showed an increase in finger vol. commencing a few min. after injection of œstrogen and continuing for 30—60 min. A plateau level is attained which is sustained for the period of observation (max. time up to 2 hr.); the average increase in finger vol. was 4·6. No change in skin temp. was noted in such cases. Injection of the corn oil vehicle alone had no such effect on finger vol. in these subjects. The response depends on dilatation of the small vessels in the skin beyond the arterioles. There is no measurable increase in the rate of blood flow in the skin. The failure of œstrogen to bring about dilatation of the skin vessels in some subjects is unexplained. C. J. C. B.

Effects of administration of œstrogens on organs of castrated and non-castrated male rats partly deprived of vitamin-*A*. E. M. Hume, R. Burbank, and V. Korenchevsky (J. Path. Bact., 1939, **49**, 291—298).—23 normal and 33 castrated male rats were subjected to prolonged partial deprivation of vitamin-*A*, to moderate doses of œstrogens, or to both together. In normal rats the earliest effect on the seminal vesicles, prostate, and coagulating glands was a decrease in size and wt. from decreased secretion. Stratification, squamous metaplasia, keratinisation, and papillomatosis occurred in the epithelium of the secondary sex organs and the bladder in both groups of rats, while hypertrophy of the fibrous and muscular tissue in the seminal vesicles and prostate was also const. in castrated rats. The most severe changes in both groups occurred when the rats were deprived of -*A* and at the same time treated with

œstrogens. Severe degeneration of the testes and calculus formation in the bladder were sp. to -*A* deficiency, hypertrophy of muscle and fibrous tissue in the vesicles and prostate to œstrogen action. Epithelial changes in the secondary sex organs could be caused by either factor. In the normal rats, a neutralising effect of the natural testicular hormones on the pathological action of œstrogens could be overcome by large doses or prolonged administration of the œstrogens. (21 photomicrographs.) C. J. C. B.

Penetration of sesamé oil painted on capon comb. D. Soloway, L. P. Hansen, and J. F. McCahey (Proc. Soc. Exp. Biol. Med., 1939, **41**, 547—551).—Oil cannot be detected histologically beyond the stratum corneum, from the inner margin of which androgens are absorbed. V. J. W.

Treatment of cryptorchidism with male sex hormone. C. Zelson and E. Steinitz (J. Pediat., 1939, **15**, 522—534).—20 boys with cryptorchidism were treated with male sex hormone: 17 of the boys had unilateral and 3 of the boys had bilateral undescended testicles. 3 showed complete descent of the testes (one was a unilateral case, and 2 were bilateral) while partial effect was obtained in 9. Although male sex hormone will produce an enlargement of the penis and scrotum and growth of pubic hair, it has a marked tendency to cause a shrinkage in the size of the testicle both descended and undescended. C. J. C. B.

Testicular regeneration and testosterone. M. Laporta and P. Miletto (Arch. Sci. biol., Napoli, 1939, **25**, 169—177).—Small testicular fragments left behind after castration of chickens, which would not have regenerated otherwise, did so after repeated administration of testosterone; secondary sex characters were fully re-established. S. O.

Absence of acute effects of sex hormones. M. Dick and C. W. Hooker (J. Lab. clin. Med., 1939, **25**, 33—34).—Intravenous administration of 50 mg. of testosterone propionate, 50,000 i.u. of œstradiol benzoate, or 400 i.u. of theelin to male and female dogs, both castrated and intact, under morphine–Na barbital anæsthesia produced no change in respiration, heart rate, or blood pressure. C. J. C. B.

Conversion of testosterone into androsterone in man. R. I. Dorfman, J. W. Cook, and J. B. Hamilton (J. Biol. Chem., 1939, **130**, 285—295; cf. A., 1939, III, 385, 587).—In men having deficient testicular secretion, testosterone, administered orally or intramuscularly as propionate, is converted into, and excreted in the urine as, androsterone. Indirect evidence is thus provided that testosterone is the principal androgenic hormone of the human testis. Possible routes for the conversion are suggested. W. McC.

Spectrochemical assay of androsterone and dehydro*iso*androsterone in simple solutions. G. O. Langstroth, N. B. Talbot, and A. Fineman (J. Biol. Chem., 1939, **130**, 585—591).—The two hormones when present together in alcoholic solution are determined together using the *m*-dinitrobenzene reaction (A., 1939, II, 378, 481) since both give identical results. The dehydro*iso*androsterone is then pptd. by digitonin, and the androsterone determined in the purified filtrate by the same spectrochemical method. J. N. A.

Effect of thyroid feeding on androgen excretion following testosterone injections in rabbits. D. Marine and S. H. Rosen (Proc. Soc. Exp. Biol. Med., 1939, **41**, 644—646).—10 mg. of testosterone or its propionate were given daily for 4—5 days with or without daily oral administration of 100 mg. of dried thyroid. Urinary androgen excretion, as determined by capon comb-growth, was greatly increased in the thyroid-fed animals. V. J. W.

Dose–response relationship of androsterone by direct application to capon's comb. S. R. Hall and L. P. Dryden (Proc. Soc. Exp. Biol. Med., 1939, **41**, 378—382).—The curve relating dose to length plus height of the comb is logarithmic for doses between 0·125 and 4 μg. V. J. W.

Inactivation of testosterone propionate and œstrone in rats. G. R. Biskind and J. Mark (Johns Hopkins Hosp. Bull., 1939, **65**, 212—217).—Pellets of testosterone propionate and œstrone do not exert their effect on the appropriate castrated rats when implanted in the spleen. The effects return, however, if the spleens containing the pellets are transplanted between the skin and abdominal muscles and the splenic vein and artery are ligated. Pellets implanted in other tissue had a normal effect and in liver, a slightly impaired effect. T. F. D.

Sperm examination. O. J. Pollák and C. A. Joël (J. Amer. Med. Assoc., 1939, **113**, 395—398).—The technique of sperm collection and examination is described. C. A. K.

Human spermatozoa. K. Joël and O. J. Pollak (Mschr. Geburtsh. Gynäk., 1939, **109**, 91—104).—Isotonic glucose–Mg salt mixtures are most potent in restoring motility of human spermatozoa. Non-mobile spermatozoa begin to move, or the degree and duration of motility is increased. K, Rb, Ag, and Hg are spermatocidal. Fe, Pb, Al, Zn, Co, and Cd coagulate spermatozoa; quinine salts dissolve them. Motility is abolished by KOH (1 : 10,000); it is not inhibited by HCl up to 15%. 80% of spermatozoa show normal motility in isotonic glucose; motion ceases after 16 hr. A. S.

Physico-chemical properties of semen. V. Zagami (Arch. Sci. biol., Napoli, 1939, **25**, 208—253).—The following consts. were measured at 20°. Man: d 1·028; Δ 0·56—0·58°; conductivity 88—107 $\times 10^{-4}$ mΩ.; p_H 7·35—7·5; relative viscosity 6·45; surface tension 66 dynes per cm. Dog: similar vals. except for viscosity 1·14—1·17 and p_H 6·67—6·76. Rabbit: p_H 6·59—6·86. Cock: p_H 7·02—7·18. In seminal fluid from man and dog the p_H decreases by about 0·25 for a temp. rise from 20° to 38°. The human semen can be diluted 10 times with no change in p_H beyond 0·04. S. O.

Reproduction in albino mouse. II. Maturation of the sperm cells. III. Duration of life of spermatozoa in female reproductive tract. H. Merton (Proc. Roy. Soc. Edin., 1939, **59**, 145—151, 207—217).—II. The spermatozoa possess a

protoplasmic swelling the kinoplasmic droplet, which when they enter the caput of the epididymis is situated immediately behind the head and moves backwards during the passage of the spermatozoon through the epididymis so that when the vas deferens is reached it is situated at the posterior part of the middle piece. Spermatozoa from the male genital tract which have lost the kinoplasmic droplet in physiological salt solution quickly die. The kinoplasmic droplet is required for the proper maturation of the spermatozoa and is essential for their motility in the male genital tract or in physiological salt solution, but in the female tract spermatozoa which have lost the droplet remain motile. The function of the Sertoli cells is discussed.

III. Spermatozoa enter the Fallopian tubes 1¼ hr. after copulation; they meet the ova at the end of the 2nd hr. and fertilisation occurs in the course of the 3rd hr. After artificial insemination the spermatozoa may migrate upwards in the tubes, even though the eggs enter them only 8—10 hr. later. In the Fallopian tubes the spermatozoa retain their fertilising ability for about 6 hr. and motility ceases only after 13⅓ hr. The phagocytes in the uterus are capable of engulfing living or newly dead spermatozoa which are later found in the cell body. The head capsule is not digested and is eventually extruded. W. O. K.

Relation of spermatogenesis to factor in testis which increases tissue permeability. D. H. Sprunt, C. W. Hooker, and J. S. Raper (Proc. Soc. Exp. Biol. Med., 1939, **41**, 398—402).—Ability of testis extracts to increase speed of spread of India ink in the rabbit's skin is markedly less in extracts of testes from immature rabbits or of rats' testes which have been fixed in the abdomen. V. J. W.

(xiii) DIGESTIVE SYSTEM.

Effect of cinchonine on salivary secretion. L. Liaci (Biochim. Terap. sperim., 1939, **26**, 429—436).—Intravenous injection of cinchonine sulphate into dogs inhibits salivary secretion; the effect is directly opposed to the stimulating effect of pilocarpine. F. O. H.

Gastro-enterology. C. M. Jones (Arch. intern. Med., 1939, **64**, 834—887).—A review. C. A. K.

History and development of gastric analysis procedure. F. Hollander and A. Penner (Amer. J. digest. Dis. Nutr., 1939, **5**, 739—743, 786—791; **6**, 22—25). C. J. C. B.

Permeability of the stomach mucosa for acids and other substances. T. Teorell (J. Gen. Physiol., 1939, **23**, 263—274).—Solutions (isotonic with blood) of strong and weak acids, salts, glucose, and glycine were introduced into the resting stomach of cats. The mucosa was permeable to the majority of ions tested; there was also permeability from the blood to the stomach content, particularly of alkali chlorides. Glucose, glycine, and $NaIO_3$ showed slow, pure weak acids rapid, penetration. The concept of the mucosa as an ion-permeable membrane can explain the acidity and Cl′ variations of the gastric juice without postulating neutralising or diluting secretions. D. M. N.

Inhibition of gastric motility associated with presence of products of protein hydrolysis in the upper small intestine. J. E. Thomas and J. O. Crider (Amer. J. Physiol., 1939, **126**, 28—39).—The materials which cause gastric inhibition when placed in the upper small intestine in neutral solution in dogs with cannulated gastric and duodenal fistulas (Thomas, Crider, and Hogan) are: commercial peptones, intestinal contents of dogs during meat digestion, various enzyme and acid digests of casein prepared *in vitro*, the separated proteose and proteose-free fractions of several of the above, various individual amino-acids and amino-acid mixtures (some of the latter were ineffective). The gastro-inhibitory effects were qualitatively similar and resembled the effect of HCl; quant. differences were observed but not explained. Min. latent period for gastric inhibition was 15 sec. After double cervical vagotomy in 2 animals no gastro-inhibitory effect was observed with 2 commercial peptones. The products of protein hydrolysis cause inhibition of gastric motility by acting in the intestine as stimuli for the enterogastric reflex. M. W. G.

Gastric carbonic anhydrase. H. W. Davenport (J. Physiol., 1939, **97**, 32—43).—Carbonic anhydrase is present in the parietal cells of the gastric mucosa of cats and rats; in cats the concn. in these cells is 5—6 times, in rats 3 times, that in the red blood cells. The anhydrase is present in the cells of the surface epithelium of the gastric mucosa; its concn. here is about $\frac{1}{10}$ that in the parietal cells (cat). There is no anhydrase in the chief cells of cats or rats and the concn. is very low in any other type of cell in the fundus. A small amount is present in an unidentified type of cell in the pyloric antrum of the rat (cf. A., 1939, III, 147). J. A. C.

Effect of gastric absorption of eupeptic substances on gastric motility in man. G. Tudoranu, C. C. Dimitriu, and S. Piram (Bull. Mém. Soc. méd. Hôp. Bucarest, 1939, **21**, 298—304).—Gastric motility is stimulated by tinctures of gentian, condurango, nux vomica, amara, nicotinic acid, and peptone, and inhibited by tincture of quassia. The substances were administered by stomach tube. H. L.

Effect of anterior pituitary-like hormone on gastric acidity in man. H. Felson, L. Schiff, and E. S. Garber (Amer. J. digest. Dis. Nutr., 1939, **5**, 777—778).—Subcutaneous administration of anterior pituitary-like hormone (antuitrin-S) to 7 individuals in daily doses of 1 c.c. for a total of 32—150 injections produced no const. effect on the gastric secretory response to histamine. C. J. C. B.

Effect of histamine on gastric secretion in normal subjects. M. Enachesco, S. Sâmboteanu, and I. Schwartz (Bull. Mém. Soc. méd. Hôp. Bucarest, 1939, **21**, 266—279).—The histamine test (of 0·75 mg. subcutaneously) gave the following results in 22 cases: vol. of gastric secretion (2 hr.) 100—200 c.c., max. vals. for free HCl 20—50 (0·073—0·182% HCl), and total acidity 50—70. Max. vol. of secretion occurred after 15 min., and max. acidity after 30 min. Repeated examinations in the same individual gave similar results. H. L.

Effect of acetyl-β-methylcholine (mecholyl) on gastric secretion in animals and in man. J. Flexner and I. S. Wright (Amer. J. digest. Dis. Nutr., 1939, **5**, 736—739).—Mecholyl in rabbits, cats, or man produces little increase in gastric free or total acidity. In man there is a marked increase in the flow of alkaline mucinous saliva. C. J. C. B.

Anorexia and gastric motility. D. P. Gullikssen, A. Fogelberg, and L. Kardos (Amer. J. digest. Dis. Nutr., 1939, **5**, 814—817).—13 children out of 200 had low food intake and poor appetite. The anorexic children had a greater no. of weaker hunger contractions and shorter interval between activity periods than children having good or hearty appetites. C. J. C. B.

Diagnosis of gastritis. K. Lundbaek (Acta med. scand., 1939, **101**, 575—595).—A comparative investigation of gastroscopy and other diagnostic adjuvants, from which it is claimed that the use of the gastroscope affords greater and more definite information than other investigations. C. A. A.

Alimentary leucocytosis and gastric acidity. B. G. Hager (Klin. Woch., 1939, **18**, 1086—1089).—Alimentary leucocytosis was more marked in cases with normal and hyperacid vals. as well as in ulcer patients than in cases with low acidity or carcinoma of the stomach (51 cases studied). E. M. J.

Pathogenesis of peptic ulcer in Indians. I. M. Orr and M. V. R. Rao (Indian J. Med. Res., 1939, **27**, 159—170).—In peptic ulcer, chronic gastritis or duodenitis and degenerative changes in Auerbach's plexus were observed in the stomach or duodenum at a considerable distance from the ulcer. Similar changes were also noted in patients with subjective symptoms of ulcer in whom no ulcer was found at operation. Degeneration in Auerbach's plexus, accompanied by changes in the mucosa, has been consistently observed in rats and dogs fed on diets resembling those consumed by the poorer classes in the Madras Presidency and Travancore (South India). H. B. C.

Control of gastric acidity in peptic ulcer. B. M. Nicol (Lancet, 1939, **237**, 881—884).—Adequate control of free acidity of the gastric contents in cases of peptic ulcer is not attained by hourly or 2-hourly milk feeds, or by addition of atropine or alkalis. The presence of free HCl may not interfere with the healing of ulcers. C. A. K.

Duodenal ulcer therapy. J. Ronald (Brit. Med. J., 1939, II, 1033—1034).—Healing of duodenal ulcers (studied in 45 patients) can occur in the presence of hyperchlorhydria. Mg trisilicate is no more effective than the usual alkalis in neutralising free HCl. C. A. K.

Relation of sex hormones to peptic ulcer. D. J. Sandweiss, H. C. Saltzstein, and A. A. Farbman (Amer. J. digest. Dis. Nutr., 1939, **6**, 6—12).—Only 1 of 70,310 pregnant women showed peptic ulcer although there was a high incidence of other gastrointestinal disorders. Antuitrin-S diminished the incidence of ulcers in 34 Mann–Williamson dogs and doubled the survival time. 18 peptic ulcer patients were treated with daily injections of 2—5 c.c. of antuitrin-S for 14 days with no greater benefit than was produced by other parenteral products. Daily subcutaneous doses of 2 and 5 c.c. of antuitrin-S had no effect on the free and total acid secretion in man or dog. C. J. C. B.

Incidence and cause of fever in patients with bleeding peptic ulcers. L. V. Dill and C. E. Isenhour (Amer. J. digest. Dis. Nutr., 1939, **5**, 779—784).—Hæmorrhage in the dog or the presence of blood in the intestinal tract of man or dog does not cause fever. Clinically, however, the incidence of fever is greatest in patients with bleeding peptic ulcers who had large hæmorrhages, are anæmic, and have a labile vegetative nervous system. C. J. C. B.

Attempt to prevent post-operative jejunal ulcer by aluminium hydroxide therapy; experimental study in Mann–Williamson dogs. G. B. Fauley, A. C. Ivy, and L. Terry (Amer. J. digest. Dis. Nutr., 1939, **5**, 792—795).—No prophylactic effect was found in 87 dogs. This treatment decreased appetite and food intake and led to a more rapid loss of wt. C. J. C. B.

Pectin as prophylactic and curative agent for peptic ulcers produced with cinchophen. M. Winters, H. A. Peters, and G. W. Crook (Amer. J. digest. Dis. Nutr., 1939, **6**, 12—15).—4 dogs treated with cinchophen showed ulcers but only 1 out of 9 dogs given cinchophen and pectin. 2 dogs with ulcers were treated postoperatively with cinchophen and pectin. On the 21st and 25th post-operative days, post-mortem examination showed well-healed ulcers. C. J. C. B.

Peptic ulcer: effect of high-protein diet on behaviour of disease. C. Windwer and M. J. Matzner (Amer. J. digest. Dis. Nutr., 1939, **5**, 743—744).—90% of 40 patients with peptic ulcer showed symptomatic relief on a high-protein diet. C. J. C. B.

Duodenal and biliary reflux in necrosis of pancreas. J. Bottin (Acta med. scand., 1939, **102**, 31—54).—Direct connexion was established between the bile duct and pancreas, and between duodenum and pancreas, in dogs. Changes in biliary pressure in various circumstances were recorded. In accordance with clinical evidence in man, biliary reflux did not cause severe necrosis of the pancreas, but duodenal reflux frequently did. C. A. A.

Blood-lipins of dogs with ligature of external pancreatic ducts. C. Entenman, I. L. Chaikoff, and M. L. Montgomery (J. Biol. Chem., 1939, **130**, 121—132).—A decrease in all constituents of the blood-lipins, resembling the changes found in dogs maintained with insulin after complete pancreatectomy, occurs after completely ligaturing the pancreatic ducts. This is independent of any loss in wt. and may be counteracted by ingestion of pancreas. H. G. R.

Chronic relapsing urticaria and angioneurotic œdema [treated with pancreatic extracts]. J. Markel (Arch. Dermat. Syphilol., 1939, **39**, 992—994).—Report of a case with associated pancreatic insufficiency which was relieved by deinsulinised pancreatic extract by mouth. C. J. C. B.

Parasympathetic-like effect of splanchnic nerve stimulation on pancreatic secretion. B. P. Babkin, C. O. Hebb, and M. A. Sergeyeva (Quart. J. Exp. Physiol., 1939, **29**, 217—237).—A secretion from the acinous cells of the pancreas of the dog and cat, comparable with that of vagal stimulation, is produced by stimulation of the splanchnic nerves. It is arrested by atropine, and enhanced by physostigmine and pilocarpine but not cocaine. Adrenaline administration does not produce a similar effect. Histological sections support the physiological findings. The secretory fibres of the splanchnic nerve pass without synaptic relay through the cœliac ganglion. Intravenous injection of nicotine abolished the secretory as well as the pressor effect. After stimulation of the splanchnic nerves with induction current, the venous blood of the pancreas contains an acetylcholine-like substance.
T. S. G. J.

Alimentary tract in lead poisoning. H. Otto and F. Kuhlmann (Klin. Woch., 1939, **18**, 1081—1084).—A review. E. M. J.

Effect of bile on propulsive motility of Thiry–Vella [intestinal] loops in dogs. H. F. Haney, W. C. Roley, and P. A. Cole (Amer. J. Physiol., 1939, **126**, 82—88).—Thiry–Vella loops were prepared in healthy adult dogs. The rate of propulsion was determined by means of a sponge rubber pellet measuring 0·8 cm. × 2 cm. The introduction of dog's gall-bladder bile into the proximal end of a loop is promptly followed by a marked increase in the rate of propulsion. A solution of bile salts is as effective as bile. Bile pigments, $CaCl_2$ solution, mucin, and unsplit fats failed to influence propulsive motility.
M. W. G.

***In-vitro* incorporation of fatty acids in phospholipins of intestinal mucosa.** R. H. Barnes, E. S. Miller, and G. O. Burr (Proc. Soc. Exp. Biol. Med., 1939, **42**, 45—47).—Tagged fat (unsaturated fatty acids of corn oil) and lipase were placed in rat's duodenum for 15 min. The intestine was then removed and kept in Ringer's solution at room temp. for 1·75—6 hr., when the mucosa was removed and total and tagged fatty acids of its phospholipins were determined. Incubation causes an increase in the ratio tagged : untagged fat, but this is due to a decrease in total fat, the tagged fat remaining const.
V. J. W.

Method for study of intestinal function. R. A. Bussabarger (Proc. Soc. Exp. Biol. Med., 1939, **42**, 50—51).—12—20 cm. of dog's small intestine is isolated, brought through the rectus muscle, and placed under the skin, vascular and nervous connexions being left intact. The open ends are brought through the skin and sutured in place. V. J. W.

Intestinal secretion during anoxia. D. W. Northup and E. J. van Liere (Proc. Soc. Exp. Biol. Med., 1939, **42**, 162—163).—When O_2 pressure was reduced to 53 mm. Hg no significant depression of secretion in the dog occurred. V. J. W.

Quantitative comparison of responses of isolated and of intact intestine to seven sympathomimetic amines. K. W. Aumann and W. B. Youmans (Proc. Soc. Exp. Biol. Med., 1939, **42**, 111—112).—7 compounds were applied to isolated rabbit gut and dog's intestine *in situ*. Order of relative potency was similar in both series. V. J. W.

Action of *apo*morphine on intact intestine of unanæsthetised dogs. C. M. Gruber, V. G. Haury, and M. E. Drake (Proc. Soc. Exp. Biol. Med., 1939, **42**, 193—197).—*apo*Morphine hydrochloride, 0·02 mg. per kg., had a variable effect on tone of a Thiry–Vella loop but increased peristalsis.
V. J. W.

Effect of spinal anæsthesia on intestinal activity. C. L. Burstein (Proc. Soc. Exp. Biol. Med., 1939, **42**, 291—293).—100 mg. of procaine given intrathecally to 12—16-kg. dogs caused marked increase in intestinal movements recorded by the balloon method. V. J. W.

Intestinal obstruction due to colloidal aluminium hydroxide. W. P. Havens (J. Amer. Med. Assoc., 1939, **113**, 1564—1565).—A case report.
C. A. K.

Prevention of carotene absorption by liquid petrolatum. A. C. Curtis and R. S. Ballmer (J. Amer. Med. Assoc., 1939, **113**, 1785—1788).—Liquid petrolatum, plain or emulsified, diminishes the absorption of carotene from the intestine in man. If it is saturated with carotene (0·28% at 37°) absorption of carotene of the food is unhindered.
C. A. K.

Action of magnesium sulphate on intestine of the cat. R. Lium and H. W. Florey (Quart. J. Exp. Physiol., 1939, **29**, 303—319).—In the intestine of the cat, $MgSO_4$ slows the absorption of isotonic NaCl, slightly retards that of distilled water, and does not influence that of glucose. Isotonic $MgSO_4$ is no more irritating than isotonic NaCl. The purgative action of the former is due to diminished absorption and is a bulk effect. The prolonged production of watery stools in cats following small doses of $MgSO_4$ may be due to slowing of the absorption of other crystalloids. In cats NaCl is best absorbed from the ileum and glucose from the jejunum. Decapitate cats are unsuitable for study of intestinal motility and washing and excessive handling of the colon are to be avoided. T. S. G. J.

Water and soap enemas. R. D. Templeton and E. L. Borkon (Amer. J. digest. Dis. Nutr., 1939, **5**, 809—814).—Enemas of soap solution or tap water are more efficient in producing defæcation than white mineral oil; using the balloon technique colonic activity was greater with oil enemas, showing that colonic activity and urge for defæcation do not run parallel. C. J. C. B.

(xiv) LIVER AND BILE.

Equality of chloride space and extracellular space of rat liver. F. L. Truax (Amer. J. Physiol., 1939, **126**, 402—408).—The Cl′ space was calc. from the equation : Cl′ space = 0·96 × 100(total liver-Cl′ − liver blood-Cl′) ÷ plasma-Cl′ + liver blood vol. The factor 0·96 = r = Gibbs–Donnan ratio. Lower blood vol. in rat = 3·2 c.c. per 100 g. liver. Extracellular space was determined from photomicrographs by weighing the picture before and after cutting out the extracellular areas. The extracellular vol. in

the liver is equal to the Cl′ space, supporting the view that hepatic cells are normally free from Cl′ and may be impermeable to it. M. W. G.

Aspiration biopsy of liver, and its diagnostic significance. P. Iversen and K. Roholm (Acta med. scand., 1939, **102**, 1—16).—A column of tissue 2 × 15 mm., suitable for histological examination, was obtained by puncture of the diaphragm and aspiration. It was successful in 122 out of 160 cases, and revealed the presence of acute and chronic inflammatory conditions, tumours, degenerations, obstruction to bile flow, etc. C. A. A.

Compensatory action of liver after cholecystectomy. M. Künsztler (Klin. Woch., 1939, **18**, 1067—1068; cf. Bützow, A., 1938, III, 1015).—Bile obtained from a duodenal tube after cholecystectomy contains 10—20 mg.-% of bilirubin at rest. When oil or $MgSO_4$ is given the bilirubin content rises to 100—120 mg.-%, the liver being responsible for this concn. E. M. J.

Blood clearance of free chloral in normal and liver-damaged dogs. B. Mukerji and R. Ghose (Nature, 1939, **144**, 636).—Liver damage is accompanied by a higher blood-chloral following oral administration of the drug. W. F. F.

Choline and fatty liver of carbon tetrachloride poisoning. H. M. Barrett, C. H. Best, D. L. Maclean, and J. H. Ridout (J. Physiol., 1939, **97**, 103—106).—Rats maintained on a diet low in lipotropic factors with an amount of added choline sufficient partly to prevent the increase in liver-fat due to a low-choline diet develop very fatty livers during the 20-day period following administration of CCl_4. Animals poisoned with CCl_4 and fed the same diet, with the addition of excess of choline, have almost normal livers at the end of the same period. Choline or other lipotropic factors are essential for removal of excess of fat which accumulates in the livers of rats as a result of CCl_4 poisoning. (Cf. Physiol. Abs., 1935, **20**, 317.) J. A. C.

Proved case of recovery from fatty metamorphosis of liver after treatment with lipocaic. D. H. Rosenberg (Amer. J. digest. Dis. Nutr., 1938, **5**, 607—613).—Biopsy studies of the liver and tests of liver function before and after treatment showed a return to normal. (2 photomicrographs.) C. J. C. B.

Non-specificity of suspensions of sodium xanthine in protecting liver against injury by chloroform; probable cause of its action. I. S. Ravdin, H. M. Vars, and S. Goldschmidt (J. clin. Invest., 1939, **18**, 633—640).—Suspensions of Na xanthine or xanthine nitrate, injected subcutaneously 24 hr. prior to the administration of $CHCl_3$, protect the liver of the rat from injury. The filtrate from saturated solutions of these substances gives negative results in the amounts used. Na allantoin and caffeine decrease the incidence of hepatic necrosis but not the total no. of injured livers. $NaHCO_3$ gives completely negative results. Na ricinoleate solutions similarly injected may confer complete protection while suspensions of colloidal C injected under the skin give a high degree of protection to the liver against the necrotising action of $CHCl_3$. It is thought that the liver is protected by the protein cleavage products set free from the tissues as a result of the increased protein catabolism incident to inflammatory reactions caused by the injected chemical. The protected liver contains unusually large stores of glycogen. This may be evidence of increased gluconeogenesis from the protein products. C. J. C. B.

Pharmacodynamics of hepatic necrosis. G. Wallbach (Rev. Méd., 1939, **56**, 357—366).—A review of the author's previous experimental work. H. B. C.

Laboratory test in differential diagnosis of toxic and obstructive jaundice. H. Shay and P. Fieman (Amer. J. digest. Dis. Nutr., 1938, **5**, 597—606).—A review based on the literature and 12 cases. A combination of tests is recommended. C. J. C. B.

Hepatic glycogen in obstructive jaundice. I. Comparative effect of oral and intravenous dextrose administration. B. M. Banks and J. B. Sears (Amer. J. digest. Dis. Nutr., 1939, **6**, 83—87).—Glucose was slightly more efficacious by vein than by mouth in raising the glycogen content of the liver in dogs with obstructive jaundice. C. J. C. B.

Infra-red photography of abdominal wall in portal cirrhosis of the liver. I. R. Jankelson and H. Baker (Amer. J. digest. Dis. Nutr., 1938, **5**, 414—418).—Infra-red photography of the abdominal wall by visualisation of the superficial veins of the abdomen presents a true pattern of these veins and assists the diagnosis of cirrhosis of the liver. Absence of the characteristic vein pattern does not rule out early portal cirrhosis. C. J. C. B.

Secretory activity of isolated Ringer-perfused frog liver. I. Differential secretion of pairs of dyes. R. Höber. **II. Inhibitory and promoting influence of organic electrolytes on secretion of dyes.** R. Höber and E. Moore (J. Gen. Physiol., 1939, **23**, 185—190, 191—202).—I. The isolated Ringer-perfused frog liver can concentrate in its secretion several hundred or thousand times a great no. of dyes. When two dyes are perfused together, the liver separates them to some degree; sometimes the secretion of one is entirely suppressed by the other. The appearance of the dye in the secretion does not depend on its diffusibility or lipin-solubility, but perhaps on its adsorbability.

II. The power of the isolated Ringer-perfused frog liver to concentrate dyes in its secretion can be reversibly abolished by replacing about $\frac{1}{8}$ of the NaCl of the Ringer solution by the osmotic equiv. of a surface-inactive non-electrolyte (disaccharide, hexose, pentose, polyhydric alcohol, amino-acid, acid amide) or electrolyte (salts of lower fatty acids, hydroxycarboxylic and dicarboxylic acids). Secretion is promoted by polar–non-polar electrolytes (salts of higher fatty acids, bile acids, aromatic sulphonic acids) and surface-active non-electrolytes (anæsthetics, alkaloids, digitonin). This effect may not be reversible, as cytolysis frequently occurs. Suitable concns. of inhibitory and promoting substances, simultaneously applied, counteract each other. In-

hibitory and promoting substances in general show opposite effects on the dispersion of colloids. D. M. N.

Gall bladder function. H. Necheles (Amer. J. digest. Dis. Nutr., 1938, **5**, 568—571).—4 small Pb beads were sewn on the serosa of the gall bladder, 2 on the longitudinal and 2 on the horizontal diameter. The beads are seen easily with the fluoroscope and are marked on transparent paper; their distance is measured before and after administration of drugs. By this method drugs can be tested on normal dogs without dye and without *X*-ray films. Adrenaline intramuscularly is the most effective contracting drug and trasentin the most effective relaxing drug. C. J. C. B.

Bile salt therapy in gall-bladder disease. H. Doubilet, H. Yarnes, and A. Winkelstein (Amer. J. digest. Dis. Nutr., 1938, **5**, 348—353).—The use of low-fat diet and large amounts of bile salts is recommended in various types of gall-bladder disease. In cases with gastric hyperacidity atropine and alkalis were helpful adjuvants. C. J. C. B.

Effect of acetyl-β-methylcholine chloride on gall bladder. P. G. Schube, A. Myerson, and R. Lambert (Amer. J. digest. Dis. Nutr., 1938, **5**, 687—690).—Mecholyl has practically no effect on the size and shape of the gall bladder, but it usually inhibits the emptying of the gall bladder following the ingestion of a fat meal. C. J. C. B.

Effect of pyloric obstruction on filling and emptying of gall bladder in cholecystography. M. Feldman (Amer. J. digest. Dis. Nutr., 1939, **5**, 785).—Pyloric obstruction, unless complete, has no effect on the filling or emptying of the gall bladder during cholecystography. C. J. C. B.

Spontaneous filling of bile passages after barium meal. G. Baltaceanu, N. Banu, M. Stanescu, and A. Prislopeanu (Bull. Mém. Soc. méd. Hôp. Bucarest, 1939, **21**, 249—253).—Filling of the common bile and hepatic ducts was observed in a patient after choledocho-duodenostomy. In a case with spontaneous fistula between the pyloric region and the common bile duct the Ba filled the extrahepatic ducts and gall bladder. H. L.

Plasma-protein, bile salt, and cholesterol metabolism as influenced by multiple injections of gum acacia in bile fistula dogs. R. G. Metcalf and W. B. Hawkins (Amer. J. Path., 1939, **15**, 429—444).—The repeated intravenous injection of acacia in bile fistula dogs results in enlargement of the liver owing to accumulation of acacia in the liver cells. The plasma-proteins progressively decrease and remain below normal as a result of the acacia in the blood stream and liver. Acacia in the liver cells does not impair their ability to form bile salts or eliminate bile pigments; fed bile salts are absorbed and excreted promptly into the bile. Bile and blood-cholesterol metabolism are not altered. C. J. C. B.

Experimental study of hydrogen-ion concentration and chemistry of bile, its effect on stones, and therapeutic application of ox bile in gall-bladder disease. S. Morrison, M. Feldman, J. C. Krantz, and F. F. Beck (Amer. J. digest. Dis. Nutr., 1938, **5**, 288—292).—The feeding of at least 8·9 g. daily of powdered extract of ox bile (U.S.P.) changes the dog's normal acidic bile to alkaline and dilutes it. The feeding of bile keto-acids (0·7 g. per day) did not change the p_H of gall-bladder bile in the dog and produced less dilution of bile and less dissolution of the stones than in the normal ox-bile-fed animal. The p_H of bile is not the sole factor causing dissolution of gall stones, as marked changes do not influence the degree of dissolution of implanted human cholesterol stones. The dissolution of the stones by the alkaline bile after the feeding of large quantities of ox bile is attributed to its cholagogue effect. C. J. C. B.

Free choline and phospholipin of hepatic and gall-bladder bile. C. G. Johnston, J. L. Irvin, and C. Walton (J. Biol. Chem., 1939, **131**, 425—437).—Small quantities of free, and large quantities of combined, choline are present in fresh bile (man, dog, pig). The combined choline is readily hydrolysed and is mainly in an unknown form. Approx. 20%, however, exists as phospholipin, at least a part of which appears to be lecithin. E. M. W.

Movements of extrahepatic bile duct system. R. Bayer (Z. ges. exp. Med., 1939, **105**, 702—722).—The movements of the extrahepatic bile duct system were studied in dogs by means of *X*-ray and I-tetragnost injections into the gall-bladder. 20—40% aq. I-tetragnost produces severe spasm of the cystic duct sphincter. 4 stages of bile transport are described. A. S.

Secretion of bile. C. R. Schmidt, J. M. Beazell, A. L. Berman, A. C. Ivy, and A. J. Atkinson (Amer. J. Physiol., 1939, **126**, 120—135).—Bile was collected from dogs by the continuous application of a slight negative pressure to tubing draining the biliary passages. All the bile secreted on one day was returned to the intestine the following day at a rate of 1 c.c. per min. Under standard conditions of feeding, with or without return of bile, the vol. and cholic acid output did not vary more than ±8% from mean daily vals.; cholesterol and total pigment varied by ±20%. Without return of bile the daily secretion of cholic acid for 8—15-kg. dogs was 1·2—1·6 g.; with return of bile this rose to 6·5—9·0 g. From 10 to 15% of the cholic acid disappears during the entero-hepatic circuit. With return of bile the output of cholesterol was increased; 33—66% of the cholesterol introduced in the bile is absorbed and excreted. Bile salts, oral or intravenous, increased output of cholesterol. Bile salts (containing no pigment) given per os did not increase pigment excretion. When bile was returned to the intestine, about 30% of the pigment was absorbed and re-excreted by the liver. Atropine (1 mg. subcutem) or acetyl-β-methylcholine (2·7 mg. subcutem in divided doses) prevented the usual increase in vol. and cholic acid content of bile which occurs after a meal. M. W. G.

Effect of food factors and orally administered bile on rate and quantity of bile secretion. M. Jacobi, I. C. Zuckerman, and B. Kogut (Amer. J. digest. Dis. Nutr., 1939, **6**, 270—274).—A high-protein diet administered to a cholecystectomised

subject with a total external biliary fistula produced twice the increase in bile vol. produced by either a high-fat diet or a mixed hospital diet. Pure carbohydrate diets do not increase bile vol. over that secreted under basic fasting conditions. The oral administration of bile alone produced a rise in biliary secretion comparable with that produced by a mixed hospital diet; addition of bile to the high-fat, mixed, or pure carbohydrate diets produced an additive effect on bile secreted. This effect was not noted with high-protein diets, suggesting that there is a max. response of the liver to bile secretory stimuli.

C. J. C. B.

Taurocholase and glycocholase in tissues. K. Takahashi (Arb. med. Univ. Okayama, 1939, **6**, 216—226).—The enzyme which splits off taurine and glycine from the corresponding bile acid is present in large quantities in the liver and kidney of rats and rabbits. It acts best at p_H 7—9. A method of purification is described. H. O. S.

Effect of therapeutic agents on volume and constituents of bile. C. R. Schmidt, J. M. Beazell, A. J. Atkinson, and A. C. Ivy (Amer. J. digest. Dis. Nutr., 1938, **5**, 613—617).—Conjugated bile acid preps. (bilron and dechacid) increased the vol. and solid constituents of the bile; oxidised, unconjugated preps. (decholin and ketochol) increased the vol. but decreased total bile acid output. Salicylic acid increased bile vol.; HgCl, NH_4Cl, urea, Ca gluconate, mucin, and chondroitin were without effect. Sulphanilamide, administered orally in doses of 1 or 2 grains per kg., had no effect on hepatic secretory function. C. J. C. B.

Excretion of bile acids after extirpation of adrenal glands. K. Ohta (Arb. med. Univ. Okayama, 1939, **6**, 196—202).—Bile acids were detected in rabbit's urine after adrenalectomy.

H. O. S.

Constituents of a fish bile. (A) G. Sugiyama. (B) K. Ohta (Arb. med. Univ. Okayama, 1939, **6**, 175—177, 193—195).—(A) The main constituents of the bile of the "Katuwo" fish (*Euthynnus pelamis*) are taurocholic acid and taurodeoxycholic acid.

(B) The bile of the pheasant "Kizi" (*Phasianus colchicus karpowi*) contains mainly chenodeoxycholic acid. H. O. S.

Desiccated and normal pig's gall-bladder bile. J. L. Irvin, H. Merker, C. E. Anderson, and C. G. Johnston (J. Biol. Chem., 1939, **131**, 439—445).—Bile dried by a vac. process differs from fresh bile mainly in the increase of free choline at the expense of phospholipin. E. M. W.

Spectrum of bilirubin in alkaline media. A. Lambrechts and G. Barac (Bull. Soc. Chim. biol., 1939, **21**, 1171—1180).—Spectrophotometric examination, with visible and ultra-violet light, of alkaline solutions of bilirubin containing, or free from, added ascorbic acid show that, when the acid is added, a reproducible curve for the zone 700—420 mμ. is obtained. Little or no biliverdin or similar substance is produced and the bilirubin remains unchanged for at least 72 hr. An intense band having max. at 430 mμ. is observed. W. McC.

(xv) KIDNEY AND URINE.

Degenerating glomeruli and vascular supply of mammalian kidney. D. B. MacCallum (Amer. J. Anat., 1939, **65**, 69—102).—A few pathological glomeruli are always present in normal mammalian kidneys and their no. increases with age. The necessary intraglomerular circulatory readjustment is effected by vascular unit obliteration and vascular unit non-glomerular transformation. The successive stages of the vascular readjustments are described and illustrated. W. F. H.

Onset of secretory activity in metanephros of fœtal pig. Cytochrome-oxidase–cytochrome system and redox potentials. L. B. Flexner (J. Biol. Chem., 1939, **131**, 703—711).—During the onset of secretory activity in the metanephros, cytochrome–cytochrome-oxidase activity (Keilin and Hartree, A., 1938, III, 529) is feeble in the presecretory structures whilst the redox potential between epithelium and stroma is nil. In the secretory structures, the activity of the oxidase system increases in the epithelium but is absent from the stroma, whilst the redox potential between epithelium and stroma attains a val. of approx. 0·200 v. at the onset of secretion. The oxidase system is inactive in Bowman's capsule and only slight in the epithelium of the collecting ducts; there is no p.d. between the latter tissue and the stroma. F. O. H.

Influence of vomiting and nausea on renal function. J. Clausen (Acta med. scand., 1939, **102**, 22—30).—Vomiting lowered the urinary vol. and the ratio urea clearance/creatinine clearance fell, though both were lowered. This did not depend on change of blood pressure, but on changes in the kidney itself. C. A. A.

Effects of renin, pitressin, and pitressin and atropine on renal blood flow and clearance. A. C. Corcoran and I. H. Page (Amer. J. Physiol., 1939, **126**, 354—367).—A modification of the Rhoads method of making the renal vein accessible by explanting the kidney in dogs is described. Phenol-red and inulin clearances varied directly with renal plasma flow; extraction % varied inversely with renal plasma flow under normal conditions. Slow intravenous infusion of renin in conscious dogs lowers phenol-red clearance and relatively increases inulin clearance because of increased inulin extraction; calc. renal blood flow is much diminished and arterial blood pressure is raised. Slow intravenous infusion of pitressin may raise or lower the two clearances and calc. renal blood flow; arterial pressure is not affected whilst heart rate is decreased. Injection of atropine during infusion of pitressin greatly increases arterial pressure and heart rate. M. W. G.

[Renal] sulphate clearance. T. Bjering and E. Øllgaard (Acta med. scand., 1939, **102**, 55—78).—SO_4'' clearance in normal persons was 37 c.c., and was lowered in nephritis parallel with urea and creatinine clearance. It was increased by administration of SO_4''. 0·8—0·9 mg. of SO_4'' per 100 c.c. of blood is combined with protein and does not pass the glomeruli; when correction is made for

this the SO_4'' clearance is const. and equals the inulin clearance. It is therefore assumed to afford a measure of glomerular filtration. The ratios creatinine/SO_4'' clearance and creatinine/inulin clearance were the same (1·4). The ratio urea/SO_4'' clearance was 0·73—0·74. C. A. A.

Acute renal insufficiency. H. C. Bergman and D. R. Drury (J. clin. Invest., 1939, **18**, 777—781).—Immature nephrectomised rats have shorter survival times than adults. Fasting slightly prolongs life. Water in normal amounts is deleterious when given after nephrectomy; glucose is beneficial; meat (fed immediately before operation) is toxic. The urine of fasted rats contains toxic materials but the amount of these poisons is not enough to account quantitatively for all the toxic symptoms after nephrectomy. K is harmful and is responsible for part of the toxicity of meat. C. J. C. B.

Fat excretion through the kidneys. C. S. Scuderi (Arch. Path., 1939, **28**, 668—675).—In dogs after intravenous injections of oil and bone marrow fat, the fat was excreted through the kidneys if the quantity injected was not less than 0·75 c.c. of olive oil per kg. body-wt. This was detectable microscopically but not macroscopically in the urine. Fat was excreted by the tubules only; U poisoning which destroyed the tubules prevented the excretion of intravascular fat. (5 photomicrographs.)
C. J. C. B.

Histidinecarboxylase and histaminase in kidney disease. I. E. Werle, M. J. Madlener, and H. Herrmann (Z. ges. exp. Med., 1939, **106**, 105—110).—The formation of histamine in slices of rabbit's kidney, previously damaged by obstruction of the ureter, is decreased by 45%; the activity of histaminase is diminished by 25%. A. S.

Reactions of urinary bladder of cat under conditions of constant volume. J. Mellanby and C. L. G. Pratt (Proc. Roy. Soc., 1940, **B**, **128**, 186—201).—Instantaneous change from const.-pressure to const.-vol. conditions produces an isometric contraction or a state of quiescence at zero pressure, according to the phase of the isotonic rhythm at which the change is made. The isometric contraction may be followed by quiescence at zero pressure, or by a rhythmic series of contractions with relaxation to zero pressure between them. The isometric contraction is probably reflex. Division of the hypogastric nerves does not modify the isometric contraction. Stimulation of the peripheral end of the cut hypogastric nerves causes submax. isometric contraction, followed by diminished excitability. Division of the nervi erigentes abolishes isometric contraction. Stimulation of the peripheral ends of the cut nervi erigentes causes a max. isometric contraction. Adrenaline produces contraction after a long latent period; acetylcholine produces prompt contraction. Atropine abolishes the isometric contraction more readily than it destroys the isotonic rhythm. D. M. N.

Phosphocreatinæmia in uræmia. A. Grimberg (Rev. Méd., 1939, **56**, 382—386).—A review.
H. B. C.

Diet and death in acute uræmia. T. Addis and W. Lew (J. clin. Invest., 1939, **18**, 773—775).—Before and after ligature of the vena cava above the entrance of the renal veins, groups of rats were given diets designed to induce a wide variation in protein consumption and protein catabolism. The mortality varied with the amount and origin of protein. The K content of the diet is regarded as the factor responsible for death in acute uræmia in rats.
C. J. C. B.

Variability of proteinuria in hypertensive complications of pregnancy. L. C. Chesley (J. clin. Invest., 1939, **18**, 617—620).—It is assumed that dividing the concn. of urinary protein by the ratio of urinary creatinine/plasma-endogenous creatinine gives the concn. of protein in the glomerular filtrate, or a val. proportional to it. 4 urine specimens, collected at intervals of an hr., were taken from 6 pregnant and 5 non-pregnant nephritics, and from 4 eclamptic and 9 pre-eclamptic patients. The "protein filtration" was calc. and the variability from hr. to hr. determined. In nephritics, pregnant or not, the protein filtration shows very little variation from hr. to hr. In toxæmia of pregnancy, protein filtration is variable. This suggests a functional cause (vascular spasms) for the proteinuria. C. J. C. B.

Chyluria of filarial origin. P. N. Ray and S. S. Rao (Brit. J. Urol., 1939, **11**, 48—64).—In 12,368 cases of filarial infection 254 showed chyluria. Infiltration with filaria or, more often, secondary infection led to fibrosis of the preaortic glands, the cysterna chyli, or the thoracic duct, with development of varicose anastomotic vessels. These sometimes burst into the urinary tract. Some biochemical aspects on variations of diet are mentioned. B. I.

Carbonate excretion in urine as indication of alkalosis. L. C. Gatewood (Amer. J. digest. Dis. Nutr., 1938, **6**, 461—464).—$NiSO_4$ is a convenient reagent for demonstrating sol. CO_3'' in the urine.
C. J. C. B.

Excretion of kynurenic acid by members of various families of Carnivora. R. W. Jackson (J. Biol. Chem., 1939, **131**, 469—478).—Following oral administration of tryptophan, kynurenic acid is excreted by the hyena, coyote, wolf, fox, and badger but not by the serval, cheetah, civet, genet, bear, raccoon, or sea-lion. Thus all members of the Canidæ tested were positive and those of the Felidæ negative. E. M. W.

Effects of acutely raised intracranial pressure on diuresis in dog. M. R. Salk, and R. E. Weinstein (Amer. J. Physiol., 1939, **126**, 316—325).—In dogs atropinised under Na-barbital anæsthesia intracranial pressure was raised by a pressure bottle system (containing normal saline) communicating both with the cranial cavity and with a Hg manometer recording the intracranial pressure. Diuresis was produced by continuous intravenous infusion of 5% glucose (2·5 c.c. per min.) given after an initial injection of 200 c.c. Artificial respiration was started as soon as respiration failed. Acute raised intracranial pressure diminished or abolished the diuretic response owing to renal vasoconstriction. Denervation of the kidney prevented this fall. A denervated

kidney on one side secreted more urine than the intact kidney on the opposite side. M. W. G.

(xvi) OTHER ORGANS, TISSUES, AND BODY-FLUIDS.

Physiological aspects of rheumatism. S. Wright (Proc. Roy. Soc. Med., 1939, **32**, 651—662).—The following points and their bearing on the treatment of rheumatism are discussed: (1) mechanism of pain, especially in muscles, (2) metabolism of skeletal muscle, (3) interchange of fluid between blood and tissues and the lymph flow, (4) massage, (5) reactive hyperæmia and heat, and (6) the physiological aspects of artificial hyperpyrexia. W. J. G.

Physiology of poultry. II. Sexual differentiation in organs of viscera of male and female Los Baños Cantonese fowls. F. M. Fronda and A. S. Marcelo (Philippine Agric., 1938, **27**, 548—557).—Measurements of the organs at hatching and at intervals up to 8 months of age are recorded. Sex differences were, in general, small. A. G. P.

Augmentation of activity in sloth by adrenal extract, emotion, and other conditions. S. W. Britton and R. F. Kline (Amer. J. Physiol., 1939, **127**, 127—130).—Observations were made on activity in the two-toed sloth *Choloepus hofmanni*, and the three-toed sloth *Bradypus griseus*. The sloth progresses at the rate of 1 mile in 3 or 4 hr. Raising the body temp. on exposure to sun more than doubles the speed. Excitement, cortico-adrenal extract, adrenaline, and prostigmine markedly increased bodily activity. The action of adrenal hormone was maintained for 8—12 hr. Thyroxine, thyroid extract, pituitary extract, benzedrine, and strychnine were without effect. M. W. G.

Parabiotic rabbits. A. G. Beer (Z. ges. exp. Med., 1939, **106**, 67—84).—Pairs of rabbits were made parabiotic by joining up their abdominal cavities. Intravenous injection of 8 c.c. of thorotrast into a partner does not penetrate into the other animal within 6—8 hr. Parabiotic rabbits showed a decrease in hæmoglobin concn. and red cell count in the first weeks after the operation; the reticulocyte count increased. Some pairs died of progressive anæmia. Body-temp. and carbohydrate metabolism were unchanged in both animals. A. S.

Selye's "alarm reaction." C. P. Leblond (Ann. d'Endocrinol., 1939, **1**, 179—196).—A crit. review. P. C. W.

Thermal resistance of mayfly nymphs from ponds and streams. R. J. Whitney (J. exp. Biol., 1939, **16**, 374—385).—Nymphs from slow or still waters have a greater resistance towards high temp. than comparable nymphs from swift waters. This is correlated with the more extreme conditions of temp. which are known to exist in slow and still waters. In one of the stream nymphs (*Baetis rhodani*) acclimatisation to higher temp. was not possible within 40 hr. J. M. R.

Effect of fasting on weight of silk-gland of *Bombyx mori*. A. Balli (R. C. Atti Accad. Lincei, 1939, [vi], **29**, 619—625).—Adult silk-worms were fasted for 7 days. The whole gland continued to increase in wt. (both wet and dry) due to increase of the (larger) middle part. The wt. of the anterior part did not change much whereas that of the posterior part decreased. S. O.

Distribution of body water and electrolytes in the intact and partly nephrectomised rat after dehydration. A. Chanutin and S. Ludewig [with G. R. Minor] (J. Biol. Chem., 1939, **131**, 519—538).—Dehydration, due to deprivation of food and water, causes a decrease in cellular water and a concn. of extracellular electrolytes in nephrectomised rats but no change in intact rats. Ingestion of aq. NaCl (0·4—0·9%) causes subcutaneous œdema and hydration and increase of electrolyte concn. in the serum only in nephrectomised rats. Dehydration by injection of isotonic glucose into the peritoneal cavity causes a shift of fluid into the muscle cells in intact animals but little change in nephrectomised rats. Injection of 1·8% aq. NaCl into the peritoneal cavity causes slight decrease in the vol. of the extracellular, and marked decrease of the intracellular, phase in nephrectomised animals. H. G. R.

Heat conduction of integument in rat. N. Medvedeva (J. méd., Ukraine, 1939, **9**, 129—145).—Measurements were made of the heat conduction of both naked and furred skin, of thickness, fat and water content of the skin in two series of rats born in summer and winter respectively. Heat conduction is highest on the first day of life, decreases steadily during the next 15 in summer rats and 9 days in winter rats, and falls again in old animals. In summer rats this change is due to all the structural changes of the skin itself whereas in winter rats the development of the fur is of great significance. H. L.

Thermoconductivity of skin in invertebrates. H. V. Ermakov (J. méd., Ukraine, 1939, **9**, 429—435).—The less thick skin of invertebrates has a lower coeff. of internal thermoconductivity, which compensates for their insufficient thickness. The coat of ascidies (dead tissue) has a much higher coeff. than living tissues. M. K.

Chemistry of human skin. IV. Electrokinetic effect of various ions on suspended particles of stratum corneum. V. A. Wilkerson (J. Gen. Physiol., 1939, **23**, 165—170).—The electrokinetic potential and the charge density of particles of human skin were determined in various salt solutions and in distilled water by means of the micro-electrophoresis cell. The potential is decreased if enough salt is added, the order of inhibition being Al > Ca > Ba > K > Na. This is the same order as is obtained by the method of electroendosmosis. The lyotropic series Li > Na > K > Rb and Cl > I > Br express respectively the comparative effect of the univalent cations and anions on the electrokinetic potential. D. M. N.

Natural mercury content of the human organism. J. Bodnár, O. Szép, and B. Weszprémy (Biochem. Z., 1939, **302**, 384—392; cf. Stock *et al.*, A., 1938, I, 324).—The Hg contents of the fresh kidneys, liver, lungs, blood, spleen, brain, bile and

gall-bladder, heart, stomach, intestine, gastro-intestinal tract, and muscle of persons who had died of disease were 17·4—58·0, 10·3—44·6, 5·3—50·6, 7·8—34·6, 36·2—70·0, 0·63—44·5, 32·5, 25·5—34·0, 31·0, 32·5, 2·6, and 0·6 μg. per 100 g. respectively. The vals. for kidneys, liver, lung, and blood are much greater than those of Stock and Cucuel (A., 1934, 1257; 1935, 247) and Kluge *et al.* (B., 1938, 1483). W. McC.

Supposed optical inactivation of *d*-tartaric acid by pancreas. C. Neuberg and E. Peiser (Enzymologia, 1939, **7**, 228—230).—*d*-Tartaric acid is not converted into *meso*-tartaric acid or otherwise affected by pancreas (cf. Betti and Lucchi, A., 1939, III, 721). W. McC.

Fat of land crabs (Seychelles islands). T. P. Hilditch and K. S. Murti (J.S.C.I., 1939, **58**, 353—355).—The depot fat of this crab (*Birgus latro*, L.) contains, as component acids, octoic 1·5, decoic 5·3, lauric 47·5, myristic 19·0, palmitic 13·1, stearic 1·7, tetradecenoic 0·7, hexadecenoic 2·2, oleic 5·3, linoleic 1·5, and unsaturated C_{20-22} acids 2·2% (mol.). It contains 66·3% of fully-saturated glycerides, the component acids of which include octoic 3·2, decoic 7·1, lauric 54·8, myristic 20·5, palmitic 12·7, and stearic 1·7% (mol.). This unusual composition (for a marine-animal fat) is explicable since this crab feeds on coconuts. The depot fat thus appears to be composed largely of glycerides deposited from ingested coconut fat, whilst the remaining, much smaller, part of the fat appears to include the acids typical of a marine-animal fat.

New Zealand fish oils. III. Composition of depot fats of the ling (*Genypterus blacodes*). F. B. Shorland (Biochem. J., 1939, **33**, 1935—1941).—The liver oil of the ling contains an increased proportion of C_{18} unsaturated acids, compared with the average fish-liver oil. More than 96% of these acids are accounted for by octadecenoic acid, whilst neither linoleic nor linolenic acid is present. The viscera and roe oils contain fatty acids with a greater proportion of C_{20} and C_{22} unsaturated acids than liver oil. There is no significant seasonal change in fatty acid composition. The roe glyceride contains more hexadecenoic acid than the phosphatide but less C_{20} and C_{22} unsaturated acids. P. G. M.

Lipins of *Tæniarhynchus saginatus*. I. A. Smorodincev and K. V. Bebeschin (Bull. Soc. Chim. biol., 1939, **21**, 1194—1203; cf. A., 1939, III, 597).—A method of fractionating the lipins is described. In the portion insol. in acetone, lecithin, kephalin, and cuorin are determined, the average contents being 0·083, 0·058, and 0·048%, respectively; the kephalin content varies greatly. These vals. represent 43·9, 30·69, and 25·4% of the total phosphatides and 5·4, 3·8, and 3·1%, respectively, of the total lipins. The average content of neutral fat (which constitutes 75% of the total lipins) is 1·31 and of cholesterol 0·19%. Variations in the fat content are much greater than those in the contents of cholesterol and phosphatide. The average I val. of the unsaturated fatty acids is 151·3. The average ratio of cholesterol : fatty acid is 0·32 and of lecithin : cholesterol 0·45. W. McC.

Peptides and proteins. C. R. Harington (Dansk Tidsskr. Farm., 1939, **13**, 294—304).—A review. M. H. M. A.

Fire-fly "spinthariscope." R. W. Wood (Nature, 1939, **144**, 381).—The lantern of the fire-fly glows with a faint, green light after the fly has been bitten by a spider or injected with snake venom. W. F. F.

Chemistry of snake venom. Comparison with saponin. T. Wense (Biochem. Z., 1939, **302**, 426—429).—Saponin increases the action of adrenaline on the isolated frog's heart but does not affect the action of pilocarpine. Since the venom of *Vipera berus* decreases the action of adrenaline and increases that of pilocarpine it is improbable that snake venoms are saponin-like substances. W. McC.

Colourless venom of *Vipera aspis*. E. Césari and P. Boquet (Ann. Inst. Pasteur, 1939, **63**, 592—599).—The toxicity of snake venom varies, even within the same species, according to the habitat of the snakes. The toxic and pharmacological effects of the colourless venom obtained from some specimens of *V. aspis* differ in some degree from those of the yellow venom of the same species. The toxicity of the yellow venom, administered subcutaneously to rabbits, is destroyed, whilst that of the colourless variety is not, by heating for 30 min. at 70°. *In vitro*, the colourless venom has less power to coagulate horse plasma and to hæmolyse horse erythrocytes than has the yellow venom. The two varieties of venom have the same antigenic properties. W. McC.

Replacement of oxygen in nests of *Atta sexdens*, L. M. Jacoby (Bol. Min. Agric. Brasil, 1939, **28**, 1—7).—The ventilation of anthills is effected during the night by replacement of foul air with cold air from outside. The rate of production of CO_2 by ants has been determined. F. R. G.

(xvii) TUMOURS.

Local induction of carcinoma of the mammary gland by methylcholanthrene. L. C. Strong and G. M. Smith (Yale J. Biol. Med., 1939, **11**, 589—592).—Mice of 7 different strains were inoculated subcutaneously with 1 mg. of methylcholanthrene dissolved in sesamé oil. At the site of injection sarcomas developed in 16 males and 18 females, but in 8 females adenocarcinoma of the mammary gland developed. These females belonged to 2 strains which have a very low incidence of spontaneous tumours. (3 photomicrographs.) F. S.

Action of carcinogenic hydrocarbons on amphibia. F. Duran-Reynals (Yale J. Biol. Med., 1939, **11**, 613—617).—261 frogs and 18 newts injected with varying amounts (0·125—4·0 mg.) of dibenzanthracene, benzpyrene, and methylcholanthrene and kept at different temp. failed to develop tumours at the site of injection or to show an increased incidence of the spontaneous adenocarcinoma of the kidney. The changes induced were mostly of a necrotising character. F. S.

Inhibition of experimental production of liver cancer by liver feeding. W. Nakahara, K. Mori,

and T. Fujiwara (Gann, 1939, **33**, 406—427).—The feeding of liver completely stopped the carcinogenic action of butter-yellow. The effect was not due to vitamin-B_1 or -B_6 or nicotinic acid. Liver filtrate and eluate were also ineffective. E. B.

Inhibition of growth of rats by oral administration of methylcholanthrene, benzpyrene, or pyrene and the effects of various dietary supplements. J. White and A. White (J. Biol. Chem., 1939, **131**, 149—161).—The growth of young rats retarded by inclusion of methylcholanthrene, benzpyrene, or pyrene in the diet is stimulated in each case by addition of *l*-cystine or *dl*-methionine and in the two former cases by *l*-cystine sulphoxide. Taurine, Na_2SO_4, and glycine have no effect. Daily injection of glutathione is effective in the case of methylcholanthrene. The retardation of growth may be due to a deficiency in S-containing amino-acids through the use of these in detoxication mechanisms. E. M. W.

Production of pathological mitoses in tissue cultures by carcinogenic hydrocarbons and sex hormones. W. von Moellendorff (Klin. Woch., 1939, **18**, 1098—1099).—Derangement of cell division, namely the appearance of equatorial plates with broken-off chromosomes, was produced in cultures of rabbits' connective tissue by concns. of testosterone, benzpyrene, and to a smaller degree œstrone and methylcholanthrene, which had no influence on the rate of growth of these cultures. E. M. J.

Mechanism of carcinogenesis. P. Rondoni (R. Ist. San. Pubbl., 1939, **2**, 345—364).—A lecture on the carcinogenic effect of hydrocarbons and the probable mechanism of their action, especially as denaturing agents of proteins participating in enzymic synthesis. F. O. H.

Carcinogenic action of autolysed human leproma on the interstitial tissue of rat testicle. A. Peyron and M. Suzanne (Compt. rend., 1939, **209**, 581—583).—Male rats which received intratesticular injections of an emulsion of an autolysed leproma developed sarcoma-like tumours of the epithelial cells with metastatic deposits in the lungs. In the early stages the new growth appeared as nodules. Hansen's bacilli, though present in the autolysate, were not found in the tumours. J. L. D.

Chemical composition of tumour-producing fraction of chicken tumour I. A. Claude (Science, 1939, **90**, 213—214).—The agent isolated by high-speed centrifuging was active in doses of 4×10^{-13} g., contains N 9%, P 1·5%, and lipin about 25%. The lipin contains 1·6% N and 2·4% P and has an aldelyde group. The protein fraction gave guanylic acid on hydrolysis. A fraction with similar chemical properties has been isolated from normal chick embryo. E. B.

Factors influencing infectivity of fowl tumours. F. R. Selbie and J. McIntosh (Brit. J. exp. Path., 1939, **20**, 443—451).—The filterability of these tumours depends on their virulence, which can be increased by methods discouraging cellular transmission. Suspensions of filterable and most non-filterable fowl tumours can be increased in infectivity by short proteolytic digestion. Repeated freezing and thawing increases the infectivity of the filterable tumours. F. S.

Complement-fixing antigen common to filterable and non-filterable tumours of fowls. L. Dmochowski and R. Knox (Brit. J. exp. Path., 1939, **20**, 466—472).—Serum prepared by immunising a rabbit with 0·8-μ. membrane filtrates of a non-filterable dibenzanthracene tumour gives complement-fixation with active filtrates of Rous and Mill Hill-2 tumours and of fowl- and duck-grown Fujinami tumours. Since filtrates of the non-filterable tumour and heat-inactivated Rous filtrates also give a positive complement-fixation reaction, filterable and non-filterable tumours show a common antigenic factor. It is not predominantly species-sp. F. S.

Position of virus tumours. N. Waterman (Chem. Weekblad, 1939, **36**, 692—693).—The chief objections to the virus theory of tumours are discussed. S. C.

Hybridisation and tumour formation in mice. C. C. Little (Proc. Nat. Acad. Sci., 1939, **25**, 452—455).—An increase in the no. of and the tendency to form multiple tumours is observed on crossing two markedly different kinds of mice. H. G. R.

Mesenchymal reaction of spleen and testis to inoculated tumour by cytotoxic stimulation or blockade of active mesenchyme. G. F. Diadusha (J. méd., Ukraine, 1939, **9**, 361—368).—Rats were inoculated with a tumour with or without stimulation of mesenchyme. Trypan-blue was injected into all animals. Stimulation of active mesenchyme by cytotoxic antireticular serum increases the no. and activity of histiocytes in spleen and testis; it also increases the cancerolytic power of the extracts of these organs and blood. M. K.

Difference in response of normal and tumour tissue. M. J. Carroll (Nature, 1939, **143**, 684—685).—An extract of Fleischmann's baker's yeast increases the respiration of normal tissues but not of tissue from a spindle-cell mammary carcinoma. E. B.

Influence of rice-germ oil on growth and histology of normal and tumour tissue in tissue culture. S. Morigami (Gann, 1939, **33**, 384—388).—Rice-germ oil was saponified and the unsaponifiable matter fractionated; the different fractions were tested for their effect on cultures of fowl fibroblasts and of a benzpyrene sarcoma. The raw oil and an acetone-sol. fraction increased the growth rates. Two of the acetone-insol. fractions produced degenerative changes in both types of culture. E. B.

Enhancing effect of azoproteins on lesions produced by vaccine virus, Shope fibroma virus, and agent transmitting chicken tumour I. A. Claude (J. Exp. Med., 1939, **69**, 641—648).—Azoprotein solutions, like testicular extracts, cause an increase in size of virus lesions on the skin of rabbits, which is proportional to the spreading power of the solution. A. C. F.

Density distribution and energy spectrum of *B*-electrons. IV. Mechanism of the excitation process in cancerous and healthy cells. O. Schmidt (Z. physikal. Chem., 1939, **B**, **44**, 194—202).—If the mutation theory of tumour formation is correct the carcinogenic hydrocarbons, which have high *B*-electron density, must attack the protein chain. Energy considerations indicate that the effect occurs through excitation of the *B*-electrons of the C:O linking, with enolisation of the :CH·CO· grouping and consequent loss of optical activity. J. W. S.

(xviii) NUTRITION AND VITAMINS.

Plane of nutrition of families of labourers in Calabanga, Camarines Sur. F. O. Santos (Philippine Agric., 1939, **27**, 755—764). A. G. P.

Maintaining nutrition in highly food-sensitive persons. W. C. Alvarez (Amer. J. digest. Dis. Nutr., 1939, **5**, 801—803).—A review. C. J. C. B.

Nutritive requirements of young pigs. M. M. Wintrobe (Amer. J. Physiol., 1939, **126**, 375—387).—Good growth in young pigs (weaned at 2—23 days) is obtained on a diet providing 157 cal. per kg. body-wt. daily and consisting of protein (derived from casein) 24%, fat (lard) 13·5%, and carbohydrate (sucrose) 62·5%. A salt mixture corresponding with the mineral content of sow's milk, with addition of KI and Fe citrate, was necessary; in the absence of adequate salt spontaneous fractures occurred. Cod-liver oil (0·5 g. per kg. per day) and yeast (3 g. or more per kg. per day) were necessary. Reduction in amount of yeast led to impairment of growth: growth was accelerated by daily injection of 70—300 μg. of thiamin chloride. Nicotinic acid (2 mg. per kg. per day) had a striking effect on the growth and skin condition of vitamin-*B*-deficient pigs. Inadequacy of the yeast ration was not entirely corr. by the use of thiamin chloride, riboflavin, and nicotinic acid. M. W. G.

p_H of representative foods. M. A. Bridges and M. R. Mattice (Amer. J. digest. Dis. Nutr., 1939, **6**, 440—449).—2100 determinations of the p_H of over 400 representative foods are given. C. J. C. B.

Defects of tapioca as staple food. W. R. Aykroyd and B. G. Krishnan (Indian J. Med. Res., 1939, **27**, 139—145).—Young rats, fed on a diet largely composed of tapioca, die in a few weeks. Addition of casein or skimmed milk permits survival and growth. A supplement of soya bean, equiv. in protein to 1·5 oz. of casein, was less effective; ½ this equiv. of soya bean or other pulses gave no growth and did not always maintain life. Cod-liver oil and Ca lactate had no effect on the survival rate, and supplementing the basal diet with yeast still gave 45% of deaths. Animals survived when fed on a tapioca and rice diet based on assay, but growth was poor, although addition of casein improved this. Tapioca is therefore deficient in quality and quantity of protein. H. B. C.

Nutritive value of papain–mutton broth. S. Booe (Indian J. Med. Res., 1939, **27**, 65—71).—The digestion of 300 g. of mutton mince + 5 g. of powdered papain was complete after 2 hr. at 60°, or 3 hr. with 2·5 g. of papain. The transformation of protein was complete in 2 hr., and further digestion slowly changed proteose into peptone. The growth of cholera vibrio on papain–mutton agar at different stages of digestion showed max. growth after 2 hr. of digestion. H. B. C.

Influence of varying levels of calcium intake on biological value of proteins. M. Swaminathan (Indian J. Med. Res., 1939, **27**, 147—152).—Ca additions of 0·036—0·4% to a diet of casein + rice proteins had no effect on the biological vals. H. B. C.

Effect of a diet qualitatively insufficient in protein on tissue metabolism. M. Mir-Salimov (J. méd., Ukraine, 1939, **9**, 39—48).—A diet containing gelatin as the only protein was given to rabbits. Total and reduced glutathione were diminished in liver and blood, increased in skeletal and cardiac muscle, and normal in kidney and adrenals. Oxidised glutathione was above normal in both blood and organs. Glycogen content and anaërobic glycolysis decreased in both liver and muscle. There was a fall in tissue respiration of liver, and increased respiration of muscle and kidney. Hypochromic anæmia with leucocytosis developed. Loss of body-wt. was greater than in animals fed on a diet containing no protein. H. L.

Effect of diet containing vitamins but no protein on tissue metabolism. M. Mir-Salimov (J. méd., Ukraine, 1939, **9**, 49—59).—Vitamins in the diet without protein have no effect on hypochromic anæmia and on changes in blood-sugar, total and reduced glutathione, glycogen (organs), and tissue respiration; they partly counteract the loss in body-wt. and prevent decrease of anaërobic glycolysis in skeletal muscles and leucocytosis; they cause an increase in oxidised glutathione (blood and organs) and a greater fall in anaërobic glycolysis of the liver. H. L.

Lesions in pregnant rabbit produced by protein-free diet. M. K. Venzkovski (J. méd., Ukraine, 1939, **9**, 421—427).—In rabbits on a protein-free diet no pregnancy occurred, nor in rabbits put on this diet immediately after copulation. The sterility is attributed to atrophy of the uterus and ovaries. In pregnant rabbits the diet caused abortion or fœtal death owing to lesions of the placenta. The liver, spleen, adrenals, and kidneys were also affected to a degree proportional to the duration of the diet. M. K.

Significance of amino-acids in canine nutrition. W. C. Rose and E. E. Rice (Science, 1939, **90**, 186—187).—The qual. amino-acid needs of the dog are identical with those of the rat. W. F. F

Cystine and methionine requirements for growth and lactation. J. R. Haag and L. D. Wright (Science, 1939, **90**, 158).—Cystine does not improve the growth- and lactation-promoting properties of peanut meal protein. Methionine improves both. W. F. F.

Value of "amides" in the feeding of cattle. K. Krebs (Bied. Zentr., 1937, **B**, **9**, 394—507).—An historical review with extensive bibliography. A. G. P.

Influence of salt on nitrogen balance of hens. J. S. Willcox (Bied. Zentr., 1937, **B**, **9**, 121—134).—Day-to-day variations in N consumption and retention by hens were not conditioned by egg-laying or loss of feathers. Addition of NaCl to the ration favoured food consumption without affecting N retention. Laying and moulting occur only when body-wt. is increasing. A. G. P.

Effect of increased iodine feeding on iodine content of cows' milk. N. L. Matthews, G. M. Curtis, and J. H. Meyer (J. Dairy Res., 1939, **10**, 395—402).—Both blood- and milk-I were increased by feeding KI. In late spring milk-I was low in both iodised and control animals. Milk-I could be increased up to 26 times the normal by feeding KI, the average value being 80 μg.-%, of which 10—20% was associated with the protein and fat. J. G. D.

Decrease in amount of Iodine in the air over Central Europe, its cause, and importance in relation to iodine content of foodstuffs.—See A., 1940, I, 43.

Effect of apples and cranberries on calcium retention. A. Mindell, W. R. Esselen, and C. R. Fellers (Amer. J. digest. Dis. Nutr., 1939, **6**, 116—119).—The inclusion of 20% of fresh cranberries in an adequate diet for white rats increased body-Ca retention by 8·4±0·8% while apples increased body-Ca retention by 10·8±1·1% Cranberries (but not apples) increase the Ca content of femur ash slightly (1·8±0·4%). C. J. C. B.

Influence of ingestion of nickel pectinate on growth of young rats. L. Arnold (Amer. J. digest. Dis. Nutr., 1939, **6**, 103).—The ingestion of 80 mg. of Ni as Ni pectinate (1256 mg. per kg. body-wt.) did not influence the growth curve of young rats over an 8-week period of observation. C. J. C. B.

Action of vitamin-*A*, -*B*, and -*C* in animals poisoned with A.T.10. L. B. Seiferth and H. Kolb (Z. ges. exp. Med., 1939, **106**, 167—180).—Vitamin-*A* potentiates the toxic action of A.T.10 (dihydrotachysterol) in rabbits; -B_1 has no action; yeast and -*C* antagonise or prevent the toxic effects. A. S.

Minimum vitamin-*A* requirements of normal adults. II. Utilisation of carotene as affected by certain dietary factors and variations in light exposure. L. E. Booher and E. C. Callison (J. Nutrition, 1939, **18**, 459—471).—Using dark-adaptation performance (as determined by the Hecht–Shlaer adaptometer) as a criterion of normal vitamin-*A* requirement in adults, it is shown that the utilisation of carotene is greater in cooked peas than in cooked spinach, and that the -*A* val. of these vegetables is intermediate to those of cod-liver oil and dissolved cryst. carotene. Investigations on the influence of thiamin, riboflavin, and dietary fat show no evidence that these promote or favour carotene utilisation, nor do controlled changes in light exposure cause noticeable differences in normal -*A* requirements. L. R. P.

Epiphyseal changes in rats on vitamin-*A*-free diet. H. J. Lauber, E. Hildebrand, and P. Burgmann (Z. ges. exp. Med., 1939, **106**, 193—200).—4-weeks old rats were kept on a Scheermann diet. Degenerative changes in the epiphyseal cartilage and disturbances of bone formation were observed. Subchondral necrosis did not occur. A. S.

Vitamin-*A* deficiency : prevalence and importance as shown by new visual test. L. B. Pett (J. Lab. clin. Med., 1939, **25**, 149—160).—Details are given of a rapid visual test for vitamin-*A* deficiency, depending on the recovery after looking at a bright light. Of 1600 people examined, 52% were found deficient in -*A*, the incidence being higher among unemployed and in February than in October. A table is given showing a higher incidence among -*A*-deficient people of night blindness, eyestrain, dry conjunctiva, dry skin, scanty saliva, and frequency and duration of colds. C. J. C. B.

Comparison of vitamin-*A* and -A_2 by distillation. E. LeB. Gray (J. Biol. Chem., 1939, **131**, 317—326).—The temp. of max. elimination by mol. distillation of vitamin-A_2 from concentrates prepared from Atlantic salmon livers is only 3° above that of -*A*. The two mols. therefore contain the same no. of C atoms. P. G. M.

Biological standardisation of vitamin-*A*. P. Tainsh and H. Wilkinson (Chem. and Ind., 1939, 1051—1052).—When rats are fed on a slight modification of the diet described in B.P. 1932, addendum 1936, the administration of 40 i.u. of β-carotene resulted in the fæcal excretion of a carotenoid and the accumulation of vitamin-*A* in the liver. -*A* is not excreted in the fæces of these rats nor of those receiving 40 i.u. of -*A*. Rats fed with -*A* accumulate less -*A* in the liver than do those fed carotene, but show a greater growth response. With a diet containing coconut meal (cf. A., 1934, 1040) β-carotene does not behave differently from -*A*, both giving good growth responses and showing low liver-vitamin accumulation. When coconut meal or certain other supplements are added to the B.P. diet similar good responses are obtained. The importance of the diet in the assay of -*A* preps. against the international β-carotene standards is emphasised. W. O. K.

Discussion on clinical aspects of vitamin-*B* complex (Proc. Roy. Soc. Med., 1939, **32**, 807—822).—R. A. Peters. The evidence for a connexion between vitamin-B_1 and the sugar metabolism of the cell is outlined. The heart, kidneys, and lower brain are the first to suffer from lack of -B_1; clinical conditions affecting these parts are most likely to respond to -B_1 therapy. Thyroid-fed rats require additional amounts of -B_1 to protect them against wt.-loss. A high-carbohydrate diet increases the requirements for -B_1. H. M. Sinclair. Using Meiklejohn's method the blood-B_1 was low in pregnancy accompanied by a poor diet, pregnancy anæmia, pernicious anæmia with myxœdema, steatorrhœa, idiopathic hypochromic anæmia, the various polyneuritides, scurvy, carcinoma and ulcer of the stomach, after gastrectomy, fatal pulmonary tuberculosis, anorexia nervosa, and beri-beri heart. Factors tending to produce deficiency are (1) inadequate ingestion, either because of an unbalanced diet or of

increased requirement due to a high-carbohydrate diet or increased metabolism; (2) failure of assimilation, due to lesions in the gut, diarrhœa, steatorrhœa. Deficient intake in normals is rare in this country. P. Wood. -B_1 deficiency as a cause of cardiovascular lesions is rare in this country but should be looked for in chronic alcoholics, prolonged dietary deficiency, pregnancy, and in right ventricular failure of doubtful ætiology. W. J. G.

Effect of yeast extract (vitamin-*B* complex) on growth and development of premature infants. H. R. Litchfield, J. Lichterman, I. Knoll, and I. Kurland (Amer. J. Dis. Child., 1939, **57**, 546—553).—Infants receiving yeast extract gained wt. sooner than those not receiving this prep.; 55% began to gain during the first week of life (compared with 8% in the control group). 95% gained after 2½ weeks (against 48% in the controls). Infants with birth wt. under 1500 g. who were given yeast extract attained 4—5 times their birth wt. at 3 months; controls only doubled or trebled their wt. Of those with a birth wt. over 1500 g., twice as many of those given yeast extract tripled their wt. compared with controls. No gastro-intestinal disturbances accompanied the administration of yeast extract. C. J. C. B.

Nitrogen metabolism of birds and vitamin-B_1. Effect of variations in nutrition. B. A. Lavrov and N. S. Jarussova (Bull. Soc. Chim. biol., 1939, **21**, 1139—1150).—In adult pigeons on a diet of buckwheat, the N balance is slightly negative but becomes strongly negative if the vitamin-B_1 of the diet is destroyed by heat. In fasting pigeons, administration of -B_1 does not affect the N balance. When the diet consists of starch, the N loss, although at first low compared with that on a normal diet, later increases and approaches that which occurs during fasting. If the starch is supplemented with -B_1, N loss is greatly retarded and survival of the pigeons is prolonged. Thus, when the diet is free from protein, -B_1 retards the breakdown of body-protein, other substances being preferentially catabolised. W. McC.

Vitamin-B_1 and leprosy. E. G. Minder (Dtsch. med. Wschr., 1939, **65**, 1346—1350).—2 cases of leprosy showed B_1-hypovitaminosis. The patients benefited from prolonged administration of a -B_1 prep. A. S.

Untoward effects resulting from use of large doses of vitamin-*B*. C. Leroy Steinberg (Amer. J. digest. Dis. Nutr., 1938, **5**, 680—681).—Three cases in which herpes zoster occurred are reported. In the only case tried herpes was produced on another occasion by 800 units of vitamin-*B* orally and 2000 units intravenously once a week. C. J. C. B.

Vitamin-B_1 and constructive processes. G. Amantea and V. Famiani (R.C. Atti Accad. Lincei, 1939, [vi], **29**, 517—521).—The vitamin-B_1 content of freshly fertilised eggs (pigeon, fowl) is equal to that of the newly hatched chick, indicating that -B_1 is not concerned with anabolic processes. F. O. H.

Carbohydrate, fat, and protein appetite of vitamin-*B*-deficient rats. C. P. Richter and B. Barelare, jun. (Amer. J. Physiol., 1939, **127**, 199—210).—Vitamin-*B*-deficient rats showed an aversion to protein and only took casein with great difficulty. Riboflavin had most effect on the reproductive tract, survival time, and protein appetite. Rats deprived of all components of the -*B* complex ate small amounts of sucrose; when given thiamin they ate sucrose but stopped taking olive oil almost entirely and refused to eat casein. Most of the rats receiving only the *W* factor showed a greater fat appetite. The rats given access to nicotinic acid have the same appetite as -*B*-free controls. There was an increase in casein appetite when the rats were given all 4 -*B* components. M. W. G.

Determination of vitamin-B_1 in blood. II. Further modification of Meiklejohn's method. H. M. Sinclair (Biochem. J., 1939, **33**, 2027—2036; cf. A., 1939, III, 165).—The modification of Meiklejohn's method (A., 1937, III, 405) described enables both free vitamin-B_1 and cocarboxylase to be determined in 4 c.c. of blood. The average val. for total -B_1 of the blood of healthy adults is $7{\cdot}4 \pm 1{\cdot}4$ μg. per 100 c.c.; 1·1 μg. per 100 c.c. is present in the plasma or serum. Vals. less than 4·5 μg. per 100 c.c. are significantly low. Allowance is made for the growth-stimulating action of blood itself on the fungus. P. G. M.

Thiochrome test for urinary aneurin as index of nutritional level. G. M. Hills (Biochem. J., 1939, **33**, 1966—1979).—The aneurin content of urine is determined by a method similar to that of Jowett (Chem. and Ind., 1939, 556), fluorescence being measured photo-electrically. Specificity is increased by using a blue filter. In man, the amount of aneurin excreted in 24 hr. is 50—170 μg. (average 100 μg.). Except in thyrotoxicosis administration of aneurin results in increase in urinary aneurin excretion and during 3 hr. after oral administration of 1 mg. of aneurin the amount is 26—110 μg. (average 65 μg.). In neurological diseases, excretion per 24 hr. and after administration of aneurin is often below normal. The daily dose of aneurin required to produce saturation is approx. 500 μg. and saturated individuals, in the 3 hr. following administration of 1 mg., excrete approx. 200 μg. Excretion after a test dose is a more reliable index of nutritional level than is excretion in 24 hr. W. McC.

Determination of thiochrome. O. Huhn (Klin. Woch., 1939, **18**, 1094—1096).—A step-photometric method for the determination of thiochrome as used in vitamin-B_1 determinations is described; it is inferior to the titration method. E. M. J.

Reduction of *d*-amino-acid oxidase content of rat tissues in riboflavin deficiency. A. E. Axelrod, H. A. Sober, and C. A. Elvehjem (Nature, 1939, **144**, 670—671).—Riboflavin is important in the synthesis of the prosthetic group of *d*-amino-acid oxidase. There is a decrease in this oxidase in livers of rats receiving a diet deficient in riboflavin or factor *W*. W. F. F.

Pellagra, beri-beri, and riboflavin deficiency in human beings. T. D. Spies, R. W. Vilter, and W. F. Ashe (J. Amer. Med. Assoc., 1939, **113**, 931—937).—A lecture. C. A. K.

10 cases of pellagra treated with nicotinic acid. V. H. Musick (Amer. J. digest. Dis. Nutr., 1939, **5**, 807—809).—Nicotinic acid, 50—500 mg. per day, is sp. in curing the acute dermatitis and glossitis of the Goldberger type of pellagra. Prolonged use of 150—500 mg. a day cures the chronic dermatitis with abrasion and chronic glossitis of typical pellagra; in doses up to 500 mg. it partially controls the diarrhœa. Nicotinic acid (50—500 mg. a day) is of little aid in the treatment of the neuritis and mental symptoms associated with pellagra in man except those with acute delirium. C. J. C. B.

Nicotinic acid in radiation sickness. J. W. Graham (J. Amer. Med. Assoc., 1939, **113**, 664—667).—Nicotinic acid (200—300 mg. daily) was successfully used in 74·3% of 70 cases of vomiting produced by *X*-ray therapy. C. A. K.

Assessment of level of nutrition. Determination of nicotinic acid in urine. L. J. Harris and W. D. Raymond (Biochem. J., 1939, **33**, 2037—2051).—The method described is a modification of that of Swaminathan (B., 1938, 974); *p*-aminoacetophenone is the amine used, being superior to aniline or metol in that the colour produced is more intense and can be extracted by ethyl acetate. The colour produced varies with p_H and the concn. of salts. Solutions must be protected throughout from light, and colour intensity is measured in a step-photometer. The method (accuracy ±10%) differentiates between nicotinic acid and vitamin-B_6 or trigonelline. The normal daily excretion of nicotinic acid in man is 3—5 mg., whilst that of guinea-pigs and dogs on a nicotinic acid-deficient diet eventually reaches zero. Rats never show zero vals., indicating the occurrence of some degree of synthesis. P. G. M.

Vitamin-B_6 and skin lesions in rats. P. György and R. E. Eckardt (Nature, 1939, **144**, 512).—Three new types of skin lesions in rats are reported. W. F. F.

Vitamin-*C* and basal metabolism. E. Altenburger and F. Diehl (Arch. exp. Path. Pharm, 1939, **193**, 10—13).—Intravenous injection of 300 mg. of vitamin-*C* in one patient produced no change in basal metabolism. H. O. S.

Vitamin-*C* requirement of man. Studied in 3 adults on controlled diets. E. P. Talli, G. J. Friedman, and S. Sherry (J. clin. Invest., 1939, **18**, 705—714).—When the amount of vitamin-*C* fed daily did not exceed 100 mg. the 24-hr. excretion of -*C* did not exceed 13 mg. When it exceeds 100 mg., there was a sharp rise in the urinary excretion of -*C*; the rise continued to parallel any increase in the ingestion of -*C*. When less than 100 mg. was fed daily, a plasma -*C* level of 1·0 mg.-% (which is necessary to cause tissue saturation) could not be attained. 100 mg. is the optimum daily intake. C. J. C. B.

Ascorbic acid and activity of pepsin. E. Tria (R. C. Atti Accad. Lincei, 1939, [vi], **29**, 632—634).—Ascorbic acid slightly stimulated the digestion of casein by cryst. pepsin; cysteine had no effect. S. O.

Physico-chemical properties of the gluconate and ascorbate of calcium and of vitamin-*C*. S. L. Ruskin and R. Jonnard (Amer. J. digest. Dis. Nutr., 1938, **5**, 676—680).—The solubility and ionisation of Ca ascorbate and Ca gluconate show that the possible [$Ca^{\cdot\cdot}$] is 20—60 times as great for the former as for the latter. The combining power of Ca ascorbate with serum-proteins is 4 times that of Ca gluconate, thus establishing a greater ratio of utilisation by the tissues for the former. C. J. C. B.

Serum-vitamin-*C* level and vitamin-*C* deficiency. W. von Drigalski (Klin. Woch., 1939, **18**, 1056—1058).—In 6 persons serum-vitamin-*C* was found to vary by more than 100% in the same individual on a const. diet; different individuals showed greatly different serum-*C* levels on the same diet; minor infections had no marked influence on the -*C* level; the reaction to injection of -*C* was variable. E. M. J.

Concentration of vitamin-*C* in blood during and after pregnancy. A. Sadovsky, D. Weber, and E. Wertheimer (J. Lab. clin. Med., 1939, **25**, 120—131).—In 207 pregnant women, the average blood-vitamin-*C* was 1·09 mg.-%; in 62 post-partum women 0·79 mg.-%; in 47 non-pregnant women 0·98 mg.-%. In severe cases of hyperemesis gravidarum, the blood-*C* was consistently low (0·7 mg.-%). The blood-*C*, -Ca, and -P of pregnant women was independent of the condition of the teeth. The average concn. of -*C* in 62 human milks was 4·62 mg.-%; the -*C* excreted in the milk per day was 2·4 mg. on the 2nd day, and 27 mg. on the 8th day post partum. The age of the mother, the parity, and the wt. of the newborn infant do not influence the -*C* content of milk or blood. The blood-*C* after confinement was below normal (less than 0·75 mg.-%) in half the patients examined. C. J. C. B.

Functional changes in ascorbic acid content of endocrine organs. H. Winkler (Z. ges. exp. Med., 1939, **105**, 723—735).—The ascorbic acid content of the adrenals in rabbits is lowest in immature animals and highest at the end of pregnancy; it decreases after delivery. Highest concns. of ascorbic acid in the pancreas and ovaries were found in the first third of pregnancy. Placental ascorbic acid increases from the 9th to the 27th day of pregnancy. The ascorbic acid content of the uterus decreases during growth; that of the growing fœtus remains const. A. S.

Vitamin-*C* content of certified milk at time of consumption. F. V. West and J. C. Wenger (Amer. J. digest. Dis. Nutr., 1938, **5**, 251—254).—The vitamin-*C* content of the milk (108 cases) fell off with time but was still 250 i.u. per quart after 48 hr. C. J. C. B.

Vitamin-*C* content of chillies, onion, and garlic, in raw state and boiled with water. H. G. Biswas and K. L. Das (Indian J. Med. Res., 1939, **27**, 135—138). H. B. C.

Vitamin-*C* content of edible Argentine vegetables. O. M. Repetto (Anal. Asoc. Quím. Argentina, 1939, **27**, 140—144).—Ascorbic and dehydroascorbic acids have been determined and the presence of oxidase noted for a no. of vegetable products. F. R. G.

N (A., III.)

Determination of vitamin-*C* in children by intradermal injection. H. G. Rapaport and S. H. Miller (J. Pediat., 1939, **15**, 503—507).—100 children were injected intradermally with a dichlorophenol-indophenol solution, and a bluish wheal was produced. The time taken for the dye substance to decolorise was compared with the amount of vitamin-*C* in the blood plasma. There was no satisfactory correlation. C. J. C. B.

Histological study of hypervitaminosis-*D*. Relative toxicity of vitamin-*D* from irradiated ergosterol and tuna-liver oil. R. S. Harris, B. D. Ross, and J. W. M. Bunker (Amer. J. digest. Dis. Nutr., 1939, **6**, 81—83).—The oral administration of 50,000 U.S.P. units of vitamin-*D* daily to rats, either in the form of irradiated ergosterol or tuna-liver oil, produced histologically detectable tissue changes in the kidney, stomach, heart, aorta, and lung. The -*D* of irradiated ergosterol was definitely more toxic than the -*D* of tuna-liver oil as measured by tissue pathology. The site of tissue calcification produced by the 2 vitamin sources was the same and the kidney, stomach, aorta, heart, and lung were more readily calcified than the liver, spleen, and adrenals. (2 photomicrographs.) C. J. C. B.

Relation of distemper [in dogs] to vitamin deficiency. A. Scheunert and R. Petzold (Bied. Zentr., 1937, **B**, **9**, 147—172).—The feeding of irradiated yeast to bitches during the late stages of pregnancy and during suckling prevents distemper in puppies whether or not these are subsequently given yeast. Administration of yeast, vitamin-B_1, or cod-liver oil before or after infection did not confer immunity or alter the course of the disease. A. G. P.

Vitamin-*E* activity of α-tocopherylquinone. O. H. Emerson, G. A. Emerson, and H. M. Evans (J. Biol. Chem., 1939, **131**, 409—412).—α-Tocopherylquinone has a vitamin-*E* potency equal to that of α-tocopherol. E. M. W.

Biological significance of tocopherols (vitamin-*E*). M. D. Wright and J. C. Drummond (Biochem. J., 1940, **34**, 32—33).—The hydroxyquinone obtained by oxidation of α-tocopherol by 5% $AgNO_3$ in 90% methyl alcohol is biologically inactive when administered to rats in doses which should be effective, if such a compound formed a part of an oxidation–reduction system involving tocopherol. P. G. M.

Curative factor (vitamin-*H*) for egg-white injury. (A) Presence in foods and yeasts. P. György. **(B) Isolation.** P. György, R. Kuhn, and E. Lederer. **(C) Physico-chemical properties.** T. W. Birch and P. György (J. Biol. Chem., 1939, **131**, 733—744, 745—759, 761—766).—(A) The relative contents of the factor in various foods, tissues, and yeasts are tabulated. The factor is present in liver and yeast in a water- and fat-insol. form; it is liberated in water-sol. form by autolysis of yeast in presence of toluene but not of $CHCl_3$.

(B) Liver, unlike yeast, does not contain the enzyme system which, during autolysis, liberates vitamin-*H*. Digestion with papain and/or autoclaving at high pressure, with or without acid, liberates -*H* from the liver residues of antianæmic preps. -*H* is dialysable, sol. in aq. alcohol or acetone, is not pptd. by Pb acetate, but is pptd. by phosphotungstic acid or, from crude preps., by $AuCl_3$; it is adsorbed by C (but not by Al_2O_3, fuller's earth, or benzoic acid) and subsequently eluted by pyridine–methanol–water mixtures. Application of these properties to liver powder yields a prep. the rat-day dose of which is equiv. to 30—40 μg. of org. dry residue. -*H* is inactivated by benzoylation or treatment with formaldehyde, HNO_2, keten, or H_2O_2.

(C) Electrodialysis experiments indicate that -*H* has isoelectric point p_H 3—3·5. -*H* and its Na salt are sol. in abs. ethyl alcohol; the Na salt is insol. in presence of $Ba(OH)_2$ or $Ca(OH)_2$. Preps. of the highest purity obtained are free from S and P and are unstable in aq. solution. F. O. H.

Isolation of α-phylloquinone (vitamin-*K*) from lucerne and the history of its discovery. P. Karrer, A. Geiger, R. Legler, A. Ruegger, and H. Salomon (Helv. Chim. Acta, 1939, **22**, 1464—1470).—Dried, crushed lucerne is extracted with light petroleum and chlorophyll is removed from the extract by adsorption on $ZnCO_3$. The clear solution is conc. and kept at −10° for 2 days; the separated solid is then removed and the residue from the filtrate subjected to mol. distillation. The distillate mainly solidifies owing to the separation of triacontane, medicagosterol I and II, and other compounds. It is liquefied and poured in a thin stream into acetone; the portions which solidify are separated and the operation is repeated on the conc. filtrate. The final filtrate is evaporated to dryness and the residue is dissolved in light petroleum and chromatographed with anhyd. $MgSO_4$, whereby 30% of the remaining impurity is removed. Final purification is effected by chromatography with $ZnCO_3$. Contrary to McKee *et al.* (A., 1939, III, 853) and Fernholz *et al.* (*ibid.*, 853) the authors maintain the homogeneity of their vitamin-*K* from lucerne (*ibid.*, 498, 853). H. W.

Vitamin-K_2. R. W. McKee, S. B. Binkley, S. A. Thayer, D. W. MacCorquodale, and E. A. Doisy (J. Biol. Chem., 1939, **131**, 327—344).—Vitamin-K_2 has been isolated from putrefied fish meal. The moistened meal is incubated at 32—40° for 2—3 weeks, dried, and extracted with light petroleum (b.p. 90—105°) and the extracts are evaporated. The residue is purified by adsorption on decalso and elution with petroleum containing 20% of benzene, followed by a similar process using permutit as adsorbent. The resulting oily product is recrystallised from alcohol–acetone and pure acetone, yielding the pure vitamin, $C_{44}H_{60(62)}O_4$, m.p. 53·5—54·5° (*dihydrodiacetate*, m.p. 59·5—60°). The ultra-violet absorption spectrum of the dihydrodiacetate is similar to that of a similar derivative of -K_1. Free -K_2 is partly destroyed by distillation at 2×10^{-4} mm. up to 200°, and it does not react with maleic anhydride, deoxycholic acid, NH_2OH, or semicarbazide. It takes up 9 H_2 and therefore appears to be a 2 : 3-disubstituted α-naphthaquinone containing 6 double linkings in the side-chains. P. G. M.

Ultra-violet absorption of vitamin-K_1, -K_2, and related compounds. D. T. Ewing, J. M. Vanden-

BELT, and O. KAMM (J. Biol. Chem., 1939, **131**, 345—356).—Absorption measurements indicate that vitamin-K_1 and -K_2 are derivatives of 2 : 3-dimethylnaphthaquinone, but that the side-chains contain no conjugated double linkings. P. G. M.

Vitamin-*K* activity in the benzoquinone series. S. ANSBACHER and E. FERNHOLZ (J. Biol. Chem., 1939, **131**, 399—400; cf. A., 1939, III, 923).—Although benzoquinone, toluquinone, trimethylbenzoquinone, and duroquinone have no vitamin-*K* activity, phlorone (2 : 5-dimethylbenzoquinone) is active at the 1-mg. level. The speed and duration of its activity are identical with those of -*K*. P. G. M.

Antihæmorrhagic activity of 2-methyl-1 : 4-naphthaquinone. H. J. ALMQUIST and A. A. KLOSE (J. Biol. Chem., 1939, **130**, 787—789, cf. A., 1939, III, 996).—On oral administration to chicks vitamin-*K* has less activity than its equiv. content of 2-methyl-1 : 4-naphthaquinone. The presence of the phytyl group detracts therefore from the activity. A. L.

(xix) METABOLISM, GENERAL AND SPECIAL.

Basal metabolism in Bombay. S. P. NIYOGI, V. N. PATWARDHAN, and I. MORDECAI (Indian J. Med. Res., 1939, **27**, 99—113).—The basal metabolism of 24 men and 52 women aged 18—35 years was studied. The average results were 187 c.c. of O_2 per min. for men and 152 c.c. for women, the corresponding heat productions being 34·5 and 32·05 cal. per sq. in. per hr. The total cal. requirements of men and women per day were approx. 2604 and 1875. H. B. C.

Basal metabolism of tuberculous children. II. Afebrile primary pulmonary tuberculosis. A. TOPPER and J. SHORE (Amer. J. Dis. Child., 1939, **58**, 119—128).—Children with active afebrile primary tuberculosis have increased basal metabolic rates as long as there are signs of activity. When the tuberculous process becomes inactive, as evidenced by absence of physical signs, negative roentgen findings, and a normal sedimentation rate, the basal metabolism returns to a normal level. C. J. C. B.

Effect of phospholipin ingestion on gaseous exchange in man. R. REISER (Amer. J. Physiol., 1939, **126**, 109—119).—After feeding 60 g. of soya-bean phospholipins to human subjects the non-protein R.Q. fell during the first ½ hr. and then rose, reaching a max. considerably above the basal val. in 3—4 hr. This was mainly an O_2 effect. The effects of the ingestion of 16 g. of Na_2 glycerophosphate and of 45 g. of olive oil, and of both together, were studied. There is a similarity in the O_2 and CO_2 changes after oil + phosphate to those after phospholipin and a dissimilarity of these changes after phosphate or oil alone. The changes in serum- and urine-inorg. P show that the absorption of fat increases absorption of PO_4''' and that this effect is greatest after phospholipin. M. W. G.

Metabolism of normal and tumour tissue. XVIII. Action of guanidines and amidines on the Pasteur effect. F. DICKENS (Biochem. J., 1939, **33**, 2017—2026).—The complete and reversible inactivation of the Pasteur effect in the presence of 0·001M-guanidine in rat brain slices is less marked in other tissues (kidney medulla, Jensen sarcoma, etc.). 1 : 11-Undecanediamidine and decamethylenediguanidine (synthalin) are similarly fully active in concns. of 10^{-6}—10^{-5}M., and are the most powerful inhibitors of the Pasteur effect yet described. These compounds are also trypanocides, but other trypanocides (trypan-blue, Baeyer 205) do not affect brain metabolism. P. G. M.

Oxygen uptake of isolated uninjured surviving organs in respiration chamber. G. MANSFELD and I. SCHEFF-PFEIFER (Arch. exp. Path. Pharm., 1938, **190**, 585—593).—A modification of Warburg's method is described. The O_2 uptake of surviving organs (suspended uninjured muscles or organ slices of 0·05—0·1 g.) can be determined in O_2 saturated with water vapour. Amphibian and mammalian muscles show a const. O_2 uptake for several hr. The vals. are identical with those found in living animals as well as in blood-perfused surviving muscles. Symmetrical muscles from the two sides of the body have equal vals. of O_2 uptake even if they are removed from the body at intervals of 1—2 days. The O_2 consumption of brain and kidney slices in O_2 is equal to those of brain and kidney slices in Ringer's solution. H. H. K.

Influence of pancreas and pancreatic preparations used for extraction of certain fractions from *Bact. aertrycke* on oxygen uptake of brain and muscle suspensions. M. E. DELAFIELD and H. A. SMITH (Brit. J. exp. Path., 1939, **20**, 216—227; cf. *ibid.*, 1936, **15**, 130).—The pancreas contains a material which greatly increases the O_2 uptake of brain suspensions in the presence of glucose, and diminishes the O_2 uptake of washed muscle suspensions in presence of succinate. Trypsin preps. vary in this respect. Bacterial fractions prepared without trypsin, or with trypsin preps. inactive in this respect, are also inactive. F. S.

Pyruvate oxidation in brain. VII. Dialysable components of the pyruvate oxidation system. I. BANGA, S. OCHOA, and R. A. PETERS (Biochem. J., 1939, **33**, 1980—1996; cf. A., 1939, III, 855).—Power to oxidise pyruvate is lost when dispersions of pigeon's or rabbit's brain in 0·9% aq. KCl are subjected to dialysis for short periods against 0·4% aq. KCl at 1—3° but is restored by adding inorg. PO_4''' + C_4 dicarboxylic acid (succinate, fumarate, or malate) + adenine nucleotide (adenylic acid or adenosine triphosphate). If brains from B_1-avitaminous pigeons are used cocarboxylase also must be added. The nucleotide, in presence of the other components of the system, renders oxidation more complete, the ratio O_2 uptake : mols. of pyruvate removed being doubled at 28°. In pigeon's brain dispersions, adenylic acid is replaceable by cozymase, which is also more active, probably because enzymic degradation of cophosphorylase occurs. In rabbit's brain dispersions, replacement is possible only where duration of dialysis is not over 1·5 hr. Possibly cozymase is an essential constituent of the pyruvate oxidation system of brain. Phosphoglycerate, because it is rapidly converted into pyruvate + H_3PO_4, is oxidised by pigeon's brain dispersions almost as

readily as is pyruvate. In the dispersions, phosphopyruvic is produced from phosphoglyceric acid and in brain extracts PO_4''' transfer from phosphoglyceric to adenylic acid occurs in the same way as in skeletal muscle. Since citrate and α-ketoglutarate are much less active as catalysts of pyruvate oxidation by brain dispersions than are C_4 dicarboxylic acids, these acids probably act in a reversible catalytic system of H carriers rather than as intermediates in a catalytic cycle. Fumarate and adenylic acid are essential for the oxidation of pyruvate by dispersions of the renal cortex of the rabbit. W. McC.

Acetyl phosphate and pyruvate oxidation. S. Ochoa, R. A. Peters, and L. A. Stocken (Nature, 1939, **144**, 750—751).—Acetyl phosphate is neither an intermediate in pyruvic acid oxidation by brain nor a donor of phosphate to adenylic acid in muscle extract. W. F. F.

Magnesium in pyruvate oxidation system of brain. S. Ochoa (Nature, 1939, **144**, 834).—$Mg^{\cdot\cdot}$ or $Mn^{\cdot\cdot}$ is a component of the pyruvate oxidation system. W. F. F.

Glutamic acid as hydrogen carrier in animal tissues. H. A. Krebs and P. P. Cohen (Nature, 1939, **144**, 513—514).—Glutamic acid or glutamine accepts H_2 in tissues. W. F. F.

Porphyrin metabolism in skin diseases. L. A. Brunsting, J. T. Brugsch, and P. A. O'Leary (Arch. Dermat. Syphilol., 1939, **39**, 307).—Increases occur in the elimination of ether-sol. porphyrins (coproporphyrin) in skin disorders accompanied with severe derangements of the general metabolism. Uroporphyrin was not demonstrated. When fever was present or induced artificially, the urinary porphyrin vals. were usually elevated, although not in proportion to the severity of the febrile reaction. The greatest increase in porphyrinuria occurred in cases of exfoliative dermatitis, after a reaction of sensitivity to neoarsphenamine. Definite porphyrinuria was noted (1) in extensive ulceration of the skin (both streptococcal and tuberculous), (2) when the skin had been denuded by extensive burns after explosion of gasoline, (3) in several cases of generalised erythroderma in association with Hodgkin's disease and leukæmia cutis but not with mycosis fungoides, and (4) in erythema multiforme bullosum and pemphigus vulgaris but not in pemphigus foliaceus. C. J. C. B.

Protein metabolism in Indians. K. P. Basu and M. N. Basak (Indian J. Med. Res., 1939, **27**, 115—134).—The min. N excretion of 2 adults (49 kg. body-wt.) on a protein-free diet gave 1·499 g. and 2·302 g. in urine, 0·946 g. and 1·133 g. in the fæces, and total outputs of 0·05 and 0·078 per kg. body-wt. The min. protein requirements for maintenance per 70 kg. on rice diets (rice, pulse, and vegetables) were 37·5 and 53·6 g., and on wheat diet (whole wheat, pulse, and vegetables) 34·7 and 60 g. The protein requirements (in 10 experiments in which N balance was nearly obtained) gave 46·4 g. of protein per 70 kg. body-wt. These diets, as consumed by poor Indians, maintain N balance without milk, but the rice diet does not give a 50% allowance above maintenance. The vals. for the digestibility of mixed proteins of rice and whole wheat diets were 62 and 78, and the biological vals. 75 and 66·5. Protein retention was greater on whole wheat than on the rice diet. Sugar added to a diet already adequate in energy val. spares protein and improves N retention. H. B. C.

Transformation of accumulated foreign proteins, introduced parenterally. R. B. Gragerova and N. B. Medvedeva (J. méd., Ukraine, 1939, **9**, 339—342).—Rats of 3 groups were given a daily injection of 1 c.c. of horse serum for 3, 5, and 10 days, respectively. The liver served as antigen in the immunisation of rabbits. Foreign proteins, introduced into the body parenterally, are rapidly transformed into proteins sp. to the species. Only in some cases did foreign proteins accumulate in the liver, where they acted as antigen and caused antibody formation. M. K.

Influence of insulin on protein metabolism as measured by nitrogen balance. E. M. McKay, R. H. Barnes, and H. C. Bergman (Amer. J. Physiol., 1939, **126**, 155—157).—Albino rats were given a diet of powdered commercial casein 20, potato starch 41, dried brewer's yeast 10, Osborne and Mendel's standard salt mixture 4, cod-liver oil 10, and lard 15. Insulin exerted a definite protein-sparing power, whether the food intake was fixed or the diet given *ad lib.*; the N balance was uniformly made more positive by insulin. M. W. G.

Protein metabolism. X. Metabolic activity of body-proteins investigated with *l*(−)-leucine containing two isotopes. R. Schoenheimer, S. Ratner, and D. Rittenberg (J. Biol. Chem., 1939, **130**, 703—732).—Adult rats were maintained on energy and N balance with a normal diet containing an amount of isotopic *l*(−)-leucine, labelled with D and ^{15}N, corresponding with 23 mg. of N per day. After 3 days 57% of the ^{15}N administered had been retained in the body-proteins, the ^{15}N contents of which varied with the locality, being highest in those of the blood serum and lowest in those of the skin and muscle. An examination of the amino-acids isolated from the protein of the liver, intestinal wall, and the rest of the body showed that at least 32% of the dietary leucine had replaced 24% of the liver- and 7% of the carcase-leucine. Moreover the isotopic N was distributed among all the amino-acids except lysine, glutamic and aspartic acids having the highest ^{15}N content. Only ⅓ of the ^{15}N of the body-proteins was associated with the C chain of the ingested leucine, the remainder having been deposited as a result of N transfer from one amino-acid to others. At least ½ of the ^{15}N in the leucine in the body-protein had been replaced by ^{14}N, showing that the leucine not only supplied but accepted N from other amino-acids. A. L.

Nitrogen metabolism during oral and parenteral administration of amino-acids of hydrolysed casein. A. T. Shohl, A. M. Butler, K. D. Blackfan, and E. MacLachlan (J. Pediat., 1939, **15**, 469—475).—Hydrolysed casein, given orally to infants as the sole source of N, gave positive N balances in all cases. Positive and sufficient N balances were also obtained by the intravenous administration of hydrolysed casein together with glucose and NaCl. In

most instances, however, there were untoward reactions, especially fever. C. J. C. B.

Retention of nitrogen of amino-acids administered singly or in mixture to dogs fed diets low in protein. E. K. Neilson, L. P. Gerber, and R. C. Corley (Amer. J. Physiol., 1939, **126**, 215—222).—Mixtures of histidine, *iso*leucine, leucine, lysine, phenylalanine, tryptophan, and valine, together with cystine or methionine or both, were administered to dogs given low-protein diets, in amounts to supply N equal to less than ½ the urinary N. The N of the amino-acid mixtures was absorbed completely. With some mixtures the absence of any rise in urinary vals. indicated complete retention of their N. The excretion dropped on subsequent days as though there were a continuing sparing effect on tissue-N of N that had been retained. While the N of the mixtures was equiv. to less than ½ that catabolised daily the evidence of selective retention or utilisation was striking. M. W. G.

Protein metabolism. XI. Metabolic relationship of creatine and creatinine studied with isotopic nitrogen. K. Bloch and R. Schoenheimer (J. Biol. Chem., 1939, **131**, 111—119; cf. A., 1939, III, 706).—Rats fed with isotopic creatine excrete isotopic creatinine in the urine, but when fed with isotopic creatinine, 75% is excreted and no isotope is found in the body-creatine. Rats on a creatine-free diet, after preliminary administration of isotopic creatine for 6 days, excrete creatinine of the same isotopic content, indicating that body-creatine is the only source of urinary creatinine. E. M. W.

***In vivo* inversion of *d*-α-amino-γ-phenylbutyric acid.**—See A., 1940, II, 44.

Metabolism of carbohydrate and protein during prolonged fasting. W. H. Chambers, J. P. Chandler, and S. B. Barker [with J. Evenden] (J. Biol. Chem., 1939, **131**, 95—109; cf. A., 1937, III, 174).—Following a loss of approx. 50% of body-wt. during fasting, 7 dogs showed an increase in N and creatinine excretion and a decrease in ketone excretion, whilst in 4 others these effects were absent or less marked and accompanied by a lower R.Q. After fat ingestion, the metabolism of dogs of the first group tends towards normality. In both groups, a glucose test-meal causes a rise in R.Q., a fall in ketone excretion, and occasionally slight glycosuria. Ingested protein causes a lowering of N excretion and R.Q. in the first group. E. M. W.

Hippuric acid synthesis during pregnancy and in the puerperium. W. Neuweiler (Klin. Woch., 1939, **18**, 1050—1052).—The excretion of hippuric acid after intravenous injection of 1·77 g. of Na benzoate was diminished in the puerperium and more so during pregnancy (67 cases). E. M. J.

Metabolism of amino-acids. VIII. Glycine precursors. Availability of *N*-methylglycine, *NN*-dimethylglycine, and betaine for synthesis of hippuric acid by rabbits. L. D. Abbot, jun., and H. B. Lewis (J. Biol. Chem., 1939, **131**, 479—487; cf. A., 1938, III, 405).—The rate of excretion of hippuric acid is increased if sarcosine is fed together with benzoic acid, but not with *NN*-dimethylglycine or betaine, indicating biological conversion of sarcosine into glycine. H. G. R.

Choline metabolism. I. Occurrence and prevention of hæmorrhagic degeneration in young rats on a low-choline diet. W. H. Griffith and N. J. Wade (J. Biol. Chem., 1939, **131**, 567—577).—A deficiency of choline in the diet of young rats is accompanied by hæmorrhagic enlargement and degeneration of the kidneys, retrogression of the thymus, and enlargement of the spleen. It is prevented by amounts of choline too small to influence deposition of liver-fat, the requirements of young being greater than those of older rats. H. G. R.

Nitrogen excretion and arginase activity during amphibian development. A. F. Munro (Biochem. J., 1939, **33**, 1957—1965).—The total NH_3 + urea excretion per g. of body-wt. of tadpoles remains approx. unchanged at all stages of development and metamorphosis but great increase in N excretion occurs after emergence of the forelimbs. Starvation, except when prolonged, does not affect N excretion. In tadpoles at all stages and in young and adult frogs NH_3 and urea excretion is greatly increased by increase of temp. (4°, 17°, 28°). The N excreted before metamorphosis is chiefly in the form of NH_3; after metamorphosis it is chiefly in the form of urea. Accompanying this change there is an increase, greatest and most rapid during active metamorphosis, in the arginase content of the liver. W. McC.

Trans-amination of *l*- and *d*-amino-acids in normal muscle and in malignant tumours. A. E. Braunstein and R. M. Azarkh (Nature, 1939, **144**, 669—670).—Malignant tumour tissue gives a relative shift of the configurational selectivity of glutamic aminopherase in favour of the *d*-enantiomerides. W. F. F.

Fat and protein metabolism and creatinine and creatine output in children with nephrosis. C. C. Wang, C. Hogden, and I. Genther (Amer. J. Dis. Child., 1939, **58**, 29—36).—The vals. for fæcal fat are above normal, especially when the disease is severe. The urinary excretion of non-protein-N was 3·1—12·9 g. per 24 hr. (38—79% of the intake). The % of the intake excreted may be lower than normal. The vals. for preformed creatinine increased with age, and in 4 of 5 cases were lower than those found in normal children. C. J. C. B.

Cholesterol balance and low-fat diet in psoriasis. J. F. Madden (Arch. Dermat. Syphilol., 1939, **39**, 268—277).—Hypercholesteræmia was generally found in the cases of psoriasis studied. Increased cholesterol intake only slightly raised blood-cholesterol. Cholesterol tolerance tests are too irregular to be of diagnostic val. and were no guide to the cases that would respond favourably to a low-fat diet. A low-fat diet helped 15 of 22 cases of psoriasis. The favourable effect of the diet may be due to a general realignment of metabolism and tissue function rather than disturbed fat metabolism. C. J. C. B.

Variations of lipocytic coefficient with age. M. D. Gatzanuk (J. méd., Ukraine, 1939, **9**, 343—359).—The cholesterol : fatty acids ratio (lipocytic coeff.) was examined in various organs of rats (3

months—2 years). The coeff. increases during the transition from youth to adult and old age in brain, blood, lung, and kidney, as cholesterol increases and fatty acids decrease. It decreases in liver and muscles, whilst the amount of fatty acids increases. There is no relation between lipocytic coeff. and water content of the tissues. M. K.

Oxidation of methyl esters of monocarboxylic fatty acids by normal and neoplastic tissue. E. Ciaranfi (Nature, 1939, **144**, 751).—The O_2 consumption of normal tissue is increased by fatty acid esters much more than by free acids; *e.g.*, in liver, 8-fold, in brain cortex, 11-fold, and in spleen, 17-fold increases were observed. Neoplastic tissues do not oxidise the free fatty acids but only the corresponding esters. W. F. F.

Relation of glycerophosphatase to carbohydrate–fat synthesis in fatty tissue. F. X. Hausberger and N. Neuenschwander-Lemmer (Arch. exp. Path. Pharm., 1939, **193**, 110—116).—Rats were starved and then given a carbohydrate-rich diet; symmetrical testicular fat depôts were analysed. Their glycogen and phosphatase content was increased, indicating the occurrence of phosphorylated intermediate compounds during fat synthesis from carbohydrate. H. O. S.

Post-mortem hepatic glycogenolysis in hyperinsulinism and glycogen disease. H. P. G. Seckel (J. clin. Invest., 1939, **18**, 723—731).—In 2 adult cases of spontaneous hypoglycæmia, due to hyperinsulinism (one of carcinoma of the Langerhans islets with liver metastases and the other of massive fibroma on right top of the liver), there was a high liver- and muscle-glycogen and normal or slightly decreased post-mortem hepatic glycogenolysis; this differs markedly from the findings in glycogen disease. C. J. C. B.

Artificial hibernation. P. Suomalainen (Nature, 1939, **144**, 443—444).—Artificial hibernation was induced in fully awake hedgehogs in June and July by subcutaneous administration of Mg with insulin and simultaneous cooling to the range 2—5°. On being warmed to 21—23° the animals awoke apparently normally. W. F. F.

Effect of age and fasting on glycogen content of liver and muscle of rats and puppies. W. Heymann and J. L. Modic (J. Biol. Chem., 1939, **131**, 297—308).—Liver-glycogen of rats 8—11 days old is only $\frac{1}{3}$ of that of adults (4·6% of fresh liver) but rises rapidly during the next 6 weeks to slightly above normal. Muscle-glycogen is const. for all ages. Fasting for 2 days does not produce hypoglycæmia, but it reduces both liver- and muscle-glycogen to the same extent, at any age. Results do not support the theory of the importance of glycogen in the maintenance of water content of organs. Similar results are obtained with puppies. P. G. M.

Vagus and carbohydrate metabolism. V. Zagami (Arch. Fisiol., 1939, **39**, 297—326).—In pigeons double vagotomy produces (after 24—96 hr.) an increase of heart- and liver- and a decrease of muscle-glycogen; blood-sugar is moderately increased. Both in normal and vagotomised animals insulin increases heart- and decreases liver- and muscle-glycogen. The changes in blood-sugar after insulin or adrenaline are not modified by vagotomy. S. O.

Carbohydrate metabolism in acute carbon monoxide poisoning. S. Moeschlin (Acta med. scand., 1939, **102**, 140—159).—In 57% of 35 cases the blood-sugar was raised (up to 390 mg.-%) and gave a diabetic type of curve, returning to normal in 24—48 hr.; glycosuria was present in only 17% of the cases. C.s.f. sugar was raised significantly in 8 out of 11 cases studied. Leucocytosis occurred in most cases. C. A. A.

Takata reaction and carbohydrate metabolism. B. G. Hager (Z. ges. exp. Med., 1939, **105**, 775—780).—There is no relationship between blood-sugar level and Takata reaction. Addition of glucose to serum *in vitro* does not influence the reaction. Glucose tolerance of patients suffering from hepatic failure is diminished. The Takata reaction becomes positive in 60% of patients with liver damage after administration of glucose and insulin. A. S.

Changes in glucose tolerance of obese subjects after weight reduction. R. S. Hubbard and E. C. Beck (J. clin. Invest., 1939, **18**, 783—789).—87% of 39 obese patients showed slightly abnormal glucose tolerance tests. After wt. reduction only 23% showed persistant abnormality. The improvement in tolerance was due to the wt. reduction rather than to the diet for the improvement persisted when the carbohydrate intake was increased. C. J. C. B.

Galactose-1-phosphoric acid in galactose metabolism. H. W. Kosterlitz (Nature, 1939, **144**, 635—636).—The metabolism of galactose in the liver differs from fermentation by dried yeast in that galactose-1-phosphoric acid accumulates in the liver (cf. A., 1938, III, 137, 933). W. F. F.

Metabolism of rare sugars. F. Clarke, R. Solkot, and R. C. Corley (J. Biol. Chem., 1939, **131**, 135—138).—Glycogen is deposited in the liver of rats following the administration by stomach tube of melezitose, turanose, and trehalose (hydrolysed by α-glucosidases) but not of raffinose or melibiose. A β-fructosidase and an α-galactosidase are therefore absent from the intestinal tract of rats. E. M. W.

Utilisation of acetone bodies. II. Influence of sex. I. Grayman, N. Nelson, and I. A. Mirsky (J. Biol. Chem., 1939, **131**, 121—126; cf. A., 1939, III, 997).—There is no significant difference in the rate of utilisation of β-hydroxybutyric acid by male and female rats. E. M. W.

Disturbances of lactic acid metabolism during glycogen breakdown. G. Hilmers (Arch. exp. Path. Pharm., 1939, **193**, 85—95).—Glycogen breakdown and creatinuria were produced in various species by the administration of urethane or camphor. Subsequent administration of adrenaline or NaCN did not produce the usual increase in blood-lactate. This is attributed to an increased rate of lactate elimination rather than to deficient production since under the same conditions $NaHCO_3$ or muscular work was still effective in raising the level of blood-lactate. H. O. S.

Metabolism of stilbene. S. W. Stroud (Nature, 1939, **144**, 245).—2 g. of stilbene were injected into rabbits over a period of 20 days. Benzoic acid was found in the urine as a metabolic product, also a cryst. phenol, m.p. 283°. W. F. F.

Sulphur metabolism of early infancy. V. Iob and W. W. Swanson (Amer. J. Dis. Child, 1939, **58**, 37—40).—Skeletal growth, involving the conversion of cartilage into bone with a 4-fold loss of S which is excreted by the kidneys, is suggested as an explanation of the reduced S balances of growing infants. C. J. C. B.

Changes in serum-sulphur following administration of preparations containing thiophen-sulphur. P. Backert (Arch. exp. Path. Pharm., 1939, **193**, 79—84).—Intramuscular and percutaneous administration of preps. containing thiophen-S resulted in a marked increase of the neutral S fraction in blood; the SO_4'' and ethereal SO_4'' fractions were unaltered. H. O. S.

Phosphorus metabolism. I. Synthesis of phospholipins, phosphoproteins, and nucleoproteins. D. Bocciarelli, A. Galamini, and M. Ligori (R. C. Atti Accad. Lincei, 1939, [vi], **29**, 512—517).—Na phosphate (containing radioactive P as indicator), ingested by dogs, is utilised (within 24 hr.) for synthesis of phospholipins separated from liver, intestine, lung, spleen, and kidney, and for that of nucleo- and phospho-proteins from liver and intestine; other organs (including blood, brain, and muscle) gave negative results. F. O. H.

Use of radioactive phosphorus in glycolysis and fermentation. O. Meyerhof (Bull. Soc. Chim. biol., 1939, **21**, 1094—1101).—A review. W. McC.

Use of radioactive forms of the common elements in physiology. A. Barnett (Physical Rev., 1939, [ii], **56**, 963).—Reasons are discussed for doubting the validity of conclusions drawn from the passage of radioactive forms of elements through (blood) cell membranes as to the corresponding behaviour of non-radioactive forms of the same elements. N. M. B.

Distribution of intravenously injected silver in organs. A. Curatolo (R. C. Atti Accad. Lincei, 1939, [vi], **29**, 522—524).—Following injection of colloidal Ag or $NaAgS_2O_3$ into rabbits, Ag rapidly disappears from the blood and appears in lung, liver, spleen, and, to a smaller extent, heart and kidney, but not in brain or muscle. F. O. H.

Significance of potassium in living tissue. N. Brock, H. Druckrey, and H. Herken (Biochem. Z., 1939, **302**, 393—425; cf. A., 1939, III, 300, 784, 854).—Resting tissues (*e.g.*, salivary gland, liver, and probably other tissues) produce no fixed acid, require no K, and lose none. When they are in any way stimulated (*e.g.*, with acetylcholine) or injured they lose K, the amount lost being approx. equiv. to the amount of fixed acid (lactic and other acid) which is at once vigorously produced (max. production after 10 min.; end of production in 20 min.). If K is absent no fixed acid is produced and there is no response to stimulation. During recovery of fatigued tissue K is probably taken up and no recovery occurs if there is no K in the medium. The min. concn. of K required for response to stimulation and for recovery is approx. 0·24 mg.-%. There is a close relationship between movement of K, production of fixed acid, and carbohydrate metabolism and the tissues which require most K are those richest in glycogen although it is probable that K is not required for the conversion of glycogen into glucose. Since Rb and Cs replace K it is probable that K moves and acts as ion. W. McC.

(xx) PHARMACOLOGY AND TOXICOLOGY.

***Staphylococcus aureus* meningitis [treated with sulphanilamide].** D. C. Pewterbaugh (Arch. Pediat., 1939, **56**, 623—627).—The patient recovered after (*a*) repeated small blood transfusions daily for 13 days, (*b*) sulphanilamide 60 grains over 2 days, (*c*) lumbar and cisternal drainage and staphylococcal antitoxin for 6 days. C. J. C. B.

Increased glycuronate excretion following administration of sulphapyridine. J. V. Scudi, H. D. Ratish, and J. G. M. Bullowa (Science, 1939, **89**, 516).—Glycuronate concns. proportional to the sulphapyridine concns. were found in the urine of 2 normals and a pneumonia patient. W. F. F.

Does sulphanilamide stimulate metabolism? G. C. Brun (Arch. int. Pharmacodyn., 1939, **63**, 103—106).—Sulphanilamide, prontosil, M. & B. 693, and uleron caused no increase of exchanges in the rabbit. Irregular decreases even were observed. D. T. B.

Albucid in treatment of gonorrhœa. W. Gertler (Klin. Woch., 1939, **18**, 1089—1093).—20 g. of albucid was given over 7 days in cases of gonorrhœa. The serum level 2 hr. after a dose of 4 g. was 8 mg.-%, 5 hr. after the last dose on the 7th day 3·7—6·5 mg.-%, and on the 8th day 1—2 mg.-%; it had disappeared from the blood on the 10th day. 50% of the dose given is excreted in the urine. The serum vals. were higher and urinary excretion lower in the cured as compared with the uncured cases. E. M. J.

Relapses after sulphonamide cure of gonorrhœa. A. J. Cokkinis and G. L. M. McElligott (Brit. Med. J., 1939, II, 1080—1083; cf. A., 1938, III, 935).—1268 male and 210 female cases of gonorrhœa were examined 6 months to 2 years after apparent cure by sulphonamides (sulphanilamide, sulphapyridine, and uleron). 20% had subsequently relapsed. Failures do not seem to be related to inadequate dosage. C. A. K.

Prontosil in plasma and serum. R. A. Hoekstra and A. J. C. Haex (Arch. int. Pharmacodyn., 1939, **63**, 40—42).—The penetration of gelatin by prontosil in presence and absence of serum-proteins was tested. No quant. combination with the proteins of the blood could be demonstrated *in vitro* or *in vivo*. D. T. B.

Absorption, distribution, and excretion of sulphapyridine. W. Brown, W. B. Thornton, and J. S. Wilson (J. clin. Invest., 1939, **18**, 803—819).—90 cases of pneumonia treated by sulphapyridine were studied. Absorption may be irregular with oral administration and frequent blood estimations should be made. With a single dose by mouth

the max. concn. is reached in 4—5 hr. Intramuscular administration gives a max. in 3 hr. and intravenous immediately, with a rapid fall in 30 min. to a level which may be taken as its effective max. concn. Post-mortem assays of tissues show high vals. in kidney and liver and low vals. in brain, bile, and body-fat. Excretion is chiefly by the kidney and usually after the first 24 hr. the free form is not as rapidly excreted as the conjugated form. If urinary output falls below 1000 c.c. in 24 hr., fluids must be given in large amounts and the chemotherapy interrupted. C. J. C. B.

Experimental basis for a method for the quantitative evaluation of the effectiveness of chemotherapeutic agents against streptococcus infection in mice. J. T. Litchfield, jun., H. J. White, and E. K. Marshall, jun. (J. Pharm. Exp. Ther., 1939, **67**, 437—453).—Administration of sulphanilamide in the diet maintains a nearly const. blood concn., which may be calc. from the daily dry intake. Treatment starting at the time of infection is as effective as premedication, but treatment delayed 4 hr. gives a decreased no. of survivals. Data relate height and duration of blood concn. to % survival. E. M. S.

Pharmacology of sulphapyridine. E. K. Marshall, jun., and J. T. Litchfield, jun. (J. Pharm. Exp. Ther., 1939, **67**, 454—475; cf. A., 1939, III, 305).—Compared with sulphanilamide, sulphapyridine is more toxic for mice, rabbits, and dogs, and absorption from the gastro-intestinal tract is slower, less complete, and more variable. The drug is distributed in tissues and body fluids in concns. the same as in blood, except in the liver, where (unlike sulphanilamide) concn. is higher. The mode of excretion of both compounds by the kidney is similar. E. M. S.

Production of anæmia in white mice by sulphanilamide, sulphapyridine, and diaminodiphenylsulphone. A. P. Richardson (J. Pharm. Exp. Ther., 1939, **67**, 429—436).—Anæmia associated with reticulocytosis follows administration in the diet. Data obtained may be used to compare the anæmia-producing properties of this group of compounds. E. M. S.

Effect of prolonged administration of sulphanilamide on rats with nephrotoxic nephritis. J. E. Smadel and H. F. Swift (J. clin. Invest., 1939, **18**, 757—762).—Sulphanilamide, given in therapeutic doses for long periods to rats with nephrotoxic nephritis, did not affect the course of the experimental disease. Rats with nephrotoxic nephritis, but without renal failure, excreted sulphanilamide in the same amounts as did normal rats. C. J. C. B.

Effect of 933 F. on the heart of the frog and the cat. W. T. Hill and G. S. Myers (Amer. J. Physiol., 1939, **126**, 305—310).—933 F. has a depressant action on the isolated frog heart (perfused by Straub's method) and on the denervated heart of the cat. Contrary to the original claim of Shen, this drug has no differential effect on the response of the heart to adrenaline or to sympathetic stimulation. These responses are only slightly modified by the drug. M. W. G.

Successful treatment of case of malaria by intravenous adrenaline. A. Paunescu-Podeanu and O. Carangiu (Bull. Mém. Soc. méd. Hôp. Bucarest, 1939, **21**, 286—290).—The mode of action is thought to be the mechanical dislocation of the parasites which become thus accessible to antibodies, and stimulation of the reticulo-endothelial system. Adrenaline does not act directly on the parasite. H. L.

Newer amœbicides and results of treatment of amœbiasis with di-iodohydroxyquinoline (diodoquin). H. G. Hummel (Amer. J. digest. Dis. Nutr., 1939, **6**, 27—32).—41 cases of amœbiasis were treated with this new amœbicide, which contains approx. 64% of I. The drug relieved the colonic and nervous symptoms rapidly. No toxic effects were encountered. Relapses occurred in 4 out of the first 13 patients treated, because the dosage administered was insufficient to effect cure. The proper dosage of diodoquin should be 23 to 30 grains per day for 20 days. C. J. C. B.

Rôle of sweat as fungicide; use of constituents of sweat in therapy of fungous infections. S. M. Peck, H. Rosenfeld, W. Leifer, and W. Bierman (Arch. Dermat. Syphilol., 1939, **39**, 126—148).—Thermal sweat may have fungistatic and fungicidal properties at a p_H below 7. Conc. heat sweat is fungistatic even when alkalinised. The fungicidal properties of sweat are due to its content of acetic, propionic, hexoic, octoic, lactic, and ascorbic acids in suitable concn. Areas which are exposed to the greatest concn. of sweat have less tendency to fungous infection. Sebum (from a sebaceous cyst) was not fungicidal or fungistatic. Topical applications of ingredients of sweat, such as mixtures of lactic, propionic, butyric, and ascorbic acid is proper concns., are valuable in the treatment of fungous infections. C. J. C. B.

Action of erythrophleine on isolated uterus and gut. E. Rothlin and Raymond-Hamet (Arch. int. Pharmacodyn., 1939, **63**, 10—17).—Erythrophleine causes increased activity of the rabbit's large and small intestine. It stimulates the uterus and abolishes the action of adrenaline. The mechanism of action is different from that of substances which cause adrenaline reversal. D. T. B.

Action of ibogaine on isolated organs. Raymond-Hamet and E. Rothlin (Arch. int. Pharmacodyn., 1939, **63**, 27—39).—Ibogaine, alkaloid of *Tabernanthe iboga*, is inhibitory to small intestine of rabbit and large intestine of guinea-pig. It diminishes the action of adrenaline but does not modify that of acetylcholine. Its action is reversed by ergotamine. It inhibits the action of both drugs on the seminal vesicle. It excites the uterus and does not modify the action of adrenaline on it. D. T. B.

Direct and indirect intestinal effects of extract of *Rauwolfia heterophylla*, Roem. and Sch. Raymond-Hamet (Compt. rend., 1939, **209**, 599—601).—A decoction of macerated roots of *R. heterophylla*, injected intravenously into chloralosed dogs, is hypotensive and produces a diminished tonus of the intestine and a cessation of peristalsis, which gradually returns. With repeated doses, the effect on peristalsis becomes of briefer duration and the

tonus increases with increased amplitude of contraction. Adrenaline (0·02 mg.) at first produces its usual effects but, after repeated doses of the extract, becomes hypotensive and produces a large, transient increase in tonus and arrest in peristalsis. J. L. D.

Action of prostigmine. H. Mies (Arch. exp. Path. Pharm., 1938, **190**, 658—665).—Perfusion of frog's hind legs with different concns. of prostigmine shows that the action of the drug is dependent on the amount of peripherally liberated acetylcholine. H. H. K.

Electrical studies on pharmacology of autonomic synapses. III. Action of ephedrine analysed by study of its sympathetic central and ganglionic effects. A. S. Marrazzi (J. Pharm. Exp. Ther., 1939, **67**, 321—329; cf. A., 1939, III, 666).—Increased preganglionic potentials show that ephedrine activates sympathetic cells within the central nervous system, but decreased post-ganglionic potentials show ganglionic block. This cancels the effect of central stimulation, which does not contribute to the changes produced by ephedrine in sympathetically innervated structures. E. M. S.

Calcium ions necessary to synaptic transmission in parasympathetic, not in sympathetic, ganglia. G. D. Shafer (J. Pharm. Exp. Ther., 1939, **67**, 341—352; cf. *ibid.*, 1936, **58**, 274).—The following autonomic pathways were tested in cats during intravenous injection of Na citrate: splanchnic to visceral blood vessels, chromaffin cells of the adrenal, cervical sympathetic to dilator pupillæ, and parasympathetic to sphincter pupillæ. Only the parasympathetic path was paralysed. E. M. S.

Integration of the vasomotor responses in liver with those in other systematic vessels. L. N. Katz and S. Rodbard (J. Pharm. Exp. Ther., 1939, **67**, 407—422; cf. A., 1938, III, 330).—The effects of adrenaline, histamine, pitressin, amyl nitrite, acetylcholine, atropine, and vagal section on the arterial, venous, and portal pressures, and on the portal flow were recorded in anæsthetised dogs. Results illustrate the importance of the large circulatory adjustment residing in the hepatoportal system. E. M. S.

Periplocin, the genuine cardiac glucoside of *Periploca græca*.—See A., 1939, II, 495.

Action of quinidine and hydroquinidine on auricular fibrillation. K. van Dongen and U. G. Bijlsma (Arch. int. Pharmacodyn., 1939, **63**, 90—94).—Of 5 samples of quinidine tested 3 were active in preventing experimental fibrillation: (1) contained 20% of hydroquinidine; (2) was not quite pure; (3) was said by maker to be pure. Two were inactive, viz., one obtained from sample (1) and an impure sample. Hydroquinidine is perhaps not the only alkaloid which renders quinidine active. D. T. B.

Cumulative action of digitalis glucosides. H. Bauer and H. Reindell (Arch. exp. Path. Pharm., 1938, **190**, 461—491).—Digitoxin was slowly injected intravenously into cats until the heart stopped (method of Magnus and Hatcher). The e.c.g. (taken at regular intervals of 1—2 c.c.) showed changes varying with amount of glucoside infused and individual sensitivity of the animals. H. H. K.

Strophanthin and coronary circulation. K. H. Osterwald (Arch. exp. Path. Pharm., 1938, **190**, 535—549; cf. A., 1939, III, 745).—The coronary vessels are not directly influenced by strophanthin given in therapeutic doses to intact animals, but the coronary circulation is adapted to the change in minute-vol. caused by strophanthin. The fall of cardiac minute-vol. after therapeutic doses of strophanthin is due to a peripheral vascular action. H. H. K.

Action of quercitrin on blood content of abdominal organs. L. Sokoray and A. G. Czimmer (Arch. exp. Path. Pharm., 1938, **190**, 622—626).—Quercitrin (1 mg. per kg.) injected into dogs produces a fall of blood pressure; the vol. of the spleen is not affected but the vol. of the kidney is decreased. Quercitrin dilates perfused isolated mesenteric vessels. H. H. K.

Use of dogs for standardisation of digitalis. J. C. David and R. Krishnaswami (Indian J. Med. Res., 1939, **27**, 279—283).—Dogs can be substituted for cats in the bioassay of digitalis. H. B. C.

Influence of anterior pituitary on tissue respiration. I. Influence of sodium luminal, strychnine, magnesium sulphate, and chloral hydrate. II. Influence of ergotamine, yohimbin, eserine, and atropine. M. Aishwa (Folia endocrinol. japon, 1939, **15**, 10—11, 12—13).—I. 0·01 g. of Na luminal, 0·02 mg. of strychnine, 0·05 g. of $MgSO_4$, and 0·015 g. of chloral hydrate per 100 g. body-wt. were injected subcutaneously into rats for 10 days. A saline extract of anterior pituitary corresponding with 0·02 g. of dried gland per 100 g. body-wt. was injected for 3—5 days from the 6th or 8th day after administration of the other drugs had started. Na luminal diminishes the increase of O_2 consumption found after administration of pituitary extract in liver, spleen, kidney, and thyroid. Strychnine does not influence the effect of pituitary extract on the respiration of various organs. $MgSO_4$ diminishes the rise of O_2 consumption after administration of pituitary extract in the liver, kidney, and thyroid, but not in spleen. Chloral hydrate diminishes the rise of O_2 consumption after administration of pituitary extract in the liver and thyroid, but not in the spleen and kidney.

II. 0·2 c.c. of ergotamine, 0·2 c.c. of yohimbine, 0·5 c.c. of 0·01% eserine, or 0·5 c.c. of 0·1% atropine solution per 100 g. body-wt. was given subcutaneously. The animals were killed on the 11th day and the O_2 consumption of the organs was determined by Warburg's method. Ergotamine diminishes the rise of O_2 consumption occurring after administration of pituitary extract. Yohimbine diminishes this rise in the liver and thyroid appreciably, but only slightly in spleen and kidney. Eserine diminishes this rise in all four organs. Atropine has no effect. E. R.

Pharmacology of vanillin derivatives. E. Vincke and H. E. Never (Arch. exp. Path. Pharm., 1938, **190**, 733—744).—The cholagogue action of synthetic vanillin derivatives was examined in dogs with duodenal fistulæ. Divanillylidene-ethylene-

diamine and -*cyclo*hexanone are active cholagogues and only slightly toxic. Divanillylidene-*pp'*-diaminodiphenylamine was found most toxic in a test on white mice. Divanillylidene-*cyclo*hexanone and -*cyclo*pentanone were non-toxic. H. H. K.

Participation of histamine in inflammatory processes. P. KAISER (Schweiz. Z. allg. Path. Bakt., 1939, **2**, 267—288).—A review. E. M. J.

Diuretic action of several combinations of fructus juniperi and radix ononidis. H. VOLLMER and A. GIEBEL (Arch. exp. Path. Pharm., 1938, **190**, 522—534).—In rats fructus juniperi or radix ononidis increases Cl excretion by more than 100%, but when mixtures of juniper infusion and radix ononidis decoction were given together the diuresis did not appear or was smaller than that after the 2 single drugs. H. H. K.

Establishment and loss of tolerance of tissue cultures to opium alkaloids. T. KUBO (Folia pharmacol. japon., 1939, **27**, 7—8).—The iris epithelium of chicken embryos was cultured in media containing M./10,000 morphine, M./8000 codeine, M./10,000 heroine, or M./20,000 eucodal. Tolerance is rapidly acquired to eucodal, less quickly to morphine and heroine, and only slightly to codeine. The drug was then stopped and the tissue grown in normal media for various periods, after which the alkaloids were added again. The tolerance for eucodal was still present after a long time, that for morphine and heroine after a slightly shorter time, and that for codeine disappeared quickly. E. R.

Sudden and gradual removal of opium alkaloids from tissue cultures accustomed to them. T. KUBO (Folia pharmacol. japon., 1939, **27**, 6—7).—Reactions of deprivation are the stronger the quicker the drug is discontinued. The tissue, however, gets more quickly used to normal culture media after sudden stopping of the drug than after gradual stopping. E. R.

Blood concentration in morphine addicts. E. G. WILLIAMS (J. Pharm. Exp. Ther., 1939, **67**, 290—298).—Variations in cell vol., sp. gr., and water content of whole blood and plasma indicate blood hydration during addiction in man. During withdrawal hydration decreases, but returns to addiction level in the early post-withdrawal period. Post-addicts have normal vals. E. M. S.

Effect of vitamin-B_1 on morphine abstinence symptoms. O. G. FITZHUGH (J. Pharm. Exp. Ther., 1939, **67**, 423—428).—Thiamin decreased irritability in morphine-addicted rats, and prevented the increase in irritability associated with withdrawal. E. M. S.

Effect of sedatives, narcotics, and anæsthetics on changes in the body-water of frogs produced by pituitrin. E. M. BOYD, K. J. CLARK, and A. E. SMITH (J. Pharm. Exp. Ther., 1939, **67**, 313—320; cf. A., 1939, III, 678).—Ether, $CHCl_3$, and anæsthetic doses of phenobarbital Na depressed the uptake of water induced by pituitrin. Small doses of phenobarbital increased the pituitrin effect. The effect of other narcotics resembled that of phenobarbital. Depressant drugs affect frog and mammalian responses to pituitrin similarly. E. M. S.

Toxicity of pentothal sodium and its treatment. A. H. MALONEY (Arch. int. Pharmacodyn., 1939, **63**, 18—26).—The min. lethal dose of pentothal given intraperitoneally to the rabbit is 80 mg. per kg. Picrotoxin is an effective antidote to 2·5 times the min. lethal dose. D. T. B.

Comparative pharmacology of menthol and its isomeride. D. I. MACHT (Arch. int. Pharmacodyn., 1939, **63**, 43—58).—*l*-Menthol is more active physiologically than *d*-menthol. Liquid menthol (equal parts of the 3 isomerides) is the most potent local anæsthetic. Camphor is less readily absorbed through the skin than the menthols. D. T. B.

Effect of liver damage on the blood level and action of paraldehyde. H. LEVINE, A. J. GILBERT, and M. BODANSKY (J. Pharm. Exp. Ther., 1939, **67**, 299—306).—In dogs with liver damage, produced by deep $CHCl_3$ anæsthesia 2 days previously, paraldehyde is retained in the circulation at a higher concn. and for longer than in normal animals. The hypnotic effect is correspondingly increased. E. M. S.

Action of deriphylline and its constituents on alkali reserve. L. CHARON (Arch. int. Pharmacodyn., 1939, **63**, 120—127).—Deriphylline, oxyamine, and theophylline increase the alkali reserve in normal rabbits, and in acidosis and alkalosis. There is no potentiation between the constituents. NH_4Cl acidosis is not prevented. Theophylline may cause convulsions with diminished alkali reserve. D. T. B.

Depressant action of picrotoxin and metrazol. J. M. DILLE and L. W. HAZLETON (J. Pharm. Exp. Ther., 1939, **67**, 276—289).—Convulsive doses of picrotoxin and metrazol decreased activity in rats during the post-convulsive period. Cortical activity, measured by the placement reactions in rabbits, was depressed by picrotoxin in sub-convulsive doses. With convulsive doses depression appeared before and outlasted the convulsions. Metrazol caused depression with convulsive doses only. When used as an analeptic against Na pentobarbital, picrotoxin in doses up to 3 mg. per kg. shortened the recovery time of placement reactions, but the time was lengthened with larger doses. Metrazol had similar effects in doses around 150 mg. per kg., but still smaller doses prolonged recovery. E. M. S.

Distribution and rate of elimination of picrotoxin. D. M. DUFF and J. M. DILLE (J. Pharm. Exp. Ther., 1939, **67**, 353—357; cf. A., 1939, III, 88).—In rabbits and dogs, picrotoxin (5 mg. per kg.) rapidly disappears from the blood and is taken up by the tissues. The blood contains a negligible amount after 2 hr. E. M. S.

Effect of analeptic drugs on hibernation in the thirteen-lined ground squirrel. C. PFEIFFER, M. A. FOSTER, and D. SLIGHT (J. Pharm. Exp. Ther., 1939, **67**, 307—312).—Sympathomimetic amines (adrenaline, ephedrine, neosynephrin, benzedrine) are least toxic and most potent analeptics against the hibernating state. Cocaine, picrotoxin, and metrazol are effective. Coramine causes persistent clonic

convulsions, and caffeine and strychnine cause spinal convulsions. These are quickly fatal during hibernation, whereas clonic convulsions are well tolerated. E. M. S.

Action of camphor on blood-sugar. T. Tobitani (Arb. med. Univ. Okayama, 1939, **6**, 178—192).—Camphor produces hyperglycæmia in rabbits. The effect is potentiated by picrotoxin and urethane and inhibited by ergotamine and veronal. H. O. S.

Effect of (A) harmine, harmaline, and bulbocapnine, (B) strychnine compounds, on the glutathione content of liver, spleen, and blood of rabbits. H. Asakawa (Arb. med. Univ. Okayama, 1939, **6**, 279—294, 295—310).—(A) The average glutathione content of rabbit's blood, liver, and spleen is 0·031, 0·28, and 0·26%. Harmaline, harmine, and bulbocapnine in appropriate doses decrease the concn. of glutathione in blood and liver and increase it in the spleen.

(B) Strychnine, ethylstrychnine, and iodoethylstrychnine depress blood-glutathione in small doses and increase it in larger doses; conversely, small doses augment and larger ones depress liver-glutathione. All doses increase spleen-glutathione. Since O_2 consumption is directly related to the glutathione content of tissues and inversely proportional to blood-glutathione it appears that strychnine stimulates O_2 consumption in lower doses and depresses it in larger ones. H. O. S.

Hypoglycæmic activity of globin insulin. L. Reiner, D. S. Searle, and E. H. Lang (J. Pharm. Exp. Ther., 1939, **67**, 330—340).—Hypoglycæmia produced by injection of a prep. containing globin and insulin lasts more than twice as long as that produced by the same amount of insulin. The onset of hypoglycæmia is comparatively rapid and it disappears gradually. E. M. S.

Effect of colchicine on blood. P. Borsetto (Arch. Farm. sperim., 1939, **68**, 235—242).—Injection of colchicine into dogs increases leucocyte (after a transient decrease) and erythrocyte counts, hæmoglobin content, and erythrocyte vol. F. O. H.

Fate of strontium after intravenous administration to normal persons. R. A. McCance and E. M. Widdowson (Biochem. J., 1939, **33**, 1822—1825).—Sr lactate (equiv. to 47 mg. of Sr daily) injected intravenously for 5 days was slowly excreted (90% by the kidney), but only 33—57% of the total Sr injected was recovered. P. G. M.

Excretion of *m*-acetamido-*p*-hydroxyphenylarsinic acid in urine and bile. C. Tomita (Folia pharmacol. japon, 1939, **27**, 1—2).—If given by stomach tube excretion of As in urine varies considerably in individual rabbits. Most As is usually excreted within the first 2 hr. and in the following 334 hr. in traces only. Within 12 hr. 10·8% of the As given is usually excreted. Injected intravenously As is found in the urine in greatest concn. during the first 2 hr.; after 70 hr. hardly any can be found in it. During the first 12 hr. 42·7% of the injected quantity is excreted in the urine. If given by stomach tube hardly any As is found in the bile during the first 12 hr. If given intravenously concn. in the bile is greatest from the 2nd to 6th hr. After 46 hr. no more As can be demonstrated in the bile. Within 12 hr. 0·8% of the injected As is excreted in bile. E. R.

Poisonous action of *m*-acetamido-*p*-hydroxyphenylarsinic acid and its absorption by gut. C. Tomita (Folia pharmacol. japon., 1939, **27**, 5—6).—Prolonged administration of this drug does not lead to tolerance or altered absorption by the intestine. E. R.

Early acute arsenical erythemas. Study of 11 cases of the "erythema of the ninth day" of Milian. O. Canizares and E. W. Thomas (Arch. Dermat. Syphilol., 1939, **38**, 867—876).—Early acute arsenical erythema is a clinical entity to be differentiated from the later œdematous exfoliative dermatitis. Its mechanism is unknown. The dose, type of As^{III}, mode of injection, or spacing of treatments does not influence the reaction. C. J. C. B.

Gold therapy of experimental polyarthritis in rats. W. A. Collier (Z. Immunitätsforsch., 1939, **95**, 132—138).—Treatment with solganal B and aurodetoxin largely prevents the appearance of polyarthritic symptoms in experimentally infected rats. Complete sterilisation is achieved in some cases, whilst in others the infection becomes latent. A close relationship to human polyarthritis is suggested. G. W.

Progressive bulbar paralysis and amyotrophic lateral sclerosis after chronic manganese poisoning. H. Voss (Arch. Gewerbepath. Gewerbehyg., 1939, **9**, 464—476).—Clinical and post mortem observations are described. M. A. B.

Severe manganese poisoning in Egyptian manganese miners. E. W. Baader (Arch. Gewerbepath. Gewerbehyg., 1939, **9**, 477—486).—Clinical symptoms are described. M. A. B.

Experimental toxicology of sodium and potassium permanganate. P. Cheramy and A. Lemos (J. Pharm. Chim., 1939, [viii], **30**, 249—252).—A rabbit fed 17 g. of $NaMnO_4$ in 4 doses by stomach tube at intervals of a week showed no pathological changes at autopsy although the Mn content (cf. A., 1937, III, 82) of different organs varied from 9·5 (adrenals) to 0·07 (liver) mg.-%. 7 g. of $KMnO_4$ fed similarly caused anorexia and loss of wt. At autopsy, the stomach had nearly perforated, there were hæmorrhages in the kidney, and the liver was congested. The Mn content of different tissues ranged between 45·5 (bile) and 1·2 (muscle) mg.-%. The blood-urea was increased, so that the main action was probably on the kidneys. J. L. D.

Fatal subacute industrial lead poisoning. W. Ehrhardt (Arch. Gewerbepath. Gewerbehyg., 1939, **9**, 407—413).—Clinical symptoms are described. M. A. B.

Retention ond excretion of selenium after administration of sodium selenite to white rats. R. A. Gortner, jun., and H. B. Lewis (J. Pharm. Exp. Ther., 1939, **67**, 358—364).—The Se content of liver, kidneys, and spleen of rats on Se-containing diets was 0·4—2·8% of the ingested Se, 20—50% of which was excreted in the fæces. There was no

correlation between the Se contents of the diet, organs, and fæces. E. M. S.

Ascorbic acid in experimental vanadium poisoning. F. Cavalli (Arch. Farm. sperim., 1939, **68**, 211—213).—No antidotal action of ascorbic acid was observed in guinea-pigs. F. O. H.

Pharmacology of calcium guaiacolglycollate. I. Simon (Arch. Farm. sperim., 1939, **68**, 214—234).—The salt has a toxicity (0·0060 g.-equiv. per kg., intravenously administered to rabbits) less than that of guaiacol and also has a less toxic effect on heart, blood vessels, blood pressure, and respiration. F. O. H.

Succinic acid in toxicological analysis. H. Klauer and W. Specht (Deut. Z. ges. gerichtl. Med., 1937, **28**, 265—269; Chem. Zentr., 1937, i, 3375).—Varying amounts of succinic acid often occur in decaying protein, and do not necessarily indicate poisoning, *e.g.* by oxalic acid. A. J. E. W.

Toxicity of coal-tar naphtha distillates. H. Taylor (Chem. and Ind., 1939, 1078—1080).—The distillates, b.p. 160—190°, in concn. greater than 0·10 vol.-% have a narcotic action on rats, and in one case death occurred after less than 6 hr. exposure to 0·16%. The effect on internal organs varies with different samples, but in general there is necrosis and fatty change in the liver and possible damage to the kidney. J. N. A.

Effect of noxious agents on creatine, creatinine, chloride, and water excretion. J. S. L. Browne, S. Karady, and H. Selye (J. Physiol., 1939, **97**, 1—7).—Characteristic changes occur in the excretion of water, Cl′, and creatine during adaptation of the rat to various noxious stimuli (cold, muscular exercise, formaldehyde injections). The non-adapted animal, just as the animal exhausted by continuous exposure, responds to these damaging agents with a decrease in the excretion of water and Cl′ and with an increase in urinary creatine. The animal optimally adapted shows a rise in the excretion of water and Cl′ towards or slightly above the normal level and a decrease of creatine and creatinine elimination below this level (cf. A., 1938, III, 587, 588, 899, 900). J. A. C.

Depressant action of strychnine on superior cervical sympathetic ganglion and skeletal muscle. A. Lanari and J. V. Luco (Amer. J. Physiol., 1939, **126**, 277—282).—Cats under dial were used. Painting the superior cervical ganglion with 1 or 2% strychnine diminished the response of the nictitating membrane to pre-ganglionic stimulation. This effect was transient, lasting about 10 min. Similar results were obtained after intravenous injection of 5—40 mg. of strychnine (3-kg. cat); its effect was more prolonged with the larger doses. In both cases post-ganglionic stimulation resulted in normal responses. Prostigmine (0·5—1·0 mg.) intravenously injected restored the normal response to pre-ganglionic stimulation during period of max. depression due to strychnine. Results leading to like conclusions as to the depressant action of strychnine were obtained on neuro-muscular junctions. M. W. G.

Effect of cobra venom on blood-sugar of guinea-pig and rabbit. G. Bertrand and R. Vladesco (Compt. rend., 1939, **209**, 585—587).—The reaction of guinea-pigs to a fatal dose of cobra venom is different from that of rabbits. Smaller doses injected intravenously result in hyperglycæmia in both species, but to a smaller degree in the former. Injection of dried serum (horse) suspended in 0·9% NaCl causes severe hypoglycæmia in guinea-pigs and is without effect on rabbits. J. L. D.

Effect of the poison of Formosa snakes on carbohydrate metabolism. I. Influence of acute poisoning. II. Chronic poisoning with snake venom on blood sugar of rabbits. T. Ri (Folia pharmacol. japan., 1939, **27**, 2—4, 4—5).—I. Venom of certain Formosan snakes injected subcutaneously in doses of 0·01—5 mg. per kg. in rabbits caused a rise of blood-sugar, starting 30 min. after the injection and reaching its max. after 2—6 hr. Removal of both splanchnic nerves or adrenal glands abolishes this action but removal of the vagus nerves below the diaphragm has no influence.

II. Repeated daily injections of small doses of venom cause at first a hyperglycæmia, but later become ineffective. Large doses can thus be injected without influencing the blood-sugar. E. R.

Effect of colchicine on spermatogenic mitosis in Orthoptera. I. Sokolov (Compt. rend. Acad. Sci. U.R.S.S., 1939, **24**, 298—300).—Injection of 0·01% colchicine into the abdomens of young male locusts (*Chorthippus*, sp. div.) in the 2nd or 3rd stage causes a complete loss of regular arrangement of the chromosomes in the gonad cells due to inactivation or inhibition of the spindle apparatus. It is concluded that the reactions of animal and plant cells towards colchicine are fundamentally the same. J. N. A.

Pharmacological action of deuterium oxide. VIII. Action on the central nervous system. J. P. Herrmann (J. Pharm. Exp. Ther., 1939, **67**, 265—275; cf. A., 1938, III, 327).—Cortical application of D_2O produced a cataleptic state in cats and primates. Cerebral depression was confirmed by encephalograms. The condition developed and persisted after D_2O had disappeared from the c.s.f. Application to spinal centres, nerve, or muscle had no effect. E. M. S.

Toxicity of various iodine solutions. A. L. Berman and A. C. Ivy (J. Lab. clin. Med., 1939, **25**, 113—120).—The toxicity of I solutions administered orally, intravenously, or percutaneously with reference to blood pressure depression, to the emesis point, to the blood-I curve, and to their effect in I-sensitive patients appears to be related to the presence of (1) the Na or K ion in the solution, (2) a buffering agent to neutralise free I if the latter is present, and (3) possibly to the amount of protein-I formed during absorption of orally administered I. Amend's solution and NaI are less toxic when given intravenously, are less irritating to the stomach when taken orally, and are better tolerated by I-sensitive subjects than Lugol's solution in I-equiv. doses. C. J. C. B.

Comparative toxicity of cryolite fluorine and sodium fluoride for rat. R. J. Evans and P. H. Phillips (Amer. J. Physiol., 1939, **126**, 713—719).—Albino rats were fed a basal diet to which cryolite, NaF, or a mixture of NaF and $AlCl_3$ was added so that the same levels of F were attained in the diet, viz., 0·007, 0·015, 0·03, 0·06% F. The highest-F diet inhibited growth and this inhibition was greatest with NaF; the lower-F diets allowed normal growth in all cases. Severity of inhibition of growth was proportional to content of sol. F′ in the diet. At all F levels above 0·007% bleaching of the teeth occurred, and the degree of bleaching was proportional to the inhibition of growth. At the higher levels of F intake the sol. form caused a higher deposition of F in the bone but at the lower levels not much difference was found. When the source of F was drinking-water containing 4 p.p.m. of F as NaF or as cryolite identical storage of F was found in the bones. M. W. G.

Detoxication by finely dispersed oil-in-water emulsions and their intravenous use. A. C. Frazer and V. G. Walsh (J. Pharm. Exp. Ther., 1939, **67**, 476—486; cf. Physiol. Abs., 1933—34, **18**, 551).—The detoxicating action is due to adsorption of the toxin on the oil globules. Adsorption is more rapid at body than at room temp. The first of two toxins added to the emulsion is detoxicated to the exclusion of the second. The antigenic properties of the toxin are not affected by detoxication. The suitability of these emulsions for therapeutic use is discussed. E. M. S.

Action of phalloidin from *Amanita phalloides*. M. Vogt (Arch. exp. Path. Pharm., 1938, **190**, 406—416).—The cryst. pure substance has all the toxic properties of the fungus. Phalloidin is chiefly a liver poison. Some immunity can be established by repeated administration. H. H. K.

Action of agaric, abietic, and lichesteric acid. R. Fischer and D. Toth (Arch. exp. Path. Pharm., 1938, **190**, 500—509).—Agaric and lichesteric acid have a hæmolytic action, which is inhibited by cholesterol. Both acids increase absorption and permeability and are toxic in fish. Abietic acid does not increase absorption and permeability; its hæmolytic action is not inhibited by cholesterol. H. H. K.

Cutaneous reaction to ointments and solutions of different p_H. D. M. Pillsbury and B. Shaffer (Arch. Dermat. Syphilol., 1939, **39**, 253—267).—Intact skin can withstand solutions of p_H from −2 to 12·6. Abraded skin reacts violently to solutions of p_H 1·2, a purulent ulcer being produced, healing slowly and leaving a scar. The response of abraded skin to alkaline solutions up to and including p_H 12·6 is no worse than that of intact skin. Acid applied to normal skin does not rise in p_H; alkaline solutions fall in p_H. The standard patch test is an inefficient means of maintaining the concn. of an applied solution. The p_H of the skin surface varies in different areas and subjects from 5·1 to 6·5. Keratolysis of the stratum corneum occurs at p_H over 12·6; at p_H 12·8 it is rapid and severe. C. J. C. B.

Action of soap on skin. I. H. Blank (Arch. Dermat. Syphilol., 1939, **39**, 811—824).—Saturated fatty acids of low mol. wt. yield a higher % of positive reactions to skin patch tests than do acids of higher mol. wt. Persons with normal skin give positive reactions to fatty acids of low mol. wt. as frequently as those with pathological skin. Fatty acids of a mol. wt. higher than that of decoic acid produce reactions less frequently on normal than on pathological skin. Positive reactions to the unsaturated oleic acid occur as frequently as those to saturated acids of high mol. wt. By a modified patch test technique certain fatty acids give a more intense reaction when maintained at p_H 7 than at p_H 5. Many instances of diminished reactions at p_H 3 were observed. Neither alkali nor fatty acid alone is regarded as responsible for the irritation produced by soap, but each is a contributing factor; as the mol. wt. of the fatty acids rises more alkali is required before irritation results. In 150 cases of contact or atopic dermatitis a mixture of 25% of sulphonated mixed olive and teaseed oils, 25% of liquid petroleum, and 50% of water, giving p_H 6·5, was substituted for soap. Irritation followed its use in less than 10% of cases. In 18 cases with remissions when the oil mixtures were used relapses occurred when soap was again used. The oil mixture thus maintains satisfactory personal hygiene without soap. C. J. C. B.

Allergic dermatitis simulating lymphoblastoma. A. B. Cannon (Arch. Dermat. Syphilol., 1939, **39**, 846—864).—A report is given on 8 patients suffering from a condition closely simulating the lymphoblastoma group of diseases but considered to be of allergic origin. Beginning as a simple dermatitis suggestive of an allergic reaction, the condition progressed through cycles of thickening, exfoliation, and lichenification to the formation of plaques and tumours resistant to all the usual forms of treatment. There was a striking response of the patients to removal from their previous environment and from known irritants. C. J. C. B.

Window patch test. B. T. Guild (Arch. Dermat. Syphilol., 1939, **39**, 807—810).—This technique is useful for testing reactions of the skin to volatile substances, as it provides const. visibility of the test site, and may also be valuable in studying dermatoses depending on exposure to light. C. J. C. B.

Immunological response to ingestion of foods by normal and by eczematous infants. V. W. Lippard (Amer. J. Dis. Child., 1939, **57**, 524—540).—Immunological responses to cow's milk and egg white by normal and eczematous infants were studied by determinations of complement fixation, passive transfer, and intracutaneous reactions before and after the initial ingestion. After ingestion of cow's milk, the development of sp. antibodies demonstrable by complement fixation was observed in normal and eczematous infants. In 35% of the latter, there also developed cutaneous hypersensitiveness to cow's milk. Passive transfer antibody for cow's milk was detected in only 1 eczematous infant. Temporarily positive intracutaneous and complement fixation reactions developed after the initial ingestion of raw egg white

by normal infants, but no reactions were noted for this group after ingestion of heated egg white. Eczematous infants who were given small amounts of heated egg white had sp. cutaneous, complement fixation, or passive transfer reactions. Furthermore, some eczematous infants who had never ingested egg were found to have similar reactions. The latter may have absorbed egg white transmitted through breast milk or placental circulation. C. J. C. B.

Comparative activity of deoxycorticosterone and other crystalline derivatives and of purified extracts of the adrenal cortex. A. GROLLMAN (J. Pharm. Exp. Ther., 1939, **67**, 257—264).—Daily administration (oral or parenteral) of 1 mg. of synthetic deoxycorticosterone acetate maintained normal growth in immature adrenalectomised rats. Active concentrate of cortical extracts yielded a cryst. sterol 100 times as potent as deoxycorticosterone. Corticosterone and other cryst. derivatives were inactive. E. M. S.

Food poisoning due to staphylococci; staphylococcus agglutination by normal horse serum. G. G. SLOCUM and B. A. LINDEN (Amer. J. Publ. Health, 1939, **29**, 1326—1330).—20 outbreaks of food poisoning due to staphylococci after consumption of cooked ham or tongue are described. Most strains of staphylococci lose their ability to produce enterotoxin or to give a positive Stone reaction on artificial culture. Non-enterotoxic strains agglutinate normal horse serum more readily than do enterotoxic. H. G. R.

(xxi) PHYSIOLOGY OF WORK AND INDUSTRIAL HYGIENE.

Influence of exercise on body. P. D. MARTSCHUK (J. méd., Ukraine, 1939, **9**, 383—384).—The blood, urine, and cardiovascular system of 30 persons were examined before and after muscular activity. All showed loss of wt. and casts and proteins in the urine. M. K.

[Urinary] phosphate excretion during muscular work. P. FOÀ and P. FORNAROLI (Arch. Fisiol., 1939, **39**, 367—371).—In experiments on human subjects running on a tread-mill the excretion of inorg. P in the urine was the higher the greater was the work done. The excretion of org. P was not altered. S. O.

Absorption of water from air (negative insensible perspiration). O. NEURATH (Cardiologia, 1939, **3**, 353—364).—In two cases of severe heart failure patients, after novurit injections and under strict observation, lost less wt. than corresponded with the water passed. In 1 case the difference was 788 g. in 12 hr. The conclusion is that water was absorbed from the air. G. SCH.

Effect of sleep on insensible perspiration in infants and children. R. DAY (Amer. J. Dis. Child., 1939, **58**, 82—91).—After the onset of sleep there are marked changes in the rate of wt. loss. At first there is a transitory substantial rise; after the first few min. of sleep a fall in rate of wt. loss occurs. There are concomitant changes in the cutaneous temp. and a fall in the rectal temp.; when rectal temp. becomes level further oscillations in the rate of loss of wt. may still occur. In estimating heat production from insensible perspiration by the method of Levine these variations should be taken into account so that basal figures can be selected from periods of thermal equilibrium. In children from 10 months to 3 years of age, thermal adjustments are frequently not complete for as long as 1 hr. after sleep has begun. It is suggested that the phenomena described result from purposeful reactions by the body to thermoregulatory changes associated with sleep rather than that they are due to inadvertent changes or relaxation in the sympathetic nervous system. C. J. C. B.

Insensible perspiration in children. V. Influence of atropine, pilocarpine, and adrenaline. G. J. GINANDES and A. TOPPER (Amer. J. Dis. Child., 1939, **58**, 71—81).—Atropine, pilocarpine, and adrenaline disturbed the correlation between insensible perspiration and basal metabolism. Atropine and adrenaline decreased insensible perspiration; pilocarpine increased it. The basal metabolism was uninfluenced by atropine and pilocarpine and slightly increased by adrenaline. C. J. C. B.

Increase of temperature of subcutaneous tissues in baths. R. GRUNER (Z. ges. exp. Med., 1939, **106**, 111—118).—The temp. after submersion in water of various temp. was measured in different parts of the body with a Zondek thermometer. The increase in body temp. follows Newton's law beginning with depths of 2—3 cm. below body surface. Various formulæ are given for the conditions at various bath temp., tissue depths, and time of exposure. A. S.

Detection of silica-containing dust in lung tissues by means of fluorescence microscopy. M. OBERDALHOFF (Arch. Gewerbepath. Gewerbehyg., 1939, **9**, 435—442).—Quartz and other mineral dusts show characteristic fluorescence colours under ultraviolet light when treated with fluorochromes, especially auramine, and then washed with water. Quartz dust can be detected similarly in silicotic lung tissues provided that the specimen is first treated with alcohol–ether to remove the covering of fat on the quartz particles. M. A. B.

Silicosis and the analyst. F. S. FOWWEATHER (Analyst, 1939, **64**, 779—787).—The principal occupations in which silicosis occurs are listed and the course of the disease is described. In diagnosis, after death, chemical evidence is not conclusive but is useful as corroborative proof of the pathological condition. A method for determining the SiO_2 content of lung tissue is outlined. E. C. B. S.

Sooty lungs. O. HÜBNER (Arch. Gewerbepath. Gewerbehyg., 1939, **9**, 426—434).—Post-mortem examination of the lungs of a soot burner showed that the lung affection was not due to soot but was a silicosis which had gradually developed as a result of earlier work in a porcelain factory. M. A. B.

Occupational manganese poisoning in the steel industry. H. VOSS (Arch. Gewerbepath. Gewerbehyg., 1939, **9**, 453—463).—Mn poisoning usually arises from exposure to ore dust or metallic vapour, but in the case described poisoning was due

to inhalation of ferromanganese dust containing 85—90% Mn. M. A. B.

Lungs affected by ochre dust. H. Otto (Arch. Gewerbepath. Gewerbehyg., 1939, **9**, 487—495).—The harmful constituents of ochre appear to be Fe oxides and SiO_2. *X*-Ray findings in ochre-affected lungs and pathological anatomy of Fe-affected lungs are described. M. A. B.

Chromium silicosis. E. Letterer (Arch. Gewerbepath. Gewerbehyg., 1939, **9**, 496—508).—Pathological anatomy of the lungs is described. The $Cr_2O_3 : SiO_2$ ratio in the original dust was 1 : 22·3, in the lungs 1 : 16·3, showing a slower elimination of Cr_2O_3 than of SiO_2. Spectral analysis showed that the Cr_2O_3 was mainly conc. in the damaged tissue. M. A. B.

Thomas slag pneumonia. A. Kahlstorf (Dtsch. Arch. klin. Med., 1939, **184**, 466—483).—Thomas slag dust pneumonia is produced by the action of pneumococci on lung tissue injured by the dust. A. S.

Significance of dust counts. J. M. Dallavalle (U.S. Publ. Hlth. Repts., 1939, **54**, 1095—1104).—Much of the confusion arising from the interpretation of dust counts is due to the lack of appreciation of their actual significance. The following rules are suggested. (1) The activities associated with a given occupation should be analysed and the length of time given to each activity determined. (2) Representative samples should be obtained for each activity. If dust concns. vary widely, the no. of samples should be increased so that a fair average may be obtained. (3) The concn. for each activity should be weighted according to its duration and the weighted average of all activities should then be taken to represent the occupation exposure. C. G. W.

Identification of aluminium oxide hydrate films of importance in silicosis prevention.—See A., 1940, I, 69.

Disabling morbidity among employees in soap industry, 1930—34. H. P. Brinton and H. E. Seifert (U.S. Publ. Hlth. Repts., 1939, **54**, 1301—1316).—This report deals with sickness and non-industrial injuries causing disability lasting 8 days or longer among persons engaged in the soap industry. The annual no. of cases per 1000 was 76·0 for males and 98·1 for females, while the annual no. of days of disability per person was 2·70 and 3·41, respectively. The average no of days per case was 35·5 among males and 34·8 among females. C. G. W.

Industrial dermatitis and melanosis due to photosensitisation. H. R. Forester and L. Schwartz (Arch. Dermat. Syphilol., 1938, **39**, 55—68).—Pitch dermatitis and melanosis are the products of true photosensitisation resulting from exposure to sp. spectral bands of light. These conditions do not result from chemical contact sensitisation of the type of dermatitis venenata or from allergic predisposition and commonly occur in previously normal skin of normal subjects. The photosensitisation occurs through local exogenous activity of a sp. photosensitiser. The photosensitising radiations predominate between λ 3900 and 5000 A. The investigations failed to establish definitely one sp. ingredient of pitch or a definite fractional distillate of coal tar or its particular pitch residue as the photosensitising agent in pitch melanosis and dermatitis. Tests with anthracene oil pitch and anthracene oil distillates, such as acridine, anthracene, and phenanthrene, after exposure to sunlight, resulted in reactions chiefly to pitch but also to the hydrocarbons tested. Because of the observations of photosensitisation following exposure through glass to rays of λ 4500—5300 A. and since acridine and its related hydrocarbons apparently absorb radiation chiefly at 3200—3800 and none beyond 4500 A. pitch probably contains other important photodynamic substances in addition to those sp. hydrocarbons suspected of causing sensitisation to pitch, or these substances emit radiation at a longer λ than that of their absorption spectra. Acridine and anthracene are probably not the sole photosensitising agents in pitch dermatitis. C. J. C. B.

(xxii) RADIATIONS.

Action of light on metabolism in man. W. Raab (Z. ges. exp. Med., 1939, **106**, 154—166).—5 patients were kept in darkness for 7—15 days. The fasting blood-sugar level was lowered; blood-cholesterol increased. Blood-Ca and -Cl and body-wt. were unchanged. A. S.

Analysis of skin pigment changes after exposure to sunlight. E. A. Edwards (Science, 1939, **90**, 235—237).—In adult man the sacral region of the skin was exposed to sunlight. Hyperæmia was the first effect, appearing in 2 hr. and reaching max. in 11 hr. The effects on blood vessel calibre and local colour persisted for several months. W. F. F.

Exposure to light and excretion of coproporphyrin in urine. B. G. Hager (Klin. Woch., 1939, **18**, 1045—1048).—Changes in the excretion of coproporphyrin in urine in man were found after irradiation with various sources of light; they were most const. with red light, 50% showing increase, 16% a decrease. E. M. J.

Measurement of neutron dose in biological experiments. L. H. Gray and J. Read (Nature, 1939, **144**, 439—440).—By three methods it is shown that a neutron beam which produces 1 e.s.u. per c.c. of ionisation in the graphite chamber described will give the same energy absorption per c.c. of tissue as 7 r. of γ-rays (±20%). W. F. F.

Quantitative comparison of the biological effects of neutrons and other ionising radiations. L. H. Gray and J. Read (Nature, 1939, **144**, 509). W. F. F.

Investigation of living matter with the electron microscope. M. von Ardenne (Z. tech. Physik, 1939, **20**, 239—242).—The max. irradiation with electrons which living matter can withstand is insufficient to allow observations of living matter to be made with the electron super-microscope. A. J. M.

Radioactive ointment as a method of surface radium therapy. A. Eidinow (Proc. Roy. Soc. Med., 1939, **32**, 553—558).—Rn was dissolved in

petroleum jelly and applied in a Cellophane envelope. Two intensities were used : 0·5 and 1 mc. per c.c. of melted ointment. Congenital nævi, sycosis barbæ, and multiple warts responded well to the ointment; in hypertrichosis the results were not so good.

W. J. G.

Effect of *X*-rays on the skin of amphibians before and after metamorphosis. W. Luther (Naturwiss., 1939, **27**, 713—720).—The black pigment content of the cells of the epidermis of the salamander before metamorphosis is increased by exposure to the rays and the irradiated skin retains its pigment when transplanted to an untreated salamander. Non-irradiated, light-coloured skin transplanted to a treated salamander remains light-coloured. The altered cells are not damaged but the growth of the salamander is retarded by the irradiation, which also prevents all reproductive processes in the tissue and destroys the regenerative power of the tail and feet. If irradiation has been sufficiently strong, the skin becomes thin and peels off at metamorphosis and death ensues. Salamanders less strongly irradiated recover but remain almost quite black and grow very slowly. Skin transplanted from untreated to treated salamanders undergoes normal metamorphosis since irradiation does not affect the hormonal conditions of metamorphosis. Irradiation does not interfere with differentiation but inhibits mitosis so that death follows metamorphosis. Before metamorphosis, the cells of the epidermis seem to function normally even when mitosis has been abolished by irradiation.

W. McC.

Effects of *X*-rays on cell nucleus. K. Wottge (Arch. exp. Path. Pharm., 1939, **193**, 96—106).—The effects of *X*-rays on the cell nucleus were studied by means of dark-ground illumination. Crenation of the nucleus and dimming of its contents were observed.

H. O. S.

Physiological changes produced in yeast by ultra-violet light and by heat. T. F. Anderson and B. M. Duggar (Science, 1939, **90**, 358).—In *Saccharomyces cerevisiæ*, the ability of the cells to divide is the physiological function most sensitive to ultra-violet light and to heat. Aërobic respiration of the cells is sensitive to, and resistance to staining with methylene-blue is decreased by, heat, but both are relatively unaffected by 2650 A. Irradiation with 2650 A. followed by heating is much more lethal than treatment in the reverse order. The rate of respiration is reduced by the same amount independent of this order.

L. S. T.

Effect of monochromatic light on action of enzymes. XXII, XXIII. Effect of absorbed visible light of the same intensity. XXIV, XXV. R. Murakami (J. Agric. Chem. Soc. Japan, 1939, **15**, 1047—1051, 1118—1124; cf. A., 1939, III, 783).—XXII, XXIII. The actions of yeast invertase and proteinase are promoted by visible monochromatic light, the effect being greatest with waves of short λ and gradually decreasing with increase of λ.

XXIV, XXV. The actions of both enzymes are promoted by monochromatic light from a Nitra lamp; the effect increases with light intensity, being approx. proportional to the wave no.

J. N. A.

(xxiii) PHYSICAL AND COLLOIDAL CHEMISTRY.

Calculations of bioelectric potentials. VI. Effects of guaiacol on *Nitella*. W. J. V. Osterhout (J. Gen. Physiol., 1939, **23**, 171—176).—Vals. were calc. for apparent mobilities and partition coeffs. in the outer non-aq. layer of the protoplasm of *Nitella*. Among the alkali metals (except Cs) the order of mobilities resembles that in water and the partition coeffs. follow the rule of Shedlovsky and Uhlig, increasing with ionic radius. The effect on these vals. of treatment of the cell by guaiacol was studied.

D. M. N.

Mechanism for concentration of potassium by cells, with experimental verification for muscle. E. J. Conway and P. J. Boyle (Nature, 1939, **144**, 709—710).—A special type of membrane with anion and cation permeability is postulated.

W. F. F.

Ultra-violet absorption spectra of cocarboxylase, thiamin, and their reduction products. J. L. Melnick (J. Biol. Chem., 1939, **131**, 615—620).—Reduction of thiamin or cocarboxylase causes at p_H 7·4 a reduction of the max. at 235—237 mμ. and a shifting (with slight reduction) of that at 265—266 to 280 mμ. At p_H 2·3, the band at 243 mμ. is lowered and not as sharp.

H. G. R.

Reactions of denatured ovalbumin with ferricyanide. M. L. Anson (J. Gen. Physiol., 1939, **23**, 247—261).—In the presence of the synthetic detergent duponol PC, there is a reaction between dil. $Fe(CN)_6'''$ and denatured ovalbumin, $Fe(CN)_6''''$ being formed. Denatured ovalbumin which has been treated with formaldehyde or iodoacetamide, both of which abolish the SH groups of cysteine, does not reduce dil. $Fe(CN)_6'''$ in duponol PC solvent. Cysteine-free proteins do not reduce dil. $Fe(CN)_6'''$. Conc. $Fe(CN)_6'''$ oxidises cystine, tyrosine, tryptophan, and proteins which contain these amino-acids but not cysteine.

D. M. N.

Denaturation of proteins by synthetic detergents and bile salts. M. L. Anson (J. Gen. Physiol., 1939, **23**, 239—246).—Synthetic detergents and bile salts denature proteins at the isoelectric point and keep the denatured protein in solution. This action of the detergents and bile salts depends on their hydrophobic–hydrophilic structure.

D. M. N.

Surface films of heat-denatured serum-albumin. Thin protein membranes.—See A., 1940, I, 70.

Performance of the Hepp micro-osmometer. E. Peters and G. Saslow (J. Gen. Physiol., 1939, **23**, 177—184).—Estimation of the mol. wt. of horse serum-albumin from the osmotic pressure of solutions containing 0·7—5·1% showed that the Hepp osmometer gave the same vals. as the Adair osmometer. The accuracy decreased at concns. of albumin below 0·7%.

D. M. N.

Equilibrium between valine and ammonium dimethylpyruvate.—See A., 1940, I, 72.

(xxiv) ENZYMES.

Steric specificity of glutamic acid dehydrogenase. H. von Euler and E. Adler (Enzymologia, 1939, **7**, 21—24; cf. A., 1939, III, 699).—The slow dehydrogenation of *d*(−)-glutamic acid by the apodehydrogenase is possibly caused by another enzyme present as impurity and is not increased by ultra-violet irradiation of the apodehydrogenase prep. for several hr. The irradiation decreases the rates of dehydrogenation of *l*(+)- and *d*(−)-glutamic acid and also the ratio of these rates. W. McC.

Increase in activity of *d*-amino-acid oxidase of rat liver produced by thyroid feeding. J. R. Klein (J. Biol. Chem., 1939, **131**, 139—147).—The increase in activity of *d*-amino-acid oxidase of rat liver produced by thyroid feeding is probably due to an increase in the concn. of protein. It is not dependent on a change in the nature of the flavin component or on the components of liver sol. in 33%-saturated aq. $(NH_4)_2SO_4$. The flavin concn. is not increased by thyroid feeding. E. M. W.

Cell-free enzymic model of *l*-amino-acid dehydrogenase (*l*-deaminase). A. E. Braunstein and S. M. Bychkov (Nature, 1939, **144**, 751—752).—The cell-free enzymic system isolated was able to deaminise *l*-alanine at high rate under aërobic conditions with pyocyanine as an autoxidisable H carrier. W. F. F.

Inhibition of pyrocatechol-oxidase by dihydroxymaleic acid. M. Florkin and G. Duchateau-Bosson (Bull. Soc. Chim. biol., 1939, **21**, 1204—1207; cf. Szent-Györgyi *et al.*, A., 1938, I, 524).—Dihydroxymaleic acid inhibits the action of the oxidase. No inhibition is caused by ascorbic, oxalacetic, succinic, malic, tartaric, or fumaric acid. It follows that inhibitory power depends not only on the presence in the inhibitor of the dienol group but also on the structure of the rest of the mol. W. McC.

Carotene oxidase. J. B. Sumner and A. L. Dounce (Enzymologia, 1939, **7**, 130—132).—Carotene oxidase (not identical with carotenase), extracted from soya bean and the navy bean (*Phaseolus vulgaris*) with water, is an aërobic enzyme. It does not attack saturated fats but catalyses the oxidation of carotenoids (α- and β-carotene, xanthophyll) and of unsaturated fats (not castor oil), probably causing addition of 2 O at each double linking, yielding peroxides. The oxidase exhibits optimum activity at p_H approx. 6·5. Between 15° and 30° the temp. coeff. is negative, probably because of the decrease in solubility of O_2 with increase of temp. The oxidase is inactivated by alcohol, $ZnSO_4$, $CdSO_4$, borate buffer, and heat and is pptd. by $(NH_4)_2SO_4$. In a method of determining the enzyme described, the amount of I liberated from KI by the peroxide produced is titrated with 0·1N-$Na_2S_2O_3$. W. McC.

Non-activation of pyruvic acid oxidation by free vitamin-B_1. F. Lipmann (Enzymologia, 1939, **7**, 142—145; cf. A., 1937, III, 427; 1938, III, 743, 926).—Free vitamin-B_1 does not activate the oxidation of pyruvic acid by the dehydrogenase of *Bacterium Delbrückii* or by dried brewer's yeast freed from cocarboxylase. W. McC.

Glucose oxidase. II. W. Franke and M. Deffner (Annalen, 1939, **541**, 117—150; cf. A., 1937, III, 480).—Various methods of purification and concn. of the glucose oxidase from *Aspergillus niger* were examined. The methods included pressing of the ground mycelium, dialysis, evaporation of the extract (which increased activity), pptn. by org. solvents, adsorption [kaolin, $Al(OH)_3$ C_y] and elution, and pptn. by $(NH_4)_2SO_4$. Activity was increased 250—600-fold. The purified prep. forms H_2O_2 in the substrate (glucose). The O_2 may be replaced by various H acceptors, *e.g.*, quinonoid pigments and cytochrome *c*. The rates of oxidation of glucose, mannose, and galactose are in the ratio 1 : 0·07 : 0·14. Glucose oxidase is probably a "yellow enzyme" since the flavin content of preps. is proportional to their activity. J. H. B.

Cytochrome oxidase in tea fermentation. J Lamb and E. A. H. Roberts (Nature, 1939, **144**, 867—868; cf. B., 1939, 432).—Evidence that the oxidase responsible for the oxidation of tea tannins is cytochrome oxidase is discussed. It is unlikely that an ascorbic acid oxidase is present in tea leaf. L. S. T.

Determination and distribution of cytochrome oxidase and cytochrome *c* in rat tissues. E. Stotz (J. Biol. Chem., 1939, **131**, 555—565).—Determination of cytochrome oxidase and cytochrome *c* by manometric methods is described. The amounts of these substances in rat tissues run parallel. No cytochrome *c* in early rat embryo or tumours is observed. H. G. R.

Inhibition of the action of oxidase and peroxidase by hydrocyanic acid. L. S. Malowan (Enzymologia, 1939, **7**, 193—194).—The action of the peroxidase of horse-radish extract and that of the oxidase of extract of avocado seed is inhibited by HCN in concns. not less than 0·00167N. (substrates : reduced 2 : 6-dichlorophenol-indophenol, which becomes red when horse-radish extract and H_2O_2 are added, pyrocatechol, and guaiacum resin). When sliced avocado seeds are used in place of extract, inhibition is caused only when the [HCN] is not less than 0·03N.; the inhibition is reversed by 1% of oxidised pyrocatechol. W. McC.

Decomposition of hydrogen peroxide by catalase.—See A., 1940, I, 32, 77.

Mechanism of cocarboxylase action. K. G. Stern and J. L. Melnick (J. Biol. Chem., 1939, **131**, 597—613).—Pyruvic acid is not decarboxylated by combination with cocarboxylase to form a catalytically active, substituted imino-acid (Langenbeck cycle) whilst thiamin is not a typical primary amine, since acetylation with keten yields an *O*-acetyl derivative. Neither dihydrothiamin nor dihydrococarboxylase is autoxidisable and, although the former has no antineuritic activity in pigeons, the latter is fully active both in the pigeon and in yeast systems, suggesting that the co-enzyme follows an oxidation–reduction cycle in its physiological function. H. G. R.

Enzymic phosphorylation of vitamin-B_1. H. Weil-Malherbe (Biochem. J., 1939, **33**, 1997—2007).—The synthesis of cocarboxylase from vitamin-B_1 monophosphate requires a longer induction period than that from free -B_1. The former, therefore, is not an intermediate product in the synthesis; it is first hydrolysed, and -B_1 then combines with a pyrophosphoric group which is transferred from adenylpyrophosphoric acid. A sol. protein (carboxylase) free from cocarboxylase has been prepared from yeast. Phosphopyruvic acid also acts as a phosphate donator for this enzyme in the presence of adequate amounts of adenylic acid or its pyrophosphate. Adenylpyrophosphoric acid forms with the protein a "pseudocarboxylase" of much lower activity than cocarboxylase, and actually competes with the latter when present in sufficient excess.

P. G. M.

Dopadecarboxylase. P. Holtz (Naturwiss., 1939, **27**, 724—725; cf. A., 1939, III, 390).—The enzyme, "dopadecarboxylase," which specifically decarboxylates *l*-3 : 4-dihydroxyphenylalanine (*d*-form not attacked), is not adsorbed by kaolin and is thus separated from tyrosine-decarboxylase. Rabbits and guinea-pig's kidneys have the same content of histidine-decarboxylase but the ratio of their contents of dopadecarboxylase is 1 : 4. Pig's kidney contains less histidine-decarboxylase than does rabbit's kidney but approx. 3 times as much dopadecarboxylase. Dopadecarboxylase occurs also in fœtal organs and in guinea-pig's small intestine and liver. It is detected by measuring the pressor action of the hydroxytyramine produced, by measuring the amount of CO_2 produced, or by isolating the hydroxytyramine as benzoate. The hydroxytyramine produced by dopadecarboxylase is detected only if O_2 is absent; if O_2 is present, the accompanying amine-oxidase converts the hydroxytyramine into the corresponding aldehyde, which reduces blood pressure. The oxidase does not attack dihydroxyphenylalanine. *d*-Dihydroxyphenylalanine is attacked by *d*-amino-acid-deaminase, the deamination being unaffected by CN′ and octyl alcohol. Guinea-pig's kidney contains little, rats kidney much, deaminase. Possibly dopadecarboxylase plays a part in the conversion, in the organism, of dihydroxyphenylalanine into adrenaline.

W. McC.

Mol. wt. and association of urease. D. B. Hand (J. Amer. Chem. Soc., 1939, **61**, 3180—3183).—Osmotic pressure (technique for 1 ml. of solution described) indicates an average mol. wt. of 700,000 for cryst. urease, but diffusion shows some of the active enzyme to have a mol. wt. of not more than 17,000. It is suggested that for proteins the term "mol. wt." should be confined to the smallest particle having the characteristic properties and the term "associated mol. wt." used for the aggregates. Urease may reassociate after diffusion before exerting its catalytic activity.

R. S. C.

Purification and properties of uricase. C. G. Holmberg (Biochem. J., 1939, **33**, 1901—1906; cf. A., 1939, III, 721).—The prep. of a purified sample of uricase from pigs' liver is described. The yield (7 mg. per 200 g. of acetone-dried powder) is equiv. to 10—14% of the enzyme present in the original extract. Purified uricase contains 13·5% N, 0·025% Fe, but no carbohydrate. It is not inhibited by Na_2S, 2 : 2′-dipyridyl, etc., but its great sensitivity to KCN is in keeping with the presence of a heavy metal (Fe or Zn) as an essential part of its active group. It has the same R.Q. as crude preps. and therefore probably catalyses both the oxidation and decarboxylation of uric acid.

P. G. M.

Choline-esterase and electrolytes. B. Mendel, D. Mundell, and F. Strelitz (Nature, 1939, **144**, 479—480).—1 mg. of a purified prep. of choline-esterase from horse serum hydrolysed 100 mg. of acetylcholine per hr. $Ca^{\cdot\cdot}$ and $Mg^{\cdot\cdot}$ accelerate the esterase action and $K^{\cdot}$ inhibits. The extent of the action is dependent on acetylcholine concn.

W. F. F.

Enzymic degradation of polyamines. V. Occurrence of diamine-oxidase in man, mammal, and bird. Occurrence of choline-esterase in birds. E. A. Zeller, H. Birkhäuser, H. Mislin, and M. Wenk (Helv. Chim. Acta, 1939, **22**, 1381—1395; cf. A., 1939, III, 871).—For the isolation of diamine-oxidase the organs are triturated with sea sand mixed with the threefold amount of 2·5% NaCl and dialysed at 0° at first against distilled water and subsequently against a phosphate buffer, p_H 7·2. The mixture is centrifuged and the supernatant liquid is further dialysed and generally used after 48 hr. Pptn. with acetone lowers the activity. The unit of diamine-oxidase is defined as the initial rate at which 10^{-6} mol. of cadaverine is oxidised per hr. if the enzyme is fully saturated with the substrate. The diamine-oxidase content of kidney, liver, and frequently of other organs of a series of warm-blooded animals was determined. The function and topography of diamine-oxidase are discussed, together with certain problems of development and comparative physiology.

The organs of birds are triturated with sand and Ringer–bicarbonate and the choline-esterase is determined in the centrifuged solution according to Ammon. The brain is extraordinarily rich in the enzyme.

H. W.

Enzymic trans-amination of amino-acids and its physiological significance. A. E. Braunstein (Enzymologia, 1939, **7**, 25—52; cf. A., 1939, III, 721).—A review. Improvements in methods are described. Trans-amination occurs in the mucous membrane of the small intestine, lactic acid being consumed (addition of pyruvic acid stimulates the process), but not in pulped salivary gland, pancreas, spleen, thyroid gland, lung, or smooth muscle of the hen's stomach. Since aminodicarboxylic acids cannot be determined in presence of glycine and since an appropriate method of determining glycine is not available, it is not known if glycine takes part in trans-amination. Saturated dicarboxylic acids which are not oxidised in the tissues to α-ketoacids tend to inhibit trans-amination probably by expelling keto- or amino-dicarboxylic acid from the active centre of the enzyme.

W. McC.

Specific enzyme deaminising free and combined adenylic acid. H. Borsook and J. W. Dubnoff (Enzymologia, 1939, **7**, 256).—Aq. extracts

of *Aspergillus Wentii* treated with acetone yield an enzyme which deaminises free and combined (adenylic acid pyrophosphate, nucleic acid) adenylic acid, 1 NH_3 being produced per mol. of acid deaminised. The extract produces small amounts of NH_3 from *d*-arginine and *l*-histidine but none from other amino-acids, peptides, and related compounds. W. McC.

Bacterial proteases. XII. Dipeptidases of anaërobic bacteria (anaërodipeptidases). E. Maschmann (Biochem. Z., 1939, **302**, 332—368; cf. A., 1939, III, 518, 793).—In broth, the mixed enzymes occur almost entirely as inactive dihydro-apodipeptidases which, after rapid reduction at measurable rate by cysteine, combine more rapidly with Fe$^{\cdot\cdot}$. Slight activity only is conferred by adding Fe$^{\cdot\cdot}$ (or Mn$^{\cdot\cdot}$) or cysteine alone and no activation is caused by pretreatment of the substrate with Fe$^{\cdot\cdot}$ + cysteine (Fe acts as co-enzyme). Hence the active dipeptidases, which possibly constitute oxidation–reduction systems, are metal–protein compounds. Each bacillus produces a mixture of dipeptidases. *In vitro* they exist only if cysteine or a substance having similar oxidation–reduction potential is present. The active dipeptidases produced during autolysis of the bacilli (no activity when cysteine + Fe added before autolysis) are deprived of metal by the H_2S present and the residual apodipeptidases are subsequently oxidised under aërobic conditions and so lose their power to bind Fe. Hence, after activation of the dihydroapodipeptidase with cysteine + Fe$^{\cdot\cdot}$, reversible inactivation is caused by H_2S. According to the bacillus used, the dipeptidase content of the broth varies. For the bacilli the dipeptidases have intra-cellular significance only. Methods of purifying them are described. Optimum activity is produced at p_H approx. 8 but dipeptides differ, often greatly, with respect to the ease with which they are attacked. Probably only dipeptides containing free NH_2 and CO_2H are attacked. Max. activation by Fe$^{\cdot\cdot}$ + cysteine is attained in 5 min. at 40°. The effect of Mn$^{\cdot\cdot}$ as substitute for Fe is greater or less than that of Fe$^{\cdot\cdot}$ according to the bacillus used. Substitutes for cysteine are thioacetic, thiolactic, thiobutyric, thiomalic, and ascorbic acid and $NaHSO_3$ (but not $Na_2S_2O_3$). These replace cysteine to extents which vary with the substrates used and the origin of the enzymes. When Mn$^{\cdot\cdot}$ is used instead of Fe$^{\cdot\cdot}$, H_2S replaces cysteine. The amounts of Fe$^{\cdot\cdot}$ or Mn$^{\cdot\cdot}$ required for activation are very small (approx. 5·5 μg. for 0·6 millimol. of substrate) but those of cysteine are relatively large. The reversible inhibition of activation caused by CN′ is complete only when 8—10 mols. of HCN per atom of Fe are added. Iodoacetic acid added before cysteine + Fe has slight inactivating effect but I produces complete irreversible inactivation. Reagents for the CO group cause only slight inactivation. W. McC.

Bacterial proteases. XIV. Anaërobiase. E. Maschmann (Naturwiss., 1939, **27**, 628—629).—The intra-cellular proteinase anaërobiase, in cell-free broth cultures of *B. botulinus* and gas gangrene bacteria is almost inactive proteolytically. Addition of cysteine or other thiol compounds, but not H_2S or ascorbic acid, to a culture filtrate activates the enzyme and max. hydrolysis of caseinogen, gelatin, and clupein occurs at p_H 7. Purified anaërobiase is completely inactive and although it hydrolyses caseinogen and gelatin in presence of cysteine, clupein is not hydrolysed unless the fraction removed during purification is added to the mixture. This activating substance is fairly thermostable and diffusible. It is present in the nutrient medium and very probably is not formed by the bacteria. It also occurs in yeast, muscle, blood, liver, kidney, and heart, and is present as an impurity in gelatin, gluten, and gluten-peptone. It can be replaced by diphospho- and triphospho-pyridine nucleotides but not by nicotinamide methiodide. It is concluded that anaërobiase is a single substance and that an activator is necessary for its action, the activator functioning as H carrier from the thiol group to the inactive dehydro-enzyme. J. N. A.

Kinetics of formation of chymotrypsin from crystalline chymotrypsinogen and of trypsin from crystalline trypsinogen. M. Kunitz (Enzymologia, 1939, **7**, 1—20; cf. A., 1939, III, 199, 423, 624).—A summary and mathematical analysis of results already reported. W. McC.

Separation of cathepsin from malignant and normal rat tissue. M. E. Maver (J. Biol. Chem., 1939, **131**, 127—134).—Cathepsin is pptd. from extracts of tissue with the globulin fraction and separated from it by incubation at 38° with citrate buffer at p_H 5·0 in the presence of KCN or cysteine and pptn. from the filtrate with $(NH_4)_2SO_4$. E. M. W.

Hydrolysis of gelatin by enzymes and by heating under pressure. V. N. I. Gavrilov and W. S. Balabouha-Popzova (Enzymologia, 1939, **7**, 245—255; cf. A., 1938, II, 222).—Determinations of the total N, NH_2-N, NH_3-N, "cyclic N," and peptide-N contents of gelatin hydrolysates obtained by heating with 2% H_2SO_4 at ordinary pressure or at 10 atm. and purified by electrophoresis show that the gelatin contains not less than 17·4% of N as preformed cyclic N compounds (diketopiperazines). When the hydrolysates are again hydrolysed under pressure, more cyclic N compounds are produced and most of the peptides are converted into cyclic N compounds. No such conversion occurs when gelatin is hydrolysed at ordinary pressure. Cyclic N compounds are also produced when gelatin is degraded successively by pepsin, trypsin, and erepsin, the peptide content of the degradation products decreasing progressively. Pancreatic juice acts similarly. Possibly part of the cyclic N compounds obtained by enzymic hydrolysis exists preformed in the protein mol. W. McC.

Sulphur content and activation of papain. A. Schöberl and M. Fischer (Biochem. Z., 1939, **302**, 310—331; cf. Kassell and Brand, A., 1938, II, 516).—The purification of papain by pptn. with acetone and methyl alcohol is described: pptn. with phosphotungstic acid is ineffective. The solubility of papain is decreased by drying and the activity is reversibly decreased by pptn. with org. liquids. Probably these changes are due to protein denatur-

ation. Purification is accompanied by increase in N content (which eventually approaches that of a protein) but by decrease in NH_2-N content. The S content also increases but S content is not a measure of degree of purity. The total S, inorg. S (chiefly SO_4''), cysteine-S, methionine-S (no methionine isolated), and ash contents are 3·1—3·6, 1·6—1·8, 0·6—1·6, 0·24—0·32, and 6·3—10·9% respectively. Much of the org. S occurs as cystine and the cystine content increases with increase in purity. The contents of free cysteine and cystine are low. When papain is hydrolysed with acid all peptide linkings are broken in approx. 6 hr. and the cystine content increases to a max. in approx. 3 hr. although great loss of cystine occurs. Great increase in activity results from purification and the purified material is activated much more by HCN than is the unpurified. Activation is also produced by thiol compounds. Thioacetic acid activates unpurified papain less than does HCN possibly because of the presence of heavy metal. When the ·SH of thioacetic acid is blocked by adding an equiv. amount of Zn, mercaptide is produced and activity suppressed. Thiohydracrylic acid activates to the same extent as does thioacetic and both are superior as activators to cysteine and reduced glutathione. Dithioglycollic acid, in proportion to the extent to which it is hydrolysed to thiol compounds, also causes activation almost equal to that caused by thioacetic acid. Thiol compounds protect papain from damage by alkali. Degree of activation is measured by determining the increase produced by the enzyme in the NH_2-N content of gelatin. The results suggest a relation between the hydrolytic conversion of the ·S·S· of papain into ·SH and the accompanying activation. The separation from papain of a natural activator containing S 13·12, N 9·85% is described.

W. McC.

Aëration of papain digests of wool. Production of compounds insoluble in trichloroacetic acid. H. H. Strain and K. Linderstrøm-Lang (Enzymologia, 1939, 7, 241—244).—When wool, rendered sol. by treatment with thioglycollic acid, is aërated in buffer solution (p_H approx. 7) containing papain, its content of substances insol. in trichloroacetic acid is increased if the wool concn. is high. The increase is due, not to production of compounds of high mol. wt. through the formation of peptide linkings, but probably to that of large, sparingly sol. aggregates in which peptides containing ·SH are united by one or more S·S bridges. The change is accompanied by disappearance of all ·SH groups and slight decrease in the CO_2H content, the contents of basic and NH_2 groups remaining undiminished.

W. McC.

Extraction of proteins and proteolytic enzymes from yeast. H. H. Strain (Enzymologia, 1939, 7, 133—141).—No protein is extractable from whole yeast cells, but when the cell walls are ruptured by grinding fresh or dried yeast with water, proteins and proteolytic and peptide-splitting enzymes are readily extracted. Extraction does not depend on autolysis of the proteins. In the extracts, the enzymes seem to be loosely united to the proteins. Autolysis of yeast is caused chiefly by enzymes other than those of the papain type and is not inhibited by iodoacetate, F', and oxidising agents which inactivate proteases of that type. H_2S inhibits autolysis of yeast and yeast extracts. In the extracts hydrolysis of the protein is not prevented by concn., and the concn. of yeast autolysates or exposure of autolysates or conc. extracts to air does not cause synthesis of protein. *dl*-Alanine and glucose interact in neutral and slightly acid solutions. Alkalis and PO_4''' accelerate the process, which is accompanied by a decrease in the NH_2-N content of the mixture. The basic N content remains unchanged.

W. McC.

Enzymes of emulsin which attack compounds of the chitin series. L. Zechmeister and G. Tóth (Enzymologia, 1939, 7, 165—169; cf. A., 1939, III, 722).—The chitinase of emulsin is not adsorbed by a bauxite column of appropriate length and hence is separated from the accompanying enzyme, chitobiase, which is adsorbed and is eluted with 0·1N-Na_2HPO_4. The enzymes do not attack *N-acetylphenyl-α-*d*-glucosaminide*, m.p. 241—243°, $[\alpha]_D$ +203° in water, +233° in alcohol, which is obtained by acetylating glucosamine hydrochloride and heating the product with phenol and $ZnCl_2$. The tetraacetate of the required compound is thus produced and is hydrolysed in methyl alcohol with Na methoxide. A modification of the method of determining chitobiase is described. The enzyme of emulsin which attacks *N*-acetylphenyl-β-*d*-glucosaminide is not identical with chitinase.

W. McC.

Enzyme of *Helix pomatia* which attacks compounds of the chitin series. L. Zechmeister, G. Tóth, and É. Vajda (Enzymologia, 1939, 7, 170—175).—The enzymic activity of the hepatopancreatic juice of *H. pomatia* is much greater than that of emulsin. The juice contains chitinase and, usually in lower concn., chitobiase. It also contains the enzyme which attacks *N*-acetylphenyl-β-*d*-glucosaminide (this enzyme is found associated with chitinase in chromatographic analysis) and much smaller amounts of an enzyme which attacks the α-isomeride. These two enzymes are separated by chromatographic adsorption. The β-glucosidase content of the juice is very low.

W. McC.

Determination of amylase in barley. K. Myrbäck and B. Örtenblad (Enzymologia, 1939, 7, 176—181; cf. A., 1937, III, 142).—The β-amylase of barley occurs partly free and partly bound to protein, the bound form being inactive. Bound β-amylase is liberated by proteolytic enzymes and hence total β-amylase content is determined after treating the barley with papain. In the determinations of Chrzaszcz *et al.* (A., 1937, III, 442) great variations in β-amylase content were found because the enzyme was inactivated, partly irreversibly, probably by Cu in the water used.

W. McC.

Oxidation–reduction processes during inhibition and activation of amylase. Rôle of ascorbic acid. J. Janicki (Enzymologia, 1939, 7, 182—192; cf. A., 1937, III, 441).—H_2S activates the amylase of resting barley by reducing an inhibitor or a constituent of the amylase system. Ascorbic acid, which occurs in barley extracts, inactivates the

amylase and also the α-amylase of barley malt. The effect is due to dehydrogenation of the acid and is reversed by H_2S and other reducing agents. Cu in concns. such as those found in barley (1·57 mg.-%) greatly stimulates dehydrogenation of ascorbic acid and hence inhibits the action of amylase in the extracts. Activation by H_2S is reversed only when re-oxidation occurs and substances (traces of sulphides or thiol compounds) produced in the extracts by H_2S check or prevent re-oxidation. The substances are bound by Cu. The disappearance of α-amylase in the last stages of ripening of barley does not depend only on oxidation of ascorbic acid and H_2S does not then cause activation. W. McC.

Emulsin. XL. Glucosides of isethionic acid and its ethyl ester.—See A., 1940, II, 36.

Activating effect of glycogen on enzymic synthesis of glycogen from glucose 1-phosphate. G. T. Cori and C. F. Cori (J. Biol. Chem., 1939, **131**, 397—398).—A glycogen-phosphorylase has been found in mammalian tissues and yeast. The action of liver-phosphorylase on glucose 1-phosphate, which starts immediately, is due to the presence of glycogen in such preps. Some muscle enzyme preps. appear to have lost activity entirely even in the presence of co-enzyme (adenylic acid), but are reactivated by addition of glycogen (10 mg. per 100 c.c.). P. G. M.

Catalytic action of milk flavoprotein in oxidation of reduced diphosphopyridine nucleotide (cozymase). E. G. Ball and P. A. Ramsdell (J. Biol. Chem., 1939, **131**, 767—768).—The flavoprotein with high oxidase activity (A., 1939, III, 624) catalyses the oxidation of the reduced nucleotide. Attainment of equilibrium of the reduced nucleotide with various redox indicators in presence of the flavoprotein gives E_0' approx. −0·26 v. at p_H 7·2. F. O. H.

Flavin-adenine dinucleotide in rat tissues. S. Ochoa and R. J. Rossiter (Biochem. J., 1939, **33**, 2008—2016).—The flavin-adenine dinucleotide contents of boiled extracts of rat brain, heart, kidney, and liver were determined. Adrenalectomy has no significant effect on the co-enzyme content, and only the extracts of liver and heart tissue of flavin-deficient rats show any deficiency. The dinucleotide is rapidly synthesised *in vivo* following the injection of lactoflavin, and its breakdown on incubation of fresh tissue is greatest at an alkaline p_H. Unheated blood shows no activity, but it appears after heating to 100° for 3 min. at p_H 7. P. G. M.

Preparation and properties of alkaline phosphatase-I. R. Cloetens (Enzymologia, 1939, **7**, 157—160; cf. A., 1939, III, 723).—The separation of phosphatase-I (yield approx. 10%) from phosphatase-II of fresh pig's liver is described. Advantage is taken of the facts that -II is more readily inactivated by acid than is -I and that acid phosphatase is inactivated by alkali. Phosphatase-I is inactive at p_H 5—6, and most active at 8·7—9·4. It is inactivated by 0·01M-KF, the effect being increased by $Mg^{··}$. In presence of $Mg^{··}$ its stability is greatest at p_H approx. 9 and decreases slowly until the p_H is 4, and rapidly thereafter with further decrease in p_H. When $Mg^{··}$ is absent stability is greatest at p_H 5·5—7·5. W. McC.

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Assimilation of sugar by living yeast: changes occurring during the first few minutes. A. Mirski and E. Wertheimer (Enzymologia, 1939, **7**, 58—71; cf. Willstätter and Rohdewald, A., 1937, III, 355; Goda, A., 1938, III, 1051).—At 30°, 30—50% of the acid-sol. PO_4''' content of living yeast cells disappears rapidly when 0·5—1·0% of glucose, fructose, mannose, or sucrose (with maltose the decrease takes place later and more slowly) is added, up to 80% of the decrease occurring during the first 30 sec. and before fermentation begins. The p_H also decreases from 7 to approx. 4·2 in 10 min.; this decrease does not occur if NaF or iodoacetate is added. After a few min., the content of acid-sol. PO_4''' becomes const. and remains unchanged until all the sugar has disappeared; the content then increases to the initial val. Addition of PO_4''' and changes in p_H between 7·2 and 4 do not affect the results, but at lower p_H the decrease is inhibited. The rate of decrease in the content is not enhanced by increasing the sugar concn. Decrease of temp. decreases the rate, whilst increase to 40—45° also decreases it possibly because, at this temp., dephosphorylation preponderates. If sugar degradation is interrupted by removing the sugar or adding iodoacetate or toluene, the content of acid-sol. PO_4''' at once increases; KCN has little or no effect on the content and NaF causes a greater decrease. The products of phosphorylation are hexose diphosphate and, when the period of incubation is long, an acid-insol. product. Balance experiments at 5—8° show that the amount of sugar consumed is more than equiv. to the decrease in acid-sol. PO_4'''. The excess is assimilated but no production of glycogen is detected. When living baker's yeast is cooled without addition of sugar, the content of acid-sol. PO_4''' decreases. In presence of KCN in an atm. of N_2, there is no decrease in the content at 5—8° but at 30° an increase occurs. W. McC.

Trapping acetaldehyde produced during alcoholic fermentation. C. Neuberg and R. Ziffer (Enzymologia, 1939, **7**, 225—227).—If excess of sugar is present, acetaldehyde produced during alcoholic fermentation is trapped as 2 : 4-dinitrophenylhydrazone by adding 2 : 4-dinitrophenylhydrazine in H_2SO_4. Interference with fermentation by H_2SO_4 is prevented by using fermentation mixtures containing excess of $BaCO_3$. Alternatively, the hydrazine is dissolved in dioxan or pyridine. W. McC.

Degradation of succinic, malic, and citric acid by yeast. F. Lynen and N. Neciullah (Annalen, 1939, **541**, 203—218).—The yeast used was frozen in liquid air and thawed. For dehydrogenation of succinic acid no co-enzyme is needed, but for citric or malic acid dehydrogenation boiled juice or co-enzyme (codehydrogenase II) must be added (methylene-blue technique). The facts that (*a*) when citric acid is added some time before the methylene-blue

the latter is more rapidly decolorised, (*b*) succinic acid is formed in the oxidative degradation of citric acid, conform to the Martius scheme for degradation of citric acid (A., 1937, III, 268). Malic acid is more slowly dehydrogenated than citric acid but at the same rate as succinic acid. The intermediate product succinic acid formed in citric acid degradation can be isolated owing to the low succinic dehydrogenase activity of the frozen yeast. The intermediate product α-ketoglutaric acid is converted into succinic acid. It is probable that yeast also degrades acetic acid by way of citric acid. J. H. B.

Constitution of yeast ribonucleic acid.—See A., 1940, II, 57.

Production of C_2 and C_4 compounds in citric fermentation of sugar by *Aspergillus niger*. V. Bolcato and P. Tono (Enzymologia, 1939, **7**, 146—156).—In the citric fermentation of sucrose by *Aspergillus niger* in presence of Na_2SO_3, the following compounds, in addition to citric and oxalic acid and traces of acetaldehyde, are detected and/or isolated: glycollaldehyde, glycollic, fumaric, malic, glyoxylic, pyruvic, and oxalacetic acids. W. McC.

Influence of light on pigment formation in *Penicillium funiculosum*, Thom. R. Ebeling (Arch. Mikrobiol., 1938, **9**, 1—19).—The wine-red pigment is produced by *P. funiculosum* in artificial light. In daylight this pigment is oxidised to an orange-red substance. In old cultures the pigment is brown. Pigment formation, which is probably a protective measure against light (especially of short λ), occurs only in light and to extents which are dependent on the quality and intensity of illumination. A. G. P.

Chemistry of ketone production in rancid fat. II. Production of methyl ketones from β-hydroxy-fatty acids by *Penicillium glaucum*. H. Thaler and G. Geist (Biochem. Z., 1939, **302**, 369—383; cf. A., 1928, 1064; 1929, 473; B., 1939, 1144).—In inorg. medium the mould produces methyl ketone from the NH_4 and alkali salts of β-hydroxy-butyric, -hexoic, -decoic, and -myristic acid. The growth o the mould and the yield of ketone vary with change in p_H, best yields (*e.g.*, 22—23%) being obtained at p_H 7 with hydroxydecoate and at p_H 6 with the other acids. At const. p_H, however, the rate of production varies greatly. In some cases the yields are better than those obtained from closely related non-hydroxylated acids of similar mol. wt. and ketone is more readily although more slowly produced. W. McC.

Physiological difference between αγ- and βγ-butylene glycols. K. Sakaguchi and O. Kanbayasi (J. Agric. Chem. Soc. Japan, 1939, **15**, 1019—1022).—The rates of growth and formation of reducing substances have been determined when five species of mould (*A. oryzæ*, *P. glaucum*, *Rhizopus chinensis*, *Monilia fructigena*, and *Oidium lactis*), five species of yeast, and ten of bacteria are grown in synthetic media containing 2% of αγ- or βγ-butylene glycol, glycerol, and ethylene glycol respectively as sources of C. βγ-Butylene glycol is assimilated almost as well as glycerol, but the αγ-glycol is not assimilated except by *O. lactis* and *B. mesentericus*. It has an inhibitory action on some species. Ethylene glycol is utilised by *B. mesentericus* and the moulds. J. N. A.

Growth of microscopic fungi of soil. A. Niethammer (Arch. Mikrobiol., 1938, **9**, 23—30).—Growth of a no. of soil algæ is favoured by small amounts of certain metallic (Zn, Fe) salts. The organisms respond to the action of growth-promoting and -inhibiting substances. Mutual effects of soil fungi and seedling plants are examined. A. G. P.

Biological synthesis of ammonia in soil and water. S. Winogradsky (Compt. rend., 1939, **209**, 616—620).—*Azotobacter vinelandii* and *A. agilis* are grown on SiO_2 gel containing ethyl alcohol or Na butyrate at 30° for many days and the NH_3 balance is determined. The amount of NH_3 liberated always exceeds the difference between the initial and residual NH_3 content, so that the N_2 (as NH_3) set free is derived from the atm. The necessary H_2 is probably derived from the cell structure as the cells in time become indistinguishable and cannot be cultured in spite of the continued liberation of NH_3. J. L. D.

Behaviour of *Azotobacter chroococcum* under abnormal growth conditions. L. E. den D. de Jong (Arch. Mikrobiol., 1938, **9**, 223—252).—Effects of supplies of fixed N, of exposure of cultures on N-containing media to pure O_2, of growth on liquid or solid media, and of exposure to Ra emanation on growth, pigmentation, and on variations in cell form are examined. A. G. P.

[Bacterial] decomposition of cellulose under reduced oxygen tension. R. Meyer (Arch. Mikrobiol., 1938, **9**, 80—94).—The CO_2 produced by cultures of cellulose-decomp. bacteria results largely from neutralisation of org. acids formed from cellulose by $CaCO_3$ present in the medium. H_2 is produced spontaneously by some but not by all cultures, to extents which are independent of cultural conditions. Methane is produced in small amounts by unheated cultures and is attributed to organisms other than cellulose-decomp. species. O_2 present in culture vessels was consumed before the production of fermentation gases. A. G. P.

Light-sensitive strain of *Pseudomonas aeruginosa*. J. Meiklejohn (Nature, 1939, **144**, 908).—In young cultures of *P. aeruginosa*, the formation of pyocyanine is diminished in daylight. In old cultures, light accelerates the formation of a reddish-brown pigment, which is an oxidation product of pyocyanine; its formation is independent of the presence of living bacteria. L. S. T.

Infra-red absorption spectra of purple bacteria. E. C. Wassink, E. Katz, and R. Dorrestein (Enzymologia, 1939, **7**, 113—129).—Various strains of purple bacteria have different infra-red absorption spectra, the curves usually having two max., but in all cases the alcoholic extract of the bacteriochlorophyll has the same spectrum with one chief max. In one strain, the positions of the two max. are not const., being affected by environmental conditions such as the light intensity during growth of the cultures. Probably all strains contain the same

bacteriochlorophyll which is bound, in the intact cells of the various strains, to different proteins. W. McC.

Luminescence of bacterial suspensions. Reactions concerned in luminescence. F. H. Johnson (Enzymologia, 1939, **7**, 72—81; cf. A., 1939, III, 201).—A method and apparatus for determining the intensity of luminescence of suspensions of bacteria are described. Experiments with *Photobacterium Fischeri* (*Achromobacter Fischeri*), *Ph. phosphoreum*, *Ph. splendidum*, and *Ph. Harveyi* in presence and absence of glucose show that max. intensity is attained only if H donator is present and that, in washed cells aërated in suspension in PO_4''' buffer in presence of glucose, the diminution with time in the intensity is not due to exhaustion of glucose or to accumulation of toxic metabolites. When the period of aëration preceding addition of glucose is lengthened, the increase in intensity resulting from the addition is more slowly attained and the max. reached is diminished, but the total luminescence produced during several hr. remains approx. unchanged. The total luminescence is increased by adding Cl′ and decreased by adding K′, the effects produced being increased if glucose is first added after long aëration. The intensity of luminescence subsequently decreases logarithmically with time. The results are best explained by supposing that the photobacteria contain a luciferin–luciferase system and that the luminescence reaction involves the irreversible oxidation of a definite amount of luciferin. In the first stage of the reaction, a precursor, *L*, of luciferin is reduced by dehydrogenase to luciferin, LH_2, 2 H being acquired from the substrate (glucose). In the second stage, LH_2 is oxidised by luciferase and O_2 with production of luminescence, the oxidation product not being identical with *L*. W. McC.

Flash of luminescence following anaërobiosis of luminous bacteria. F. H. Johnson, K. L. van Schouwenburg, and A. van der Burg (Enzymologia, 1939, **7**, 195—224; cf. preceding abstract).—Max. intensity of flash is obtained after very short time of anaërobiosis. When the time is long and no substrate is added, the intensity is very low but is followed by a secondary increase during the succeeding 2 min., the intensity attained being greater than that of the period preceding anaërobiosis. If added glucose is present, the same holds for short periods of anaërobiosis although abs. intensities are greater. Moderate prolongation of the period of anaërobiosis causes no change in flash or final intensity and no secondary increase occurs, but if the period exceeds 2 hr. irreversible diminution of flash and final intensity occurs. Substrates not metabolised in absence of O_2 have no effect. Anaërobic addition of adequate amounts of glucose after long aëration in absence of substrate progressively increases flash and final intensity, the max. attained being up to 20 times that obtained when no substrate is added. Compounds (*e.g.*, glucose, peptone, pyruvate) which can be metabolised in absence of O_2 increase flash intensity when added anaërobically and maintained in absence of O_2 for 30 min. but the intensity is not affected if these compounds are replaced by substances (*e.g.*, glycerol, succinate) which require presence of O_2 for their degradation. The results, and those of experiments in which the effects of addition of urethane or CN′ are demonstrated, support the luciferin–luciferase mechanism previously suggested. W. McC.

Biological production of gluconic acid. K. R. Butlin and W. H. D. Wince (J.S.C.I., 1939, **58**, 365—367).—A biological method for the production of gluconic acid from glucose is described in which *Bact. suboxydans* is used with intense aëration of the medium. The most favourable initial concn. of glucose is 15%, but glucose may be added during fermentation to make the total glucose up to 30—35%. Further increase in concn. is impracticable owing to crystallisation of Ca gluconate from solution due to the necessity of adding $CaCO_3$ for partial neutralisation. Almost quant. conversion into gluconic acid or its Ca salt is obtained if the p_H is initially controlled to allow good growth of the organism and subsequently is not allowed to fall below p_H 3·5 and preferably p_H 4·0.

[Biological] formation of acetol from αβ-propylene glycol. K. R. Butlin and W. H. D. Wince (J.S.C.I., 1939, **58**, 367—368).—A method is described for the production of acetol by the biological oxidation of αβ-propylene glycol, using *Bact. suboxydans* in a suitable nutrient medium. With intense aëration, control of p_H of the medium, and the addition of 0·5% glycerol or glucose for the C requirements of the organism, rapid and almost quant. conversion of the glycol in concns. up to 15% into acetol can be obtained.

Acidoproteolytic cocci (Gorini). E. Corberi (Arch. Mikrobiol., 1938, **9**, 95—115).—Six strains of these organisms isolated from milk and cheese are examined. The morphology and biochemical activities (described) are not sufficiently different to justify their consideration as different species. A. G. P.

Degradation of citric acid by bacteria. M. Deffner and W. Franke (Annalen, 1939, **541**, 85—117).—Strains of *B. lactis aërogenes*, *B. acidi lactici*, and *B. pyocyaneum* could be "trained" to ferment citric more readily than tartaric acid by growth on citrate media. *B. pyocyaneum* in fermenting citrate anaërobically produced no acetone, contrary to the finding of Butterworth and Walker (A., 1929, 1493). With resting bacteria (*B. pyocyaneum*) balance sheets showed that the products obtainable from citric or oxalacetic acid are CO_2, formic, acetic, and succinic acid; the quant. relations are similar to those given by *B. lactis aërogenes* and fit into the general scheme of citric acid degradation postulated (A., 1938, II, 428). It is suggested that the scheme may have wider applicability. The Martius (A., 1937, III, 268) and Walker (A., 1927, 228; 1928, 155) schemes are rejected. Under (anaërobic) conditions in which citric acid is destroyed, α- or β-ketoglutaric acid + formic acid are not attacked by *B. pyocyaneum* or *aërogenes*. Also under aërobic conditions the intermediates postulated in the Martius and Walker schemes are attacked too slowly to explain the oxidative degradation of citric acid, whereas the equimol. mixture of oxalacetic and

acetic acid is oxidised at the same rate as citric acid. J. H. B.

Production of βγ-butylene glycol by fermentation. I. K. Sakaguchi, K. Ohara, and S. Kobayashi (J. Agric. Chem. Soc. Japan, 1939, **15**, 1075—1084).—30—40% (max. 46%) of βγ-butylene glycol is formed from glucose by ten strains of bacteria isolated from soils and vegetable materials. Seven strains belong to *Aërobacter aërogenes* and related species and the other three to *A. cloacæ* and its associates. In addition to the glycol some of the strains form large amounts of ethyl alcohol. The optimum conditions for glycol formation are p_H 6—7, 37—38°, and approx. 8% of glucose. 2—5% of powdered soya-bean cake, fish meal, or rice bran mixed with small amounts of $(NH_4)_2SO_4$ can be used as sources of N. J. N. A.

Pathogenicity of *Bacterium alkalescens*. D. Nabarro and D. G. F. Edward (J. Path. Bact., 1939, **49**, 515—528).—In 17 cases in which *B. alkalescens* was isolated from the fæces it was associated with disease, usually of the intestinal tract. There was 1 example of case-to-case infection in a ward, thus demonstrating the infectivity of the organism. *Bact. alkalescens* can produce a mild form of acute dysentery or a chronic colitis. Sp. agglutinins of significant titre were produced in many cases; these were absent in a small series of healthy children. Attention is drawn to strains with abnormal biochemical properties and to the occasional variations in these properties in different cultures of the same strain. These variations are important in bacteriological diagnosis. C. J. C. B.

Preservation of *Borrelia duttoni* by freezing. K. Knight Oag (J. Path. Bact., 1939, **49**, 587—590).—Virulent *B. duttoni* were maintained for one month in tissue frozen at a temp. of −78°, whereas the strain failed to multiply *in vitro* and did not withstand ordinary desiccation and refrigeration. In mice inoculated with frozen material the appearance of spirochætes in the blood tends to be delayed in proportion to the duration of the freezing. This delay is possibly due to a progressive decline in the no. of viable organisms during refrigeration. C. J. C. B.

Bacterial growth factors. IX. Growth factor for *Clostridia*. D. W. Woolley, L. E. McDaniel, and W. H. Peterson (J. Biol. Chem., 1939, **131**, 381—385).—The prep. from a commercial cereal grain extract (galen B) of a growth-promoting substance for *Cl. butylicum* is described. A 50% aq. solution is extracted with butyl alcohol and transferred to 1% aq. NaOH. The alkaline solution is acidified, conc., and extracted with ethyl acetate. The residue on evaporation of solvent is dissolved in dil. aq. NaOH, treated with C, and the active substance eluted with alkaline alcohol. The product contains 1 unit in 0·05 μg. (compared with 1 unit in 10 μg. of galen B); it is an acid of low volatility, difficult to esterify, and is destroyed by oxidation. P. G. M.

Effect of blood digest and hæm on growth of *C. diphtheriæ*. V. Glass (J. Path. Bact., 1939, **49**, 549—561).—Peptic blood digest and hæm inhibit the growth of *C. diphtheriæ*, especially under aërobic conditions. Strains classified as resistant because of their growth on media containing heated blood can tolerate greater concns. than sensitive strains. Resistant variants derived from a sensitive strain by cultivation on heated blood, hæm, or blood digest media are resistant on all 3 kinds of media. The inhibitory effect of blood digest is not reduced by storage in the refrigerator but is reduced by boiling; that of hæm gradually decreases on storage and the deterioration is accelerated by rise in temp. This is not accompanied by a diminution of the peroxidase activity. The amount of hæm required as "*X*" factor varies with different strains of *H. influenzæ* and is of the same order as that required to inhibit the growth of sensitive strains of *C. diphtheriæ*. The ratio of the lowest concn. of hæm giving a peroxidase reaction to that producing distinct inhibition of a sensitive strain is 1 : 50. Inhibition is caused by hæmatoporphyrin under certain conditions but appears to be different from that caused by hæm. Ferri et ammonii citras (B.P.) causes no inhibition in a concn. of 0·5%. Inhibition of growth by hæm or blood digest is partially neutralised by appropriate concns. of $Na_2S_2O_4$. KCN inhibits the growth of *C. diphtheriæ* especially under aërobic conditions. In appropriate circumstances some mutual neutralisation of the effects of hæm and cyanide has been observed. C. J. C. B.

Diphtheria scratch test. M. Grozin (Amer. J. Dis. Child., 1939, **57**, 564—569).—The diphtheria scratch test is performed and the results are read in the same manner as the Pirquet test for tuberculosis. The material used is a diphtheria toxin of 1200 min. lethal doses and of at least 30 flocculating units per c.c. The test is sp. for diphtheria. Its results compare favourably with those of the well known Schick test. Its advantages are that the technique is simple; the test requires no syringes and needles; it requires less time, and it is slightly more sensitive. C. J. C. B.

Preparation of proteins from diphtheria bacilli. K. Soehring (Klin. Woch., 1939, **18**, 1093—1094).—A method for preparing pure proteins from diphtheria bacilli using human or animal serum in the culture media is described; the product gives most of the protein reactions, is free from carbohydrates and lipins, and contains 12·5% N (on dried substance). E. M. J.

Effect of viscosity of serum on rate of adsorption of antibodies. D. C. Lahiri (Indian J. Med. Res., 1939, **27**, 225—231).—Antibodies in antidiphtheritic horse serum are absorbed less rapidly after intramuscular injection in rabbits when they are mixed with gelatin, gum acacia, milk fat, or conc. antitetanic horse serum to increase their viscosities than when diluted with saline. Difference in the rates of absorption is gradually made up until from 48 hr. after injection the rates become equal. H. B. C.

Water-blue as indicator in type determination of diphtheria bacilli. J. Hohn (Z. Hyg., 1939, **121**, 732—734; cf. A., 1939, III, 1101).—When using water-blue as indicator of carbohydrate fermentation

a buffered peptone medium may be used instead of Hottinger broth, although the latter is the better medium. M. A. B.

Rôle of saliva bacteria in the Dold–Weigmann inhibition phenomenon. V. Muhlenbach (Z. Hyg., 1939, **121**, 569—580).—Growth of diphtheria bacilli and staphylococci on agar was generally inhibited to a greater extent by addition of fresh saliva than by addition of a suspension of saliva organisms previously cultured on blood–agar. Of the different species in the saliva only the streptococci showed this antagonism. M. A. B.

Toxins of meningococci [in mice]. A. Michaelides (Z. Immunitätsforsch., 1939, **96**, 55—108).—The toxicity of the exotoxin depends on the strain, media used, length of incubation, and mode of prep. The most effective was a prep. from a 4-week culture in wheat broth, inspissated to ¼ of its vol. after centrifuging. Endotoxins have hardly any toxicity for mice. The effect of the exotoxin can be increased by addition of mucin. G. W.

Toxin of *B. parapertussis* and relationship of the organism to *H. pertussis* and *Br. bronchiseptica*. I. E. Bruckner and D. G. Evans (J. Path. Bact., 1939, **49**, 563—570).—The toxin of *B. parapertussis* is very similar to those of *H. pertussis* and *Br. bronchiseptica*, although it is not so potent. It is extremely labile and not antigenic. It is distinct from the bacterial antigen. Agglutination, complement fixation, and pptn. tests demonstrate close antigenic relationship between *B. parapertussis*, *H. pertussis*, and *Br. bronchiseptica*. The results of experimental infection of mice also indicate the similarity of these organisms. (3 photomicrographs.) C. J. C. B.

Type-specific antibody production with living pneumococci in the rabbit. J. Freund and M. A. Behan (Science, 1939, **90**, 185—186).—Attenuated living pneumococci (type III) were used to immunise rabbits and proved more effective than suspensions of killed cultures passed through mice frequently. W. F. F.

Characters and systematic position of Morgan's bacillus. A. Sevin and R. Buttiaux (J. Path. Bact., 1939, **49**, 457—466).—Morgan's bacillus no. 1 differs from the other types described in possessing distinctive characters which are fairly const. in different strains and are not altered by long maintenance in artificial media. It fails to ferment lactose and mannitol and ferments glucose, fructose, and usually galactose with very slight gas production. Cultures on 1% agar develop as a film on the surface but not on 3% agar. This character is also seen in certain *O* forms of *proteus* but not in other intestinal organisms. Strains of Morgan's bacillus show a community of antigens most marked in cultures on soft agar; such cultures show also serological relationships with certain strains of *proteus vulgaris* and *proteus* X 19. Morgan's bacillus no. 1 is to be regarded as a distinct organism related to *B. proteus* and included in the subspecies which does not ferment mannitol. C. J. C. B.

Nutritional requirements of plague bacillus. M. S. Rao (Indian J. Med. Res., 1939, **27**, 75—89).—Proline, phenylalanine, and cystine are essential for growth of plague bacilli; glycine, though not essential, is stimulatory. Accessory growth factors are not essential. The different strains of the bacillus have similar nutritional requirements. H. B. C.

Hæmolysis produced by staphylococcus colonies and toxin on agar media containing various animal bloods. R. H. Rigdon (J. Lab. clin. Med., 1939, **24**, 1264—1276).—The blood used in the prep. of blood agar media influences the hæmolysis which occurs around staphylococcus colonies. The widest hæmolytic zone about any colony of the 3 types of blood studied, sheep, rabbit, and man, occurs on the rabbit. The hæmolytic zones develop much later on human blood than on either rabbit or sheep. There is a variation in the size of the areas of hæmolysis produced by toxin on the different types of blood agar. It is shown that this may be influenced by the potency of the toxin and by the temp. Staphylococcus antitoxin, when added to blood agar media, inhibits the hæmolysis which occurs around the colonies. Likewise, hæmolysis produced by staphylococcus toxin dropped on the surface is also inhibited by the antitoxin. This process apparently is one of neutralisation of the toxin by the antitoxin and is sp. since 2 strains of hæmolytic streptococci produced hæmolysis on the plates containing staphylococcus antitoxin. (12 photomicrographs.) C. J. C. B.

Carbohydrate metabolism of streptococci. T. E. Friedemann (J. Biol. Chem., 1939, **130**, 757—761).—Representative strains of green-forming streptococci were grown on beef infusion media containing 1% of peptone and 0·9% of glucose. Lactic acid was the principal product which, together with small quantities of acetic and formic acid and ethyl alcohol, accounted for 80—95% of the sugar consumed. Other Gram-positive cocci, with the exception of *Tetracoccus casei* and *Leuconostoc dextranicum*, grown on the same medium also yielded large quantities of lactic acid. A. L.

Influence of glutamine on the growth of *Streptococcus hæmolyticus*. M. Landy (Nature, 1939, **144**, 512—513).—Peptone contains factors essential to the growth of *S. hæmolyticus* in culture media. W. F. F.

Specificity of glutamine for growth of *Streptococcus hæmolyticus*. H. McIlwain (Biochem. J., 1939, **33**, 1942—1946).—No derivative or analogue of glutamine can substitute this compound as a growth factor for *S. hæmolyticus*. It appears that the organism does not utilise glutamine either for peptide formation (unless highly sp. enzymes are involved), or for NH_3 transference since NH_4 pyrrolidone-α-carboxylate and glutamic acid show no glutamine activity. P. G. M.

Quick micro-reaction for cerebrospinal fluid in syphilis. K. Boventer (Z. Immunitätsforsch., 1939, **96**, 166—172).—1 drop of c.s.f. is mixed with 1 drop of Meinicke's extract for the "Klärungs"

test on a microscopic slide and kept for 1 hr. in a moist chamber. The results are read under the microscope, dark lumpy floccules indicating a positive result. The method has the same sensitivity as the macro-Meinicke reaction. G. W.

Eagle complement fixation test for syphilis. A. Gold (J. Lab. clin. Med., 1939, **25**, 194—195).—A modification of the method of amboceptor titration is described. C. J. C. B.

Inadequacy of Laughlen and Ide test in diagnosis of syphilis. J. M. Flood and V. Mayer (Arch. Dermat. Syphilol., 1939, **39**, 510—514).—A comparative study of the Laughlen and the Ide test with the Kline, Kahn, and Kolmer tests is presented. The Laughlen and the Ide test are less sp. than the 3 standard tests used. The Ide test is satisfactory for the examination of spinal fluid, but the Laughlen test grossly fails when the spinal fluid is not conc. C. J. C. B.

Virulence of the tubercle bacillus. A. Boquet (Ann. Inst. Pasteur, 1939, **63**, 531—553).—A review. W. McC.

Tuberculosis in children less than 6 years of age. J. Tortone, A. Chattas, J. A. Myers, C. A. Stewart, and T. Streukens (Amer. J. Dis. Child., 1939, **58**, 92—101).—Of the 4328 children under the age of 6 years 79·1% had negative and 16·4% positive tuberculin reactions when first tested; in 4·5% the results of the initial tuberculin test were inconclusive. Roentgen study of over 1700 children who were not sensitive to tuberculoprotein consistently failed to reveal any lesions suggestive of tuberculosis. Of the 709 children who were sensitive to tuberculin when first tested, the initial roentgen examination disclosed no lesion in 268, calcification in 286, and pneumonic infiltrations in 155. Of the 629 children who had positive tuberculin reactions and were traced, 619 or 98·4% were alive after 5 years. Of the 3424 children who failed to react to tuberculin when first tested, 157 later became sensitive to tuberculoprotein. Roentgen studies made after these primary infections were acquired revealed normal lungs in 91 children, pneumonic infiltration in 17, and intrathoracic deposits of Ca in the remaining 49. None of the 157 children died of tuberculosis in the period during which they were followed. During the follow-up, 22 children who previously were sensitive to tuberculin lost their sensitivity and gave negative reactions to repeated intracutaneous injections of 1 mg. of old tuberculin. C. J. C. B.

Effect of irradiating tubercle bacillus with radon. P. Bonet-Maury and H. R. Olivier (Nature, 1939, **144**, 833—834; cf. A., 1939, III, 1104).—Guinea-pigs vaccinated with Rn-irradiated bacteria had a survival period double that of controls vaccinated with untreated material. Irradiation produces non-virulent tubercle bacilli. W. F. F.

Action of bactericidal substances on human and bovine tubercle bacilli. V. Bases, salts, esters, and some other compounds. E. Hailer (Z. Hyg., 1939, **121**, 633—648; cf. A., 1939, III, 795).—Saturated aq. NaCl was not effective against tubercle bacilli even after 72 hr. LiCl and $CaCl_2$ in conc. solution were effective in 24 hr. Salts of salicylic, *m*-hydroxytoluic, chloroxylene- and chlorothymolcarboxylic acids showed some toxicity, but those of benzoic, cinnamic, phenylpropiolic, chlorohydroxy- and *p*-hydroxy-toluic acids none. The free acids were all toxic in very low concn. 0·1% aq. $HgCl_2$ did not kill with certainty in 10 min. NaOH, $Ca(OH)_2$, and $Ba(OH)_2$, quaternary NH_4 compounds, caffeine, and nicotine had only a slight action. Neurine, NH_3, and tertiary amines were fairly toxic. Benzamide and salicylamide had only a slight effect. Formic esters were highly toxic, acetic and propionic esters slightly toxic, and urethane was without effect. Certain plant constituents and dyes were inactive although effective against other bacterial species. M. A. B.

Existence in tubercle bacilli of complex phosphatide acids composed of glycerophosphoric acid esterified by fatty acids and nitrogen-free polyalcohols. M. Machebœuf and M. Faure (Compt. rend., 1939, **209**, 700—702).—Fractionation of the lipin fraction of tubercle bacilli insol. in warm acetone (cf. A., 1937, III, 398) affords phosphatide acids (N less than 0·15%; P approx. 2·8%) as their Na, Ca, and Mg salts, which with N-H_2SO_4 split off fatty acid and leave water-sol. organo-phosphoric acids which are pptd. by basic but not by neutral Pb acetate and NH_3. When heated with 5% H_2SO_4 at 120°, the phosphatide acids afford glycerophosphoric acid, oses, and inositol. Hydrolysis with warm $Ba(OH)_2$ gives non-reducing osides which can be hydrolysed to oses and inositol. A very small amount of inositol is formed during hydrolysis with $Ba(OH)_2$ so that inositol may in part be linked to the sugar and in part to the glycerophosphoric acid moiety. The bacilli also contain simple phosphatide acids resembling those in higher plants, but they do not appear in this fraction. The complex acids alone have hapten activity, which is lost by hydrolysis with cold N-H_2SO_4. J. L. D.

Chemistry of lipins of tubercle bacilli. LVIII. Firmly bound lipins of so-called leprosy bacillus. W. B. Geiger, jun., and R. J. Anderson. **LIX. Composition of polysaccharide of firmly bound lipins of leprosy bacillus.** R. J. Anderson and M. M. Creighton (J. Biol. Chem., 1939, **131**, 539—548; 549—554).—LVIII. The "leprosy bacillus" after exhaustive extraction with alcohol–ether and $CHCl_3$ contains 19·2% of firmly bound lipins which can be removed by extraction with ether and $CHCl_3$ after the partly defatted cells have been treated with dil. HCl. The lipins thus obtained are separated into three main fractions. The least sol. fraction, a white amorphous powder, m.p. 175—185°, gives when hydrolysed 40·5% of carbohydrate and 66·4% of ether-sol. compounds. These are mainly OH-acids similar to leprosinic acid but lower fatty acids are also present in small amount with unsaponifiable or neutral material which contains *d*-eicosan-β-ol and *d*-octadecan-β-ol. The OH-acid was optically active but is apparently a mixture from which no definitely pure acid can be isolated. The OH-acid decomposes at 250—270°/vac., yielding 15·2% of cryst. acids which distil off. A cryst. tetracosanoic acid, m.p.

76—77°, having probably a branched-chain structure, was isolated from the volatile acids.

LIX. The polysaccharide isolated from the firmly bound lipins of the leprosy bacillus consists principally of pentosans and *d*-arabinose is the chief constituent. About 7% of pentose or pentoses other than *d*-arabinose is present but could not be identified. The polysaccharide contains a small amount of *d*-galactose. The sugars actually isolated account approx. for the total amount of reducing sugars liberated on complete hydrolysis but represent only about half of the polysaccharide. The nature of the other non-reducing cleavage products of the polysaccharide could not be determined. H. W.

Transport and point of attack of tetanus toxin in local tetanus. D. Högger (Z. Hyg., 1939, **121**, 663—678).—Injection of tetanus toxin into the myocardium of rabbits caused stiffness in the back and upper leg muscles on the left side. The toxin probably diffuses through the tissue spaces and is not transported along the axis cylinder of the nerves. It appears to act on the nervous system and not on the muscles. M. A. B.

Distribution and metabolism of nitrogen: their effects on the activity of tetanus toxin. A. R. Prévot and H. J. Boorsma (Ann. Inst. Pasteur, 1939, **63**, 600—610).—Determinations of total N and N fractions (N pptd. by trichloroacetic acid, $ZnSO_4$, and phosphotungstic acid; NH_2-N, NH_3-N, amino-acid- and diamino-acid-N, and polypeptide-N) and of total and polypeptide-CO_2H of broth to be used for propagation of the tetanus bacillus show that one of the chief factors controlling the activity of the toxin is the ratio polypeptide-CO_2H : total CO_2H as determined by Martens' method. Activity approaches its max. as the ratio does likewise. Activity is increased also by vitamins (-B_1, -B_2, nicotinamide), present or added, and by org. extracts (*e.g.*, those of brain or liver). These, and products of the N metabolism of the bacillus, alter the ratio. W. McC.

Leucocidal toxin extracted from typhoid bacilli. E. W. Dennis and H. Senekjian (Amer. J. Hyg., 1939, **30**, 103—111).—Trichloroacetic acid extracts of typhoid bacilli destroyed rabbit neutrophils in 1 : 1000 dilution. Dilution to 1 : 1,000,000 reduced the activity 50%. Heating at 100° for 2 min. inactivated the leucocidin. The crude extract contains a mixture of toxic somatic antigen complex and leucocidal factor. The latter is not antigenic and is probably an acid–alcohol-sol. N compound mixed with polysaccharide complexes. Similar extracts of leucocidin were obtained from other members of the *Salmonella* group. B. C. H.

Yaws [serological tests]. V. Pardo-Castello (Arch. Dermat. Syphilol., 1939, **40**, 762—775).—A review based on 500 cases in Cuba. Changes in c.s.f. were found in 13 of 25 cases in which examination was made, but no clinical manifestations were observed in the nervous system. Serological tests gave positive reactions in all cases. The Chediak micro-test of pptn. on a drop of defibrinated dried blood is recommended as the easiest to perform under the circumstances in which the patients are found. In this series, serological tests frequently gave positive reactions in spite of vigorous treatment. *S. pertenuis* was found in about 25% of the cases of late yaws as long as 25 years after the initiation of the disease. C. J. C. B.

Bacteriophage–organism relationships in lactic streptococci. H. R. Whitehead and G. J. E. Hunter (J. Dairy Res., 1939, **10**, 403—409).—Preps. of phages are conveniently prepared by filtration of acid- or rennet-pptd. milk cultures of the organism after incubation with the appropriate phage. The reactions between 9 phages and 11 streptococci and corresponding "resistant" strains are described. Although mostly strain-sp., some phages attack up to 4 strains. Cross-resistance tests indicate that no simple relationship holds for these phages. J. G. D.

Purification of bacteriophage. G. Kalmanson and J. Bronfenbrenner (J. Gen. Physiol., 1939, **23**, 203—228).—*B. coli* was allowed to proliferate and regenerate bacteriophage in a completly diffusible synthetic medium with NH_3 as the only source of N. After removal of bacteria and débris by filtration through a Berkefeld filter, the bacteriophage was conc. by filtration of the medium through a collodion filter which just retained the active agent. The active material, after thorough washing, contained 15% of N, and gave protein colour tests. It had 10^{-14} mg. of N per unit of lytic activity; assuming that each unit represents one mol., the mol. wt. would be approx. 36×10^6. Assuming a spherical shape of particles and density of 1·3, the calc. radius would be 22 mμ. By measurement of diffusion rate, the average radius of particle was obtained as about 9 mμ., with calc. mol. wt. of 2,250,000. A fraction could be obtained by forcing through a thin collodion membrane which gave vals. of 2 mμ. for particle radius and 25,000 for mol. wt. It appears therefore that the active agent is distributed as particles of widely different sizes. Results of a similar nature were obtained with a staphylococcus bacteriophage. D. M. N.

Filterability of the infectious anæmia virus of Equidæ. Determination of the size of the virus. L. Balzolet (Compt. rend., 1939, **209**, 703—704).—The serum of an infected donkey was diluted with 3 vols. of 0·9% NaCl and passed over infusorial earth. The resulting fluid was filtered under negative pressure through collodion membranes with pore diameters of 1000—25 mμ. The virus passed pores of 100 mμ. but was retained by 52 mμ. The virus particles are calc. to be 18—50 mμ. in diameter. J. L. D.

Second attacks of experimental poliomyelitis in *Macacus rhesus* monkeys. III. Immunity or lack of immunity to the Philadelphia 1932 strain of virus. J. A. Toomey (Amer. J. Dis. Child., 1939, **58**, 41—44).—*M. rhesus* monkeys which did not contract poliomyelitis or which had but mild infection after the injection of virulent heterologous strains of virus had second attacks of the disease when subsequently inoculated with the virulent Philadelphia strain. Monkeys which had had severe attacks occasionally contracted second attacks when

subsequently inoculated with the virulent Philadelphia strain. C. J. C. B.

Human vaccination against equine encephalomyelitis virus with formolised chick embryo vaccine. J. W. Beard, D. Beard, and H. Finkelstein (Science, 1939, **90**, 215).—Injections were made with bivalent vaccine prepared as for immunisation of horses. Antibody induction occurred. W. F. F.

Propagation of agent of measles in the fertile hen's egg. G. Rake and M. F. Shaffer (Nature, 1939, **144**, 672—673).—After 12 egg passages, monkeys infected with cultured material developed a typical maculo-papular rash resembling measles in 12—16 days. After 29 egg passages a rash developed in 10—11 days. The strain was initiated by unfiltered blood from human measles. W. F. F.

Effect of lipin solvents on vaccinia virus. A. S. McFarlane and M. G. MacFarlane (Nature, 1939, **144**, 376—377).—Ether-extracted virus contains 9% of lipins. Alcohol treatment renders the virus non-infective. W. F. F.

Effect of ultrasonic vibration on vaccinia virus. F. L. Hopwood, M. H. Salaman, and A. S. McFarlane (Nature, 1939, **144**, 377).—No effects of ultrasonic vibration treatment were observed. W. F. F.

Mol. wt. of tobacco mosaic virus protein. V. L. Frampton (Science, 1939, **90**, 305—306).—A discussion. L. S. T.

Aneurin and heterotrophy in micro-organisms. W. H. Schopfer (Arch. Mikrobiol., 1938, **9**, 116—128).—The growth-promoting action of aneurin as a mol. effect or as a succession of effects by the pyrimidine and thiazole constituents is discussed in relation to the varied abilities of the organism to synthesise the vitamin from its constituents. The thiazole constituent is of importance in controlling oxidation–reduction reactions. A. G. P.

Structure and mode of growth of bacterial colonies morphologically intermediate between *R* and *S* forms. K. A. Bisset (J. Path. Bact., 1939, **49**, 491—496).—Of the colonial forms intermediate between smooth and rough colonies, some are stable and others unstable. The unstable forms, which are common in old laboratory cultures and in strains of vaccine charbonneuse, may present an infinite series of variations in morphology between the 2 extremes. The variable factor to which these changes are due is the strength of the longitudinal attachment of the component bacteria and the consequent rigidity of the chains of filaments which they may form. In 1 case described the differences were due not to the rigidity but to the length of the component units, and this was stable for each stable colonial form. (4 photomicrographs.) C. J. C. B.

Anaërobic technique—a modified deep agar shake. N. J. Miller, O. W. Garrett, and P. S. Prickett (Food Res., 1939, **4**, 447—451).—The deep agar shake is modified by use of an oval tube, the broader sides of which are approx. parallel. The round neck of the tube is partly filled with agar treated with reduced methylene-blue. The development of the blue colour indicates the rate and extent of O_2 absorption during incubation. E. C. B. S.

Apparatus for preservation of bacterial cultures in dried state. M. L. Cooper and F. J. Grabill (J. Lab. clin. Med., 1939, **25**, 184—188).—A simple, inexpensive, low-vac. apparatus is described which satisfactorily freezes and dries 32 bacterial cultures daily. C. J. C. B.

Effective control of culture mites by mechanical exclusion. H. N. Hansen and W. C. Snyder (Science, 1939, **89**, 350).—A method is described of sealing culture tubes with cigarette papers fixed in position with gelatin, the whole being sterilised before use. W. F. F.

Preservation of the biological properties of serum, especially of complement. A. Germershausen (Z. Immunitätsforsch., 1939, **96**, 1—36).—Methods for preservation of complement are reviewed. Addition of 10·0 g. of NaCl and 4·0 g. of H_3BO_3 to 100 c.c. of serum is recommended. Na acetate instead of NaCl is equally effective. It preserves the complement up to 6 months without significant loss in titre or function. The method can also be applied to preservation of amboceptor and immune sera. G. W.

Agglutination test. F. Hansen (Z. Immunitätsforsch., 1939, **96**, 162—165).—In estimations of the titre of agglutinating sera the nature of the agglutinate should be taken into account rather than the size of the floccules, as the latter is mainly dependent on the η of the serum and not on its agglutinating power. G. W.

Hypersensitivity to toxins. H. Hiroki (Z. Immunitätsforsch., 1939, **96**, 37—55).—Immunisation of guinea-pigs with tetanus, dysentery, viper, and diphtheria toxin and with diphtheria formol toxin does not produce any hypersensitivity to the toxins. Animals which died in the course of immunisation had received more than the min. lethal dose or immunisation has proceeded too quickly. G. W.

Synthetic immunological chemistry. C. R. Harington (Dansk Tidsskr. Farm., 1939, **13**, 304—314).—A review. M. H. M. A.

(xxvi) PLANT PHYSIOLOGY.

Present and potential service of chemistry to plant breeding. A. F. Blakeslee (Amer. J. Bot., 1939, **26**, 163—172).—The effects of chemicals, notably colchicine, on chromosome behaviour in plants are reviewed. A. G. P.

Embryology of Oxalidaceæ. Development of the embryo in *Oxalis corniculata*, L. R. Souèges (Compt. rend., 1939, **209**, 698—700).—Details of the planes of cell division are described. They resemble the stages in *Senecio vulgaris* except in the formation of the bark and root primordia. J. L. D.

Solute transport in plants. A. S. Crafts (Science, 1939, **90**, 337—338).—Evidence of the existence and characteristics of tensile sap columns in plants is put forward. The mechanism of sub-aq. transpiration is discussed. L. S. T.

Upward transport of minerals through the phloem of stems. F. G. Gustafson (Science, 1939, **90**, 306—307).—Further data on the conduction of radioactive P in *Bryophyllum calycinum* and *Salix* show that, under normal conditions, upward conduction in the phloem does occur, but it is less than that postulated by Gustafson *et al.* (A., 1937, III, 365). L. S. T.

Relation of copper and zinc salts to leaf structure. H. S. Reed (Amer. J. Bot., 1939, **26**, 29—33).—Tomato plants grown in Cu-deficient media show characteristic dwarfing, involution of leaflets, colour change, and eventual necrosis. In media deficient in Zn the plants are dwarfed and show curvature and chlorosis of leaflets and involuted laminæ in which necrosis appears early. Plastids of leaf cells are small and contain oil droplets although no free oil appears in vacuoles. Evidence of disturbed metabolism is given by the production of melanotic material and much deposition of cryst. Ca oxalate. A. G. P.

Rôle of copper, manganese, and zinc in nutrition of higher plants. P. R. Stout and D. I. Arnon (Amer. J. Bot., 1939, **26**, 144—149).—A water-culture technique for the study of nutritional effects of secondary nutrients is described. A. G. P.

Rôle of sorbitol in carbon metabolism of the Kelsey plum. II. Relation of carbohydrate and acid loss to CO_2 production in stored fruit. I. Donen and E. R. Roux (Biochem. J., 1939, **33**, 1947—1956; cf. A., 1939, III, 1109).—In Kelsey plums, stored at 13° or 25°, the stage of maturity and the corresponding changes in sorbitol content are the chief factors governing C balance. The loss of C as CO_2 in young plums, which contain little sorbitol, is balanced by the loss of C as sorbitol, acid, and sugar. In plums stored first at 1° and then at 7·5° and 20° loss of C as CO_2 is much less than loss of C as sorbitol, acid, and sugar, and, in ripe plums stored at 13°, the ratio of the losses varies with the duration of storage. Hence, loss of C as sorbitol, acid, and sugar is a measure of C eliminated only when the plums are young and the temp. of storage is outside the range in which low-temp. breakdown occurs. Probably part only of the CO_2 eliminated is derived directly from sorbitol, acid, and sugar, the rest being produced from intermediate breakdown products. When the storage temp. is first 1° and then 7·5° and 20° degradation and synthesis (from sorbitol) of sugar probably occur simultaneously, as a result of low temp., before final breakdown of sugar takes place. W. McC.

Utilisation of carbohydrates in leguminous symbiosis. G. Bond (Nature, 1939, **144**, 906—907; cf. A., 1939, III, 1109).—Comparison of the evolution of CO_2 from the root systems of nodulated and nodule-free, NO_3'-fed soya-bean plants growing in water culture indicates that the amount of CO_2 produced by the nodules of a plant of the former type is slightly greater than that from the roots alone. If the respiration of the nodules is partly anaërobic (*loc. cit.*), the amount of carbohydrate utilised in nodule respiration in these water culture plants probably exceeds that used by the roots. L. S. T.

Ontogenesis and chemical synthesis of plant cell wall. K. Hess, W. Wergin, H. Kiessig, W. Engel, and W. Philippoff (Naturwiss., 1939, **27**, 622—628).—During synthesis of the primary cell wall of the cotton hair (cell enlargement), the principal constituents are non-cellulosic substances such as waxes, phosphatides, and proteins with smaller amounts of cellulose which is not arranged in a regular pattern. In the formation of secondary wall (wall thickening) the main constituent is cellulose which is arranged regularly in a lattice formation. Extraction of the primary wall with alcohol and cold water causes a spontaneous lattice formation of the cellulose and simultaneously the primary wall exhibits the same *X*-ray pattern, double refraction, swelling, and viscosity as the secondary wall. It is concluded that a substance "X," which is not wax and which contains P and N, inhibits lattice formation, but with synthesis of the secondary wall this substance is no longer formed; or that "X" is a substance which stimulates unoriented cellulose formation and is then removed so that lattice formation can occur. J. N. A.

Effect of light on growth of blue and green algæ. M. L. Iggena (Arch. Mikrobiol., 1938, **9**, 129—166).—Growth of 18 species of Cyanophyceæ was in all cases greatest with the max. daily exposure to light even when the total duration of exposure was const. *Chlamydomonas pseudococcum*, *Scenedesmus obliquus*, *Hormidium nitens*, and *Stichococcus bacillaris* were affected by the length of the light–dark interval, growth being min. when the interval was 1 min. and increasing to max. with 5 sec. and 12 hr. intervals. Interrelationships between sugar concn., light intensity, presence of CO_2, and growth of *C. pseudococcum* and *H. nitens* are examined. A. G. P.

Inhibition of assimilation in green algæ after depriving of oxygen. K. Noack, A. Pirson, and H. Michels (Naturwiss., 1939, **27**, 645).—After 12—17 hr. in absence of O_2 in the dark and in acid media containing CO_2 but no carbohydrate, assimilation of CO_2 by *Chlorella* and *Scenedesmus* is inhibited, even in absence of bacteria. After long exposure to light the inhibition is not removed until air or O_2 is admitted to the medium. If a CO_3''–HCO_3' buffer is added after anaërobiosis in the dark, assimilation takes place immediately in absence of air. The inhibition is due to the presence of acid fermentation products amongst which is lactic acid. Inhibition of assimilation can also be prevented by addition of quinone to the medium in the light, but in this case the *Chlorella* cells are soon irreversibly damaged. Other H acceptors such as methylene-blue and $K_3Fe(CN)_6$ cannot replace quinone. J. N. A.

Protoplasmic structure of *Spirogyra*. III. Effects of anæsthetics on protoplasmic elasticity. H. T. Northern (Bot. Gaz., 1938, **100**, 238—244).—Anæsthetics ($CHCl_3$, ether, esters) decrease protoplasmic elasticity in the filaments. Long immersion in anæsthetic solutions is followed by a return to normal except in the case of alcohols, which increase elasticity under these conditions. A. G. P.

Relation of environment and of physical properties of synthetic growth-substances to the

growth reaction. D. M. Bonner (Bot. Gaz., 1938, **100**, 200—214).—The acid-induced curvature in split sections of pea stems results from the greater growth of the cut than of the intact surface and is due to increased concn. of active auxin following the diminution of internal p_H of the cut surface. Correlation is established between dissociation curves and activity of *cis*-cinnamic and phenylacetic acids. On the basis of equimolar concns. of free acid *cis*-cinnamic, indolyl-acetic, -propionic, and -butyric, naphthyl- and anthracyl-acetic acids have the same activity in the pea test. Phenylacetic and indolylvaleric acids have lower activities. Acids of the same essential mol. structure probably have the same activity in the p_H-dependent and stoicheiometric growth reactions. A. G. P.

Vitamin-B_1 and growth of green plants. J. Bonner and J. Greene (Bot. Gaz., 1938, **100**, 226—237).—Vitamin-B_1 is produced in pea leaves in daylight and is translocated to growing root tips. Application of -B_1 to seedlings grown in darkness increases both root and shoot growth. Slow-growing but not rapid-growing annual plants give a growth response to treatment with -B_1 under greenhouse conditions. Org. manure contains appreciable amounts of -B_1. A. G. P.

Growth and tropic responses of excised *Avena* coleoptiles in culture. G. S. Avery and C. D. La Rue (Bot. Gaz., 1938, **100**, 186—199).—In normal coleoptiles the proportion of growth-substance is relatively low, increasing rapidly as growth proceeds from 2 to 6 mm., and remaining substantially const. after growth exceeds 1 cm. Excised coleoptiles supplied with indolylacetic acid grow well on agar media having p_H 4—7. Response of cultured excised coleoptiles to mineral nutrients and sugar in the medium diminishes with age at excision. The rate of decrease in geotropic and phototropic responses of excised coleoptiles exceeds that in concn. of growth-substances in the tips. Doubt is thrown on the conception that elongation of coleoptiles cannot occur in the absence of growth-substance. A. G. P.

[Growth of] excised tomato roots. W. J. Robbins and M. B. Schmidt (Amer. J. Bot., 1939, **26**, 149—159; cf. A., 1939, III, 437).—The greater efficiency of brown sugar than of pure sucrose in promoting growth of excised tomato roots is not due to its ash constituents. Addition of nicotinic acid, nicotinamide, or amino-acids to a sucrose–minerals–thiamin medium did not improve growth but vitamin-B_6 produced beneficial effects. -B_6 also improved growth in a sugar–minerals–thiamin medium in which the proportion of brown sugar was restricted. The presence of a growth-substance in maltose is indicated. A. G. P.

Dual effect of auxin on root formation. F. W. Went (Amer. J. Bot., 1939, **26**, 24—29).—Phenylacetic acid is not itself a root-forming substance. In the stimulated rooting of etiolated pea-stem cuttings two phases of the action of indolylacetic acid are distinguished, viz., an initial effect causing redistribution of rhizocaline (also brought about by phenylacetic and γ-phenylbutyric acids and Na naphthalenesulphonate) and a second effect (produced only by indolylacetic acid and homologues) probably involving activation of the accumulated rhizocaline. A. G. P.

Bud growth. F. W. Went (Amer. J. Bot., 1939, **26**, 109—117).—Indolylacetic and γ-phenylbutyric acids applied to short lengths of etiolated pea stems caused accumulation of bud-growth factors just below the point of application but did not themselves inhibit growth. Bud inhibition can be induced in *Œnothera* roots which regenerate buds on their basal cut surfaces. A. G. P.

Auxin distribution in seedlings; bearing on problem of bud inhibition. J. van Overbeek (Bot. Gaz., 1939, **100**, 133—166).—A method for extraction of auxin from plant organs is described, and utilised to examine auxin distribution in etiolated maize, oat, and pea seedlings. In maize the region of max. growth activity (mesocotl) has the min. auxin concn. This region is highly sensitive to auxin action. Max. concns. of auxin in maize and oats occur in basal regions of primary leaves; this may not be free-moving auxin. The auxin concn. in lateral buds of peas increases 12 hr. after decapitation: the concn. in stems decreases simultaneously. Auxin applied to the stump increases the concn. in the stem and in the upper lateral bud. High proportions of auxin in the stem probably prevent auxin formation in lateral buds. Inhibition of buds is most readily effected by introducing auxin into the vascular system of the stele. The bud-inhibiting action of auxin applied to decapitated stumps diminishes with prolongation of the interval between decapitation and treatment. A. G. P.

Anatomy of auxin-treated etiolated seedlings of *Pisum sativum*. F. M. Scott (Bot. Gaz., 1938, **100**, 167—185).—Swelling and root formation in the decapitated seedlings vary in extent with the auxin concn. and with the age of the seedling. Four phases of anatomical change in growth of swellings following auxin treatment are described. A. G. P.

Comparison of *Avena* techniques in determination of 3-indolylacetic acid. R. H. Goodwin (Amer. J. Bot., 1939, **26**, 74—78).—The relative advantages and disadvantages of the Went (water-culture) and Jensen (soil-culture) methods are examined. A. G. P.

Photo-inactivation of auxin in the coleoptile of *Avena* and its bearing on phototropism. W. F. F. Oppenoorth (Proc. K. Akad. Wetensch. Amsterdam, 1939, **42**, 902—915).—Illumination of the coleoptile tip is followed immediately by a reduction of 30% in auxin content (determined by extraction) in both light and dark sides, probably due to inactivation of the lactone fraction. Later changes suggest that phototropism is due to redistribution of auxin. E. M. W.

Evidence for the presence in certain ether extracts of substances partially masking the activity of auxin. R. H. Goodwin (Amer. J. Bot., 1939, **26**, 130—135).—The diffusion of auxin (agar block) contained in ether extracts of maize meal or bean shoots differed from theoretical vals. for auxin-*a*

or -*b*. The presence in the extracts of substances masking the effect of auxin is indicated. A. G. P.

Inhibitor of growth extracted from pea leaves. R. Snow (Nature, 1939, **144**, 906; cf. A., 1939, III, 535).—Pea leaves soaked in ether yield a water-sol. substance which inhibits the growth of oat coleoptiles. L. S. T.

(xxvii) PLANT CONSTITUENTS.

Determination of hydrocyanic acid in plant tissue by the picric acid method and the KWSZ photometer. J. T. Sullivan (J. Assoc. Off. Agric. Chem., 1939, **22**, 781—784).—HCN was determined in fresh white clover leaves, by the colour developed on heating with an alkaline picric acid reagent. The leaves are autolysed, preferably by keeping 1—2 days with toluene at room temp., and steam-distilled, HCN being determined in the distillate. E. C. B. S.

Fine structure of phloem fibres. I. Untreated and swollen hemp. B. C. Kundu and R. D. Preston (Proc. Roy. Soc., 1940, **B**, **128**, 214—231).—Several lines of investigation (*X*-ray diagrams, study of striations, swelling reactions) suggest that the phloem fibres of hemp are usually built up of cellulose chains running in a steep spiral. Observations on fibre development indicate that, during cell elongation, the chains in the primary wall move from a more transverse position to a direction similar to that of the chains in the secondary layer deposited later on it. Detailed interpretation of the effect of swelling agents on the fibres is given; the structure of the swollen wall has no resemblance to that of the intact wall. D. M. N.

Ellagic tannins. L. Reichel and E. Ulsperger (Naturwiss., 1939, **27**, 628).—The cryst. tannin, $C_{42}H_{26}O_{26}$, isolated from the fruit of divi-divi is a tetragalloylellagic acid, 2 : 2′-dihydroxy-3 : 4 : 3′ : 4′-tetragalloyldiphenyl-6 : 6′-dicarboxylic acid, and on hydrolysis yields 1 and 4 mols. of ellagic and gallic acids, respectively. The tannins from myrobalans, algarobilla, valonia, gall-nuts, etc. are constituted on the same principle. The leaves of *Quercus penduculata* also contain tetragalloylellagic acid in the acid form together with catechins or catechin-like substances. J. N. A.

Crotonoside.—See A., 1940, II, 27.

Infra-red absorption spectra of chlorophyllous pigments in living cells and in extra-cellular states. E. Katz and E. C. Wassink (Enzymologia, 1939, **7**, 97—112; cf. A., 1937, III, 486).—Cell-free systems containing the pigments of unicellular organisms (*Chlorella*, *Chromatium*, the green S bacterium *Chlorobium limicola*, *Rhodospirillum rubrum*, and the blue-gree alga *Oscillatoria*) are obtained by grinding with fine carborundum powder and water, PO_4''' buffer, dil. HCl, dil. aq. KOH, alcohol, or ovalbumin solution. As in the cells, the pigments of the extracts are bound to carriers which are presumably protein-like substances. In the red and infra-red zones, the absorption curves are almost identical with those of the living cells. The infra-red absorption of the *Chromatium* extract is not affected by H_2 + Pt, O_2, air, N_2, or H_2S and is much less affected by strong light than is the absorption of extracts made with org. solvent. When colloidal aq. extract of *Chromatium* is heated a new max. appears on the curve. This change is probably due to liberation of the pigment from the carrier. From the relation between the position of the absorption max. of extracts of dried *Chlorella* and *Chromatium* made with org. solvents and n of the solvents, the val. of the max. of the free pigment is obtained by extrapolation. When org. solvent is used to extract the pigment the max. is shifted to shorter λ (except when alcohol is used for *Chromatium*) because liberation of pigment from carrier occurs. W. McC.

Anthocyanins. IV. Isolation of pæonin from the flowers of *Pæonia albiflora*, var. *hortensis*. V. Dye of the berries of *Fatsia japonica*. K. Hayashi (Acta Phytochim., 1939, **11**, 82—89, 91—108; cf. A., 1937, II, 464).—IV. Flowers of three differently coloured, Japanese varieties of *P. albiflora*, var. *hortensis*, contain approx. 0·115, 0·099, and 0·030%, respectively, of pæonin (absorption max. at 1950, 3000, 3550, and 3750 A.). The first two contain also a little (?) datiscetin, m.p. 282° (tetra-acetate, m.p. 142°); the third contains also a little kæmpferol; both flavones are isolated as tetra-acetate. The structure of pæonin is proved by (*a*) conversion by H_2O_2–NaOH into glucose (isolated as phenylosazone) and a product, hydrolysed by hot HCl to vanillic acid, and (*b*) hydrolysis by boiling HCl to glucose (quant.) and pæonidin chloride.

V. The ripe berries of *F. japonica*, Decaisne et Planchon, yield idæin (isolated with difficulty as cryst. chloride, +6·5 and +2·5 H_2O) and a little quercetin (isolated as penta-acetate). The structure of idæin is proved by (*a*) hydrolysis by HCl to galactose (quant.) and cyanidin chloride, which in KOH at 160° gives phloroglucinol and protocatechuic acid, (*b*) successive partial methylation and H_2O_2-oxidation, yielding veratric acid, and (*c*) colour reactions, distribution, and absorption max. at 1900, 3000, and 3550 A. R. S. C.

Pigment of seed-husks of *Andropogon sorgum*, Brot.—See A., 1940, II, 19.

Osage orange pigments.—See A., 1940, II, 19.

Identification of a Columbian plant, *Piñique-Piñique*, as *Rauwolfia heterophylla*, Roem. and Schult. (*Chalchupa* of Guatemala). M. M. Janot and R. Mendoza (Compt. rend., 1939, **209**, 653—656).—Alkaloids different from rauwolfine (cf. Siddiqui and Siddiqui, A., 1933, 289) are extracted from the roots and leaves. The hypertensive action of adrenaline (0·01—0·05 mg.) (cf. Raymond-Hamet, A., 1939, III, 1085) after injection of the alkaloid is reversed. The alkaloid is an emetic. *R. heterophylla*, *Chalchupa*, and *Piñique-Piñique* have identical morphological characteristics. J. L. D.

Alkaloids of white quebracho bark. R. A. Labriola (Anal. Asoc. Quím. Argentina, 1939, **27**, 150—159).—Alkaloids present in *Aspidosperma quebracho-blanco*, Shlecht, and some related species are described. F. R. G.

Alkaloids of *Rœmeria refracta*, DC. Alkaloids of plants of the Papaveraceæ family.—See A., 1939, II, 565.

Cassaine, a crystalline alkaloid from bark of *Erythrophleum guineense* (G. Don).—See A., 1940, II, 28.

Structure of monocrotaline, the alkaloid in *Crotalaria spectabilis* and *C. retusa*.—See A., 1940, II, 29.

Chemistry of the *Aesculus* saponin and its structure.—See A., 1940, II, 50.

Hypaphorine from *Erythrina cristagalli*.—See A., 1940, II, 59.

Chemical study of *Ammothamnus Lehmanii*, Bge.—See A., 1940, II, 58.

Preparation and reactions of karanjin.—See A., 1940, II, 49.

(xxviii) APPARATUS AND ANALYTICAL METHODS.

Combination simple manometer and constant-volume differential manometer for studies in metabolism. W. H. Summerson (J. Biol. Chem., 1939, **131**, 579—595).—The apparatus is the equiv. of two single manometers of the Barcroft–Warburg type. The differential readings are significant for high- or low-pressure vessels and a sensitive manometer fluid may be used. H. G. R.

Construction of inexpensive power washer and the designing of economical and efficient brushes for cleaning of laboratory glassware. H. E. Morton (J. Lab. clin. Med., 1939, **25**, 211—215). C. J. C. B.

Illuminating box for flocculation (Kahn) and sedimentation tests. J. S. Brotherhood (J. Lab. clin. Med., 1939, **25**, 195—196). C. J. C. B.

Nomogram for determining statistical significance and probable error of differences of percentages. R. Schrek (J. Lab. clin. Med., 1939, **25**, 180—184).—By means of the nomogram described it is possible to determine whether two % have significant differences. The nomogram can also be used to find the *P* val. of the difference of two %. C. J. C. B.

Stability of colour produced by Nessler's reagent. Use of the reagent in the photometric determination of nitrogen. L. Gillo (Bull. Soc. Chim. biol., 1939, **21**, 1117—1138).—In the determination of N (in samples containing 0·5—1 mg. NH_3-N) by photometric measurement of the colour produced with Nessler's reagent, stability of the colour is attained and development of turbidity avoided if the alkalinity is 0·1N., the concn. of electrolytes does not exceed 0·1N., and measurement is made after 1 hr. Much greater concns. of electrolyte do not interfere if 1% gum-arabic solution (freed from NH_3 by a current of air and treatment with permutite) is added as protective colloid. N in biological material is determined directly, after destruction of org. matter as in the Kjeldahl method and neutralisation of the solution. The results agree to within 1% with those of that method. If Danet's colour standards (A., 1932, 921) are used, they must be filtered. W. McC.

Colorimetric determination of ammonia with thymol–hypobromite reagent.—See A., 1940, I, 38.

Micro-Kjeldahl method including nitrates. R. H. Moore (Bot. Gaz., 1938, **100**, 250—252).—Reduction of NO_3' by H_2SO_4–reduced Fe is followed by the normal Kjeldahl digestion (using K_2SO_4–$CuSO_4$–H_2O_2) and distillation by Pregl's method. A. G. P.

Photometric determination of tryptophan, tyrosine, di-iodotyrosine, and thyroxine.—See A., 1940, II, 32.

Polarographic micro-determination of cystine in protein hydrolysates. A. Stern, E. F. Beach, and I. G. Macy (J. Biol. Chem., 1939, **130**, 733—740).—A polarographic method is employed for the determination of not less than 15 μg. of cystine per c.c. in protein hydrolysates from casein, edestin, and mammalian globins. For each protein a calibration curve is first made by plotting increases in the wave heights against added known amounts of cystine. A. L.

Isolation of lysine from protein hydrolysates.—See A., 1940, II, 30.

Submicro-determination of total nitrogen, ammonia, amino-nitrogen, amides, peptides, adenylic acid, and nitrates. H. Borsook and J. W. Dubnoff (J. Biol. Chem., 1939, **131**, 163—185; cf. A., 1935, 1140).—The determination of the above N compounds in duplicate in a mixture using 0·2 ml. containing 0·5 mg. of N is described. The Conway–Byrne NH_3 distillation (cf. A., 1933, 654) has been made more rapid and a modified Kjeldahl procedure devised. The final procedure in all the methods is an electrometric titration using a glass electrode. E. M. W.

Rapid determination of water in biological material. A. S. Chaikelis (J. Lab. clin. Med., 1939, **24**, 1284—1290).—A rapid method for the determination of water in biological material, particularly whole blood, in samples of 1 ml., embodying alcohol extraction and xylene–alcohol–water miscibility principle has been perfected. This method applied to human diabetic blood (62 observations) gave consistently good results requiring a max. analytical period of 1—1½ hr. contrasted with 75 hr. in the standard drying method. The results are 2% higher than those obtained with the standard drying method. The sensitivity of the method was 0·3%. Description of an inexpensive, but efficient, cooling apparatus, wherein temp. better than −30° are obtainable, is given. C. J. C. B.

Analysis of biological compounds containing deuterium by interference refractometry. R. Jonnard (Bull. Soc. Chim. biol., 1939, **21**, 1185—1193).—The method of interference refractometry applied to the determination of the concn. of D_2O in water gives results in agreement with those obtained by other methods. A curve showing the relation between n and D_2O concn. is given. The presence of D_2O in very small amounts of biological material is detected by dissolving in water and in D_2O of known concn. and measuring n of the solutions. The results agree well with those calc. from the amount of D which exchanges with H. W. McC.