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ERRATA.

(Abstracts, 1931.)

page. col 1051 2	l. line. 3-4	For "dihydroergoster in CHCl ₃)" read ' [a] _D +4-01° in CH	rol I, m.p. 156°, [a] _D +4·01 ' <i>dihydroergosterol</i> I, m.p. 215 HCl ₃)."	° in CHCl ₃ (acetate —216°, [a] _D —4·4	, m.p. 215—216°, [a]o ° in CHCl ₂ (acetate, m.p	- 4·4° 5. 156°,
			(Abstracts, 1932.)			

106	1	20*	For "this vol., 14" read "A., 1931, 14."
381	2	4*	For "[vi]" read "[iv]" and for "154" read "144."
547	I	13*	For "levorotatory" read "destrorotatory."
615	1		In formula (V), at the top left-hand corner, for "CH-C" read "OH-CH-C."
816	1	12*	Insert "The following are described : p-methyl-, m.p. 185-186° (picrate, m.p. 149-150°), p-methoxy-, m.p. 202-203° (picrate, m.p. 144-145°), p-iodo-, m.p. 179-180° (picrate, m.p.
		- NE	151-152°), p-chloro-, m.p. 175-176° (picrate, m.p. 155-156°), o., m.p. 168-169° (decomp.)
			(picrate, m.p. 167-168°), and m-nitro-phenacylbenzyldimethylammonium bromide, m.p. 153-
			154° (picrate, m.p. 134–135°), p-nitrophenacylbenzyldimethylammonium chloride, m.p. 176°
	1		(picrate, m.p. 164-165°), m-, m.p. 180-181° (picrate, m.p. 149-150°), and o-bromophenacyl-
			benzyldimethylammonium iodide, m.p. 134-135° (picrate, m.p. 125-126°); w-chloro-m-
			bromoacetophenone, m.p. 47-48°; w-dimethylamino-w-benzyl-p-methylacetophenone, m.p.
			62°; p-methoxy-, m.p. 57-58°, p-iodo-, m.p. 119-120°, p-chloro-, m.p. 91-92°, m-nitro-,
			m.p. 77-78°, m-bromo-, m.p. 99-100°, and o-bromo-w-dimethylamino-w-benzylacetophenone
			(picrate, m.p. 126—127°).
854	1	32	For "afford" read "the former affords."
854	1	4*	For "NHMe CH, Ph " read " NPhMe CH, Ph,"
175	2	8*	After "HARRIS" insert "I. MILLS."

* From bottom.

BRITISH CHEMICAL ABSTRACTS

A.--PURE CHEMISTRY

FEBRUARY, 1933.

General, Physical, and Inorganic Chemistry.

Resonance spectrum of hydrogen. K. R. RAO and J. S. BADAMI (Proc. Roy. Soc., 1932, A, 138, 540—549; cf. A., 1931, 1343).—The anomalous effect previously reported (*loc. cit.*) is considered to be caused by a transfer of energy by collisions of the second kind between As atoms in the metastable state $4p^{21}S_0$ of As II and atoms of H. A new type of impact is thus demonstrated, for the energies of ionisation and excitation of one atom are simultaneously transferred to another atom by a single act of collision.

L. L. B.

Rotational uncoupling, with application to the singlet hydrogen bands. P. M. DAVIDSON (Proc. Roy. Soc., 1932, A, 138, 580—593).—Theoretical. The theory of rotational uncoupling is applied to the nd' bands of H_2 , and found to give fairly good results for the levels and the intensities in the bands.

L. L. B.

Photographic elementary process for lithium hydride. F. BACH and K. F. BONHOEFFER (Naturwiss., 1932, 20, 940).—The absorption spectrum of LiH shows a sharp absorption max. at 2517 ± 2 Å., which corresponds with the photographic elementary process for this substance, the electron of the H⁻ ion being transferred to the Li⁺ ion and giving rise to neutral atoms of H and Li. A. J. M.

Structure of β -nitrogen and the different phosphorescing powers of the two forms of nitrogen. L. VEGARD (Z. Physik, 1932, 79, 471-491).—In the low-temp. α -N₂ the mol. axes behave as if "frozen," whereas in the β -form they appear to precess or rotate; assuming phosphorescent bands due to a metastable state, this explains their absence from the β -modification. A. B. D. C.

Absorption measurements and transition probabilities for the A (0,0) and B (0,1) bands of oxygen. W. H. J. CHLDS (Phil. Mag., 1932, [vii], 14, 1049—1060).—The ratio of the vibrational transition probabilities $0 \rightarrow 0$, $0 \rightarrow 1$, determined from the relative intensities of the A and B atm. O_2 bands, is 1:0.081. The total absorption is proportional to the square root of the no. of absorbing mols. H. J. E.

Continuous absorption of oxygen at 1450 A. E. C. G. STUECKELBERG (Physical Rev., 1932, [ii], 42, 518-524).—Mathematical. The explanation in the term diagram of the mol. of the measurements of Ladenburg is compared with the corresponding matrix elements. N. M. B. Displacements and their significance in (PP)combinations of the sodium arc spectrum. H. BARTELS (Z. Physik, 1932, 79, 345-369).-18 members of (PP)-combinations were observed in the Na arc. Displacements from calc. positions are explained as a quadratic Stark effect. A. B. D. C.

Spectra of Na IV, Mg V, Al VI, Mg III, and Al IV in the extreme ultra-violet. J. Söderqvist (Z. Physik, 1932, 79, 634-641). A. B. D. C.

Hyperfine structure of the spectra of sodium, mercury, and lead. Origin of the intensity variation of hyperfine structure components. K. MURAKAWA (Sci. Papers Inst. Phys. Chem. Res. Tokyo, 1932, 20, 1—12).—Data are given for the lines λ 3302·34, 3302·94, 5889·96, and 5895·93 of Na, indicating a nuclear moment of 1/2 in opposition to that given by band spectra; for λ 5790·66, 3663·28, and 3131·84 of Hg, and for λ 4057·83, 3572·74, and 4340·43 of Pb. Intensity variation is due to uneven self-absorption of hyperfine structure components.

N. M. B.

Calculation of the terms of the optical spectrum of an atom with one series electron. J. Mc-DOUGALL (Proc. Roy. Soc., 1932, A, 138, 550-579).--Mathematical. Hartree's method for determining energies of optical terms (A., 1928, 216) gives good vals. for the X-ray levels, but not for the optical terms; the discrepancy is attributed to the polarisation of the core by the series cleetron. Slater's approximation to the many-body problem (A., 1930, 126) is used to obtain more accurate expressions for the terms, and calculations have been carried out for 12 optical terms of Si⁺³. L. L. B.

Pole effect of iron. (FRL.) M. ADAM (Ann. Physik, 1932, [v], 15, 568—612).—The Stark and pole effects of Fe have been studied. The relationships between the pole effect and pressure, inner quantum no., Stark effect, and the dependence of pole effect on the series character of individual multiplets are discussed. W. R. A.

First spark spectrum of tellurium. S. C. DEB and H. B. MOHANTI (Bull. Acad. Sci. Agra and Oudh, 1931—1932, 1, 26—32).—About 90 lines of the first spark spectrum of Te in the wave-length range 2600— 7200 Å. have been measured and classified.

J. W. S.

Hyperfine structure and isotopes. B. VENKATE-SACHAR (Current Sci., 1932, 1, 10).—Unexplained lines in the fine structure of CdI lines excited by pass-

I

age through a Hg arc were observed. The line 5086 Å. has a satellite at -0.026 Å., which is a doublet of separation 0.012 Å., indicating the presence of isotopes in small quantities. CH. ABS.

Isotope effect in the spectrum of cadmium hydride. E. SVENSSON (Nature, 1933, 131, 28).— Components belonging to Cd¹¹⁸ and Cd¹⁰⁸ have been detected in addition to those for Cd¹¹⁴, Cd¹¹², Cd¹¹⁰, and Cd¹¹⁶. Indications of Cd¹¹¹ may have been obtained. Peculiarities of intensity distribution among the isotope components are discussed.

L. S. T.

Zeeman effect of "forced "dipole lines. C. J. BAKKER and E. SEGRÈ (Z. Physik, 1932, 79, 655— 660).—An investigation of the Zeeman effect in the forbidden Hg line at 3680 Å. confirms the theory of forced dipole radiation. A. B. D. C.

Hyperfine structure of arc lines in vacuum of bismuth in the visible and ultra-violet regions. W. MOHAMMAD and P. N. SHARMA (Phil. Mag., 1932, [vii], 14, 1143—1149; cf. this vol., 2).—Term schemes for levels in Bi are given. H. J. E.

Pressure broadening and displacement of spectral lines. M. KULP (Z. Physik, 1932, 79, 495-510).—Line displacement in absorption and emission is associated with a const. density of gas, and line width with fluctuations in density. Stark effect and multiplet lines are discussed. A. B. D. C.

Spectrum of cosmic radiation. A. S. SKAPSKI (Nature, 1932, 130, 893).—A correction (cf. A., 1932, 1187). L. S. T.

Spectral light zones in front of glow discharge cathodes. A. GÜNTHER-SCHULZE and F. KELLER (Z. Physik, 1932, 79, 563—565).—The light zones previously reported have been photographed (cf. A., 1932, 552). A. B. D. C.

Process of space quantisation. R. FRISCH, T. E. PHIPPS, E. SEGRÈ, and O. STERN (Nature, 1932, 130, 892-893).—Results for K are described.

L. S. T.

Optical investigations of discharge by condensed spark in low-pressure gases. N. RYDE (Z. Physik, 1932, 79, 626-633).—Intensity distribution and displacement of spectral lines were used to determine the field at various points of the discharge. A. B. D. C.

Black-body radiator of electrically heated carbon. T. N. PANAY (Compt. rend., 1932, 195, 1256—1258).—An arrangement is described whereby the radiation issuing through a hole from the interior of a hollow C cylinder heated electrically to about 2400° can be observed. C. A. S.

Inversion measurements with spectral lines for estimation of total absorption and relative numbers in excited atomic states. H. KOHN (Physikal. Z., 1932, 33, 957—963).—When a continuous spectrum is passed through a gas which absorbs and emits selectively, certain lines are removed from the continuous spectrum and in the limit they disappear. This "inversion" can be made use of to calculate total absorption and other data of various energy levels. A. J. M.

Fine structure of $K\alpha$ of carbon. W. MORAND and A. HAUTOT (Compt. rend., 1932, 195, 1070— 1071).— $K\alpha$ of C consists of two lines 0.6 Å. apart, as required by theory, that of longer λ being the stronger (cf. A., 1929, 366). C. A. S.

 $K\alpha_1\alpha_2$ doublet of chlorine in different compounds. O. LUNDQUIST (Naturwiss., 1932, 20, 905—906; cf. A., 1932, 1072).—The displacement of the $K\alpha_1\alpha_2$ lines of Cl₂ by combination in NaCl, NaClO₂, and NaClO₄ has been investigated. There is displacement towards the shorter waves, greatest for NaClO₄. A. J. M.

K-Absorption edges of nickel, copper, zinc, and their compounds. M. ISHINO and K. KOJIMA (Mem. Coll. Sci. Kyoto, 1932, A, 15, 293—300).—The structures of the absorption edges for the pure metals differ from those of their respective compounds, and appear to be more closely related to the crystal forms of the substances. J. W. S.

Modification of X-rays by passage through matter. S. BHARGAVA and J. B. MUKHERJEE (Bull. Acad. Sci. Agra and Oudh, 1931—1932, 1, 48—53; cf. A., 1931,277).—With Cu K radiation through six sheets of black paper 1 mm. thick a satellite is observed corresponding with the modification by C expected, analogous to the Raman effect for visible radiation. A similar modified line has been observed using Ag K radiation and a Ni film 0.04 mm. thick. J. W. S.

Diffraction of cathode rays by single crystals. III. Simultaneous reflexion. K. SHINOHARA (Sci. Papers Inst. Phys. Chem. Res. Tokyo, 1932, 20, 40— 51; cf. A., 1932, 979).—Theoretical. Additional lines, due to the simultaneous reflexion of cathode rays from two net-planes, in the diffraction patterns of electrons are investigated. N. M. B.

Multiple Compton effect. H. HULUBEI (Compt. rend., 1932, 195, 1249—1251).—Theory requires that in addition to the line caused by the normal (single) Compton effect there should be bands resulting from multiple application thereof. This has been confirmed by means of Mo K radiation on paraffin and of Rh K radiation on Li, when bands with max. at 785 and 700.68 X, respectively, are produced, the lines resulting from the ordinary effect due to $K\beta$ being at 656.5 and 570 X, respectively (0=92°). C. A. S.

Intensity measurement of X-radiation by means of enumeration of light quanta. V. LOECK (Ann. Physik, 1932, [v], 15, 527-544).

W. R. A.

Corrections for X-ray spectrometers. H. SEE-MANN (Z. Physik, 1932, 79, 661—667).—Corrections are given for calculations of the zero point, the inclination of the crystal surface to the photographic plate, and interpolation of a line between two known lines. A. B. D. C.

Absorption of short electric waves in ionised gases; an attempt to detect the long-wave radiation of hydrogen atoms. O. BETZ (Ann. Physik, 1932, [v], 15, 321—344).—The absorption of electric waves (3—30 cm.) by ionised H, O, and N has been studied. H shows 3 regions of absorption at 3, 9, and 28 cm. corresponding, respectively, with the transitions

 $2p_1-2s$, $3d_2-3p_2$ or $2p_1-2s$, and $3d_1-3p_1$. O and N show no characteristic absorption. W. R. A.

Photo-electric quantum counters for visible and ultra-violet light. I. G. L. LOCHER (Physical Rev., 1932, [ii], 42, 525-546).—The principles of the photo-electric cell and Geiger-Müller tube counter are combined to give a means of measuring faint light in the range 900-7500 Å., and sensitive to photocurrents of 0.05 electron per sec., by direct electron counting. For ultra-violet light the most sensitive photo-electric surface was I on Sc. Surfaces sensitive to visible light were made by coating Cu cathodes with fused NaCN, and with amalgams of Na, K, Cs, Sr, and Na-K, and forming by reduction thin films of the respective hydrides by intense H⁺ bombardment. The most sensitive were KH-Hg. Very thin films of 30 org. dyes and photographic sensitisers coated on the Zn cathode of a counter shifted the photo-electric threshold towards the ultra-violet and increased the sensitivity of the surface. By introducing NPhEt, in the vicinity of the W cathode and reversing the field direction the sensitivity was increased 25 times; gases with high min. ionisation potentials gave the best results. Results are illustrated for various light N. M. B. sources.

Electronic ionisation at low and high pressures. K. MASCH (Z. Physik, 1932, 79, 672-675). —The ionisation coeff. is determined for N_2 , O_2 , and air at pressures between 20 and 1077 mm. Hg, and at different field intensities. A. B. D. C.

Unifying relation for intensity of ionisation in gases. W. KOLHÖRSTER (Z. Physik, 1932, 79, 682– 683).—Earlier work (Naturwiss., 1919, 7, 412) is extended to intensity of ionisation at various temp. and pressures, and with different gases.

A. B. D. C.

Transfer of energy between molecules during collisions: quenching of mercury resonance radiation by admixed thallium vapour. O. S. DUFFENDACK (Physical Rev., 1931, [ii], 37, 107).— At 0.8 mm. and 750° the radius of the excited Hg atom has an apparent val. 30 times the normal kinetic theory radius. He added to the Hg-TI mixture gives a radius little greater than normal at 0.001 mm. and 750°. N₂ instead of He gives a slightly larger radius. The differences are attributed to differences in the concn. of excited Hg atoms in the ${}^{3}P_{1}$ and ${}^{3}P_{0}$ states. L. S. T.

Fraction of the current traversing a lowpotential arc carried by positive ions. A. GEHRTS and H. VATTER (Z. Physik, 1932, 79, 421-435).— At low currents only 0.5% is carried by positive ions from a glowing cathode. Increase of the current lowers the temp. of the cathode until a limiting current is reached, when the cathode temp. rises with increasing current; 5% is then carried by positive ions. A. B. D. C.

Method for the production of slow canal rays. W. REUSSE (Ann. Physik, 1932, [v], 15, 252-255). W. R. A.

Energy loss of slow canal rays by passage through a solid body. W. REUSSE (Ann. Physik, 1932, [v], 15, 256-258).—The method of measuring energy loss and the dependence of energy loss on the linear velocity are discussed. W. R. A.

Emission of positive ions from heated metals. LER. L. BARNES (Physical Rev., 1932, [ii], 42, 487– 491).—In addition to the emission of singly-charged atoms of the alkali metals by Fe, Ni, Cu, Rh, Nb, Pt, U, and Th, the five first named emit singly-charged atoms of their own metals. N. M. B.

Temperature variation of the positive-ion emission from molybdenum. LER. L. BARNES (Physical Rev., 1932, [ii], 42, 492-497).—Vals. for the positive-ion work function and the reflexion coeff. for Mo ions were in better agreement than those of Smith (cf. A., 1930, 514) with the latter's theory of positive-ion emission. N. M. B.

Non-existence of ion mobility spectrum in air. R. N. VARNEY (Physical Rev., 1932, [ii], 42, 547— 555; cf. Loeb, A., 1932, 4).—New experimental methods indicate the absence of a spectrum in relatively clean air, and its appearance after prolonged radiation, or in presence of impurities. N. M. B.

Accommodation coefficient of gaseous ions at cathodes. K. T. COMPTON (Proc. Nat. Acad. Sci., 1932, 18, 705—711; cf. A., 1931, 780).—Available data are reviewed and interpreted. The theory of pressures on a cathode is confirmed by measurements on a Mo cathode in ionised He. N. M. B.

Influence of the angular distribution of scattered electrons on the measurement of effective cross-sections. R. KOLLATH (Ann. Physik, 1932, [v], 15, 485-515).—Theoretical. W. R. A.

Inelastic collisions of fast electrons. O. KLEMPERER (Ann. Physik, 1932, [v], 15, 361-394). W. R. A.

Polarisation of electrons after two scatterings through 90°. E. RUPP (Z. Physik, 1932, 79, 642– 654).—Electrons of 130 kv. showed unsymmetrical reflexion of 3-4%, and those of 250 kv. showed 9– 10%. A. B. D. C.

Electron microscope. M. KNOLL and E. RUSKA (Z. Physik, 1932, 79, 699).—An acknowledgment (cf. A., 1932, 1184). A. B. D. C.

Behaviour of electrons in nitrous oxide. V. A. BAILEY and J. B. RUDD (Phil. Mag., 1932, [vii], 14, 1033—1046; cf. A., 1930, 1081; 1932, 559).—A peak occurs in the λ (fractional energy loss on collision of an electron with N₂O)-u (electron velocity) curve at $u=3\times10^7$ cm. per sec. This energy corresponds with the strongest infra-red absorption band of N₂O. There is a smaller peak at $u=7\times10^7$ cm. per sec.

H. J. E.

Determination of energy states of metal electrons from optical constants. H. FRÖHLICH (Naturwiss., 1932, 20, 906).—The dependence of the optical consts. of a metal on frequency provides a method of finding the energy states of the electrons. The quantity nkv^2 , where *n* is refractive index, *k* absorption coeff., and \vee frequency, can be obtained from a study of the absorption spectrum. This determination of the intensity of absorption bands indicates that the behaviour of the electrons of Cu, Ag, and Au differs considerably from that of free electrons. A. J. M. At. wt. of lead from cyrtolite. G. P. BAXTER and C. M. ALTER (Science, 1932, 76, 524—525).— Four determinations of the at. wt. of Pb from cyrtolite (Bedford, N.Y.) gave an average val. of 205.924 from the ratio $PbCl_2: 2Ag$ (Ag 107.88, Cl 35.457). Comparative determinations with common Pb and Pb from Swedish kolm gave 207.211 and 206.012, respectively. Cyrtolite lead is thus nearly, if not quite, free from common Pb, and the Pb–U ratio found by Muench can be used to estimate the age of this mineral. The low val. is difficult to reconcile with Aston's isotopie wt. of Ra-Pb (205.98 \pm 0.02) and ratio of Pb²⁰⁶ to Pb²⁰⁷ in pure U-Pb from Katanga. L. S. T.

Chemical elements and atomic types from the viewpoint of investigation of isotopes. (Report on work from end of 1931 to end of 1932.) O. HAHN (Ber., 1933, 66, [A], 1—14).—A discussion and tabular presentation of the present knowledge of individual and chemical (practical) at. wts. calc. therefrom. H. W.

Rare earths. W. KLEMM (Z. anorg. Chem., 1932, 209, 321—324).—The classification of rare earths proposed by Endres (A., 1932, 696) is regarded as unsatisfactory. E. S. H.

Recalculation of mass defects. D. IWANENKO (Nature, 1932, **130**, 892).—New mass defect vals. are plotted from the point of view that only neutrons and protons are present in the nucleus. New vals. for Sn^{124} and Pb^{208} are given. L. S. T.

Vapour pressure of hydrogen rich in the heavier isotope. W. MEISSNER and K. STEINER (Z. Physik, 1932, 79, 601-612).—The difference in v.p. of normal H₂ and H₂ rich in H² increases with time, and this increase gives 26% of the richer mixture as isohydrogen (H₂ with one H of mass 1 and the other of mass 2), whereas density determinations give 0.9%: the larger percentage given by v.p. is explained by the presence of two modifications of the *iso*hydrogen, the heavier having nuclear moment 0 or 1.

A. B. D. C.

Cosmic occurrence of the H² isotope. A. UN-SÖLD (Naturwiss., 1932, 20, 936–937).—By studying the H lines in the solar spectrum it is found that the relative cosmic occurrence of H² is <1 in 100,000. A. J. M.

Mass ratio of the boron isotopes from the spectrum of BO. F. A. JENKINS and A. MCKELLAR (Physical Rev., 1932, [ii], 42, 464–486).—New waveno. data of the rotational structure of bands of the B¹¹O and B¹⁰O systems are tabulated. Vibrational, rotational, and electronic isotope effect data are deduced. N. M. B.

Method of separating gaseous isotope mixtures and its application to the isotopes of neon. G. HERTZ (Z. Physik, 1932, 79, 700).—A correction (cf. this vol., 4). A. B. D. C.

Neutronic equilibrium of isotopes. W. SWIENTO-SLAWSKI (Nature, 1932, 130, 964).—The existence of every kind of atom and of all isotopes can be explained by assuming that the atoms of different elements can emit or incorporate neutrons (Nr) even under astronomical conditions, thus $O^{18} \Longrightarrow Nr + O^{17}$ and $O^{17} \Longrightarrow$ $Nr+O^{16}$. The concellation of each isotope then depends on the velocity of formation or decomp. of the heavier isotope. The neutronic equilibrium among all the isotopes of one element was probably established under astronomical conditions of formation of the elements and exists at the present time, although the non-radioactive elements are decomposed with extremely small velocity. L. S. T.

Ionisation produced in a spherical vessel by radon. COLMANT (Bull. Soc. chim. Belg., 1932, 141, 464—476).—Tables based on Mund's equations are given for calculating the no. of ion pairs formed; their use does not involve the range of the α -particles concerned nor the total ionisation, and they are independent of the distribution of the Ra-A and Ra-C. H. F. G.

Internal conversion coefficient for radium-C. H. R. HULME (Proc. Roy. Soc., 1932, A, 138, 643— 664).—Mathematical. Assuming the radiation field to be represented by an oscillating dipole at the nucleus, the internal conversion coeff. has been calc. for Ra-C. Actual wave functions were used, instead of the asymptotic expansion (cf. Casimir, A., 1931, 139). The process may be explained as an ordinary photo-electric effect, provided the ray $h\nu=14\cdot26\times10^5$ e.v., which is almost completely converted, be excluded. In some cases the γ -rays are due to transitions where the angular momentum of the nucleus changes by one unit, whilst Taylor and Mott (this vol., 111) have shown that the assumption of quadripole radiation explains the remaining lines.

Ľ. L. B.

Origin of the actinium series of radioactive elements. A. VON GROSSE (Physical Rev., 1932, [ii], 42, 565—570).—It is concluded from the correlation of data on selected material that the Ac series is independent of, and the decay much more rapid than in, the U-Ra series. The geological significance of this result is discussed. N. M. B.

Velocities of emission of α -particles. G. H. BRIGGS (Nature, 1932, 130, 1000).—Vals. for the relative velocities of Ra-C', Th-X, thoron, Th-A, -C, and -C', and Ra-A and radon are recorded. L. S. T.

Absorption of β -rays by matter. G. FOURNIER and M. GUILLOT (Compt. rend., 1932, 195, 1264— 1265; cf. A., 1930, 130).—Using a source of Ra-*E* the mass absorption coeffs., μ/ρ , of Pt and Pb are respectively 25.8 and 26.4, compared with 26.08 and 26.64 deduced from the author's formula $\mu/\rho = 15 + 0.142Z$. C. A. S.

Measurement of radium in minerals of small uranium content by the method of γ -rays. F. BĚHOUNEK (Z. Physik, 1932, 79, 583—594).—An electrometer method for measurement of small Ra content in pitchblende is described. A. B. D. C.

Number of electrons expelled by the action of hard γ -rays. H. HERSZFINKIEL (Acta phys. Polon., 1932, 1, 237—248; Chem. Zentr., 1932, ii, 1885).—For γ -rays of wave-length 6.6 X, the absorption coeff. and the relative no. of electrons expelled were for Al, Fe, Ag, and Pb, respectively, 245, 283, 352, 473, and 0.85, 1.0, 1.33, 1.67. A. A. E.

Theory of the internal conversion of γ -rays. H. M. TAXLOR and N. F. MOTT (Proc. Roy. Soc., 1932, **A**, 138, 665—695).—Mathematical. Hulme's calculations (this vol., 110) have been repeated, assuming the field of a quadripole, instead of that of a dipole, for the nucleus. L. L. B.

Disintegration of light elements by fast protons. J. D. COCKCROFT and E. T. S. WALTON (Nature, 1933, 131, 23; cf. A., 1932, 556, 893).—A more sensitive method shows that the disintegration of Li gives a second group of particles of max. range approx. 2 cm. in addition to the α -particle group of 8.4 cm. range. The no. of particles in the second group is approx. equal to that of the first. The group appears to be composed of a-particles. By decreasing the absorption between target and ionisation chamber the no. of particles from B greatly increases and approx. 25 times as many are obtained from B as from Li. One particle per 2×10^6 incident protons at 500 kv. is emitted. The ionisation produced indicates that they are a-particles, and the energy of the main group supports the assumption that a proton enters the B^{11} nucleus to form a nucleus which breaks up into 3 α -particles. A few particles with a range up to approx. 5 cm. also appear to be present. L. S. T.

Neutron and neuton, the new element of at. no. zero. W. D. HARKINS (Nature, 1933, **131**, 23).— Theoretical. Neutrons of unit mass may be considered to constitute an element of at. no. 0, for which the name " neuton " is suggested. L. S. T.

Interaction between neutrons and atomic nuclei. L. MEITNER and K. PHILIPP (Naturwiss., 1932, 20, 929–932).—To find whether there is any connexion between neutrons and the accompanying γ -rays, the Wilson method was used to compare the intensities of H-rays liberated from paraffin and an air-H₂O mixture by neutrons from Be, B, and Li. The results agreed with those of Becker and Bothe (A., 1932, 671, 1187) with γ -rays. It is therefore probable that neutrons and γ -rays are emitted simultaneously. The neutron emission from Be is not homogeneous. Some examples of breakdown experiments with Be neutrons are given. It is possible to carry out these nuclear processes in both directions. By bombarding B with α -rays, N₂ is obtained, and a neutron is split off; when N₂ is bombarded with neutrons, the B nucleus is formed, and an α -particle is split off.

A. J. M.

Binding energy of nuclear constituents. H. R. VON TRAUBENBERG (Naturwiss., 1932, 20, 934-936). -The nucleus may be regarded as made up of free electrons, a-particles, neutrons (N), duotons (H², D), and triotons (H^3, T) . It is possible to make up the at. nuclei of elements, including isotopes, of a-particles, N, D, and T, and without free electrons up to O^{18} . Above this it is necessary to include free electrons. The curve connecting binding energy with the no. of x-particles is characteristic of each type of nucleus, and by extrapolation the binding energy of H^2 and H^3 can be determined. That of H² is approx. 5 microergs, and of H3, 15 microergs. The binding energy of two α -particles is < that between an α -particle and D, or an α -particle and T. A. J. M.

Theory of atomic nuclei. E. N. GAPON (Z. Physik, 1932, 79, 676–681).—Mass defect and isotope formation can be explained between He and A by assuming nuclei of α -particles and protons.

A. B. D. C.

Evaporation phenomena of mercury droplets and their influence on the elementary electric charge. A. LUSTIG and M. REISS (Z. Physik, 1932, 79, 696-699).—Polemical, against Nestle (A., 1932, 981) and Schäfer (*ibid.*, 198). A. B. D. C.

Can the eye distinguish a "schrot" effect for photons? R. B. BARNES and M. CZERNY (Z. Physik, 1932, 79, 436—449).—The human eye accommodated to darkness is sufficiently sensitive to observe inherent fluctuations in the no. of photons emitted by a weak light source; experiments that might reveal this effect are described. A. B. D. C.

Direction-quantised atoms in a variable magnetic field. E. MAJORANA (Nuovo Cim., 1932, 9, 43-50; Chem. Zentr., 1932, ii, 970).

Atomic physics and vital activities. (SIR) F. G. HOPKINS (Nature, 1932, 130, 869-871).—An address. L. S. T.

Value of e/m by deflexion experiments. G. E. UHLENBECK and L. A. YOUNG (Physical Rev., 1931, [ii], **37**, 99).—Quantum mechanical considerations predict no observable deviations for the val. of e/mfrom classical results for electrons possessing energies of the order of magnitude used in deflexion experiments. L. S. T.

Colours of inorganic salts. M. N. SAHA and S. C. DEB (Bull. Acad. Sci. Agra and Oudh, 1931– 1932, 1, 1–11; cf. A., 1931, 545).—A detailed discussion of results described previously. J. W. S.

Rotational analysis of ultra-violet bands of silicon monoxide. P. G. SAPER (Physical Rev., 1932, [ii], 42, 498—508).—From measurements on Si arc spectrograms a rotational analysis of the (0,1), (0,2), (0,3), (0,4), and (1,4) ultra-violet band system of SiO is made. An equation for the band origins of the Q branch system is obtained. N. M. B.

Influence of temperature on absorption of aqueous hydrochloric acid in the far ultra-violet. R. TREHIN (Compt. rend., 1932, 195, 1269—1270; cf. A., 1931, 19).—The absorption of H_2O is independent of temp. between -6° and 95° ; that of aq. HCl between 25° and 90° increases continuously as λ decreases from 2816 to 2170. For each temp. a max. absorption occurs for some definite concn. and wavelength. Beer's law is not obeyed. C. A. S.

Absorption spectra of some alkali fluorides and the heat of dissociation of fluorine. M. S. DESAI (Bull. Acad. Sci. Agra and Oudh, 1931-1932, 1, 116-118).—See A., 1931, 912; 1932, 698.

J. W. S.

Absorption spectrum of calcium chloride vapour. S. C. DEB and B. MUKERJEE (Bull. Acad. Sci. Agra and Oudh, 1931—1932, 1, 110—115).— From measurements made at 900—1300° two band systems have been observed in the absorption spectrum of CaCl₂, a system of 6 bands with heads at 39203850 Å. and 9 bands in the region 2850-2730 Å. Beyond 2640 Å. continuous absorption begins and extends to 2530 Å., where absorption is completely cut off. The distance between the two absorption bands is of the same order of magnitude as the distance of the metastable state of Ca⁺ from the normal state.

J. W. S.

Absorption spectra of saturated halides. S. C. DEB (Bull. Acad. Sci. Agra and Oudh, 1931-1932, 1, 92-99).—The intensity of absorption and the absorption limits of MgCl₂, MgBr₂, AlCl₃, AlBr₃, AlI₂, SiCl₄, SiBr₄, and SiI₄ vapours have been measured. J. W. S.

Absorption spectra of saturated halides of multivalent elements. A. K. DATTA and M. N. SAHA (Bull. Acad. Sci. Agra and Oudh, 1931—1932, 1, 19—25; cf. A., 1931, 667).—Details of results reported previously are given. J. W. S.

Absorption spectrum of sulphur dioxide. A. K. DUTTA (Bull. Acad. Sci. Agra and Oudh, 1931— 1932, 1, 88—91).—27 bands of SO₂ have been observed and measured in the region 3400—2800 Å., and the assignment agrees with infra-red and Raman spectra data. J. W. S.

Band spectra produced by certain explosion mixtures. H. A. WILHELM (Iowa State Coll. J. Sci., 1932, 6, 475-478).—Spectra of explosions such as those of flash-light powders were examined. Spectra of MgS, PbS, and CuS have been identified.

CH. ABS.

Zeeman effect of perturbed terms in the CO Angström bands. W. W. WATSON (Physical Rev., 1932, [ii], 42, 509—517).—Perturbed line data and quantum assignments are recorded; the Zeeman patterns are described and explained. N. M. B.

Ultra-violet absorption spectra of azoxybenzenes. III. E. MÜLLER and E. HORY (Z. physikal. Chem., 1932, 162, 281—285; cf. A., 1932, 734).— Determination of the absorption curves of various symmetrical azoxybenzenes and their isomerides has shown that the *iso*-form always exhibits, in addition to the characteristic azo-absorption band at 3200— 3600 Å., a second max. at about 2400 Å. These observations, together with other data, show the occurrence of *cis-trans* isomerism. The spectra of the *iso*-forms markedly resemble those of Angeli's α -isomerides. R. C.

Absorption spectra of metallic colloidal solutions, and emission and absorption of metallic films. A. T. WILLIAMS (Nature, 1932, 130, 963— 964).—The absorption curves of colloidal solutions and films of Ag are practically coincident. L. S. T.

Absorption and dispersion of celluloid between 300 and 1000 Å. H. M. O'BRYAN (J. Opt. Soc. Amer., 1932, 22, 739—748).—The absorption max. is $1\cdot1 \times 10^6$ per cm. at 800 Å., when a film 100 Å. thick transmits 30%. Reflecting power, extinction coeffs., and refractive indices are obtained for various wavelengths. The dispersion min. is at 550 Å. Electron dispositions are calc. and discussed. N. M. B.

Rigidity and type of binding from continuous absorption spectra. J. FRANCK and H. KUHN (Naturwiss., 1932, 20, 923—925).—It is possible to determine whether a mol. possesses ionic or at. binding from a study of continuous absorption spectra, and results of various authors are quoted. The usual definitions of ionic and at. mols. based on following the oscillation term from its ground state to convergence and noting whether an atom or an ion is formed are ambiguous. Ionic mols. are always heteropolar, whilst at. mols. may have electric moment, or may be non-polar. The use of the potential curve may give misleading results. Conclusions on the dissociation work and type of binding of polyat. mols. cannot at present be reached from observations of the long-wave limit of the continuous absorption spectrum.

A. J. M.

Energy of the ground state of methane. H. J. WOODS (Trans. Faraday Soc., 1932, 28, 877–885).— Mathematical. The calc. val. lies between -5.3 and -4.9 volts, in agreement with experiment.

F. L. U.

Band system of CaO in the near infra-red. P. H. BRODERSEN (Z. Physik, 1932, 79, 613-625).---20 band edges and rotational lines were measured between 6000 and 9000 Å.; the upper state has a Ca-O separation of 1.82 Å. and the lower 1.74 Å.

A. B. D. C. Absorption bands of hydrogen halides in the liquid state. E. O. SALANT and W. WEST (Physical Rev., 1931, [ii], 37, 108—109).—The (0,2) bands of liquid HCl, HBr, and HI and the (0,3) band of liquid HI show no rotational structure, the centres of the HCl and HBr bands being displaced to longer waves as compared with the corresponding gas bands. Frequencies and gas-liquid displacements are HCl 5543 (125), HBr 4850 (180), and HI 4262 and 6262 cm.⁻¹ HI absorption, in particular, is strongly intensified in the liquid. The vibration frequencies and anharmonic coeffs. of the vibrational terms are calc. L. S. T.

Quantum theory of rotational dissociation of diatomic molecules. G. MULLER (Z. Physik, 1932, 79, 595-600).—An expression is deduced for the width of rotational lines near rotational dissociation; the expression differs by a factor of 4 from that of Kronig (A., 1930, 981). A. B. D. C.

New infra-red band system of the CO molecule. B. K. VAIDYA (Nature, 1932, 130, 963).—A discussion. L. S. T.

Infra-red spectra of ammonium salts in the region of anomalous specific heats. R. POHLMAN (Z. Physik, 1932, 79, 394–420).—The sublimation method was used to give thin layers of $\rm NH_4Cl$, $\rm NH_4Br$, $\rm (NH_4)_2SO_4$, and $\rm NH_4NO_3$, and their spectra were investigated between 2.5 and 9 μ at temp. between -80° and room temp. Isochromates, or curves of transparency at a given wave-length plotted against temp., for the $\rm NH_4$ and $\rm SO_4$ radicals show discontinuities at the temp. of anomalous sp. heat. Fine structure of the bands indicates that the $\rm NH_4$ group occupies rotation states in $\rm NH_4$ salts.

A. B. D. C.

Infra-red region of the spectrum. VII. Infra-red grating spectrometer as a double monochromator. A. B. D. CASSIE and C. R. BAILEY (Proc. Roy. Soc., 1932, A, 138, 531-539).—Details are given of the construction and method of working of an infra-red grating spectrometer for use as a double monochromator. The experimental errors and resolving power are calc. L. L. B.

Infra-red absorption of quartz. D. G. DRUM-MOND (Nature, 1932, 130, 928-929). L. S. T.

The OH band of phenol in the near infra-red. A. A. NAHERNIAC (Compt. rend., 1932, 195, 1254— 1255).—The OH band in PhOH increases in intensity as temp. rises from 63° to 140°, whilst the max. moves from λ 9852 to 9776. In CCl₄ solution the band is double, max. at λ 9728 and 9892, the former moving to 9684 on dilution, the latter decreasing in intensity and disappearing in solutions containing < 10% PhOH; rise in temp. acts as dilution. Addition of a compound containing double linkings, e.g., C₆H₆ or C₁₀H₈, but not C₆H₁₂ or C₁₀H₁₈, to the dil. CCl₄ solution brings out the λ 9892 band. C. A. S.

Rotation-vibration spectrum of acetylene. W. LOCHTE-HOLTGREVEN and E. EASTWOOD (Z. Physik, 1932, 79, 450-454).—Experimental results agree with those of Leug and Hedfeld (A., 1932, 982), but a different allocation of frequencies is given.

A. B. D. C. Infra-red absorption spectra of aliphatic and aromatic hydrocarbons. P. LAMBERT and J. LECOMTE (Ann. Physique, 1932, [x], **18**, 329—390; cf. A., 1932, 212, 445).—For the range 6—16 μ absorption curves and diagrams of position and intensity max. are given for 16 aliphatic and 40 aromatic hydrocarbons. In each case the position of the absorption max. is directly related to the mol. structure, and allows isomerides and homologues to be distinguished. N. M. B.

Progressive relationships in the near infrared absorption spectra of the halogen derivatives of benzene. F. S. BRACKETT and U. LIDDEL (Physical Rev., 1931, [ii], 37, 108).—The spectra have been analysed with respect to the second overtone of the fundamental vibration of C₆H₆ occurring in the region 3.25 μ , which probably approximates to a linear oscillation of H with respect to C. In C_6H_6 (8772 cm.-1), PhI (8780 cm.-1), PhBr (8787 cm.-1), and PhCl (8800 cm.-1), a progressive shift to shorter wavelengths of this second overtone at 8772 cm^{-1} is observed. Further reduction of electron density about the C centres resulting from substitution by an increasingly electronegative halogen appears to be the explanation. Other predicted shifts are substantiated in a general way for the three dichloro-, 1:2:4- and 1:3:5-trichloro-, pentachloro-, and p-dibromobenzene. L. S. T.

Existence of a continuous Raman effect in liquids. R. BAR (Z. Physik, 1932, 79, 455-470).— Investigation of continuous light scattered by many org. liquids in a direction parallel to the incident beam showed that it is due either to fluorescence or to Rayleigh scattering (cf. A., 1932, 675). A. B. D. C.

Raman effect in crystals. F. RASETTI (Nuovo Cim., 1932, 9, 72—75; Chem. Zentr., 1932, ii, 976).— Gypsum, calcite, fluorspar, quartz, anbydrite, baryte, aragonite, rock-salt, and ice have been examined, and new lines have been observed. A. A. E. Molecular diffusion of light. Cabannes-Daure effect and molecular field. A. ROUSSET (J. Phys. Radium, 1932, [vii], 3, 555-563).—A more detailed account of work already noted (A., 1932, 792).

Molecular symmetry and diffusion spectra. J. CABANNES (Ann. Physique, 1932, [x], 18, 285— 328).—Theoretical. From the concept of the anisotropic mol. a simple theory of selection rules and rules for the polarisation of Raman lines of polyat. mols. is deduced and applied. N. M. B.

Critical opalescence. Y. ROCARD (Compt. rend., 1932, 195, 771—773; cf. A., 1928 1310).—The theories of Ornstein and Zernicke and of Einstein relating to fluctuations of density err in applying to states far from equilibrium, relations which are valid only for the equilibrium state. In dealing with such fluctuations density must not be treated as const., and it is pointed out that even at the crit. point some work is required to produce such fluctuations, and hence that there will at that point be only a finite intensity of opalescence which should be proportional to $1/\lambda^4$ instead of $1/\lambda^2$, and also that similar diffusion should occur at angles 0 and π —0. A formula for the intensity of diffusion in binary mixtures is thus obtained which agrees with experimental results.

C. A. S.

Raman effect in CO. E. AMALDI (Z. Physik, 1932, 79, 492-494).—Up to 6 atm. pressure CO showed the single displacement 2145 cm.⁻¹ and rotation lines about the undisplaced lines. A. B. D. C.

Carbon-oxygen linking in the metal carbonyls. J. S. ANDERSON (Nature, 1932, 130, 1002).—The Raman effect in Ni carbonyl shows that the CO is present in the mols. of the metal carbonyls as such and not as a :C:O group. L. S. T.

Raman spectra of C and Si compounds. M. DE HEMPTINNE (Ann. Soc. sci. Bruxelles, 1932, B, 52, 185—189).—Data for CHCl₃, SiHCl₃, PCl₃, and SiCl₄ are given, and compared with calc. vals. N. M. B.

Raman effect of some inorganic halides in the molten and gaseous states. H. BRAUNE and G. ENCELBRECHT (Z. physikal. Chem., 1932, B, 19, 303— 313).—In the vapour state the frequency of the inactive oscillation of the Hg halides is proportional to the heat of dissociation. The frequency is greater in the vapour than in the molten state, which is attributed to either coupling of the mols., *i.e.*, increase in the oscillating masses, or reduction of the binding forces under the influence of adjacent mols. For Hg, P, As, and Sb halides the graph of the % difference in frequency in the vapour and molten states against the linking dipole moment is approx. linear. R. C.

Raman effect of molecules of the types XY₆ and XY₅. O. REDLICH, T. KURZ, and P. ROSENFELD (Z. physikal. Chem., 1932, B, 19, 231—241).—The Raman spectra of $HSbCl_6$, H_2SnCl_6 , Li_2SnCl_6 , and $MgSnCl_6$, all of which are due to the group XY₆, and of $SbCl_5$ have been determined. The corresponding mol. frequencies are deduced by means of Placzek's selection rules (A., 1931, 893) and Bjerrum's central force principle (Verh. Deut. physikal. Ges., 1914, 16,

737). For the compounds XY_6 the results do not agree with those obtained by applying the valency force principle. R. C.

Circular polarisation of Raman lines. II. W. HANLE (Ann. Physik, 1932, [v], 15. 345-360; cf. A., 1932, 108).—Measurements of the circular polarisations of the Raman lines of xylene, PhCl, PhCHO, trichloroethane, (CHCl₂)₂. AcOH, COMe₂, Et₂O, glycerol, CS₂, aq. NH₃, HNO₃, and H₂SO₄ have been made and are discussed. W. R. A.

Raman effect in organic nitrates. A. S. GANE-SAN and V. THATTE (Phil. Mag., 1932, [vii], **14**, 1070– 1080).—Raman spectra for Me, Et, Pr^a, Pr^{β}, Bu^{β}, and *iso*amyl nitrates have been measured. The NO₃ ion frequency is missing, but appears for solutions of MeNO₃ in MeOH and for C₅H₁₁·NO₃ in *iso*amyl alcohol. H. J. E.

New photo-electric experiment. Q. MAJORANA (Atti R. Accad. Lincei, 1932, [vi], 16, 82-86, 173-179, and Compt. rend., 1932, 195, 1358-1360).--A more detailed account of work already noted (A., 1932, 898). O. J. W.

Nature of the spontaneous current on illumination of various detector substances. E. RUPP (Z. Physik, 1932, 79, 562).—Polemical, against Waibel (A., 1932, 1189). A. B. D. C.

Internal photo-electric effect in crystals. A. H. WILSON (Nature, 1932, 130, 913-915). L. S. T.

Electrical conductivity of graphite powder. Z. SPECHT (Z. Elektrochem., 1932, 38, 920—925).— The variation of conductivity with pressure has been measured in the case of graphite powders from various sources. Ryschkewitsch's results (B., 1922, 597) have been confirmed. D. R. D.

Dependence of electrical conductances and dielectric constant on frequency in mixtures of strong electrolytes. H. FALKENHAGEN and W. FISCHER (Nature, 1932, 130, 928).—A discussion. L. S. T.

Utilisation of dipole moment data. H. M. SMALLWOOD (Z. physikal. Chem., 1932, B, 19, 242-254).—In dipole moment measurements of solutions neither the at. polarisation nor the effect of the solvent on the solute is capable of exact theoretical treatment, and either may cause such serious errors in the val. deduced for the dipole moment that determinations made with a single solvent at a single temp. are of little more than qual. significance. Smyth and Dornte's observations with CPh-CPh (A., 1931, 669) may be explained by interaction of solvent and solute. By extrapolation the moment of the CH linking is found to be about 0.5×10^{-18} e.s.u. The methods of deriving group moments are critically examined. Group moments are closely related to the polarity of the linking as deduced from heats of formation. R. C.

Anisotropy of the forces of crystal growth. G. SOMMERFELD (Zentr. Min. Geol., 1932, A, 189– 202; Chem. Zentr., 1932, ii, 969).

Optical activity. I. Valency theory. C. H. JOHNSON (Trans. Faraday Soc., 1932, 28, 845-856).-- Attempts to resolve $K_3M(C_2O_4)_3$, $3H_2O$ (M=Fe, Mn, Cr) and salts of Men_3^{++} (M=Ni, Cu, Zn, Cd) have been unsuccessful. It is therefore considered that these compounds possess the ionic type of binding. Magnetic and optical-activity criteria of valency are in agreement where both can be applied. F. L. U.

Magnetic rotatory dispersion and absorption of the cerous ion in solution. R. W. ROBERTS and L. A. WAILACE (Nature, 1932, 130, 890-891).— The magnetic rotations of 0.7, 2.7, and 4.4% aq. solutions of Ce₂(SO₄)₃ at room temp. indicate the existence of two paramagnetically active absorption bands, one weak near 300 mµ and the other strong near 240 mµ. The presence of other absorption bands of the Ce^{***} ion is discussed. L. S. T.

New empirical formula for refractive indices. A. BIOT (Ann. Soc. sci. Bruxelles, 1932, **B**, 52, 177– 185).—A convenient formula accurate to 5 decimal places is deduced, and illustrated for quartz.

N. M. B. Fundamental frequencies of the group SiO_4 in quartz crystals. J. WEILER (Nature, 1932, 130, 893). L. S. T.

Calculation of characteristic frequencies of organic chain-molecules by means of models. E. BARTHOLOMÉ and E. TELLER (Z. physikal. Chem., 1932, B, 19, 366—388).—Calculations are made for hydrocarbons and some derivatives on the basis of greatly simplified mol. models, in which the internal oscillations of the constituent groups are disregarded. The observation that in the Raman effect of halogenohydrocarbons the halogen frequency is independent of the length of the chain is accounted for. R. C.

Dimensions of complex anions and lattice dimensions of Werner's co-ordination compounds of the fluorite and yttrium fluoride type. O. HASSEL and H. KRINGSTAD (Z. anorg. Chem., 1932, 209, 281–288).—Lattice consts. have been determined for compounds of $[Ni(NH_3)_6]$ " and $[Co(NH_3)_6]$ " with BF', ClO₄', and SO₃F'. The effective radii of the anions are ClO₄' 2·42, SO₃F 2·45, BF₄ 2·36 Å. E. S. H.

Diamagnetism of thin films of bismuth. C. T. LANE (Nature, 1932, 130, 999; cf. A., 1932, 449).— The magnetic susceptibility of Bi remains const. for films from 0.2 to 15μ thick. L. S. T.

Gyromagnetic effect in some ferromagnetic powders. D. P. RAY-CHAUDHURI (Nature, 1932, 130, 891).—For pptd. Fe_3O_4 , ferromagnetic Fe_2O_3 , and NiO, Fe_2O_3 the vals. determined for the ratio of angular momentum to magnetic moment of the elementary magnet are 1.008, 1.016, and 1.022 m/e, respectively. L. S. T.

Magnetic susceptibilities of some paramagnetic substances. W. SUCKSMITH (Phil. Mag., 1932, [vii], 14, 1115—1126).—An apparatus for measuring susceptibilities between -183° and 470° is described. The temp. variation for Yb₂O₃, Nd₂O₃, Sm₂O₃, and Eu₂O₃ follows Van Vleck's theory (cf. A., 1928, 572). The paramagnetism of MoCl₅, MoCl₃, U(SO₄)₂, and UCl₄ is probably due to spin moment only. H. J. E. Magnetochemical researches. VII. Magnetism of rare-earth borides. W. KLEMM, W. SCHÜTH, and M. VON STACKELBERG (Z. physikal. Chem., 1932, B, 19, 321–327; cf. A., 1932, 985).— Susceptibility measurements show that in LaB₆, CeB₆, PrB₆, NdB₆, and SmB₆ the rare-earth metal is present as tervalent ions set in the electron gas responsible for the metallic characteristics of these borides. The nos. of effective Bohr magnetons are the same as for the metals themselves. R. C.

Volume chemistry of liquid carbon compounds. F. WRATSCHKO (Pharm. Presse, 1931, 157—163, 177—183; 1932, 1—6; Chem. Zentr., 1932, ii, 1113).—Theoretical. A. A. E.

Surface tension near the critical point. A. W. PORTER (Nature, 1932, 130, 929—930).—A discussion. L. S. T.

Surface tension of mercury in silica apparatus. R. S. BURDON (Trans. Faraday Soc., 1932, 28, 866—876).—The surface tension of Hg distilled and manipulated in vac. was found from measurements of the height of large sessile drops to be 488 dynes per cm. at 25°. The temp. coeff. of surface tension is -0.23 dyne per 1° up to 230°. The lowering of surface tension observed in presence of air is thought to be due to an adsorbable impurity.

F. L. U.

Rotation goniometer diagram and the reciprocal lattice. E. SAUTER (Naturwiss., 1932, 20, 889—890).—By rotating an oriented single crystal in a monochromatic beam of X-rays, the interference spots obtained in the ordinary rotation diagram are somewhat altered. A. J. M.

Interpretation of X-ray term values. M. N. SAHA and R. S. SHARMA (Bull. Acad. Sci. Agra and Oudh, 1931–1932, 1, 119–134).—Theoretical.

J. W. S.

X-Ray spectrum and lattice binding force. R. GLOCKER (Physikal. Z., 1932, 33, 963—967).—Experiments with very soft X-rays on C and substances containing C give different intensity distributions in the spectra. The difference in form and width of the lines obtained for graphite, diamond, and carborundum are explained theoretically. A. J. M.

Rotation of crystals floating on liquid surfaces. P. GAUBERT (Compt. rend., 1932, 195, 1088—1090).— Any solid, cryst. or amorphous, and lighter or not much heavier (e.g. aspirin, d 1·39, or NHAcPh, d 1·211, on H₂O) than the liquid, will rotate on the surface of such liquid provided that it is itself sol. or is saturated with a substance sol. therein. The phenomena as exhibited by crystals of *iso*valeramide (d 0·955, n_a 1·438, n_β 1·450, n_γ 1·457) and thymol (d 1·035) are described. The movements are recoil effects due to diffusion currents from the dissolving substance.

C. A. S.

Scattering of X-rays by gases and crystals. G. E. M. JAUNCEY (Physical Rev., 1932, [ii], 42, 453-463).—Theoretical. Woo's formulæ (cf. A., 1932, 892), the effect of temp. on electron distribution, and the classical relations for scattering are discussed. N. M. B. Free electrons in a crystalline network. Wave equations and magnetic properties. L. BRIL-LOUIN (J. Phys. Radium, 1932, [vii], **3**, 565–581).

Theory of glass formation and the glassy state. E. BERGER (J. Amer. Ceram. Soc., 1932, 15, 647-677).-Recent research leads to a theory, according to which the formation of glass from the liquid state, in contrast to crystallisation, is a continuous process from the liquid, through the viscous (supercooled) to the brittle state. A transformation point is recognised, which represents the boundary temp. between viscous and brittle glass, at which the property-temp. coeffs. change more or less suddenly. When a melt is cooled, a dynamic aggregation is assumed; this proceeds more slowly as the transformation point is approached and is checked completely at lower temp. Viscosity and electrical conductivity of the liquid or viscous state between 1300° and 300° follow a hyperbolic law, whilst the brittle state properties follow a different, more complicated course below the transformation point. Brittle glass is not identical, therefore, with a supercooled liquid. A thermodynamical interpretation of the transformation point cannot be given, but kinetic considerations suggest an analogy with the gelation of sols. E. S. H.

Vitreous state. R. O. HERZOG and H. C. KUDAR (Naturwiss., 1932, 20, 951-952).—The kinetic theory is applied to the vitreous state. A. J. M.

Zwicky's theory of the structure of real crystals. E. OROWAN (Z. Physik, 1932, 79, 573-582). —The polarisation energy deduced by Zwicky from the contraction of a lattice plane on formation of a crystal is three times too large, and the effect termed "self-perpetuating polarisation" is a well-known property of ferromagnetic substances; the hypothesis of a secondary structure is thus rendered unnecessary. A. B. D. C.

Ostwald's gradation rule. I. N. STRANSKI and D. TOTOMANOW (Naturwiss., 1932, 20, 905).— Volmer's expression for the probability of nucleus formation in supersaturated media (A., 1926, 676) provides an explanation in support of Ostwald's gradation rule for the formation of polymorphous modifications from supersaturated gaseous or liquid phases. A. J. M.

Transformations in homogeneous substances. G. TAMMANN (Z. anorg. Chem., 1932, **209**, 204–212). —Recent work and theories on transformations without recrystallisation are reviewed with especial reference to the α - β transformations in Fe and Ni, the β - β' change in brass, and the CuAu and Cu₂Au transformations in Au-Cu alloys. A. R. P.

Transformation of metal phases. IV. Kinetic curves for the process of precipitation. U. DEHLINGER (Z. Physik, 1932, 79, 550–557).— Theoretical. A system of differential equations is established which gives all the characteristic resistance effects for Al_2Zn_3 . A. B. D. C.

Grating constants of copper-palladium mixed crystals. J. O. LINDE (Ann. Physik, 1932, [v], 15, 249-251).—Two types of crystal, Cu₃Pd and CuPd, are discussed. The lattice is cubic, face-centred for the Cu_3Pd , and body-centred for the CuPd. W. R. A.

Crystal structure of ammonium iodate. J. GARRIDO (Anal. Fis. Quim., 1932, 30, 811—814).— NH_4IO_3 has a 4.51 Å., and the structure is of the perowskite type. H. F. G.

Structure of tetra- and tri-phosphonitrilic chloride. F. M. JAEGER and J. BEINTEMA (Proc. K. Akad. Wetensch. Amsterdam, 1932, 35, 756—762).— The crystal structures of $(PNCl_2)_4$ and $(PNCl_2)_3$ have been investigated by X-ray diffraction methods. The structure found for $(PNCl_2)_3$ is not in agreement with the cyclic structure suggested by Schenck and Römer (A., 1924, ii, 752). Electronic structures for these compounds are suggested. J. W. S.

Crystal structure of borides of composition MB_6 . M. VON STACKELBERG and F. NEUMANN (Z. physikal. Chem., 1932, B, 19, 314—320).—The lattice of CaB₆ has the CsCl structure, the lattice points being occupied by Ca atoms and B₆ groups, and the atoms of a B₆ group occupy the corners of an octahedron. The lattices of SrB₆, BaB₆, LaB₆, CeB₆, PrB₆, NdB₆, ErB₆, and ThB₆ are probably of the same type. All these borides are metallic in their physical properties. R. C.

X-Ray study of borides. G. ALLARD (Bull. Soc. chim., 1932, [iv], **51**, 1213—1215).—A study of the following borides by the powder method indicates that they have the same structure as ThB₆ (A., 1929, 987; cf. A., 1931, 1218), the val. of *a* in Å. being: CaB₆ 4·10, SrB₆ 4·19, BaB₆ 4·38, LaB₆ 4·16, CeB₆ 4·12, NdB₆ 4·07, GdB₆ 4·12, ErB₆ 4·05, YbB₆ 4·13, YB₆ 4·07. D. R. D.

Crystal lattice of so-called orthosilicates. B. GOSSNER and C. REICHEL (Zentr. Min. Geol., 1932, A, 25–29; Chem. Zentr., 1932, ii, 2144–2145).— Zoisite and epidote have space-group V^{16} and C_{2h}^{2} , respectively. Lievrite has a 8.82, b 13.07, c 5.86 Å., with 4 mols. of CaFe^{II}₂(Fe^{III}OH)(SiO₄)₂ in the unit cell; possible space-groups V^{14} . Axinite has a 12.87, b 7.15, c 8.91 Å.; α 82° 26', β 95° 20', γ 135° 35', with 2 mols. of Ca₂MgHAl₂B(SiO₄)₄ in the triclinic unit cell. A. A. E.

X-Ray investigation of normal paraffins near their m.p. A. MÜLLER (Proc. Roy. Soc., 1932, A, 138, 514—530).—X-Ray photographic measurements have been made of the lattice dimensions of 15 normal paraffins ranging from $C_{18}H_{32}$ to $C_{44}H_{90}$ at temp. between 20° and the m.p. The substances tend to become hexagonal at the m.p., and in the range of C_{21} to C_{29} this state of high symmetry is actually reached; substances outside this range melt before becoming hexagonal. C_{21} and C_{29} show a continuous change of the *a* and *b* axes with rise of temp. up to the m.p. C_{24} , C_{25} , C_{26} , C_{27} , C_{30} , C_{30} , C_{31} , C_{34} , and C_{44} show abrupt transitions between room temp. and the individual m.p. Combining the present measurements with Garner's data on the heat of crystallisation and transition (A., 1931, 899), it is found that the internal energy decreases rapidly with increasing mol. distance. L. B.

Structural changes in crystalline salts of longchain fatty acids at m.p. of parent substances. P. A. THIESSEN and E. EHRLICH (Z. physikal. Chem., 1932, **B**, **19**, 299-302; cf. A., 1931, 1367).-For Na salts of higher fatty acids the cooling curve exhibits a halt near the m.p. of the corresponding acid, and at the same time the coeff. of cubical expansion changes discontinuously and there is a reversible change in the lattice. Similar changes occur at the m.p. of the hydrocarbon with the corresponding C-H chain. These "genotypic" effects are ascribed to dualism of the lattice linkings, sets of lattice planes acting on each other almost entirely through the presence of polar ionic linkings of the CO₂H groups together with sets of planes in which the linking is determined by the cohesive forces of the R. C. long chains.

X-Ray investigation of a case of chromoisomerism. E. HERTEL and G. H. RÖMER (Z. physikal. Chem., 1932, B, 19, 228-230).—The yellow form of $1:2:4-C_6H_3Me(NHMe)\cdotNO_2$ has a monoclinic lattice, space-group C_{2h}^{e} , and a continuous succession of identically placed mols. occurs along the c axis, the planes of the rings coinciding with the (001) planes. In the triclinic lattice of the red form mols. are spaced along the c axis at a distance equal to half the period of identity, and are not identically placed. The red colour is ascribed to the formation of a unimol. mol. compound. R. C.

Change of properties of non-metallic substances by working. G. TAMMANN (Naturwiss., 1932, 20, 958—960).—The change of hardness and density of AgCl after heating to temp. up to 250° is investigated. Changes of colour with other substances when subjected to heat treatment are noted. Phosphors show phosphorescence when rubbed. Grinding affects solubility; this may be due not only to the decreases in particle size, but also to change of solubility owing to cold working. A. J. M.

Theory of metals. I. A. H. WILSON (Proc. Roy. Soc., 1932, A, 138, 594-606).—Mathematical. A method, analogous to that used for diat. mols., is developed for examining the interaction between the electronic motions and the nuclear vibrations in a metal. The "mean free path" of the electrons is calc. by this method. Existing theories are discussed, and Peierl's criticisms of Bloch's theory (A., 1930, 281) are considered to be unfounded. L. L. B.

Changes in the resistance of ferromagnetic crystals. R. GANS and J. VAN HARLEM (Ann. Physik, 1932, [v], 15, 516-526).—Mathematical. W. R. A.

Change of electrical resistance on magnetisation. W. GERLACH (Physikal. Z., 1932, 33, 953-957).—The anomalous resistance-temp. curve shown by ferromagnetic conductors below the Curie point is studied, and the change of resistance with magnetisation in the neighbourhood of and below the Curie point is investigated. Simple formulæ are given connecting the resistance change with temp. and magnetisation. A. J. M.

Resistance anomaly of pure bismuth. C. DRUCKER (Z. physikal. Chem., 1932, 162, 305-317).

The results reported previously (A., 1928, 10) have been confirmed. Just above 100° the negative temp. coeff. of Bi pressed into wire at or rather below 100° abruptly becomes much more negative, then with further rise in temp. quickly becomes more positive again. After heating at 130° the discontinuity has disappeared. With wires pressed out at 100° and 225° the anomaly is less marked after annealing at a temp. above the temp. of formation, whereas if the wires are not annealed they give reproducible results at low temp. only. The observed effects seem to arise from the simultaneous operation of several factors considered. R. C.

Magnetisation of paramagnetic crystals in alternating fields. I. WALLER (Z. Physik, 1932, 79, 370–388).—Theoretical. Two cases are considered: (i) where the applied field is small compared with the field due to interaction of the magnetic particles; (ii) where the applied field is large. The crit. frequency is deduced. A. B. D. C.

Permeability of iron at ultra-radio frequencies. J. B. HOAG and H. JONES (Physical Rev., 1932, [ii], 42, 571-576). N. M. B.

Triboelectricity and friction. VII. Quantitative results for metals and other solid elements, with silica. P. E. SHAW and E. W. L. LEAVEY (Proc. Roy. Soc., 1932, A, 138, 502—514; cf. A., 1928, 467).—A metal or other rod is rubbed on a Si tube, using an apparatus maintaining const. pressure and length of rub. The volta and triboelectric effects are found to be somewhat similar, but there are disparities. At least ten factors are concerned in the process of rubbing two solids. These are discussed. L. B.

Influence of cold-working on the temperature of the beginning of grey glow heat. G. TAMMANN, F. NEUBERT, and W. BOEHME (Ann. Physik, 1932, [v], 15, 317-320).—Cold-working lowers the temp. of the grey glow of metals. The corresponding temp. in salts is lowered by pulverisation.

W. R. A.

Change in conductivity of metal [tungsten] foil by the action of an electric discharge. M. PIERUCCI (Nuovo Cim., 1932, 9, 33-42; Chem. Zentr., 1932, ii, 1032).

Change in electrical conductivity of a metal foil dependent on its electric charge. G. POLVANI (Nuovo Cim., 1932, 9, 69-71; Chem. Zentr., 1932, ii, 1032).

Electric superconduction in metals. J. C. McLENNAN (Nature, 1932, 130, 879—886).—A British Association discussion. L. S. T.

Theory of the thermo-electric effect at low temperatures. W. KROLL (Z. Physik, 1933, 80, 50-56).

Quantum theory of latent heat of fusion. H. C. KUDAR (Z. Physik, 1932, 79, 529-531).—Preliminary. Application of Boltzmann's law to excited electronic levels gives a solid finite energy near 0° abs.; if Boltzmann's law applies to electronic levels only at temp. above that at which the energy content of the solid body becomes equal to that of the mean electronic energy (according to Boltzmann's law), a definite m.p. is defined, and Richardson's law explained; the essential property of liquids, diffusion into one another, is explained as an exchange effect. A. B. D. C.

Fusion under pressure. II. E. JANEOKE (Z. physikal. Chem., 1932, 162, 286–288).—With the derivation by van Laar (this vol., 16) of an equation for the fusion curve which indicates that there is no max. fusion temp. at high pressure the interpolation formulæ previously suggested for the fusion curves of pure substances (A., 1931, 1222) are shown to be inapplicable at high pressures. R. C.

Molecular heat of gaseous nitric oxide at low temperatures. A. EUCKEN and L. D'OR (Nachr. Ges. Wiss. Göttingen, 1932, 107—112; Chem. Zentr., 1932, ii, 682).—The mol. heat increases below room temp. (max. at about 70° abs.) owing to the existence of para- and dia-magnetic modifications with energy difference 354 cal.; cooling increases the proportion of the latter, of lower energy. The theoretical course of C_p is calc., and vals. have been obtained by Lummer and Pringsheim's method from 127° to 288° abs. A thermostat for low temp. is described. Equilibrium between the two mol. species is attained about 0.001 sec. after change of temp. A. A. E.

Calorimetric investigations at liquid helium temperatures. K. MENDELSSOHN and J. O. CLOSS (Z. physikal. Chem., 1932, B, 19, 291–298).—The at. heat of Cu has been determined at 4.5—15° and that of Ag at 2—20° abs. For Cu the results can be represented by a Debye function, but with Ag the vals. at very low temp. show slight positive deviations. R. C.

Graphical method for the calculation of boiling points at various pressures. E. SCHLENKER (Chem.-Ztg., 1932, 56, 1001—1002).—The method suggested by Cox and by Davis (B., 1923, 699; 1925, 690; A., 1926, 142) of plotting $\log_e p$ against t is shown to give straight lines for glycerol-H₂O mixtures. It is suggested that this facilitates the measurement of the conen. of such mixtures. J. W. S.

Thermal state of superheated steam at high pressures. W. KOCH (Z. tech. Physik, 1932, 13, 263—266; Chem. Zentr., 1932, ii, 1275).—A discussion of measurements at 120—200 atm. from saturation temp. to 450°. A. A. E.

New equation of state for water vapour. H. HAUSEN (Forsch. Gebiet Ingenieurw., 1931, A, 2, 319-326; Chem. Zentr., 1932, i, 1763).

Van der Waals' equation. I. K. JABŁCZYŃSKI (Rocz. Chem., 1932, 12, 773—781).—It follows from van der Waals' equation that b=2w, and a=2wRT pw^2 , where w is the vol. of 1 mol. at the pressure p for which pw^2 has a min. val. The val. of b is const., and is 0.0320 for CO₂ over the range 37—198°, and 0.0454 for C₂H₄ over the range 10—198.5°. In the liquid phase the val. of b is slightly < in the gaseous phase, for both gases. The val. of a varies with temp. and pressure, at first diminishing to a min. with the mol. vol., and then rising; with rise of temp. it increases from 2.58 at 21° to 2.86 at 107°, and then falls to 2.28 at 198° for CO₂, whilst for C₂H₄ it falls irregularly from $3.94 \text{ at } 0^{\circ} \text{ to } 3.15 \text{ at } 198.5^{\circ}$. Substitution of the vals. of *a* and *b* into the ordinary formulæ for calculating crit. consts. gives variable results differing widely from experimental vals., due to the formulæ in question being based on the erroneous assumption that *a* and *b* are const. R. T.

Empirical control of a simple equation for real gases. E. J. M. HONIGMANN (Forsch. Gebiet Ingenieurw., 1931, 2, 261–266; Chem. Zentr., 1932, i, 1762; cf. A., 1931, 31).—For various gases and vapours d(PV)/dJ = (n-1)/An and $C_p = g(TP^{(n-1)/n})$, where A is the mechanical equiv. of heat, J the heat content, n a sp. const., and g is a no. to be determined. L. S. T.

Entropy, heat content, and free energy of iron. J. B. AUSTIN (Ind. Eng. Chem., 1932, 24, 1388— 1391).—The entropy, heat content, and free energy of both α - and γ -Fe have been calc. for the temp. range -250° to 1600°. The heat of transition changes sign between the transition points, in accordance with theory. J. W. S.

Vapour-pressure constant of methane. T. E. STERNE (Physical Rev., 1932, [ii], 42, 556-564; cf. A., 1932, 566).—The consts. of the statistical quantum mechanical formula are evaluated. The v.-p. const. is -1.94, in close agreement with experiment.

N. M. B.

Study of association by the fluidity method. E. C. BINGHAM and H. L. DE TURK (J. Rheology, 1932, 3, 479–493).—Fluidities and vals. of d are recorded over the temp. range 0–100° for CEt₃·OH, phenylethyl alcohol, cetyl alcohol, MeCNS, PhSCN, COPhPr, Bu^a formate, acetate, propionate, *n*-butyrate, *n*-valerate, Et *n*-valerate, *n*-heptoate, *n*-amyl *n*-butyrate, and *n*-heptyl acetate. E. S. H.

Flow of viscous liquids. C. CAMICHEL and collaborators (J. Rheology, 1932, 3, 413–436).— Applications of theory are considered. E. S. H.

[Stability of] liquid sodium amalgams. G. R. PARANJPE and R. M. JOSHI (J. Univ. Bombay, 1932, 1, 17-24).—Sodium amalgams are said to represent colloidal suspensions of sodium in mercury.

A. S. C. L.

Thermal and electrical conductivities of magnesium alloys. R. KIKUCHI (Kinzoku-no-Kenk., 1932, 9, No. 6, 239—243).—When Mg is alloyed with another element the thermal and electrical conductivities generally decrease proportionally to the amount added. The effects are in the order Al, Sn, Zn, Ag, Ni, Cu. The ratio of the changes in the two vals. is not const. CH. ABS.

Transformation of β -mixed crystals in brass. R. RUER (Z. anorg. Chem., 1932, 209, 364—368; cf. A., 1930, 161).—Heating and cooling curves for Cu-Zn alloys with 44.7—65.6% Cu give no indication of a double transition of the β -mixed crystals. A simple transition occurs at 453° with alloys having 53—64% and at 465° with those having 42—52% Cu in the presence of the α - and γ -phases, respectively. F. L. U.

Mechanism of the transformations in β -brass and in β -silver-zinc alloys. J. WEERTS (Z. Metallk., 1932, 24, 265—270).—Micrographic, X-ray, and kinetic observations show that both transformations are governed strictly by crystallographic lattice relations. After quenching β -brass the $\beta - \alpha$ transformation occurs by a lattice displacement similar to that in the formation of martensite from supercooled austenite; the displacement parallel to the (110) plane in the (110) direction amounts to 0.36 Å. and that parallel to the (112) plane in the (110) direction to 0.22 Å. The $\beta' - \zeta$ transformation in Ag–Zn alloys, on the other hand, shows all the characteristics of a growth from a const. no. of nuclei at a const. linear rate. A. R. P.

Nature of the β -transformation of copper-tin alloys. II. H. IMAI and M. HAGIYA (Mem. Ryojun Coll. Eng., 1932, 5, 77—89).—Dilatometric measurements confirm the results afforded by thermal and electrical resistance data (A., 1931, 33). The striated cryst. structure gives place to a closer texture, which appears to be characteristic of the β'' state. The martensitic needle-like structure, formed by chilling β -bronze poor in Sn from a high temp., is destroyed by annealing at 450—500°; it is apparently characteristic of the intermediate β' form. E. S. H.

Alloys of gallium with zinc, cadmium, mercury, tin, lead, bismuth, and aluminium. N. A. PUSHIN, S. STEPANOVIĆ, and V. STAJIĆ (Z. anorg. Chem., 1932, 209, 329—334).—M.-p. data show that Ga forms two immiscible liquid layers with Cd, Hg, Bi, and Pb. With Zn and Sn eutectic mixtures and with Al the compounds Ga₂Al, GaAl, and GaAl₂ are formed, whilst with Na a compound of high m.p. and unknown composition is formed. Ga has a max. solubility of 5% in liquid Pb, about 11% in liquid Bi, 12—13% in liquid Cd, and is practically insol. in Hg at low temp. E. S. H.

Alloys of palladium with antimony. A. T. GRIGORIEV (Z. anorg. Chem., 1932, 209, 308–320).— Thermal analysis and observations on microstructure and electrical resistance confirm the existence of the compounds PdSb and Pd₃Sb, but not Pd_5Sb_3 . The eutectic contains 58·17 at.-% Pd. E. S. H.

Alloys of gold with antimony. A. T. GRIGORIEV (Z. anorg. Chem., 1932, 209, 289–294).—Electrical conductivity measurements support the results of thermal analysis and confirm the existence of AuSb₂. It is probable that each metal is slightly sol. in the other in the solid state. E. S. H.

System tungsten-cobalt. C. AGTE, K. BECKER, and VON GÖLER (Metall-Wirt., 1932, 11, 447-450; Chem. Zentr., 1932, ii, 1682).—Co is sol. in W up to 10 at.-%; W is sol. in Co up to 8 at.-%. There is an intermediate crystal form, containing 52-63 at.-% Co, which has m.p. 1710° and is an intermetallic compound. It decomposes on fission. A. A. E.

Rules of valency electron concentration in binary intermetallic alloys. H. PERLITZ (Acta Comm. Univ. Tartu., 1932, No. 24, 3—16).—From a consideration of the rules governing the valency electron concn. in β -, γ -, and ϵ -lattices, it is shown that such lattices can be expected only in those binary intermetallic alloys in which one pure component contributes at the most one, and the other component at least two, valency electrons to the lattice structure; β -, γ -, and ε -lattices will thus be expected in binary alloys containing a transition metal or Cu, Ag, or Au, together with a metal of a *B* sub-group or Be or Mg. The nos. of valency electrons which take part in the metallic binding are given for various metals.

A. J. M.

System silver-copper-cadmium. M. KEINERT (Z. physikal. Chem., 1932, 162, 289–304).—The equilibrium diagram has been established by micrographic methods. R. C.

Copper-rich alloys of the copper-nickel-tin system. J. T. EASH and C. UPTHEGROVE (Amer. Inst. Min. Met. Eng., Preprint, 1932).—For alloys containing 0—20% Ni, the α -phase boundary and the liquidus and solidus temp. have been determined. Alloys containing >31% Sn and 5% Ni were also investigated. Addition of Ni to Cu-Sn alloys decreases the solubility of Sn in the α -phase; fall of temp. produces the same effect. The $\alpha+\delta$ eutectoid which occurs in Cu-Sn alloys is replaced by either the θ phase or the δ' phase when >1% Ni is added. The θ phase is always homogeneous; the second new phase may be homogeneous or in the form of the $\alpha+\delta'$ eutectoid, depending on the rate of cooling.

CH. ABS.

Polymorphic transformation of iron at points A3 and A4. V. N. SVECHNIKOV (Domez, 1932, No. 4—5, 29—32).—Sp. vol. changes are 1.94 and 6.67%, and the heat changes 0.9 and 3.4 g.-cal. per g., for A4 and A3, respectively. Different ratios obtained with another sample are attributed to the presence of gaseous impurities. CH. ABS.

Surface energy of iron carbide. Y. CHU-PHAY (Amer. Soc. Steel Treating, 13th Ann. Conv., 1931, 25 pp.).—The surface energy of Fe₃C is calc. to be 4900 and 3800 ergs per sq. cm. at 20° and 1136°, respectively. These vals. account for the hardness of martensite, in which the particle size of Fe₃C corresponds with a radius of $3-4\times10^{-7}$ cm.

C. W. G.

Effect of carbon on the hardness and the transformation points of nickel-chromium steels. T. MURAKAMI and M. MIKAMI (Kinzoku-no-Kenk., 1932, 9, No. 6, 225—238).—The steel contained Ni 3.21, Cr 0.96, C 0.31—1.11%. A3 gradually falls as the C content increases, although A1 is nearly const. As the max. heating temp. or the cooling rate increases, the transformation point is markedly lowered, resulting in self-hardening. The self-hardening ability increases as the C content increases up to 0.8%. The hardness of the Ni–Cr steels increases as the cooling rate increases and as the C content increases up to 0.8%. The micro-structure of the specimens is described. CH. ABS.

Transformations in the hardening of steel. F. WEVER (Z. Metallk., 1932, 24, 270–275).—In the first stage of the transformation of austenite ($650-500^{\circ}$) excess ferrite saturated with C separates above the pearlite point (590°), and below this point the austenite decomposes into a highly disperse mixture of ferrite and cementite owing to the sudden decrease in the rate of diffusion. In the second stage ($500-120^{\circ}$) the austenite is converted into an intermediate stage characterised by needle-like crystals which slowly decompose by diffusion into cubic ferrite and cementite or an unknown C compound of Fe. In the third stage transformation of austenite proceeds directly to the intermediate state of tetragonal martensite without diffusion; on annealing this decomposes by diffusion into the more stable cubic form with the pptn. of C. A. R. P.

Martensite crystallisation followed cinematographically. H. J. WIESTER (Z. Metallk., 1932, 24, 276—277).—Steel with 1.65% C was quenched in a metal bath at 100° to obtain homogeneous austenite; the specimen was then etched at 100°, allowed to cool slowly to room temp. or quenched in liquid air to -20° , and the formation of martensite followed by taking photographs with a cine-camera at 20 exposures per min. The film showed that the formation of a martensite needle takes place in <0.05 sec. A. R. P.

Refractive index of liquid mixtures having benzene as a component. N. A. PUSHIN and P. G. MATAVULJ (Z. physikal. Chem., 1932, 162, 415— 418).—The *n*-concn. (wt.-%) curves of various binary mixtures of C_6H_6 with phenols and aromatic amines are convex to the concn. axis, which is ascribed to dissociation in the mixtures of associated mols. of the second component. With $C_6H_6-C_5H_5N$ mixtures the curve is slightly concave to the concn. axis. R. C.

Influence of cellulose nitrate of varying stability on the refraction of liquid mixtures. T. TOMONARI (J. Soc. Chem. Ind., Japan, 1932, 35, $465-467_{B}$).—The val. of *n* for dispersions of cellulose nitrate in mixed solvents is shown to vary with the method of prep. and after-treatment of the cellulose nitrate and to be independent of the N content. The determination of *n* would seem to provide a rapid and sure means of assessing the stability of cellulose nitrate preps. V. E. Y.

Vapour-liquid equilibria of ethyl alcoholwater mixtures at temperatures from 120° to 180°. T. KLEINERT (Angew. Chem., 1933, 46, 18— 19).—The relation between the composition of the vapour and of the liquid at 120°, 140°, 160°, and 180° is expressed graphically. The compositions of the azeotropic mixtures at these temp. are given.

E. S. H. Heat content of liquid ethyl alcohol-water mixtures. F. BOŠNAJAKOVIĆ and J. A. GRUMBT (Forsch. Gebiet Ingenieurw., 1931, 2, 421-428; Chem. Zentr., 1932, i, 1763).—Heat contents, heats of mixing, and b.p. under pressures up to 3 atm. are recorded. L. S. T.

Mechanical properties of binary inorganic salt mixtures. K. LAYBOURN and W. M. MADGIN (Trans. Faraday Soc., 1932, 28, 857—866).—Transverse breaking strength, compression strength, and Brinell hardness have been measured for the systems NaNO₃-KNO₃, Ph(NO₃)₂-NaNO₃, and Pb(NO₃)₂-KNO₃. Property-composition curves are of the same general form in all three. Such measurements therefore do not distinguish between solid solutions and eutectics. Reproducible results can be obtained only when the effects of atm. moisture on the surface of the castings are removed by treatment with H_2O and subsequent protection with oil. F. L. U.

System water-phenol. II. Viscosities. O. R. HowELL (Trans. Faraday Soc., 1932, 28, 912–928; cf. A., 1932, 990).—Viscosities of the homogeneous mixtures have been determined at intervals of 10° from 20° to 70°. The viscosity-composition curve at 70° is sagged in the neighbourhood of the crit. composition. The results are considered to indicate formation of an equimol. compound. The applicability of various formulæ to represent the relation between viscosity and composition or temp. is discussed. F. L. U.

Two liquid phases of minimum density in the system carbon disulphide-ethylene dichloride. D. L. HAMMICK and J. HOWARD (J.C.S., 1932, 2915—2916).—The temp. curve for the solid-liquid equilibrium in the system $CS_2-C_2H_4Cl_2$ shows a flat portion indicating a separation into two liquid layers at -50° . Mixtures corresponding with this part of the curve become turbid at various temp. below about -30° , with a max. temp. for an approx. equimol. mixture. For the equimol. mixture d^{20} is a min. M. S. B.

Systems of four immiscible layers. J. R. PARTINGTON (Nature, 1932, 130, 967).—The system previously described (A., 1931, 159) is unstable and separates into two layers on long keeping. L. S. T.

Behaviour of sulphur dioxide towards water. D. S. DAVIS (Chem. and Mct. Eng., 1932, 39, 615— 616).—Equations are given which express the variation of the dissociation const. of H_2SO_3 and the solubility of SO_2 between 0° and 40°. A solubility nomograph has also been derived. D. K. M.

Is ammonia evolved by the freezing of seawater ? G. TAMMANN and H. J. ROCHA (Z. anorg. Chem., 1932, 209, 257—263).—Partial pressures of NH₃ in aq. solutions of NaCl, CaCl₂, and MgCl₂ have been determined between 0° and -80° . The salts (especially MgCl₂) lower the partial pressure of NH₃. The question whether appreciable amounts of NH₃ can accumulate in the atm. in geological time by the continual transport of sea-water from the tropics to the polar regions is discussed. E. S. H.

Volatility of boric acid in steam. S. BEZZI (Annali Chim. Appl., 1932, 22, 713—725).—Discordant results of previous authors are attributed to differences in the experimental conditions. The transformation of the o- into the m-acid is due to dehydration. At 100°, m-boric acid is stable and non-volatile and the o-acid is converted into the m-acid even at 50°. In solution the two acids co-exist, but the o-acid is alone volatile in steam at temp. up to slightly above 100°. T. H. P.

Equilibrium in binary systems under pressure. III. Influence of pressure on the solubility of ammonium nitrate in water at 25°. L. H. ADAMS and R. E. GIBSON (J. Amer. Chem. Soc., 1932, 54, 4520-4537; cf. A., 1932, 810).—Sp. vols. of NH₄NO₃ solutions at atm. pressure are recorded. Measurements of the compressibility show that the partial vol. of NH₄NO₂ does not increase with pressure, except with 15% solutions at low pressures. Above 5000 bars the partial vol. of $\rm NH_4NO_3$ is independent of the concn. when this is >15%. The solubility of $\rm NH_4NO_3$, calc. thermodynamically, decreases continuously with increasing pressure, and the solubility curve intersects the freezing pressure curve of ice_{VI} at 12,100 bars and 25.3 wt.-% $\rm NH_4NO_3$. The equilibrium diagram for pressures up to 12,000 bars is confirmed by experiment. J. G. A. G.

Partial pressures and distribution ratios of acetic acid over its aqueous solutions at 25°. K. FREDENHAGEN and H. LIEBSTER (Z. physikal. Chem., 1932, 162, 449—453).—Partial pressure measurements show that the distribution ratio of single mols. between the liquid and gaseous phases varies from 8.24×10^4 for 0.018N to 14.5×10^4 for 2.54N solution. R. C.

Distribution ratios of hydrogen fluoride over the binary system water-hydrogen fluoride at 25°, and b.-p. curve of this system under atmospheric pressure. K. FREDENHAGEN and M. WELLMANN (Z. physikal. Chem., 1932, 162, 454-466).—The conductivity of aq. HF has been measured at dilutions of 0.5—10,000 litres. The dilution law is not valid even at the highest dilution. The distribution ratio of single HF mols. between the liquid and gas phase, as deduced from partial pressure measurements with 0.090—63.7 mol.-% solutions, passes through a max. at about 0.9 mol.-%. The b.-p. curve, measured over the whole range of concns. under 1 atm., exhibits a max. at about 33 mol.-% HF. R. C.

Distribution ratios of hydrogen cyanide and water over the binary system water-hydrogen cyanide at 18°. K. FREDENHAGEN and M. WELL-MANN (Z. physikal. Chem., 1932, 162, 467—470).— The distribution ratio of HCN between the liquid and gaseous phase, calc. from partial pressure data (A., 1927, 819), passes through a max. at about 80 mol.-% HCN. R. C.

Distribution method for determining dissociation pressures of salt ammoniates. R. P. SEWARD (J. Amer. Chem. Soc., 1932, 54, 4598-4605). —The solubility of NH₃ at pressures < 455 mm. in CHCl₃ at 25° has been determined. Dissociation pressures of salt ammoniates, in accord with vals. obtained statically, are determined more rapidly by shaking the solid ammoniates with CHCl₃. Experiments with ZnCl₂,4NH₃,H₂O indicate that a dissociation pressure of NH₃ can be measured in the presence of H₂O by the distribution method with CHCl₃.

J. G. A. G.

Adsorption of gases by active charcoal. H. REMY [with W. HENE] (Kolloid-Z., 1932, 61, 313– 322).—The adsorbability of a series of gases by active C at 15° bears a simple relation to the v.p. of the liquefied gases. The variation of adsorption with pressure has been determined for SO₂, MeCl, CO₂, N₂O, N₂, O₂, and H₂, and an empirical formula expressing the influence of temp. has been derived. The adsorption of gases from mixtures bears no relation to the partial pressures of the components. E, S. H.

Testing the adsorption formula by adsorption measurements with a highly active charcoal. E. L. LEDERER (Kolloid-Z., 1932, 61, 323-328).--Remy's data (cf. preceding abstract) agree with the Langmuir isotherm. The data suggest that the adsorbabilities of gases or vapours in corresponding states are equal. The application of the mixture rule to the adsorption of mixed gases is complicated by differences in the velocity and structure of the mols. E. S. H.

Adsorption of electrolytes by ash-free charcoal. VII. Evidence that negative adsorption of inorganic bases decreases with time of contact of charcoal with solution. E. J. MILLER (J. Physical Chem., 1932, 36, 2967—2980; cf. A., 1928, 167).— C must be heated at or above 1000° to produce negative adsorption from solutions of NaOH. The degree of negative adsorption increases with time. It is impossible to remove completely even a feebly adsorbed acid (HCl) by repeated extraction with boiling H_2O , but complete removal may be effected by electrodialysis. E. S. H.

Adsorption displacement and molecular orientation on activated ash-free carbon. E. LANDT and W. KNOP (Z. physikal. Chem., 1932, 162, 331-345).-When HCl is displaced by monobasic fatty acids and alcohols in the adsorption from aq. solution on sugar-C which does not adsorb alkali, the quotient, k, of the no. of HCl mols. displaced by the no. of adsorbed org. mols. is const. for a given org. compound, but is proportional to the no. of C atoms. It is therefore concluded that there is no sp. poisoning of the centres adsorbing HCl, but that the org. mols. act simply by the C atoms lying flat on the C surface and thus reducing the adsorbing area. For dibasic org. acids of low mol. wt. k varies considerably with the concn., which is attributed to the simultaneous occurrence of mol. adsorption and ionic exchange, but with the higher homologues the variation of kwith the concn. is less marked and apparently the CH, groups lie on the surface. The ring of BzOH seems to lie on, and the CO₂H to stand at right angles to, the C surface. R. C.

Adsorption of electrolytes by carbon mixtures. J. ŠÁNA (Z. Zuckerind. Czechoslov., 1932, 57, 121— 125).—Electrolytes are adsorbed by mixtures of gas and chemically activated C in a selective manner. In general, such mixtures show a greater adsorption than would be expected according to the mixture rule, although the difference is not so great as that observed for their colour-adsorption val. J. P. O.

Adsorption. I. Adsorption of carbon dioxide, sulphur dioxide, and water. II. Adsorption of lower fatty acids. R. C. BOSWORTH (Trans. Faraday Soc., 1932, 28, 896–902, 903–912). —I. Refractometric determination of the adsorption of CO₂ or SO₂ from air, both dry and moist, at a Hg surface, shows that CO₂, SO₂, and H₂O are selectively adsorbed as a unimol. layer in <0.25 sec. When two active gases are present each is adsorbed in a proportion depending on the relative concns., but the total no. (n) of adsorbed mols. corresponds with a unimol. layer and is independent of the relative concns. For a layer not saturated, $n \propto c^{2/3}$.

II. Similar results have been obtained for un-

saturated vapours of the first five fatty acids. At and near saturation multimol. layers are formed. $EtCO_2H$, $PrCO_2H$, and $BuCO_2H$ can form two types of adsorption layers, one at low and the other at high pressures. The behaviour is interpreted on the basis of two-dimensional packing. Gibbs' equation is valid for conens. > 30% saturation. F. L. U.

Adsorption of oxalic acid by alumina. P. H. DEWEY (J. Physical Chem., 1932, **36**, 3187–3188).— AcOH and $H_2C_2O_4$ are adsorbed by Al_2O_3 ; AcOH, but not $H_2C_2O_4$, can be washed out by H_2O . The adsorbed $H_2C_2O_4$ can be determined by titrating with hot, acid KMnO₄ solution. E. S. H.

Sorption of alcohol and ether vapour by silica gel. L. VON PUTNOKY and W. NERATH (Math. nat. Ber. Ungarn, 1931, 38, 173—225; Chem. Zentr., 1932, ii, 514).—A period of adsorption is followed by one of capillary condensation. In the former the velocity depends on the internal surface of the gel, and in the latter on the size of the pores. A. A. E.

Hygroscopic moisture of cellulose. X. Velocity of sorption of water vapour on cellulose. S. OGURI (J. Soc. Chem. Ind., Japan, 1932, 35, 507— 515B).—The sorption velocity of H_2O vapour on cellulose of varying origin and on fibrous materials such as wool and silk is examined. The sorption of H_2O vapour on cotton and other celluloses at const. pressure and temp. proceeds in at least two stages, the velocity in each being represented fairly well by $dx/dt=k(x_{\infty}-x)$, where x and x_{∞} denote the sorption at time t and at equilibrium, respectively.

V. E. Y.

Sorption of vapours on wood and cellulose. N. H. GRACE and O. MAASS (J. Physical Chem., 1932, 36, 3046–3063).—Apparatus and technique for measuring the sorption of vapours by cellulose by the use of a quartz spring balance in an evacuated glass system are described. Results are given for the sorption of H₂O vapour by various woods, and are compared with the vals. for cotton cellulose. Cellulose sorbs gaseous HCl appreciably, but equilibrium is attained very slowly; the process is more rapid with white spruce as sorbent. The form of the sorption curve is quite different from that of H₂O vapour and resembles the Freundlich isotherm. Equilibrium vals. are reached more quickly with wet wood than with dry wood, and the amount of HCl sorbed by the wet wood is greater (after allowing for the amount taken up by the H₂O present). It is probable that the sorption of HCl approximates to true surface adsorption, in which case the phenomena can be explained by supposing that the H₂O increases the active surface available for adsorption of HCl. Preliminary results are reported on the sorption of SO₂, NH₃, CO₂, Et₂O, amylene, and MeOH. Sorption of Et₂O and of amylene is very small, but large E. S. H. amounts of MeOH are taken up.

Sorption of sodium hydroxide on cellulose and wood. R. RICHARDSON and O. MAASS (J. Physical Chem., 1932, 36, 3064—3073).—Data for the sorption of NaOH in aq. solution by cotton, spruce flake, and "celanese" are given. Theoretical treatment of the results is reserved. E. S. H. Condensation of water vapour on dust nuclei. G. R. PARANJPE, H. D. MIRCHANDANI, and Y. G. NAIK (J. Univ. Bombay, 1932, 1, 5-17).—The influence of the number of nuclei on the size of the drops in the formation of a cloud has been examined. A. S. C. L.

Adhesion tension. Receding contact angle, pressure of displacement method. F. E. BARTELL and C. E. WHITNEY (J. Physical Chem., 1932, 36, 3115-3126) .- A rapid method for measuring the receding contact angles formed in the pores of a membrane of compressed powder is described. The adhesion tensions of a no. of liquids against SiO2 (including those which have zero contact angle), determined by this method, agree closely with those obtained by the single capillary method. The results furnish evidence that the free surface energy changes, which occur when org. liquids come into contact with polar solids, are of the same order as the corresponding energy changes for contact of the same liquids with H₂O. E. S. H.

Interfacial tension between asphaltic materials and solutions of alkaline inorganic salts. R. N. TRAXLER and C. U. PITTMAN (Ind. Eng. Chem., 1932, 24, 1391—1393).—Solutions of Na₃PO₄ and Na₂SiO₃ give lower interfacial tensions in contact with asphaltic fluxes than do Na₂HPO₄ and Na₂B₄O₇, whilst Na₂CO₃ solutions give intermediate results. The occurrence of reaction at such interfaces may have considerable influence on the type and stability of a bituminous emulsion. Possible effects of varying $p_{\rm H}$ and of the nature of the anion are discussed. J. W. S.

Surface activity and surface tension as a method of investigation of flotation reagents. I. M. E. LIPETZ and M. M. RIMSKAYA (Tzvet. Met., 1931, 594-610).—Surface tension measurements have been used to determine: (1) the solubility of $C_{10}H_7$ ·NH₂,HCl, *m*-xylidine, *m*- and *p*-cresol, *n*-hexoic and *n*-heptoic acids in H₂O, (2) the effect of $p_{\rm H}$ of the medium on the surface activity of *p*-C₆H₄Me·SO₃H and α -C₁₀H₇·NH₂ distributed between H₂O and PhMe or H₂O and C₆H₆, (3) the flattening of the meniscus on the C₆H₆-H₂O surface caused by alkalis and hydrolysing salts, and (4) the partition of *p*-cresol between H₂O and C₆H₆ boundary. CH. ABS.

Spreading of oil on water. P. Wood (Ann. Office Nat. Combust. liq., 1931, 6, 617–655; Chem. Zentr., 1932, i, 1764).—A theoretical discussion of the spreading of oil on H_2O , of the difference between fatty, mineral, and activated mineral oils, and of the smoothing of waves by means of oil. L. S. T.

Boundary lubrication by soap solutions. R. C. WILLIAMS (J. Physical Chem., 1932, 36, 3108—3114). —A dynamometer for the study of lubrication in wire-drawing is described. The effectiveness of solutions of Na or NH_4 soaps is due to the fatty acid or acid soap formed by hydrolysis; the solutions have no lubricating properties when hydrolysis is repressed. There is no close relation between lubrication and surface tension when the $p_{\rm H}$ is varied. E. S. H.

Transmission of surface changes in the interior of crystals. D. BALAREV and B. SREBOV (Kolloid-Z., 1932, 61, 344–346).—The temp. of reaction of finely-divided BaO, CaO, and MoO_3 with various oxides and salts varies with the relative amounts of the reactants, but not in accordance with any simple rule. Surface changes are believed to be transmitted to the interior of crystals. E. S. H.

Electrokinetics. XII. Interfacial energy and molecular structure of organic compounds. II. Al₂O₃-organic liquid interfaces. O. G. JENSEN and R. A. GORTNER (J. Physical Chem., 1932, 36, 3138-3151; cf. A., 1932, 804).-Streaming potentials of Al₂O₃-liquid interfaces for 15 org. liquids have been measured and the ζ potential, electric moment of the double layer, and degree of orientation calc. The streaming potential increases linearly with pressure. For a series of n-aliphatic esters, the ζ potential and electric moment of the double layer decrease with increasing no. of C atoms. In all the esters examined the immobile side of the double layer is negatively charged (except HCO₂Et), and is positively charged in the series of n-aliphatic acids. The ζ potential and electric moment also show the alternating effect of odd and even no. of C atoms. The symmetrical C_6H_6 and CCl_4 mols. give no streaming potential. The % of unbalanced mols. oriented in the interface decreases with increasing length of the C chain and is parallel with the electric moment per unit area of the double layer. This observation suggests that the electrokinetic forces at a solid-org. liquid interface are due to the electrical dissymmetry of oriented org. mols. E. S. H.

Fundamental assumptions and equations of electrokinetics. J. W. McBAIN and M. E. LAING-MCBAIN (Z. physikal. Chem., 1932, 161, 279–298).— The classical Helmholtz theory is inadequate because it does not take into account the existence or properties of ions. The authors' theory (A., 1924, i, 937; ii, 594; 1931, 1121), however, leads to a clearer picture of electrokinetic phenomena and also gives a comprehensive and quant. representation of the experimental data. R. C.

Application of the double-layer theory of Otto Stern. I. F. URBAN and H. L. WHITE (J. Physical Chem., 1932, 36, 3157—3161).—Using Stern's equation, a relation between ζ potential and surface conductance is derived. All the ions of the double layer are believed to be mobile in an electric field. E. S. H.

Correlation of stream potentials and surface conductance. H. L. WHITE, F. URBAN, and E. A. VAN ATTA (J. Physical Chem., 1932, 36, 3153— 3156).—Streaming potentials measured with capillaries of 0.005 mm. diam. are 0-25% > those determined with large capillaries (cf. A., 1932, 699). This result cannot be accounted for by the classical streampotential equation. E. S. H.

Liesegang rings. S. C. BRADFORD (Nature, 1932, 130, 1002).—Polemical. L. S. T.

Osmotic systems in which non-diffusing substances may occur also. II. Equilibrium and change of permeability of the membrane. F. A. H. SCHREINEMAKERS (Proc. K. Akad. Wetensch. Amsterdam, 1932, 35, 1131-1139).-Mathematical. D. R. D. Dispersion of salt solutions. Relation between dispersion and osmotic coefficients. G. KARA-GUNIS (Praktika, 1931, 6, 385–391; Chem. Zentr., 1932, ii, 2149).—The relative differences in dispersion of alkali halide solutions have been determined and related to the osmotic coeff. A. A. E.

Classical dissociation theory. G. TAMMANN (Z. physikal. Chem., 1932, 163, 17-32).-If the internal work due to the change in the internal pressure caused by ionisation is taken into account, the heat of ionisation calc. from the variation of the mass action const. with the temp., T, is positive and independent of T. The effect of pressure on the conductivity of solutions of salts and strong acids points to complete ionisation. Heats of neutralisation of strong acids and bases do not vary with T when the internal work is taken into account. The vol. changes in the neutralisation are to be attributed, not to the formation of H₂O from its ions, but to changes in internal pressure, and their variation with T corresponds with that of the compressibility of H_2O . In the formation of NH_4 from NH₃ and H^{*}, however, there is a considerable contraction. Corresponding solutions have equal internal pressures, and are not usually isohydric.

R. C. Association of strong electrolytes. J. ZIRKLER (Z. physikal. Chem., 1932, 163, 1—7).—The degree of association of $Ba(NO_3)_2$ deduced from the temp. coeff. of the conductivity agrees approx. with the val. calc. from the temp. coeff. of the heat of dilution. Vals. have therefore been calc. for other electrolytes from conductivity data. Differences between the thermal and conductivity data are ascribed to heat of solvation of the ions. R. C.

Dusts, smokes, mists, and fogs. W. E. GIBBS (Chem. and Ind., 1932, 1042—1043).—An alternative classification of aerosols is proposed instead of that advocated by Blacktin (this vol., 23), emphasis being placed on the importance of particle size.

D. R. D.

Dusts, smokes, mists, and fogs. S. C. BLACK-TIN (Chem. and Ind., 1932, 1077—1078).—A reply (cf. preceding abstract). D. R. D.

Theory of emulsions. C. H. M. ROBERTS (J. Physical Chem., 1932, 36, 3087-3107).—A general discussion, in which the properties and behaviour of emulsions are described in terms of those of ions and mols. in heterogeneous systems. E. S. H.

Dielectric constants of disperse systems. A. PIEKARA (Acta phys. Polon., 1932, 1, 135—153; Chem. Zentr., 1932, ii, 1601).—For Hg-vaselin emulsions ε depends on the particle size; deviations from the theoretical val. increase as the size of the Hg particles diminishes. The deviation is attributed to the effect of boundary layers of oriented mols. about 100 mols. thick. A. A. E.

Dielectric constants of water and alcohol emulsions. A. PIEKARA (Acta phys. Polon., 1932, 1, 155—163; Chem. Zentr., 1932, ii, 1602).—For the emulsions examined the deviations from the Clausius-Mosotti vals. are much < for media of low ε ; an orientation effect is not apparent. A. A. E. Validity of the Clausius-Mosotti law for emulsions. W. S. URBANSKI (Acta. phys. Polon., 1932, 1, 165—176; Chem. Zentr., 1932, ii, 1601).—Vals. of ε for suspensions of Wood's metal of const. particle size in vaselin-vaselin oil deviate considerably from calc. vals. The deviations are attributed to changes in the polarisation of the suspended particles.

A. A. E. [Validity of the Clausius-Mosotti law for emulsions.] A. PIEKARA (Acta phys. Polon., 1932, 1, 285–287; Chem. Zentr., 1932, ii, 1602).—Polemical (cf. preceding abstract). A. A. E.

Colloidal boron. A. L. ELDER and N. D. GREEN (J. Physical Chem., 1932, 36, 3085–3086).—Sols of pure B are prepared by fusing Mg and B_2O_3 (1:3), extracting with HCl, and refluxing 0.5—1.0 g. of the dried B with 100—250 c.c. distilled H₂O. The sol differs in properties from impure B sols formerly described. The particles are negatively charged and are extremely resistant to coagulation, even by multivalent ions. The sol cannot be conc. by evaporation. E. S. H.

Preparation and properties of highly concentrated sols. II. Sols of vanadium pentoxide, silicic acid, and molybdic acid. C. AHOBALA-CHARYA and N. R. DHAR. III. Sols of zirconium hydroxide. R. D. SHARMA and N. R. DHAR (J. Indian Chem. Soc., 1932, 9, 441—453, 455—461).— II. The viscositics of sols prepared from NH₄ vanadate and HCl and from SiCl₄ and H₂O increase greatly during dialysis and the concn.-viscosity curves of the dialysed sols are very steep. The viscosity of a conc. sol prepared from NH₄ molybdate and HNO₃ is practically the same as that of H₂O. The ratio of the coagulating concns. of KCl and BaCl₂ decreases with increasing purity of the V₂O₅ and molybdic acid sols, but increases with increasing purity of the SiO₂ sol sensitised with aq. NH₃.

III. By dialysing hot solutions of $Zr(NO_3)_4$, sols containing 100 g. and 55 g. of ZrO_2 per litre were obtained, in which the ratios ZrO_2/NO_3 were 6.6 and 16.1, respectively. These sols are very viscous, and the purer is the sol the steeper is the concn.-viscosity curve. Addition of $Zr(NO_3)_4$ diminishes the viscosity and increases the ratio of the coagulating concns. of KBrO₃ and K₂SO₄. The surface tension may be as low as 70.2, and the electrical conductivity increases on ageing. When the sol is dried slowly in the dark the residue returns to the sol state on addition of H₂O. A. G.

Stable suspension of dibenzanthracene in water. I. BERENBLUM (Lancet, 1932, 223, 1107— 1108).—Stable suspensions are produced by adding C_5H_5N solutions of 1:2:5:6-dibenzanthracene drop by drop with stirring to H_2O or, for more conc. suspensions, to a 6% solution of gum acacia, and dialysing for 2 or 3 days until C_5H_5N is removed. L. S. T.

Colloidal solutions of 1:2:5:6-dibenzanthracene. E. BOYLAND (Lancet, 1932, 223, 1108; cf. preceding abstract).—A COMe₂ solution of 1:2:5:6dibenzanthracene is poured into excess of 0.5% aq. gelatin solution (40—50°) with rapid stirring and boiled until COMe₂ is removed. The colloidal solution is

K

stable for long periods. Colloidal solutions stable towards heat and electrolytes, but of lower conen., arc produced when gelatin is omitted. The hydrocarbon is negatively charged. 1:2-Benzanthracene, dihydroanthracene, and chrysene, but not anthracene, naphthacene, acenaphthene, and 1:2:5:6-dibenzphenazine, form colloidal solutions in this way. L. S. T.

Kinetics of cupric oxide sol formation. N. PESKOV and E. PREIS (Kolloid-Z., 1932, 61, 328— 335).—The formation of CuO sols by hydrolysis of Cu succinimide is a typical autocatalytic reaction of the first order. Cu succinimide has properties intermediate between those of colloids and crystalloids, probably by reason of its high dispersity; it is coagulated to CuO by electrolytes, but coagulation is inhibited by protective colloids or by excess of succinimide. E. S. H.

Relation between charge and stability of colloidal solutions of gold and ferric hydroxide dialysed to different extents. B. N. DESAI, G. M. NABAR, and P. M. BARVE (J. Indian Chem. Soc., 1932, 9, 463—469).—When Au sols are dialysed the coagulating conen. of KCl and the cataphoretic speed increase at first and then decrease; the two effects show a close correspondence. $Fe(OH)_3$ sols also give a max. cataphoretic speed, but the coagulating conen. of KCl falls continuously. A. G.

Specific conductivity of the intermicellar liquid in gold sols. R. WINTGEN and W. HACKER (Kolloid-Z., 1932, 61, 335–344).—The electrical conductivity of a Au sol prepared by reduction with CH_2O is very nearly the same as that of the intermicellar liquid remaining after centrifuging the solid phase. Unprotected sols of relatively high Au content (up to 0.27%) can be obtained with the aid of the centrifuge. E. S. H.

Filtration phenomena in colloids. M. ANNETTS (J. Physical Chem., 1932, 36, 2936—2939).—By passing an As_2S_3 sol through filter-paper, the electrical conductivity is decreased by about 50%. Repetition of the process reduces the conductivity to a const. val. These and other effects observed are explained by combination of (a) an increase in conductivity due to impurities derived from the filter-paper and (b) a decrease due to adsorption of H' by the filter.

E. S. H. Critical potential characteristic of coagulation of a colloid. B. N. DESAI (J. Univ. Bombay, 1932, 1, 25-27).—Theoretical. The coagulation of a colloid by an electrolyte will be affected by both the non-coagulating and the coagulating ion. The initial adsorption of the former may lead to an increase of potential and of cataphoretic velocity before the conen. of the latter is sufficient to cause coagulation. With multivalent ions, the activity of the coagulating ion is so much greater that the effect does not occur.

Gelation of sucrose with metal hydroxides. W. COLTOF (Kolloid-Z., 1932, 61, 347-363; cf. A., 1932, 1202).—Under certain conditions solutions of sucrose and Ca(OH)₂ give a gelatinous ppt. on warming, which redissolves on cooling. A ppt. is also formed

by great dilution or by adding KOH. Equilibrium diagrams are shown. E. S. H.

Study of gels by physical methods. E. HAT-SCHEK (J. Physical Chem., 1932, 36, 2994-3009).-Gelatin cylinders with plane ends have been used in the determination of Young's modulus by compression and the results compared with those obtained by tension. The modulus decreases with increasing compression, and increases with increasing elongation. The modulus of agar gel decreases with increasing compression and undergoes no change with time. The modulus of SiO, gel is const. under increasing compression, but rises rapidly with age. The increase with age is very marked in gelatin gels hardened with CH₂O. The optical anisotropy of strained gels and the lenticular form of bubbles produced therein are discussed. Observations on the orientation of the equatorial planes of the lenticular bubbles show that: (1) during reversible deformation the direction of min. tensile strength is that in which the linear dimension has been increased, and (2) after irreversible deformation it is that in which the linear dimension has been reduced. Diffusion from a point source in a gelatin gel under strain gives a perfectly spherical zone; gels remain isotropic for diffusion both during reversible and after irreversible deformation. These results are discussed in relation to the fibrillar structure of the gel. E.S.H.

Structure of gelatin sols and gels. V. In-solubilisation of gelatin by heat. S. E. SHEPPARD and R. C. HOUCK (J. Physical Chem., 1932, 36, 2885–2900; cf. A., 1932, 995).—Measurements of the rate of diminution of the swelling power and solubility in warm H_2O of gelatin after prolonged heating show that this is a function of temp. The reaction is termol., and the crit. increment, calc. from the temp. coeff., is 23,160 g.-cal. With ultra-violet light the change follows the same course, but is more rapid. The product has the same H₂O absorption as collagen and is converted into gelatin by extraction with hot H₂O, but the X-ray diagram of collagen and optical birefringence are not shown. When gelatin jellies, containing much EtOH, are stretched greatly and dried at room temp., the product is anisotropic and gives the X-ray diagram of collagen, but the H₂O absorption is the same as for unstretched gelatin. These facts suggest that the conversion of collagen into gelatin involves more than the disorientation of long-chain mols. assembled in crystallites; hydrolytic disruption of chemical linkings between the chains is probably involved. These linkings involve 2- or 3dimensional polymerisation and hence the insolubility and restricted intermicellar absorption of H₂O. The phenomenon is compared with the vulcanisation of rubber and the " permanent set " of steamed hair. E. S. H.

Active oxides. LV. Dehydration of hydrogels in presence of different gases. G. F. HUTTIG and K. STRIAL (Z. anorg. Chem., 1932, 209, 249— 256; cf. A., 1932, 988, 1008).—The rate of loss of H_2O by hydrogels of $Cr(OH)_3$, $Zr(OH)_4$, and $Th(OH)_4$ depends on the gas or vapour in contact with the gel; it is greatest with NH₃ and McOH, smaller with O_2 and H₂, and least with N₂. The H₂O content of

A. S. C. L.

the product dried at a given temp. has a characteristic val. for each gas. These phenomena are related to the affinity of the gas for H_2O . E. S. H.

Determination of jelly strength and the modulus of elasticity $E_{\rm D}$ of gelatin jellies, and the effect of additions on the viscosity and $E_{\rm D}$. E. GOEBEL (Collegium, 1932, 830—838).—Apparatus is described for the determination of jelly strength and $E_{\rm D}$ for different concess of the jelly. $E_{\rm D}$ diminishes rapidly with rise of temp. A curve is given showing the variation of viscosity with $E_{\rm D}$. $E_{\rm D}$ is practically independent of $p_{\rm H}$ in the region 5.0—7.5. The viscosity of hide glues is increased and $E_{\rm D}$ unaffected by addition of alum or CH₂O. Neither viscosity nor $E_{\rm D}$ is altered by addition of ZnSO₄. D. W.

Crystallisation and the setting of gelatin jellies. J. C. DERKSEN (Collegium, 1932, 838—842).—X-Ray interference rings are shown by gelatin jellies below their setting point, but not above; the behaviour suggests the presence of crystals. Similar interference effects are shown by air-dried gelatins, but not by gelatin jellies dried by hot air. The setting of gelatin solutions is attributed to the conversion of an amorphous form gelatin-A into a cryst. form gelatin-B. D. W.

Influence of acidity on solubility of silver chromate in gelatin solution. B. N. DESAI and G. M. NABAR (J. Univ. Bombay, 1932, 1, 28–30).— The stability of Ag_2CrO_4 in gelatin solution increases as the $p_{\rm H}$ decreases from 5.15 to 5.00 on addition of AcOH. As the $p_{\rm H}$ decreases, the amount of Ag_2CrO_4 in ionic dispersion increases. A. S. C. L.

Coagulation, viscosity, and thixotropy in colloidal systems. S. S. KISTLER (J. Physical Chem., 1932, 36, 2948-2966).-Theoretical. Colloids are divided into two classes, corresponding with lyophobic and lyophilic, according as the formation of cybotactic complexes (evanescent lattice-like arrangements of liquid mols.) is favoured by the surfaces or not. The stability of a lyophilic sol depends mainly on a concn. gradient of cybotactic complexes decreasing with the distance from each colloid particle, whilst the tendency to coagulate is connected with a gradient in the opposite direction. Coagulation, viscosity, and thixotropy, and the phenomena of viscosity, dispersion, diffusion, and lyotropic series are discussed in the light of these views. E. S. H.

Swelling and dissolution of cellulose esters. I. SAKURADA (J. Soc. Chem. Ind. Japan, 1932, 35, 500-503B).-The electrostatic attraction between the dipoles of cellulose acetate and the liquid media is the main factor in the swelling and dissolution of . this ester (cf. B., 1929, 713). This dipole attraction results in a mol. aggregation of cellulose esters and the solvents. Both COMe₂-sol. acetates (I) and cellulose triacetate (II) swell better in strongly polar media, as is shown by the swelling of (II) in 2M-C₆H₆ solutions of various substances. All active swelling media have a high dipole moment. (II) swells in weakly polar media more, and in strongly polar media less, than (I); this is shown more clearly in binary mixtures. Cellulose nitrate (III) behaves substantially the same. Dissolution and swelling are also

functions of the degree of depolymerisation of the ester. The order of the esters as regards swelling and dissolution in org. media is : (II)>(I)>(III). V. E. Y.

Elastometric method of measuring swelling. A. V. Hochlov (Kolloid-Z., 1932, 61, 364-365).— Swelling is measured by the loss of elasticity. E. S. H.

Elasticity of caoutchouc. K. H. MEYER, G. VON SUSICH, and E. VALKÓ (Kolloid-Z., 1932, 61, 370– 371).—Polemical (cf. A., 1932, 1089). E. S. H.

Physical structure of elastic colloids. W. F. BUSSE (J. Physical Chem., 1932, 36, 2862-2879).-The following features are regarded as characteristic of elastic colloid systems : (1) long, fibrous mols., (2) weak or uniform cohesive forces, (3) interlocking of the fibres, (4) a means of storing free energy when the fibres are distorted. The sp. properties of rubber are discussed in the light of these views. Fibrous rubbers are obtained by stretching cured, soft rubber and further curing it with S₂Cl₂ while stretched. When this treatment is applied with simultaneous stretching in two directions, a non-fibrous, parchmentlike material is obtained, in which the fibres are probably oriented at random. This product is strong and flexible, and is very resistant to org. E. S. H. liquids.

Dielectric constants of aqueous solutions of some amino-acids and polypeptides. M. FRANKENTHAL (Z. physikal. Chem., 1932, B, 19, 328—343).—NH₂-acids and polypeptides increase the dielectric const., ε , of H₂O, and with increase in the concn., c, ε rises and apparently approaches a limiting val. This behaviour is attributed to increase in the proportion of zwitterions. Among the α monoaminomonocarboxylic acids the tendency to zwitterion formation seems to diminish as the no. of C atoms increases. Glycine anhydride depresses the ε of H₂O. These results agree qualitatively with the accepted configuration of the solutes. R. C.

Union of biocolloids. XI. Union between two proteins. S. J. PRZYŁECKI. XII. Aggregation of gelatin. S. J. PRZYŁECKI and J. TARGON-SKA (Biochem. Z., 1932, 255, 393-405, 406-419; cf. A., 1932, 1274).—XI. The factors which influence the combination of two proteins are discussed.

XII. Changes in the state of aggregation of gelatin have been followed by observing the time required for an Fe sphere to fall a known distance in the gel, the changes being produced by variation of p_{π} and by the introduction of various electrolytes, glucose, starch, and albumin. P. W. C.

Equilibrium constant of the reaction between ethyl alcohol and acetic acid. A. L. CORSO and C. A. DURRUTY (Anal. Asoc. Quim. Argentina, 1932, 20, 140—146).—The equilibrium const. at 100° increases approx. linearly from 2 to 5 as the initial AcOH concn. is raised from 20 to 80 mol.-%; for a 50 mol.-% mixture the val. of the const. is $3\cdot80\pm0\cdot03$. H. F. G.

Dissociation constants of organic acids. VI. Acetic acid. G. H. JEFFERY and A. I. VOGEL (J.C.S., 1932, 2829-2838).—Conductivity measurements have been made at 25° on AcOH in SiO₂ cells and on NaOAc and KOAc in Pyrex cells, over the range 0.0001-0.01N. The data obtained for the salts have been corr. for hydrolysis. The classical and thermodynamic dissociation consts. are 1.813 and 1.776×10^{-5} , respectively. The limiting vals. for OAc', determined from the Na and K salts, are 39.7 and 40.0, respectively. The results are compared with those of Shedlovski and MacInnes (A., 1932, 695, 699) and reasons for the discrepancies suggested.

M. S. B.

Ammines. VI. Nickelammine salts in aqueous solution. H. J. S. KING, A. W. CRUSE, and F. G. ANGELL (J.C.S., 1932, 2928—2931).—From f.-p. depressions of pentamminonickel sulphate and hexammino- and hexapyridino-nickel nitrate in H_2O solutions of various concn. vals. are deduced for the no. of mols. of NH₃ or C₅H₅N still combined with each atom of Ni by attributing the excess f.-p. depressions of the ammines over those of equiv. solutions of NiSO₄ or Ni(NO₃)₂ to free base. New *compounds* are [Ni(NH₃)₅]SO₄,H₂O and

solutions of NiSO₄ or Ni(NO₃)₂ to free base. New compounds are [Ni(NH₃)₅]SO₄,H₂O and [Ni(C₅H₅N)₆](NO₃)₂ (I). In the former the proportion of free NH₃ varies from 0.6 to 3 mols. for concns. 0.3—0.075*M* and in [Ni(NH₃)₆](NO₃)₂ (II) from 0.44 to 0.8 mol. for 0.3—0.2*M* solutions. Free base in the C₅H₅N compound varies from 1.5 to 3.3 mols. for concns. 0.25—0.05*M*. (II) is more stable and (I) less stable than the corresponding Cu compound (cf. A., 1930, 1536). M. S. B.

Properties of volatile hydrides. III. System H_2S-CO_2 . A. KLEMENC and O. BANKOWSKI (Z. anorg. Chem., 1932, 209, 225–235).—The partial pressures of H_2S and CO_2 in liquid mixtures have been measured at low temp. The equilibrium diagram is characterised by a eutectic at $-95\cdot2^\circ$ and $90\cdot21$ mol.-% H_2S . E. S. H.

Equilibrium diagram of a ternary system containing a gaseous phase. H. NISHIMURA (Suiyokwai-Shi, 1932, 6, 735–744).—The diagram is derived theoretically. The systems $Fe-N_2-H_2$ and $Fe-O_2-H_2$ are discussed. CH. ABS.

System lead acetate, acetic acid, water. G. TARBUTTON and W. C. VOSBURGH (J. Amer. Chem. Soc., 1932, 54, 4537—4544; cf. A., 1928, 131).— Solubilities in HOAc-H₂O mixtures at 25° and 30° are recorded. The compounds Pb(OAc)₂,0.5AcOH and Pb(OAc)₂,0.5H₂O exist as stable solid phases. Anhyd. Pb(OAc)₂ is metastable. J. G. A. G.

Equilibria in systems containing magnesium oxide, iron oxide, and magnesium aluminate. H. G. FISK and W. J. MCCAUGHEY (Ohio State Univ. Eng. Exp. Sta. Bull., 1932, No. 70, 1-44).—Fe oxide passes into solid solution in periclase at high temp., probably as MgO,Fe₂O₃ with Fe₃O₄. Mg ferrite separates on slow cooling. A continuous series of solid solutions is formed with spinel, which retains up to 50% Fe₃O₄ in solid solution at room temp. Spinel and Mg ferrite are isomorphous.

CH. ABS.

System 2FeO,SiO₂-FeS. B. P. SELIVANOV, A.S. GINZBERG, and S. I. NIKOLSKI (Sovbshch. Vsesoy. Inst. Met., 1931, No. 3-4, 74-78).—The m.-p.

diagram shows solid solutions of FeS in 2FeO,SiO₂, and of the latter in the former, with an intermediate region characterised by distinct liquid layers. A eutectic at 940° corresponds with about 43%2FeO,SiO₂ and 57% FeS. CH. ABS.

Equilibria between metals and slags in melts. III. Equilibrium $2MnO+Si = SiO_2+2Mn$. W. KRINGS and E. KEHREN (Z. anorg. Chem., 1932, 209, 385-408; cf. A., 1932, 811).—The law of mass action is followed only when the regulus contains < 20% Si, the const. ([MnO]²[Si]/[SiO_2][Mn]²) being 0.113 ± 0.025 at 1500°. The decrease in the val. of the const. when the Si content is > 20% is attributed to auto-complex formation in the SiO₂. The thermal val. of the reaction at 1500° is 14.3 kg.-cal. The influence of admixtures was studied. F. L. U.

Formulation of the second law of thermodynamics. H. HANSEN (Forsch. Gebiet Ingenieurw., 1932, 3, 206-208; Chem. Zentr., 1932, ii, 985-986).

Activity coefficients of potassium chloride. Application of the extended Debye-Hückel theory to interpretation of f.-p. measurements. H. M. SPENCER (J. Amer. Chem. Soc., 1932, 54, 4490-4497).---Vals. are calc. from recent f.-p. data for aq. solutions and corr. for heats of dilution. A method of extrapolating from the low concn. region, where observations become difficult, to infinite dilution is given. J. G. A. G.

Activity coefficients of hydrochloric acid in uni-univalent chloride solutions at constant total molality. J. E. HAWKINS (J. Amer. Chem. Soc., 1932, 54, 4480—4487).—The e.m.f. of the cells $H_2|HCl(m_1)|AgCl|Ag$ and $H_2|HCl(m_1)+MCl(m_2)|AgCl|$ Ag, where M=Li, Na, and K, and $m_1+m_2=0.1-6.0M$, has been determined at 25°. The linear relation between log γ and concn. is valid for the high concn. used, and the activity coeff. of HCl in LiCl is greater than that of pure HCl at the same concn. The consts. of the Hückel equation, derived by a simplified method, are in satisfactory agreement with the experimental data. J. G. A. G.

Free energies and heats of formation of tetrahydrate and anhydrous forms of cadmium bromide and their transition temperatures. H. M. SPENCER and R. F. SELDEN (J. Amer. Chem. Soc., 1932, 54, 4504-4515).—The e.m.f. of the cells Cd,Hg|CdBr₂,4H₂O(s)|sat. CdBr₂,4H₂O + AgBr| AgBr(s)|Ag(s) and Cd,Hg|CdBr₂(s)|sat. CdBr₂ + AgBr| AgBr(s)|Ag(s), set up in the absence of O₂, have been determined at $25-35^{\circ}$ and $35-45^{\circ}$, respectively. The transition point CdBr₂,4H₂O(s)-CdBr₂(s)-saturated solution determined thermally is $35\cdot82^{\circ}$ and from e.m.f. data is $35\cdot63^{\circ}$. The thermodynamic quantities computed are compared with existing vals.

J. G. A. G.

Thermodynamic properties of solid solutions of gold and silver. A. WACHTER (J. Amer. Chem. Soc., 1932, 54, 4609—4617; cf. A., 1931, 1371; 1932, 573).—The e.m.f. of the cell Ag(s)[AgCl(s)]Ag+0.0—0.85 mol. fraction Au (s. solution) has been determined at temp. between 192° and 415°. The e.m.f. at const. temp. varies continuously with the composition of the alloy, and the vals. are lower than previously reported. The energy changes in the dilution of Ag with Au show the solid solution containing 0.5 mol. fraction of Ag to be the most stable. The activities of both Au and Ag exhibit large negative deviations from Raoult's law; the results are, however, compatible with the existence of a regular arrangement of Au atoms in the Ag crystal lattice. J. G. A. G.

Free energies of formation of various forms of lead monoxide. H. M. SPENCER and J. H. MOTE (J. Amer. Chem. Soc., 1932, 54, 4618—4624; cf. A., 1928, 841).—Free energies of formation at 25° of the several forms of PbO are computed from e.m.f. data for cells Pb,Hg]PbO[0.05-0.21M-Ba $(OH)_2|HgO(red)$ +PbO|Hg(l). The free energy contents of PbO, $\frac{1}{3}$ H₂O (neglecting that of H₂O) and yellow PbO exceed that of red PbO by 233 and 145 g.-cal., respectively. J. G. A. G.

Exact thermodynamics of membrane equilibria. F. G. DONNAN and E. A. GUGGENHEIM (Z. physikal. Chem., 1932, 162, 346—360; cf. A., 1925, ii, 528).—By using Gibbs' chemical potential method and the function electrochemical potential (A., 1929, 885) exact thermodynamic equations have been derived for the membrane equilibrium of electrolytes and non-electrolytes in ideal and non-ideal solution, assuming that all the solutions become ideal at infinite dilution and that their compressibility is independent of the pressure. The relations between these equations and the usual approx. equations are worked out.

R. C.

Heat of dissolution of water vapour in various solvents. R. P. BELL (J.C.S., 1932, 2905-2911).— The concn. of dissolved H_2O in equilibrium with the system Na₂SO₄-Na₂SO₄,10H₂O has been determined for a no. of org. solvents at 15°, 20°, and 25° by the method previously described (this vol., 135). The vals. of Q, the heat of dissolution of H_2O vapour at const. vol., calc. from these and other data, are used to test the equations previously developed (A., 1931, 901; 1932, 21) for the electrostatic energy of dipole mols. in different media. The agreement is satisfactory. The equation $A = RT \log_e c_1/c_2$ has no thermodynamic basis when c_1 and c_2 refer to different media.

M. S. B.

Heats of dilution of solutions of strong electrolytes, and Nernst's association hypothesis. E. PLAKE (Z. physikal. Chem., 1932, 162, 257-280; cf. A., 1928, 953, 1097).-The heat of dilution, V, for the 25- and 50-fold dilution of 0.01-0.5M aq. solutions of various salts has been determined at 20°, and measurements have been made at 0° and 10° to ascertain the variation of V with temp. The results indicate that at about 20° bi-bivalent salts at concns. <0.25M are practically completely dissociated, and application of the Gronwall-La Mer-Sandved extension of the electrostatic theory (ibid., 841) gives vals. for the mean ionic diameters which agree with activity coeff. data. Ca(OAc)₂, CaCl₂, and NiCl₂ approx. follow the Debye-Bjerrum law (A., 1926, 476; 1927, 1028), and at concns. < 0.5M are completely dissociated at 20°. The true degree of association, $(1-\alpha)$, and heat of dissociation have been cale, from V for various uni-bi- and bi-uni-valent salts by Nernst's method. The vals, of V calc. by assuming the mass law to be valid for the variation with concn. of the true association agree with the measured vals. only when equilibria of the type $[Ca(NO_3)]' \Longrightarrow Ca''+$ NO_3' are assumed to occur. The tendency to true association increases with decrease in the valencies of the ions. For uni-bi- and bi-uni-valent salts the vals. of $(1-\alpha)$ deduced from data for V agree, in order of magnitude at least, with vals. deduced from f.-p. depression and conductivity data. R. C.

Concentration at which heats of dilution are measured in the calorimetric method. Correction. V. K. LA MER and I. A. COWPERTHWATTE (J. Amer. Chem. Soc., 1932, 54, 4754—4755; cf. A., 1932, 1206).—A criticism is withdrawn.

J. G. A. G.

Heats of formation of halide phosphinates. III. R. HÖLTJE (Z. anorg. Chem., 1932, 209, 241– 248; cf. A., 1930, 876; 1931, 583).—The heats of formation for solid phosphinates produced from the solid halide and gaseous PH₃ are: AlCl₃, PH₃ 9.9 \pm 0.2, AlBr₃, PH₃14·3 \pm 0·3, AlI₃, PH₃14·7 \pm 0·1, SnCl₄, 1·5PH₃ 15·9 \pm 0·2, TiCl₄, PH₃ 16·4 \pm 0·1, TiCl₄, 2PH₃ 13·6, TiBr₄, PH₃ 16·0 \pm 0·2, TiBr₄, 2PH₃ 13·9. The compounds are more stable than the corresponding compounds with H₂S. E. S. H.

Limiting mobilities of some univalent ions and the dissociation constant of acetic acid at 25°. A. I. VOGEL and G. H. JEFFERY (Nature, 1933, 131, 27-28).—A reply to criticism (this vol., 28).

L. S. T. Conductivity of aluminium chloride in nonaqueous solution. E. WERTYPOROCH and T. FIRLA (Z. physikal. Chem., 1932, 162, 398-414).-Results similar to those recorded for AlBr₃ (A., 1931, 913) have been obtained. At small concns. the mol. conductivity, μ , of AlCl₃ in EtCl scarcely varies with the concn., which indicates that the complexes formed by solvation of Al₂Cl₆ and Al₄Cl₁₂ are completely ionised and that the ions are not dissociated on dilution. In PraCl, PrBCl, and chlorocyclohexane μ is much larger than in EtCl, which is attributed to the formation of propylene or cyclohexene and its incorporation in the complex. BzCl and AcCl as solvents form salt-like compounds with the AlCl₃ and become part of the cation. With all these solutions the addition of C_6H_6 causes an increase in Transport measurements with EtCl solutions μ. containing hydrocarbons show that 4 hydrocarbon mols. migrate to the cathode with each Al atom. With the other solvents the amounts migrating are smaller. R. C.

Position of gold in the potential series in the electrolysis of molten alloys. L. LAMMERMAYR, jun., and R. KREMANN (Monatsh., 1932, 61, 345-350).—Electrolysis of molten alloys of Au with Bi, Sb, Pb, and Al, respectively, in capillary tubes, followed by analysis of the anode and cathode regions, shows that the position of Au falls in the series Bi, Sb, Hg, Pb, Au, Al. E. S. H.

Electro-potentials of ternary gold-tin-mercury alloys. F. GRIENGL and R. BAUM (Monatsh., 1932, 61, 330-344).—Isopotential lines for the system Au-Sn-Hg have been determined. The curves afford no evidence of the existence of AuSn or AuSn₂, which are indicated, however, by discontinuities in potential in the binary system. The data suggest that both AuSn and AuSn₂ are partly dissociated in the ternary system. E. S. H.

Electro-potentials and constitution of gold amalgams. R. KREMANN and R. BAUM [with L. LAMMERMAYR, jun.] (Monatsh., 1932, 61, 315—329). —The potential of Au-Hg alloys containing < 30% Au becomes less noble with time; amalgams containing $30-43\cdot35\%$ change little with time, whilst those containing 60-70% become more noble. When the Au content is < 75% (the Au₃Hg composition) the equilibrium potential is that of Hg, but when > 75% of Au is present the potential assumes a val. near that of Au. E. S. H.

Electrode potential of iron. III. Corrosion of iron in water in the absence of oxygen and determination of the solubility product of ferrous hydroxide. K. MURATA (J. Soc. Chem. Ind. Japan, 1932, 35, 523-530B).—The rate of evolution of H₂ from 10 g. of powdered Fe in pure O-free H₂O reaches a min. of 0.3 c.c. per day after 4 days, then follows a continuous rise to a max. of approx. 1 c.c. reached after nearly a month; there is a subsequent very slow decrease. No blackening of the powder is observed, but small colourless prismatic crystals of Fe(OH)2 appear after a few months. On exposure to air these are immediately oxidised. Opaque violet layers are formed and a metallic lustre similar to that of magnetite appears. Measurements of electrical conductivity, solubility, and $p_{\rm H}$ at 25° gave 2.90, 1.56, and 2.13× 10⁻¹⁵, respectively, for the solubility product of Fe(OH),. M. S. B.

Nature of dropping mercury electrode. Nonapplicability of thermodynamical equilibrium considerations to solutions of indefinitely small concentration. M. ANDAUER and E. LANGE (Z. physikal. Chem., 1932, 162, 241-256).-Theoretical. The assumption that thermodynamical and electrochemical equilibrium exists at the interface leads to certain impossible results, particularly in relation to the conen. gradient at the interface. A comprehensive theory, which avoids these difficulties, is arrived at by supposing that the galvanic potential at the interface is a function of the adsorption of Hg_2 , and that the passage of potential-determining ions between the extended and adsorbed phases is subject to a certain hindrance, in consequence of which its speed is limited. Similar considerations are applicable to the electrocapillary curve. The applicability of thermodynamical considerations, in the form of Gibbs' adsorption equation, to the dropping electrode and electrocapillary curve would thus seem to be very limited. R. C.

Electromotive behaviour of nickel and cobalt. E. MULLER and J. JANITZKI (Z. physikal. Chem., 1932, 162, 385—397).—The behaviour of Ni and Co in neutral solutions of their salts and aq. acids and alkalis is qualitatively similar to that of Fe (A., 1932, 813); the p.d. established at an electrode of the massive metal represents an equilibrium between the dissolution of metal ions at active parts of the surface and the diffusion away of H discharged at other parts of the surface. If the electrode is continually scraped the p.d. becomes more negative, and in Co salt solutions approximates to the reversible potential, which for N-CoCl₂ is -0.292 volt. R. C.

Theory of concentrated solutions. V. E. WILKE and W. SCHRÄNKLER (Z. physikal. Chem., 1932, 162, 361—371; cf. A., 1932, 700).—The e.m.f.-concn. curves for concn. cells consisting of H halide solutions and H electrodes or alkali halide solutions and alkali-metal amalgam electrodes exhibit discontinuities at the concns. predicted by the theory (cf. A., 1926, 906). R. C.

Polarisation potential of zinc deposited from aqueous solutions. T. ISHIHARA, K. MIHARA, and K. UMETU (Kinz. no Kenk., 1932, 9, No. 6, 244 278).—The cathodic polarisation potential, the anodic over-voltage, and the total polarisation potential have been measured for ZnSO_4 solutions of various conces. and p_{II} at 35°. The relations between cathodic polarisation potential and c.d. vary with the composition of the solution. The polarisation potential decreases greatly on addition of $\text{H}_2\text{SO}_4 < N$. Both neutral and acid solutions of 0.5N-Zn show min. over-voltage. The max. O over-voltage occurs in Zn solutions > 2N, the conen. varying with the amount of acid added. CH. ABS.

Electrolytic polarisation. X. Ammines of copper, silver, zinc, and cadmium. S. GLASSTONE (J.C.S., 1932, 2849-2857).-Electrometric titration by aq. NH₃ of solutions of Cu, Ag, Zn, and Cd salts, in presence of excess of $(NH_4)_2SO_4$, indicates the existence of the ions $Cu(NH_3)_4$, $Ag(NH_3)_2$, $Zn(NH_3)_4$, and $Cd(NH_3)_3$, or $Cd[(NH_3)_3(H_2O)]$. Measurements of the cathode potential in 0.1M and 0.01M solutions for different c.d. show that, for Ag and Cd solutions, none of the stages in the process $M(NH_3)_* \longrightarrow M$ is slow. In the cupriammine solutions two limiting c.d. were observed, one being a measure of the rate of spontaneous dissolution of the deposited Cu and the other the sum of this and the rate of diffusion of the ammine ions to the cathode, the difference agreeing with the calc. val. of the limiting c.d. No limiting c.d. could be determined for Zn owing to the spontaneous dissolution of this metal with evolution of H.

M. S. B.

Electrochemistry of polonium. M. HAISSINSKY (J. Chim. phys., 1932, 29, 453–473).—The crit. deposition potential of Po on Au from alkaline solution is -0.29 volt; the potential diminishes with increase in the alkalinity, and varies with the nature of the electrode. The crit. anodic potential is approx. const. at 0.53 ± 0.01 volt. The mechanism of deposition in alkaline differs from that in acid solution. N. M. B.

Behaviour of hydrogen electrode in chromicchromous solutions and solubility product of chromous hydroxide. W. H. BENNETT (Trans. Faraday Soc., 1932, 28, 889—895; cf. A., 1930, 565). —In H_2SO_4 solutions of $Cr^{II}+Cr^{III}$ sulphates to which NaOH is added gradually, the potential of the H electrode is determined by the $Cr^{"}/Cr^{""}$ potential until the $Cr(OH)_3$ is completely pptd., and thereafter by the [H[•]] of the solution. Inflexions in the potentiometric titration curve corresponding with the three stages of neutralisation are not sharp enough for quant. purposes. From the $p_{\rm H}$ of pptn. of Cr(OH)₂ from very dil. solutions of CrSO₄, viz., 5·6, the solubility product of Cr(OH)₂ is calc. to be 2×10^{-20} at 18°. F. L. U.

Utilisation of potentiometric titrations. X. Ampholytes. F. L. HAHN and R. KLOCKMANN (Z. physikal. Chem., 1932, 162, 318–330).—The "effective" acid and basic dissociation consts. of an ampholyte, in the definition of which no distinction is made between zwitterions and undissociated mols., may be deduced directly from conductivity and $p_{\rm H}$ measurements, and the vals. used to calculate the isoelectric point and the change in $p_{\rm H}$ caused by addition to the solution of acid or alkali. The true dissociation consts. of the mols. and zwitterions, respectively, and the ratio of mols. to zwitterions may be derived from an analogy of ampholytes to bivalent acids or bases, and also from certain theoretical considerations. R. C.

Unimolecular reaction velocity. M. G. EVANS (Trans. Faraday Soc., 1932, 28, 840-845).—A theoretical discussion of the spontaneous decomp. of activated mols. F. L. U.

Chain reactions. M. BODENSTEIN (Z. Elektrochem., 1932, 38, 911-918).—Historical. D. R. D.

Kinetics of the decomposition of molecules of intermediate complexity. C. N. HINSHELWOOD and C. J. M. FLETCHER (Nature, 1933, 131, 24).— In a mol. of moderate complexity it is possible that there may be several different modes of activation, corresponding with particular divisions of part of the energy among a limited no. of vibrational or rotational states, and that the most general form of curve obtained by plotting the half-val. of the reacting substance against pressure is of the segmented type. Experiments on the decomp. of N₂O and MeCHO at low pressures indicate the existence of these different types of activated state. L. S. T.

Energy exchange in unimolecular gas reactions. O.K. RICE (J. Amer. Chem. Soc., 1932, 54, 4558-4581).—Mathematical. The theory is developed with reference to collisions in H₂, He, and org. vapours, and it is concluded that an activated mol. is deactivated by nearly every collision with a mol. of its own kind. In general, the probability of energy transfer decreases with increasing frequency and force const. of the oscillator, but increases with sharpness of collision. Increasing the mass of the particle decreases the probability of energy transfer, but, owing to complications, this factor may not completely account for the contrasting effects of H₂ and He in restoring the velocity coeff. of the decomp. of vapours at low pressures to the vals. at high pressures. J. G. A. G.

"Vibratory movement" in flames. O. C. DE C. ELLIS and E. MORGAN (Trans. Faraday Soc., 1932, 28, 826—839; cf. A., 1931, 1371).—The method of shadow displacement has been used to determine the gas temp. at different positions in a tube containing a burning mixture of CO and air saturated with H_2O . Flame temp. was measured by the method of

reversal of Na lines. From the temp. gradient throughout the tube the acoustic properties of the system can be deduced, and it is shown by mathematical analysis that the vibratory movement in the flame is determined by these and by the dimensions of the tube. F. L. U.

Conditions of ignition of gaseous mixtures. I. Induction period of the thermo-ignition of methane-oxygen mixtures. M. B. NEUMANN and L. N. EGOROV. II. Region of thermo-ignition of methane-oxygen mixtures. M. B. NEUMANN and A. I. SERBINOV (J. Phys. Chem., Russia, 1932, 3, 61-74, 75-82).—I. The induction period for $CH_4: O_2=1:2$ admitted into a SiO₂ tube at 728-853° decreases with rise of temp. or increase in pressure.

II. The above mixture exploded on introduction into SiO_2 tubes at $645-679^\circ$ only within three different pressure regions. CH. Abs.

Thermal decomposition of ethylamine. H. J. SCHUMACHER and E. O. WIIG (Z. physikal. Chem., 1932, 162, 419—431).—Contrary to Taylor's observations (A., 1931, 175), the reaction at $510-535^{\circ}$ under 10—60 mm. is a heterogeneous chain reaction, its velocity being influenced by H₂O vapour, foreign gases, and the material of the containing vessel. Decomp. involves a pressure increase of 125—180% and results in the formation of a great variety of products, including N₂, H₂, CH₄, NH₃, and resinous and oily substances. The temp. coeff. depends on the containing vessel. Under some conditions the course of reaction can be represented by the unimol. law, but periods of induction and other abnormalities are often observed. R. C.

Role of solvent in unimolecular reactions. M. MAGAT (Z. physikal. Chem., 1932, 162, 432-448) .-A crit. review of available experimental data indicates that the influence of the solvent on a unimol. reaction is determined by its ability to form swarms or complexes with the solute, which in general runs parallel with its self-association; steric peculiarities, electronic interaction, and the sharpness of the resonance of the characteristic frequencies of the solvent and solute may exert a decisive influence in special cases. If Z in the equation $k = Ze^{-E/RT}$ is of the order of 10¹¹ or greater the reaction is retarded by an "active" solvent, whilst if $Z=10^3$ to 10^9 the reaction is accelerated. It is tentatively suggested that for reactions of the first class, for which both Z and E are large, the solvent causes a dissipation of energy, whilst reactions for which both Z and E are small are probably "tunnel reactions," the accelerating effect of the solvent being due to its influence on the potential curves. Moelwyn-Hughes' theory (A., 1932, 233) is R. Ć rejected.

Decomposition of dilute sodium carbonate solutions at temperatures between 147° and 243°. F. G. STRAUB and R. F. LARSON (Ind. Eng. Chem., 1932, 24, 1416—1419).—The velocitics of decomp. of Na₂CO₃ solutions at 147—243° indicate that there are two reactions Na₂CO₃+H₂O \Longrightarrow NaOH+NaHCO₃ and NaHCO₃ \Longrightarrow NaOH+CO₂. On this supposition approx. equilibrium consts. have been calc.

J. W. S.

Rate of reaction between chlorate and sulphur dioxide in acid solution. A. C. NIXON and K. B. KRAUSKOPF (J. Amer. Chem. Soc., 1932, 54, 4606— 4608).—The velocity of the reaction $\text{ClO}_3'+3\text{H}_2\text{SO}_3=$ $\text{Cl}'+3\text{SO}_4''+6\text{H}'$ in acid solution at 0° is given by $-d[\text{ClO}_3']/dt=2\cdot4[\text{H}_2\text{SO}_3][\text{ClO}_3']$. J. G. A. G.

Neutral salt effect in the thiosulphate and monobromoacetate ion reaction. I. A. VON KISS [with P. VASS] (Z. anorg. Chem., 1932, 209, 236— 240).—Solutions of sulphates and nitrates of Na, K, NH₄, and Mg do not alter the mechanism of the reaction. An accelerating effect is observed, but there is no clear relation between its magnitude and the nature or concn. of the salt. E. S. H.

Kinetics of the action of ammonium halides on epichlorohydrin. S. BANERJEE and H. K. SEN (J. Indian Chem. Soc. 1932, 9, 509—518).—The reactions of epichlorohydrin with NH_4 halides follow the bimol. law if the $p_{\rm H}$ is const. A. G.

Velocity and mechanism of racemisation. II. Mandelic acid. A. N. CAMPBELL and A. J. R. CAMPBELL (J. Amer. Chem. Soc., 1932, 54, 4581— 4585).—The racemisation of 0.1M-mandelic acid has been investigated at 96° in 0.9—7.0N-NaOH. The change is very slow in HCl solutions, and some decomp. occurs in 11-24N-HCl. There is no evidence of complex formation. J. G. A. G.

Trypanocidal action and chemical constitution. XIV. Relative velocity of oxidation of arylarsenoxides. A. COHEN, H. KING, and (MISS) W. I. STRANGEWAYS (J.C.S., 1932, 2866—2872).—The velocity of oxidation of various arylarsenoxides to arsinic acids by cystine has been determined polarimetrically and bimol. reaction coeffs. have been deduced. The latter bear no apparent relation to the toxicities of the arsinic acids to mice. D. R. D.

Stability of diazo-chlorides. Influence of various substituents, temperature, and concentration. C. C. SNOW (Ind. Eng. Chem., 1932, 24, 1420-1423).-The rates of decomp. of 32 diazo-compounds have been measured under varying conditions of temp. and concn. Diazo-chlorides containing electropositive groups are more sensitive to rise of temp. than those containing electronegative groups. Diazotisation may in some cases be carried out at temp. > those generally used, facilitating diazotisation of those amines which are very resistant to low-temp. diazotisation. In some cases increased concn. increases the stability of the diazo-chloride. Variation of the negative radical also changes the stability of a diazo-compound, acetates being usually less stable and sulphates more stable than chlorides. J. W. S.

Reactions in solids. Comparison of the methods of deriving the energy of activation. R. S. BRADLEY, J. COLVIN, and J. HUME (Phil. Mag., 1932, [vii], 14, 1102—1114; cf. A., 1932, 1094).— Theoretical. For flat plates or spherical particles the ratio of the instantaneous tangent to the reaction curve before and after a change from a high to a low temp. in a "split run" gives the true activation energy. The errors in using finite times of measurement are reviewed. H. J. E. Reaction velocity in reversible systems solid₁ \implies solid₂ + gas. B. TOPLEY (Phil. Mag., 1932, [vii], 14, 1080—1090; cf. A., 1932, 26).—A correction is applied to previous results due to the concn. of gas mols. in the reaction zone, even with no impedance due to (solid₂). New measurements of the effect of small concns. of H₂O vapour on the velocity of CuSO₄, 5H₂O \implies CuSO₄, H₂O + 4H₂O are recorded. The correction is about 1% at 22.25°. H. J. E.

Influence of the anion on the velocity of dissolution of zinc in acids. E. MÜLLER and J. FÖRSTER (Z. Elektrochem., 1932, 38, 901–906).—The rate of evolution of H_2 from a Pt wire in contact with amalgamated Zn in various acids at 20° has been measured. With HCl and HBr the velocity is approx. proportional to the concn., but with H_2SO_4 , HClO₄, HClO₃, and H_3PO_4 the velocity-concn. curve passes through a max., which occurs at a higher concn. than that of max. conductivity. The max. velocity does not correspond with a max. concn. of H^{*}. Hence, the anions have a sp. action. There is, however, a qual. agreement between velocity of reaction and [H^{*}], the Zn dissolving more rapidly in the stronger acids. There is no induction period. D. R. D.

Rate of dissolution of industrial aluminas in fused cryolite. N. PARRAVANO and O. D'AGOSTINO (Atti R. Accad. Lincei, 1932, [vi], 16, 186—190).— Measurements of the rate of change of conductivity of cryolite at 1050° produced by the addition of Haglund's, of Bayer's, and of Blanc's Al_2O_3 show that the rate of dissolution increases in the order given. O. J. W.

Calculation of velocity of contact oxidation of ammonia. G. K. BORESKOV.—See B., 1933, 16.

Polymerisation of acetaldehyde. II. W. H. HATCHER and M. G. KAY (Canad. J. Res., 1932, 7, 337— 344).—Pure MeCHO, paraldehyde, and metaldehyde have d^{15} 0.7865, 0.9884, and 1.120—1.127, respectively, and the *d* curve for mixtures of the former two closely resembles the ideal straight-line curve. The polymerisation of MeCHO in presence of H₃PO₄ (A., 1931, 1273) has been reinvestigated in the absence of O₂, and again found to be a third-order reaction. Metaldehyde appears in the later stages. Preliminary treatment of MeCHO with O₂ retards polymerisation. A. C.

Active oxides. LVIII. Change in the catalytic activity of an aluminium oxide hydrate gel during ageing. G. F. HÜTTIG and J. BRÜLL (Ber., 1932, 65, [B], 1795—1799).—The catalytic dehydration of MeOH by three samples of gel at 300° has been investigated. Activity is at a max. with specimens which have been preserved from 42 to 56 days. The slight change in catalytic activity during the action indicates a stabilising effect of MeOH vapour.

H. W.

General method for fluorination of inorganic halides. H. S. BOOTH and C. F. SWINEHART (J. Amer. Chem. Soc., 1932, 54, 4751–4753; cf. this vol., 134).—SbF₃ and a catalyst effect partial replacement by F of halogens from non-polar inorg. halides. Non-polar oxychlorides and thiohalides react with SbF₃. J. G. A. G.

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Influence of the structure of the contact substance of the combustion of carbon monoxide. J. ECKELL (Z. Elektrochem., 1932, 38, 918—920).— The catalytic action of Fe₂O₃ and Fe₂O₃-Al₂O₃ mixed crystals on the reaction $2CO+O_2=2CO_2$ has been investigated over the range $160-204^\circ$. The heat of activation falls linearly with increase in concn. of Al₂O₃ until the composition reaches approx. 25%Al₂O₃, after which it remains const. This variation is exactly parallel to the change in lattice const. Increase in fineness of division of the catalyst corresponds with the increase in the velocity coeff. of the reaction. The variation of the latter with temp. agrees well with the log k-1/T law. For pressures of 1-10 mm. the reaction is unimol. with respect to CO. D. R. D.

Decomposition of dimethyl ether on the surface of platinum. E. W. R. STEACIE and H. A. REEVE (J. Physical Chem., 1932, 36, 3074-3084).—The thermal decomp. of Me₂O in contact with Pt filaments at 1150° is unimol. and occurs in a layer of hot gas surrounding the filament. The heat of activation is 67,000 g.-cal., as compared with 58,500 for the homogeneous reaction. The high temp. coeff. is explained by assuming that the accommodation coeff. is low, and hence thermal equilibrium with the filament is not attained by colliding gas mols. E. S. H.

Hydrogenating and dehydrogenating efficiency of platinum catalysts in relation to the supporting substance and the fineness of division of the platinum on the latter. R. KÖPPEN (Z. Elektrochem., 1932, 38, 938—942).—A discussion of published work on the use of finely-divided Pt as a catalyst, especially in combination with an adsorbent such as active C, SiO₂ gel, cellulose, starch, gum, etc., for effecting hydrogenation and dehydrogenation of org. compounds. D. R. D.

Benzine synthesis from carbon monoxide and hydrogen at atmospheric pressure. XII. K. FUJIMURA and S. TSUNEOKA.—See B., 1933, 7.

Oxidation of sulphur dioxide in electrodeless discharge. S. D. MAHANT (J. Indian Chem. Soc., 1932, 9, 417–422).—SO₂ is oxidised when mixed with O_2 and exposed to an electrodeless discharge, the max. being about 35% for a mixture containing 60 vol.-% SO₂. The frequency of the discharge has little effect. A. G.

Polarographic studies with the dropping mercury cathode. XXVIII. Evolution of hydrogen from neutral and alkaline solutions. D. ILKOVIČ. XXIX. Electrodeposition of calcium and magnesium and the determination of calcium. G. KIMURA (Coll. Czech. Chem. Comm., 1932, 4, 480-491, 492-503).-XXVIII. Currentvoltage curves, obtained polarographically during the electrolysis of dil. neutral or alkaline solutions with the dropping Hg cathode, show, above a voltage of approx. 3 volts, a steady rise of current apparently due to the decomp. of H₂O. The true deposition potential is obtained by subtracting the product of the current iand the resistance r of the electrolytic circuit from the applied e.m.f. The cathodic potential of the decomp. of H₂O agrees with that derived on the assumption that the evolution of H at a Hg cathode is due to the reaction $H'+H \longrightarrow H_2$. The inhibiting effect of alkali metal ions and the catalysing action of Mg^{**} and Ca^{**} on the evolution of H are also explained on the basis of this hypothetical reaction and the formation of hydrides.

XXIX. Ca deposits reversibly from alkaline solutions containing quaternary amine bases. The polarographic current-voltage curves show reproducible saturation currents the magnitude of which is proportional to the concns. of Ca". The amine should be 0.01-0.1N and the concn. of Ca 0.1 of this. Ca may thus be determined electrolytically with an accuracy of $\pm 5\%$ in concns. > $10^{-5}N$, provided Li is absent and the concn. of other metals does not exceed 15 times that of Ca. It is impossible to deposit Mg without the simultaneous evolution of H2, since alkali cannot be added in this case to prevent the catalytic action of Mg on H₂ evolution. The use of $(NMe_4)_2 \tilde{C}_2 O_4$ does not solve the problem satisfactorily, owing to the simultaneous reduction of C_2O_4'' at the dropping Hg cathode. M. S. B.

Electrodeposition of iron-cobalt alloys. I. S. GLASSTONE and J. C. SPEAKMAN.—See B., 1933, 24.

Chromium plating on zinc. M. DE K. THOMP-SON and F. C. JELEN.—See B., 1933, 24.

Electrodeposition of chromium from aqueous chromic acid containing hydrofluoric acid. E. Müller and O. Rossow.—See B., 1933, 67.

Electrochemistry of chromium. III. Tervalent chromium. A. V. PAMFILOV and O. S. FEDEROVA.—See B., 1933, 24.

Electrodeposition of metals. L. E. STOUT. See B., 1933, 67.

Protective properties of colloids and their behaviour in the electrolytic deposition of metals. P. A. JACQUET.—See B., 1933, 67.

Polarographic studies with the dropping mercury cathode. II. Reduction of acetone. G. SEMERANO. III. Reduction of benzaldehyde. G. SEMERANO and G. DE PONTE (Gazzetta, 1932, 62, 959—991, 991—999; cf. A., 1932, 1093).—II. Currentvoltage curves have been measured with a dropping Hg cathode during the electrolytic reduction of COMe₂ in aq. Li salt solutions in air and in H₂. The effects of varying the concn. of COMe₂, of H', and of Li salt are described. The reduction is explained as a direct electronic process, in which hydrated COMe₂ decomposes at the electrode surface into OH' and a residue, which reacts with the CMe₂(OH)₂ in solution to give pinacone and with H' or H₂O to give Pr^gOH.

III. PhCHO is reduced to hydrobenzoin at a dropping Hg cathode, and the process consists of depolarisation of a metallic cathode in neutral or alkaline solution and of a H cathode in acid solution. PhCHO is strongly adsorbed at the Hg-solution interface. By means of the polarographic measurements, 10^{-7} g. of PhCHO can be detected and determined. O. J. W.

Active nitrogen and formation of ammonia in the silent discharge with reference to the material of the electrodes and to catalytic problems. E. TIEDE and E. HEY (Ber., 1933, 66, [B], 85-94; cf. A., 1930, 1139).—The concn. of at. N formed in the neighbourhood of the cathode and leaving the discharge under otherwise similar conditions depends mainly on the re-combining affinity of the surfaces near the region of cathode discharge; owing to the intense evaporation of the cathode, the effect depends more on the deposits on the walls of the vessel than on the electrodes. The ability of the electrodes and their deposits to adsorb N atoms at their surfaces, and hence to accelerate their union to mols., increases in the sequence Al, W, Ni, Fe, Cu, (Pt). The slight adsorptive power of the deposits of Al and W is attributed to the formation of nitrides. NH₃ is formed from N and H atoms adsorbed at the cathodic surfaces; if the sequence of chemical reactions is sufficiently rapid, the rate of formation is proportional to the concn. of adsorbed atoms. The bearing of the results on the thermal contact synthesis of NH₃ is H. W. discussed.

Blue coloration of rock-salt accompanying spark perforation of the crystals. H. STEINMETZ (Neues Jahrb. Min., 1932, 65, A, 119—127; Chem. Zentr., 1932, ii, 1754).—The rock-salt becomes coloured blue along the spark canal. The coloration is in a thin layer, and is sensitive to temp. In air, but not in vac. over H_2SO_4 , it disappears in a few days. It gives an alkaline reaction to an aq. solution of the salt. The following mechanism is postulated : (1) formation of Cl', Na', and electrons, (2) Na' \longrightarrow Na, (3) diffusion of Na into the NaCl, (4) formation of amicrons with the constituents of the rock-salt lattice and stabilisation of the diffusing Na atoms towards atm. O_2 . A. A. E.

Activation of molecular oxygen by electron impact. G. GLOCKLER and J. L. WILSON (J. Amer. Chem. Soc., 1932, 54, 4544—4558; cf. A., 1930, 1000; 1931, 1139).—The active species produced by interaction of 0.023—0.05 mm. of O_2 with 3—20-volt electrons react with a Hg surface. Activation by 3—8-volt electrons affords metastable ${}^{1}\Sigma_{g}$ · O_{2} mols., 8—12-volt electrons afford electronically excited ${}^{3}\Sigma_{g}$ · O_{2} mols., but the rate of pressure decrease does not increase markedly at the ionisation potential (12.5 volts). The product from higher voltage electrons reacts with KI when adsorbed on glass and may be either at O or O_{3} . The results are discussed in terms of probabilities of energy transfer from electrons to normal mols. and of reaction between activated states and the Hg surface. J. G. A. G.

Photochemical reaction of hydrogen and chlorine. H. B. BAKER (Nature, 1933, 131, 27).— A criticism (this vol., 34). The inhibition of the action of light on a mixture of H_2 and Cl_2 after drying is affirmed. L. S. T.

Inhibition of photochemical decomposition of ammonia by atomic hydrogen. H. W. MELVILLE (Trans. Faraday Soc., 1932, 28, 885–889).—In a mixture of NH₃ with H₂ and Hg vapour illuminated by a Zn spark the rate of decomp. is lowered when at. H is produced by operating a Hg arc. This observation explains the low quantum yield due to the reaction NH_2 - $H=NH_3$, and affords a proof of the dissociation of NH_3 into H atoms. F. L. U.

Time lag in the formation of the latent image. L. I. ZIMMERMAN (Physical Rev., 1931, [ii], 37, 106). Image density gradually decreases with a decrease in time of flash illumination to a crit. point, after which it decreases rapidly. The formation of the latent image is indicated to be a resonance process.

L. S. T.

Photochlorination of tetrachloroethylene in carbon tetrachloride solution. J. A. LEERMAKERS and R. G. DICKINSON (J. Amer. Chem. Soc., 1932, 54, 4648—4657; cf. A., 1932, 1215).—In the absence of O_2 , photochlorination is fairly rapid, but about 9% less Cl_2 is absorbed than is required by $Cl_2+C_2Cl_4=$ C_2Cl_6 . The results for light of wave-length 4358 Å. are reproduced by the relation $-d[Cl_2]/dt=$ $5\cdot1 \times I_{abs}^{1/2}[Cl_2](1+0\cdot4[Cl_2]/[C_2Cl_4])^{-1/2}$. Quantum efficiencies between 300 and 2500 were observed. The temp. coeff. is $1\cdot16\pm0.08$ per 10°. The mechanism of the reaction is discussed. J. G. A. G.

Measurement of ultra-violet radiation intensity. I. Photochemical formation of molybdenum-blue. (MLLE.) D. SACHS (J. Chim. phys., 1932, 29, 474–478).—The formation, in acid solution, of Mo-blue by the partial reduction of Na_2MoO_4 by ultra-violet light, in presence of a weak reducing agent (HCO₂H or CH₂O), is purely photochemical, and affords a convenient quant. method of measuring ultra-violet light intensity. N. M. B.

Halogenated pyridone derivatives in radiography. A. BINZ, C. RATH, H. MAIER-BODE, and K. HERRMANN (Angew. Chem., 1932, 45, 713—715).— The % transmission of X-rays through 0.25*M* and 5% solutions of nine halogenated pyridone derivatives, Na₂SO₄, NaI, NaBr, CH₂I·SO₃Na, and CHBr₂·SO₃Na, has been determined. For the wave-lengths employed in radiography the Br derivatives are more opaque than the corresponding I derivatives. H. F. G.

Radiochemical decomposition of hydrogen sulphide at room temperature. COLMANT (Bull. Soc. chim. Belg., 1932, 41, 431-463).-The decomp. of H₂S containing Rn at pressures between 37 mm. and 10 atm. has been studied. The ratio M/I, where M is the no. of mols. decomposed and I the no. of ion pairs formed, calc. on the assumption that all the Ra-A and Ra-C is deposited on the walls of the vessel, passes through a min. (about $2 \cdot 2$) at 100-200 mm., and tends to reach a const. val. (about 3.6) at high pressures. The variations at low pressure may be attributed to the action of recoil atoms, but it appears that for high pressures the principle of the constancy of M/I must be abandoned, and that the chemical effect of slow α -particles is greater in proportion to their power of ionisation than is the case with rapid α -particles. H. F. G.

High-temperature chemistry. O. RUFF (Angew. Chem., 1933, 46, 1-7).—A lecture, surveying published work on reactions and stability at high temp. It is inferred that in this region chemical behaviour is not essentially different from that at room temp. E. S. H.

Double iodide ammines. E. VOJIATZAKIS (Bull. Soc. chim., 1932, [iv], 51, 1310—1312).—The following compounds may be crystallised from solutions of Formation and decomposition of potassium perchlorate and revision of the heat toning. K. A. HOFMANN (Sitzungsber. preuss. Akad. Wiss. Berlin, 1932, 27, 3–13).—In the absence of catalysts for the reaction $2\text{KClO}_3 \rightarrow 2\text{KCl}+3\text{O}_2$ a yield of 73% KClO₄ can be obtained by heating KClO₃ at 490°. The reaction 4KClO₃ \longrightarrow 3KClO₄+KCl is accelerated by KCl and more powerfully by KI or KIO3, but retarded by molten KNO2, which, by reason of its solvent action on KClO_4 , promotes decomp. of the latter according to $2\text{KClO}_4 \rightarrow$ $2KClO_3 + O_2$. NaNO₂ reduces $KClO_4$ successively to $KClO_3$ and KCl and is itself oxidised to NaNO₃. The reaction $KClO_4 \longrightarrow KCl + 2O_2$ is accelerated by salts of various heavy metals, especially of Cu, and occurs with the evolution of 1.73 kg.-cal. The stability of KClO₄ compared with KClO₃ is due to its higher m.p. and to the large heat of transformation of the rhombic into the cubic modification, viz., 3.29 kg.-cal. at 299.5°. F. L. U.

Hydrothermal synthesis of calcium hydroaluminates. I. S. NAGAI (J. Soc. Chem. Ind. Japan, 1932, **35**, 495–500B).—Mol. proportions of CaO and $Al_2(OH)_6$, heated together at pressures ranging from 5 to 20 kg. per sq. cm. and temp. 152–213°, give a mixture of 2CaO, Al_2O_3 , xH_2O and

3CaO,Al₂O₃,xH₂O. By varying the proportion of CaO to 1 mol. Al₂(OH)₆ at 10 kg. pressure and 180— 182°, 2CaO,Al₂O₃,3H₂O is obtained from 1 mol. CaO, a mixture of 2CaO,Al₂O₃,3H₂O and 3CaO,Al₂O₃,6H₂O from 2 and 3 mols. CaO, and 3CaO,Al₂O₃,6H₂O from 4 mols. CaO. Mol. proportions of CaO and calcined Al₂O₃, at 5 kg. pressure and 152—154°, give 2CaO,Al₂O₃,(6—7)H₂O. M. S. B.

Course of the solid reaction between lime and silicic acid. I. WEYER (Z. anorg. Chem., 1932, 209, 409-428; cf. A., 1931, 921).—The reaction in an equimol. mixture of CaCO₃ and SiO₂ has been studied by microscopical and X-ray analysis at temp. between 650° and 1250° . At 650° the product is β -Ca₂SiO₄. This is also the primary product at 735° , but on tempering is slowly converted into CaSiO₃ (wollastonite). At 815- 835° both products are formed, whilst at and above 1050° CaSiO₃ is alone produced. F. L. U.

Extraction and purification of radium-E. P. FOUCAUD (J. Chim. phys., 1932, 29, 479–487).—The continuous extraction of Ra-E (life period 5 days) as it is formed by Ra-D obtained from Ra-Pb was effected by pptg. as carbonate the Pb of the impure chloride of Ra-Pb, and converting the carbonate into nitrate. A ppt. containing the Ra-E was obtained by the addition of colloidal Fe(OH)₃, and this ppt. was purified and the Ra-E isolated. N. M. B.

Action of aluminium on solutions of metallic salts. M. J. SALAUZE (Bull. Soc. chim., 1932, [iv], 51, 1346—1352).—When powdered Al displaces Cu from aq. CuSO₄ there is a period of induction of 1-2 hr., after which a violent reaction sets in. This effect is attributed to the presence of a protective film of Al_2O_3 . The Al may be activated by treatment with aq. HCl or Au, Hg, or Pt salts, or by boiling with a metallic salt which is hydrolysed giving an acid solution, activation being most efficient in presence of Cl'. Al so treated reacts immediately with aq. CuSO₄, Pb(OAc)₂, NiSO₄, and CdSO₄, giving almost quant. yields of finely-divided Cu, Pb, Ni, and Cd. With FeSO₄ the yield of Fe is only 50%, since the reaction $2Al+3H_2O=Al_2O_3+3H_2$ occurs to a considerable extent. D. R. B.

Significance of alkali in blue ultramarine. K. LESCHEWSKI and H. MÖLLER (Z. anorg. Chem., 1932, 209, 369—376; cf. A., 1932, 351).—Blue ultramarine when boiled with $OH \cdot CH_2 \cdot CH_2 Cl$ for 30—150 hr. loses all but 1.5% of its Na and yields a white or pink substance no longer possessing the cryst. structure of ultramarine. The S content remains unchanged. Subsequent treatment with suitable Na compounds gives a yellow or green substance. In molten HCO_2Na ultramarine takes up Na, its S is reduced, and it is decolorised, the substance thus formed regaining its colour by hydrolysis with H_2O or by the action of HCl at 100°. Finally, ultramarine takes up Na from molten NaNO₃ at 500° without oxidation or loss of colour or cryst. structure. F. L. U.

Oxidation and reduction of ultramarine. K. LESCHEWSKI and H. MÖLLER (Z. anorg. Chem., 1932, 209, 377–382; cf. preceding abstract).— Ultramarine loses only traces of S in O_2 at 500°, and its depth of colour is increased. H₂ at 400° reacts more readily, reducing the S and yielding a substance of brighter colour. Similar differences are observed with the white product formed by the action of OH·CH₂·CH₂Cl. The natural colour of ultramarine is related to the firmness of binding of the S due to its alkali content. F. L. U.

Crystal-chemical processess with carbon. U. HOFMANN (Ber., 1932, 65, [B], 1821-1830).—A lecture. H. W.

Production of gaseous hydrogen cyanide. A. SOLDI and A. REGE (Annali Chim. Appl., 1932, 22, 695-705).—The best yield obtainable from NaCN and H_2SO_4 was 78-79%. T. H. P.

Properties of active charcoal reactivated in oxygen at 400°. I. M. KOLTHOFF (J. Amer. Chem. Soc., 1932, 54, 4473—4480).—Charcoal activated at 900—1000° ($C_{act.}$) and then heated in O_2 at 300— 500° (C_{acid}) forms at the surface a definite acidic compound which could not be identified. The surface acid is also formed slowly on $C_{act.}$ in moist air at room temp., and is stable in vac. at 500—550°. In contrast to $C_{acid.}$ $C_{act.}$ does not adsorb strong bases, but renders salt solutions alkaline by hydrolytic adsorption of acid. Differences in catalytic activity and other adsorptive properties have been investigated. J. G. A. G.

Volatile transport of silica. J. W. GREIG, H. E. MERWIN, and E. S. SHEPHERD (Amer. J. Sci., 1933, [v], 25, 61-73).—SiO₂ is volatilised from many silicate minerals on heating at about 1100°.

C. W. G.

Fluorochlorides of silicon. H. S. BOOTH and C. F. SWINEHART (J. Amer. Chem. Soc., 1932, 54, 4750—4751; cf. A., 1932, 1218).—By interaction of SbF₃ and SiCl. in the presence of SbCl₅ or Cl₂, SiFCl₃, b.p. $12 \cdot 2^{\circ}$, $t_c \ 165 \cdot 17^{\circ}$, $p_c \ 34 \cdot 34 \ \text{atm.}$, SiF_2Cl_2 , $t_c \ 95 \cdot 75$, $p_c \ 34 \cdot 57$, and $\text{SiF}_3\text{Cl} \ t_c \ 34 \cdot 5$, $p_c \ 34 \cdot 42 \ \text{have been}$ J. G. A. G. prepared.

Germanium and gallium from germanite. II. R. BERG and W. KEIL (Z. anorg. Chem., 1932, 209, 383-384; cf. A., 1926, 589).-Ga can be obtained from germanite by shaking the aq. HCl solution with Et_2O , when GaCl₃ passes into the latter, accompanied by AsCl₃ and FeCl₃, from which it is easily separated. F. L. U.

Preparation of per-acids and their salts. R. R. Coons (Iowa State Coll. J. Sci., 1932, 6, 419-422).-Treatment of Na₂HAsO₄ with 30% H₂O₂ affords a substance, probably a mixture, having a composition corresponding with 25Na2HAsO4,32H2O2,16H2O. Na2O2 and Na2HAsO4

in EtOH produced 2Na3AsO4,7Na2O2,2NaOH,75H2O, also probably a mixture. CH. ABS.

Decomposition of metallic sulphides, especially those of antimony, tin, and lead, at high any those of antimony, this and read, at high temperatures. E. J. KOHLMEYER (Metall u. Erz, 1932, 29, 105—113; Chem. Zentr., 1932, ij, 653).— Data for Sb₂S₃, PbS, PbS–Sb₂S₃, SnS, SnS–PbS, Cu₂S, PbS–Cu₂S, and Bi₂S₃ have been obtained. The b. p. of Pb and Sb are 1740° and 1645°, re-spectively. L. S. T.

Chromium pentoxide. E. H. RIESENFELD (Ber., 1932, 65, [B], 1868-1869).-Contrary to Schwarz (A., 1932, 708), CrO_5, C_5H_5N is obtained by the author's process (A., 1907, ii, 357) if cooling is sufficiently careful. The products are identical in composition, but differ somewhat from one another in appearance, in their rate of decomp. by acids, and, particularly, in their behaviour towards alkali. Since each oxide has the simple mol. wt., stereoisomerism is assumed. H. W.

Reactions of complex chlorides of tervalent and quinquevalent tungsten. R. C. YOUNG (J. Amer. Chem. Soc., 1932, 54, 4515-4519).-In an atm. of N₂, $K_3W_2Cl_9$ is oxidised by H_2O in accordance with the equation $5W_2Cl_9''+18H_2O \longrightarrow 45Cl'+30H^*+3H_2+2(W_2O_3,3WO_2)$. With 6N-KOH, 80% of the W is oxidised, whilst with 50% KOH all of the W is oxidised, whilst with 50% KOH all of the W is oxidised to W¹v and only in presence of air is the W oxidised to a higher state. $K_4W(CN)_8$ is produced by interaction of KCN with $K_3W_2Cl_9$, but H_2 is not evolved. $(NH_4)_2WOCl_5$ reacts with KCN as follows: $2WOCl_5''+60H' \longrightarrow W_2O_5+10Cl'+3H_2O$; $W_2O_5+H_2O+8CN' \longrightarrow W(CN)_8'''+WO_4''+2OH'$. The compound $K_3W_2Br_9$ was prepared.

J. G. A. G.

Influence of filter-paper on hydrochloric acid. E. GRUNSTEIDL (Mikrochem., 1932, 12, 174-186).-Separation of I in filter-paper moistened with a solution of IO_3' -free KI acidified with HCl is due, not to oxidation of HCl by the filter-paper, but to the combined action of air and light. F. L. U.

Influence of sodium, barium, and aluminium chlorides on the hydrolysis of ferric chloride

above 100°. T. KATSURAI (Bull. Chem. Soc. Japan, 1932, 7, 374-375).-The influence of NaCl, BaCl, and AlCl₃ on the hydrolysis of FeCl₃ has been in-vestigated by heating the mixed aq. solutions in an autoclave and observing the temp. of pptn. of Fe₂O₃. NaCl and BaCl₂ cause this temp. to rise, but AlCl₃ D. R. D. has little effect.

Reduction of palladium oxide by carbon monoxide. P. V. MCKINNEY (J. Amer. Chem. Soc., 1932, 54, 4498-4504; cf. A., 1931, 1366).-A small initial reduction of PdO by CO was observed at 23°, but if adsorbed O_2 is removed, there is no reaction below 76°. At temp. < 156° reduction is never complete and the velocity decreases with time. CO₂ retards the reaction, whilst O₂ is a catalyst, and reduction probably proceeds at an interface.

J. G. A. G.

Amino-compounds of platinic chloroammines. B. E. DIXON (J.C.S., 1932, 2948-2955).-The action of alkali on Pt chloroammines, whereby HX is removed and an NH₂ group formed, has been further investigated. Addition of NH₃ to aq.

 $[Pt(NH_3)_4Cl_2](NO_3)_2$ gives a yellow ppt. of the compound $[Pt(NH_3)_3(NH_2)Cl_2]NO_3$. When prepared in the cold, the compound described by Werner (" Neuere Anschauungen," pp. 53, 192) as [Pt(NH₃)₄ClPO₄] has the formula $[Pt(NH_3)_4Cl_2](OH)(H_2PO_4), 2H_2O$, but the ppt. obtained in hot solutions is

 $[Pt(NH_3)_4Cl(HPO_4)]OH$, which loses 1 mol. of H₂O at 130°, forming [Pt(NH₃)₃(NH₂)Cl(HPO₄)]. The action of an excess of Ag₂O on aq. [Pt(NH₃)₅Cl]Cl₃ yields an aq. solution of 2[Pt(NH₃)₂(NH₂)₃(OH)],3AgOH, but the solid compound has not been isolated. Using only 2 equivs. of Ag₂O, the compound

2[Pt(NH₃)₃(NH₂)₂Cl]Cl,3AgCl is obtained, and, using 4 equivs., the compound $[Pt(NH_3)_2(NH_2)_3(OH)]$, 2AgCl. Addition of $(NH_4)_2HPO_4$ to $[Pt(NH_3)_6]Cl_4$ in aq. NH_3 produces a ppt. of the compound

 $[Pt(NH_3)_6]_2(OH)_2(HPO_4)_3, 2H_2O$ or

 $[Pt(NH_3)_5(NH_2)]_2(HPO_4)_3, 4H_2O$, which loses $2H_2O$ at 130°. D. R. D.

Supposed anomaly among the plato-tetram-mines. H. D. K. DREW and G. H. WYATT (J.C.S., 1932, 2975—2976; cf. A., 1906, i, 339).—The same compound, β -[Pt(NH₃)₂(NHMe₂)₂]Cl₂ (I), is obtained both from β -Pt(NHMe₂)₂Cl₂ and NH₃, and from β -Pt(NH₃)₂Cl₂ and NHMe₂. Whether the red monohydrate, β -[Pt(NH₃)₂(NHMe₂)₂]PtCl₄,H₂O, or the buff anhyd. salt (II) separates on adding K₂PtCl₄ depends on the temp. and acidity, and not on the mode of prep. of (I). High temp. and acidity favour the separation of (II). D. R. D.

Spectrum analysis. XI. Method of quantit-ative and qualitative spectrum analysis. W. GERLACH and K. RUTHARDT. XII. Detection of antimony, arsenic, and tellurium. E. RIEDL (Z. anorg. Chem., 1932, 209, 337—355, 356—363; cf. A., 1931, 328).—XI. Tables previously given for the quant. analysis of metals and solutions are also applicable to spectra formed by an arc broken 5—10 times per sec., procedure for which is described. General methods for carrying out qual. analysis and details regarding a no. of elements are described.

The high-frequency discharge is specially useful in the examination of material having a high resistance.

XII. Either an intermittent or flame arc can be used to detect As, Sb, or Te in solids or solutions. In the former the limits are 2×10^{-8} g. As and 10^{-7} g. Te, in the latter 0.01% As and 0.002% Te from 2 c.c. of liquid. A preliminary treatment of the solution permits the detection of 5×10^{-7} g. As, 5×10^{-8} g. Sb, and 5×10^{-8} g. Te. F. L. U.

New methods of qualitative micro-analysis. J. WINCKELMANN (Mikrochem., 1932, 12, 119– 128; cf. A., 1932, 358).—Spot reactions are carried out in a substratum of gelatin jelly made with aq. glycerol and mounted for microscopic observation. The method is very sensitive, and is especially useful in that permanent preps. can be made for reference. F. L. U.

Determination of end-point in micro-titrations. F. L. HAHN (Mikrochem., 1932, 12, 264–268).—A criticism of papers by Partridge and others (A., 1932, 1012, 1013, 1051). F. L. U.

Time required for suitably arranged potentiometric titrations. F. L. HAHN (Z. anal. Chem., 1932, 90, 417–420).—A criticism of statements by Kordatzki and Wulff (A., 1932, 1013). F. L. U.

Compensating apparatus for avoiding troublesome calculations in $p_{\rm H}$ determinations. G. HATOS (Magyar Chem. Fol., 1932, 38, 41–44; Chem. Zentr., 1932, ii, 1477–1478).

Suitability of anhydrous sodium carbonate for volumetric standardisations. J. LINDNER and N. FIGALA (Z. anal. Chem., 1932, 91, 105–112).— Anhyd. Na₂CO₃, prepared by heating NaHCO₃ to const. wt. at 300°, is a suitable substance for the standardisation of volumetric solutions, the quantity of HCl required to neutralise a weighed quantity of Na₂CO₃ being on the average 0.006% < theory.

D. R. D.

Use of bimetallic electrodes in potentiometric acidimetry. I. Behaviour in buffer solutions. II. Behaviour during the titrations. A. BAN-OHETTI (Gazzetta, 1932, 62, 999—1010, 1011—1018).— I. Measurements have been made of the p.d. in solutions of varying $p_{\rm H}$ between Pt and N-Hg₂Cl₂, respectively, and electrodes of the following metals and alloys: steel, Ag, Co-Cr, Cr-Ti, Duralumin, Fe, oxidised Fe, Fe-Cr, Fe-Mo, Fe-Ni-Mo, Fe-Ni-W, Fe-Ta, Fe-Ti, Fe-V, Fe-W, Ni, brass, Pb, pyrites, Cu, Cu-Hg, Sn, and Ti.

II. The potentiometric titration of H_2SO_4 with NaOH and of AcOH with $Ba(OH)_2$ by means of bimetallic electrodes consisting of Pt and one of several of the metals and alloys mentioned above is described. O. J. W.

Catalytic determination of hydrogen by means of a contact candle. E. BIESALSKI and H. GIEH-MANN (Angew. Chem., 1932, 45, 767-769).—The candle consists of a porous porcelain tube each end of which has been impregnated with Na₂PtCl₆ and heated in H₂ at 150° to reduce the salt to Pt. The tubes are filled with 25% aq. NaClO₃ and are heated in a water-bath to 80-90°, while the gas mixture is passed backwards and forwards through the tube; the H_2 is thus burnt to H_2O , whilst CH_4 and C_2H_6 remain unattacked. The method is useful for the analysis of the gases derived from cracking heavy petroleum oils. A. R. P.

Titration method for the determination of water. R. P. BELL (J.C.S., 1932, 2903–2905).— H_2O in non-hydroxylic org. liquids, moist air, etc. may be determined by reaction with α -naphthoxydichlorophosphine (A., 1894, i, 586), the HCl evolved being absorbed in H_2O and titrated with NaOH.

D. R. D. Volumetric determination of chlorides by means of Ionescu-Matiu and Popesco's reaction. J. FOUCRY (Bull. Sci. Pharmacol., 1932, 39, 172; Chem. Zentr., 1932, ii, 1663).—The procedure is reversed, standard $HgSO_4$ solution being employed with Na nitroprusside as indicator. The method is applicable to urine. A. A. E.

Determination of chlorine by Volhard's method. M. B. STSCHIGOL (Z. anal. Chem., 1932, 91, 182–185). —The solution is treated with 5—10 c.c. of C_6H_6 , PhMe, or $C_6H_4Mc_2$ and then with excess of AgNO₃ and HNO₃. The excess of AgNO₃ is titrated with NH₄CNS as usual. Use of Et₂O instead of C_6H_6 etc. leads to low results for Cl'. It is concluded that the mutual solubility of Et₂O and H₂O diminishes the interfacial tension between these liquids and hence the power of adsorption of AgCl. J. W. S.

Potentiometric determination of hypochlorite and chlorate with cuprous chloride. B. TROBERG (Z. anal. Chem., 1932, 91, 161–165).—ClO' can be potentiometrically titrated directly with Cu_2Cl_2 at room temp. after addition of Na_2CO_3 . The titration of ClO_3' must be carried out in acid solution and at a higher temp. Most of the Cu_2Cl_2 is added in the cold and the titration is completed after acidification with H_2SO_4 . Addition of a little TlCl accelerates the reaction. J. W. S.

[Reactions of iodine]. E. ABEL (Z. physikal. Chem. 1932, 162, 372).—Polemical (cf. A., 1932, 920). R. C.

Test for iodides by catalytic reaction. I. F. FEIGL and E. FRANKEL (Z. anal. Chem., 1932, 91, 12—14).—The decomp. of PhBr by o-nitroaniline with the production of HBr is catalysed by KI. This may be used as a test for KI. The presence of HBr is detected by aq. Cl and CHCl₃, a comparison test being carried out in the absence of KI. The sensitivity is 1 in 1,000,000. Cl' and Br' have no influence.

M. S. B.

Determination of iodides in presence of other halides. S. V. GORBATSCHEV and I. A. KASATKINA (Bull. Nauch.-Issledov. Khim.-Farm. Inst., 1930, 7-8).—Excess of HCl and a little CHCl₃ are added; the mixture is titrated with 0.1N-KMnO₄ until the I at first liberated is converted into ICl and the CHCl₃, after shaking, is colourless. CH. ABS.

Detection of fluorine by spot reactions. F. FEIGL and E. RAJMANN (Mikrochem., 1932, 12, 133– 136).—When a drop of an acidified solution containing F' is brought on to filter-paper impregnated with brown Zr p-dimethylaminoazophenylarsinate, a colourless spot surrounded by a red circle is produced. The sensitiveness is 1 in 2×10^5 , 80 times as great as with Zr-alizarin paper. F. L. U.

Determination of fluorine by precipitation as tin triphenyl fluoride. N. ALLEN and N. H. FUR-MAN (J. Amer. Chem. Soc., 1932, 54, 4625—4631; cf. A., 1920, i, 340; 1931, 925).—About twice the calc. quantity of SnPh₃Cl solution (0.02 g. per c.c.) is diluted with an equal vol. of 95% EtOH and the boiling liquid is added to the boiling fluoride solution in 60-70 vol.-% of aq. EtOH at $p_{\rm H}$ 7—9. The ppt. is filtered after about 15 hr. and dried at 110°. 0.05— 40 mg. of F can be determined, but large quantities of other salts cause co-pptn. of reagent and give high results. J. G. A. G

Determination of [dissolved] oxygen [in water] in presence of sulphite. L. W. HAASE.—See B., 1932, 94.

Influence of boric acid and of buffer mixtures on the iodometric determination of ozone. R. RUYSSEN (Natuurwetensch. Tijds., 1932, 14, 245— 253).—In presence of HBO₂ the error is erratic and may be as great as 10%; with buffer solutions ($p_{\rm H}$ 5—7) the result is high and appears to be a function of the $p_{\rm H}$. For O₃ concns. up to 5% there is little difference between the results obtained with a KI solution and with a solution buffered at $p_{\rm H}$.7.

H. F. G.

Volumetric determination of free sulphur. A. CASTIGLIONI (Z. anal. Chem., 1932, 91, 32—33).—The COMe₂ extract of free S (from rubber etc.) is boiled for $\frac{1}{2}$ hr. with KCN under a reflux condenser to form KCNS. COMe₂ is removed on the water-bath, the dry residue is dissolved in H₂O, and excess of KCN is destroyed with CH₂O. After acidifying with HNO₃ the solution is titrated with AgNO₂, using Fe(NO₃)₃ as indicator. Very accurate results are obtained if the pptn. of AgCNS is not too rapid. M. S. B.

Determination of sulphate ion. P. PHOTIADIS (Z. anal. Chem., 1932, 91, 173–180).—In the volumetric determination of SO_4'' by addition of excess of $BaCl_2$ followed by excess of CrO_4'' and subsequent determination of the residual CrO_4'' in the solution the results are too high for acid solutions and too low for alkaline solutions. The solution containing $0\cdot 1$ — $0\cdot 12$ g. SO_4'' is diluted to 100—120 c.c., neutralised, and treated with 1 c.c. of conc. HCl; 25 c.c. of $0\cdot 1N$ -aq. $BaCl_2$ are added dropwise while the solution is stirred, and the solution is then boiled. After cooling, 5 g. NaOAc are added, followed by 25 c.c. of $0\cdot 1N$ -aq. $(NH_4)_2CrO_4$ dropwise to the stirred solution. The whole is diluted to 200 c.c., filtered through a dry paper, and 100 c.c. are treated with 15 c.c. of conc. HCl and 2 g. KI, the liberated I being titrated in the usual way. A special procedure for determination of traces of SO_4'' , e.g., in H₂O, is detailed. J. W. S.

Preservation of standard thiosulphate. II. F. J. WATSON (J. Soc. Chem. Ind. Victoria, 1932, 32, 679-680).—Buffering to p_{11} 9·0-9·5 preserves almost indefinitely the titre of aq. Na₂S₂O₃; with 0·01*M*-Na₂B₄O₇, 0·1*N*-Na₂S₂O₃ remains unchanged after 3 years. A. R. P.

Iodometric determination of thiocyanates. N. P. ALEKSANDROV (Uchen, Zapiski Kazan, Gosud.

Univ., 1930, **90**, 1036—1044).—Schwicker's method is satisfactory. Good results are obtained also with insol. thiocyanates (especially Cu). CH. ABS.

Detection and separation of selenocyanates in presence of halides. G. SPACU and V. ARMEANU (Z. anal. Chem., 1932, 90, 429–432; cf. A., 1925, ii, 1003, 1004).—When Ni(NO₃)₂ dissolved in aq. C_5H_5N is added to a solution containing CNSe', a skyblue cryst. ppt. of [Ni(C_5H_5N)₄](CNSe)₂ separates *almost quantitatively. Any halides present may be detected or determined in the filtrate. F. L. U.

Precipitation of telluric acid as the chromium hexammino-salt. T. BERSIN (Z. anal. Chem., 1932, 91, 170—171).—Addition of a warm freshly-prepared 40% aq. solution of $Cr(NH_3)_6(NO_3)_3$ to an ammoniacal solution of Na_2TeO_4 yields a bright yellow ppt. which after drying has the composition $[Cr(NH_3)_6]_2(H_4TeO_6)_3$. The solution no longer shows any trace of Te with N_2H_4 and H_2SO_4 . The determination is not affected by the presence of TeO_3'' , Cl', NO_3' , or SO_4'' , but $[Cr(NH_3)_6](NO_3)_3$ gives sparingly sol. ppts. with P_2O_7''' , SiF_6'' , $Fe(CN)_6'''$, $Cr(CN)_6'''$, $Cr(CN)_6'''$, and S_2O_6'' . J. W. S.

Suppression of sulphuric acid mist in Kjeldahl determinations. A. HENWOOD and R. M. GAREY (Science, 1932, 76, 524).—A close-fitting alundum tube closed at the bottom and flanged at the top for support on the flange of the digestion flask prevents escape of H_2SO_4 mist when fitted into the neck of the flask. Digestion can then be carried out in the open laboratory. L. S. T.

Determination of ammonia by Ostwald's nitrometer method. F. MUHLERT.—See B., 1933, 16.

Continuous analysis of ammonium salt solution. M. MATSUI, T. NODA, and S. MIYAGI.—See B., 1933, 17.

Colour reaction for nitrites. A. CASTIGLIONI (Z. anal. Chem., 1932, 90, 427–429).—A large no. of substances containing phenolic OH give a yellow, red, or brown colour with aq. nitrites, especially on heating. The reaction is not given by other oxidising agents, nor by derivatives in which the phenolic H is completely substituted. The most sensitive reaction observed was that with $o-C_6H_4(OH)_2$, which can be used to detect 1 part of NaNO₂ in 10⁶ parts. F. L. U.

Determination of phosphorus in aluminium. W. D. TREADWELL and J. HARTNAGEL.—See B., 1933, 23.

Micro-determination of carbon monoxide by the iodine pentoxide method. G. LJUNGGREN and G. FRANG (Svensk Kem. Tidskr., 1932, 44, 279– 285).—The apparatus of Schläpfer and Hofmann has been simplified and reduced in size, so as to permit the employment of only 25 c.c. of gas if 0.2% of CO is present in the sample. The I set free is collected in CCl₄ and titrated with 0.005N·Na₂S₂O₃, 6 c.c. of 1% KI and 0.5 c.c. of starch solution being added just prior to the end-point; an accuracy equiv. to 0.0005c.c. of CO is attainable. The spontaneous liberation of I from I₂O₅ at different temp. has also been investigated; the quantity of I set free in a given time is increased if air is not drawn over the I₂O₅. In practice, a preliminary heating in a current of air for 1 hr. at 160° is sufficient to reduce the blank to a negligible quantity, when the time occupied in the actual determination does not exceed 25 min.

H. F. H.

Determination of cyanide by distillation from sulphuric acid solution. H. A. PAGEL and W. CARLSON (J. Amer. Chem. Soc., 1932, 54, 4487— 4489).—Conditions for the accurate determination of alkali cyanide in the presence of Cl', Br', NO_3' , and SO_4'' by distillation from moderately conc. H_2SO_4 without loss due to hydrolysis of HCN etc. have been investigated (cf. A., 1923, ii, 702). J. G. A. G.

Potentiometric determination of a mixture of [silver salts], thiosulphate, and chloride. A. PETIT (Bull. Soc. chim., 1932, [iv], 51, 1312—1320).— Ag', Cl', and S_2O_3'' may be determined simultaneously by potentiometric titration with AgNO₃ at 90°. Br' and I' cannot be determined in this way in presence of S_2O_3'' . D. R. D.

Characterisation of chemical species by their catalytic properties. Silver. G. DENIGES (Bull. Soc. Pharm. Bordeaux, 1932, 70, 13—16; Chem. Zentr., 1932, ii, 747).—The Ag ion acts as a sp. catalyst. 10 c.c. of Ag solution are warmed with 0.7 c.c. H_2SO_4 , 11 drops of $MnSO_4$ (4 g. per litre), and 1 drop of $K_2S_2O_8$. 0.02 mg. Ag per litre gives a positive reaction (pink colour). Cu, Fe, Ni, and V do not catalyse this reaction, whilst 50 and 200 times as much Hg and Co, respectively, are required to give an equal effect to Ag. The reaction will detect Ag on a metallic surface. L. S. T.

Determination of calcium by the magnetooptic method. E. R. BISHOP and C. B. DOLLINS (J. Amer. Chem. Soc., 1932, 54, 4585—4588).— 3.7×10^{-12} g. Ca^{**} per c.c. can be detected by the method described. Larger concess. of Ca^{**} can be determined to within 10%. The results are not affected by excess of Cl', NO₃', SO₄'', PO₄''', or by the presence of Mg^{**}, Na^{*}, or NH₄^{*}. J. G. A. G.

Preparation of soap solution for use in determining the hardness of water. K. Scheringa.— See B., 1933, 46.

Determination of hardness of water by Wartha's method in the case of water high in chlorides. BRAUER and REISS.—See B., 1933, 46.

Separation and determination of strontium and barium as bromide. L. SZEBELLÉDY [with A. DÓRZA] (Magyar chem. Fol., 1932, 38, 81–83; Chem. Zentr., 1932, ii, 1480).—Winkler's procedure is modified. A. A. E.

Precipitation of barium sulphate in presence of ferric salts. V. M. SHLAPIN (Uchen. Zapiski Kazan. Gosud. Univ., 1928, 88, 461—464).—The complex Ba₃[Fe(SO₄)₃]₂ (I) is formed in quantity increasing with the concn. of Fe^{TT}. With a large excess of FeCl₃, Cl' inhibits the ionisation of BaCl₂ and favours formation of complexes of the composition (BaCl)₃Fe(SO₄)₃ and (BaCl)₂SO₄, this partly compensating for the error resulting from the formation of (I). CH. ABS.

Effect of nitric acid on precipitation of barium sulphate. N. A. RUDNEV (Uchen. Zapiski Kazan.

Gosud. Univ., 1930, 90, 1054—1061).—The use of $Ba(NO_3)_2$ or the presence of HNO_3 gives high results owing to formation of $(BaNO_3)_2SO_4$. With increasing concn. of HNO_3 the error becomes max. and then decreases. Washing with hot water liberates Ba^{**}. CH. ABS.

Malachite-green as indicator in the volumetric determination of zinc. V. N. SKVORTZOV (Uchen. Zapiski Kazan Gosud. Univ., 1930, **90**, 1010—1021).— ZnSO₄,7H₂O is titrated with KOH in presence of malachite-green, the colour of which is discharged by free KOH. Rapid titration is necessary. Results for >0.07 g. Zn are too low. CH. ABS.

Determination of zinc in aluminium and its alloys. H. WAGNER and H. KOLB.—See B., 1933, 23.

Solubility of lead chromate in ammonium acetate and acetic acid solutions and the determination of small amounts of lead. E. A. GOODE and W. H. SUMMERS (J. Soc. Chem. Ind. Victoria, 1932, 32, 686–693).—The solubility of PbCrO₄ in H₂O is increased slightly by addition of AcOH and appreciably by NH₄OAc. As little as 1 mg. of Pb may be rapidly pptd. with an error ≥ 0.08 mg. provided that the concess of NH₄OAc and AcOH are $\geq 5\%$, the vol. of solution is ≥ 20 c.c., and the K₂Cr₂O₇ concn. is $\leq 0.25\%$.

Potassium iodide as spot reagent for heavy metals. E. GRUNSTEIDL (Mikrochem., 1932, 12, 169-173).--KI can be used as a sensitive spot reagent for salts of Cu, Au, Pt, or Pd. F. L. U.

Quantitative applicability of spot reactions. J. KISSER and K. LETTMAYR (Mikrochem., 1932, 12, 235-256).—By comparison with suitable standards spot reactions can be adapted to the rapid approx. quant. examination of a large no. of specimens. The mean error in the case of paper tests varies between ± 15 and $\pm 30\%$. Special reactions suitable for determination of Cu, Ag, Pb, Mn, Sn, Zn, and Mg are described. F. L. U.

Sensitive test for cerium with phosphomolybdic acid and instances of formation of molybdenumblue in alkaline solution. A. S. KOMAROVSKY and S. M. KORENMANN (Mikrochem., 1932, 12, 211—214). —If to a solution containing Ce^{III} equal quantities of saturated aq. phosphomolybdic acid and 40% NaOH are successively added, a blue coloration is produced. When used as a spot test, 5×10^{-7} g. Ce can be recognised. The reaction is given by no other rare earth. Several instances of the production of Mo-blue in alkaline solution are given. F. L. U.

Volumetric determination of cerium with arsenious acid. R. LANG and J. ZWERINA (Z. anal. Chem., 1932, 91, 5—12).—Ce^{IV} salts are readily determined by H_3AsO_3 in aq. H_2SO_4 using as catalyst a Mn salt, the action of which must itself be catalysed by KIO₃. In the presence of HNO₃, in place of H_2SO_4 , an alkali chloride and a trace of I are used to catalyse the action of Mn. Excess of H_3AsO_3 is used and back-titrated with KMnO₄. A Ce^{III} salt must first be oxidised by heating with (NH₄)₂S₂O₈. With NiSO₄, NaOH, and K₂S₂O₈, NiO₂ is formed, which oxidises the Ce^{III} salt in the cold after acidifying with H_2SO_4 , added in one quantity. If Ni(NO₃)₂ and HNO_3 are employed, oxidation is not always quite complete. Direct potentiometric titration with H_3AsO_3 , either by the compensation method or by the sudden change in potential at the end-point, can also be employed. M. S. B.

Cobalt thiocyanate as a microchemical reagent for mercury. A. DE SWEEMER (Mikrochem., 1932, 12, 223—226).—The formation of blue cryst. HgCo(CNS)₄ is recommended for the micro-detection of Hg¹¹. The solubility of the compound in H₂O is 0.084% and in 0.014N-Co(CNS)₂ 0.008% at 25°. F. L. U.

Ceric salts in volumetric analysis. R. VANOSSI and R. FERRAMOLA (Anal. Asoc. Quím. Argentina, 1932, 20, 96—139).—The reagent is $0\cdot1N\cdot\text{Ce}(SO_4)_2$ in $1-2N\cdot\text{H}_2\text{SO}_4$, and is standardised with H_2O_2 and KMnO_4 , $\text{Na}_2\text{C}_2\text{O}_4$, or, preferably, $\text{K}_4\text{Fe}(\text{CN})_6$. More dil. solutions ($0\cdot05$ — $0\cdot0005N$) may be used for microanalysis, but tend to be unstable. Suitable indicators are malachite-green, methylene-blue, Me-violet, and, as an external indicator, indigo-carmine. The error in titration of 1 c.c. of a $0\cdot0005N$ solution of a reducing substance (e.g., FeSO_4) is about 2%. Under certain conditions indigo-carmine may be employed as both reducing agent and indicator in the titration of Ce^{IV} . H. F. G.

Determination of aluminium with 8-hydroxyquinoline in presence of phosphoric acid. G. BALANESCU and (MLLE.) M. D. MOTZOC (Z. anal. Chem., 1932, 91, 188—191).—Usual methods for the determination of Al with 8-hydroxyquinoline in presence of H_3PO_4 lead to divergent results. The solution is treated with aq. NaOH until the AlPO₄ ppt. redissolves and then with excess of 5% 8-hydroxyquinoline in EtOH. After heating the solution to the b.p. the ppt. is collected on a glass filter, washed, redissolved in 4N-HCl, and titrated with KBrO₃. The method is also suitable for the determination of Al in the absence of H_3PO_4 . J. W. S.

Quantitative separation of manganate and permanganate. J. E. ORLOV (Z. anal. Chem., 1932, 91, 186—187; cf. A., 1932, 1223).—When excess of aq. BaCl₂ is added to an alkaline solution containing CO_3'' , BaCO₃ is first pptd., but finally all the MnO₄'' is pptd. as BaMnO₄; after centrifuging, the MnO₄' can be determined. J. W. S.

Microchemical detection of rhenium. E. KRONMANN and V. BIBIKOVA (Mikrochem., 1932, 12, 187—188).—A drop of solution in which crystals of "nitron" perrhenate have formed and which also contains Na₂S is mixed with a drop of warm 10%gelatin and the mixture is allowed to set. On addition of TiCl₃ solution, reduction of the perrhenate crystals takes place and the latter are coloured brownishyellow through formation of ReS₂. The reaction is localised by the jelly and the perrhenate crystals are thus distinguished from those of other insol. "nitron" compounds. F. L. U.

Microchemical methods in the determination of 1 mg. of rhenium after preliminary separation of molybdenum. O. MICHAILOVA, S. PEVSNER, and N. ARCHIPOVA (Z. anal. Chim., 1932, 91, 25–28).— Mo and Re are first separated as sulphides and oxidised with alkaline H_2O_2 . Excess of the latter is removed, the solution neutralised with H_2SO_4 , and Mo separated by 8-hydroxyquinoline in presence of NH_4OAc and AcOH. Re is then pptd. as nitron perthenate, $C_{20}H_{16}N_4HReO_4$, with aq. nitron acetate at 80°, cooled in ice H_2O , filtered, dried at 110°, and weighed. In the determinations made the error varied from 0.4 to 3%. The micro-method requires 8 hr. as compared with 2 days for the macro-method. M. S. B.

Iron thiocyanate reaction. A. von Heden-STROM and E. KUNAU (Z. anal. Chem., 1932, 91, 17-25).—The disturbing effect of foreign substances on the CNS' test for Fe'' has been investigated by adding Et₂O to solutions prepared from different salts of the two ions, to solutions containing excess of either reagent, or to the reagents in HCl solution, and shaking with sufficient solution of the acid or salt to be examined to decolorise the Et_2O which had taken up the red undissociated $Fe(CNS)_3$. The results are tabulated. Slightly dissociated, complex, or insol. Fe salts are probably formed in presence of excess Fe by alkali salts and org. and inorg. acids. In presence of excess CNS' complexes will also be formed and ppts. with Hg^{II} and Ag salts. The disturbing effects are diminished for the most part in aq. HCl. In neutral solutions with no excess of either reagent H₂O has the least effect. Of the org. acids tried AcOH has the least action and $H_2C_2O_4$ the most, and of inorg. acids H_3BO_3 least and HF most. Of metal salts, borates, arsenates, phosphates, and fluorides have the greatest effect and also Hg^{II} and Ag salts. The influence of alkali and alkaline-earth salts is comparatively small. M. S. B.

Electrolytic reduction in analytical chemistry. G. T. GALFAJAN (Z. anal. Chem., 1932, 90, 421-427). —A collodion diaphragm is used to prevent loss of cathode liquid. Using a Pt cathode satisfactory results were obtained in the determination of Fe^{III}, Ti^{IV}, V^V, and Mo^{VI}. Details are given. F. L. U.

Gravimetric determination of cobalt, using dinitrosoresorcinol. O. TOMIČEK and K. KOMÁREK (Z. anal. Chem., 1932, 91, 90—105).—Cf. A., 1932, 1224. D. R. D.

Solubility of nickel dimethylglyoxime. P. NUKA (Z. anal. Chem., 1932, 91, 29—32).—The determination of Ni by pptn. of Ni dimethylglyoxime, filtering hot, and washing with hot H_2O gives a result 0.5-1% lower than by the electrolytic method. This is avoided by allowing the solution to cool before filtering, washing with cold H_2O , and avoiding the presence of EtOH or AcOH. Pptn. is then practically complete. M. S. B.

Gasometric determination of chromium. M. COUTURE (Annali Chim. Appl., 1932, 22, 680–682). —The Cr in minerals, alloys, Cr alum, etc. is converted by treatment with H_2O_2 into CrO_3 , which is then treated with a solution of NaBO₃ containing Na₂HPO₄ (as stabiliser), the vol. of O_2 evolved being measured. The method is standardised by means of $K_2Cr_2O_7$. Results agree well with those obtained iodometrically. T. H. P.

Volumetric determination of tungsten. B. G. MOKEEV (Uchen. Zapiski Kazan Gosud. Univ., 1930,
90, 1022—1024).—Kanchev's method (pptn. with benzidine chloride and titration with NaOH) is unsatisfactory. CH. ABS.

Complete quantitative micro-analysis of Ceylon thorianites. F. HECHT (Mikrochem., 1932, 12, 193—204).—A detailed description of procedure, using 20—40 mg. of material. F. L. U.

Determination of bismuth. P. P. SOLODOV-NIKOV (Uchen. Zapiski Kazan Gosud. Univ., 1928, 88, 457-460).—The most satisfactory methods are those of Löwe (basic nitrate \longrightarrow Bi₂O₃) and of Jannasch (HBiO₃ \longrightarrow Bi₂O₃). CH. ABS.

Detection of small quantities of bismuth with 8-hydroxyquinoline. R. SAZERAC and J. POUZER-GUES (Compt. rend. Soc. Biol., 1932, 109, 79-82; Chem. Zentr., 1932, ii, 1809).—The compound is cryst. and is readily distinguishable from the Fe compound; the reaction detects 1 p.p.m. A 2% solution of 8-hydroxyquinoline is treated with an equal vol. of 4% KI, and the mixture is added to the Bi solution. A. A. E.

Analytical chemistry of tantalum, niobium, and their mineral associates. XXIV. Separation of tantalum from niobium. W. R. SCHOEL-LER (Analyst, 1932, 57, 750—756; cf. A., 1925, ii, 1096).—The technique is based on the fractional pptn. of the aq. NH_3 -oxalate solution by tannin.

T. McL.

Smoke density meter. R. D. BEAN (J. Sci. Instr., 1932, 9, 391—392).—The smoke passes between a source of light and a photo-sensitive cell, the current through which is measured. C. W. G.

Fluorescence microscope for strong illumination. E. TIEDE (Mikrochem., 1932, 12, 269).—A claim for priority over Haitinger (A., 1931, 702, 928). F. L. U.

[Fluorescence microscope for strong illumination.] M. HATTINGER (Mikrochem., 1932, 12, 270-271).—A reply to Tiede (cf. preceding abstract). F. L. U.

X-Ray spectrograph for micro-analysis. E. S. VON BERGRAMPF (Mikrochem., 1932, 12, 231—234).— Apparatus is described. F. L. U.

Colorimetric determinations with the use of a special tube stand. G. LOCKEMANN, W. ULRICH, and T. KUNZMANN (Chem.-Ztg., 1933, 57, 18-20).---A colorimeter tube stand in which the tubes are arranged obliquely is described. Data concerning the accuracy attainable in detecting and determining various ions colorimetrically are tabulated. Only a few c.c. of the sample are used. J. W. S.

Use of colorimeter for absolute colour measurement (spectro-photometry). A. THIEL and R. DIEHL (Sitzungsber. Ges. Beforder. ges. Naturwiss. Marburg, 1932, 67, 11—30; Chem. Zentr., 1932, ii, 743). L. S. T.

Apparatus for rapid measurement of photomicrographs. J. WOUDA (Z. Physik, 1932, 79, 511-515). A. B. D. C.

Examination of microscopic crystals with X-rays. III. Micro-X-ray goniometer. O. KRATKY and K. ECKLING (Z. physikal. Chem., 1932, **B**, **19**, 278—290; cf. A., 1931, 413).—A goniometer suitable for the determination of the lattice structure of microscopic crystals is described. A satisfactory precision is attained, and determinations are made as readily as those with macro-crystals, using the ordinary apparatus. **R**. C.

Conductivity cell. B. MOORE (J. Sci. Instr., 1932, 9, 389—390).—Cylindrical electrodes are sealed to a glass tube attached to the ground stopper of the cell, and through it Hg connexion is made with one of them. The other is joined by a Pt wire to Hg in another tube, also sealed to the stopper. C. W. G.

Electro-ultrafilter. D. VON KLOBUSITZKY (J. Physical Chem., 1932, 36, 3189-3190).—The apparatus is described. E. S. H.

Cathode sputtering. F. H. NEWMAN (Phil. Mag., 1932, [vii], 14, 1047—1049).—An apparatus for producing sputtered surfaces is described. H. J. E.

Capillary electrometer. G. O. HARNAPP (Z. Elektrochem., 1932, 38, 900).—A simple type of apparatus is described. D. R. D.

Distillation tube for nitrogen determination. W. LEPPER (Z. anal. Chem., 1932, 91, 15–16).—The (cheap) distillation tube reduces the possibility of error by loss of NH_3 and ensures quiet distillation. M. S. B.

Precision distillation apparatus. A. HANAK (Chem.-Ztg., 1932, 56, 984).—Loss of vapour from the distillate during the distillation is prevented by a specially designed condenser. The apparatus (diagrams given) is used for the determination of EtOH. S. M.

Soxhlet type of extraction apparatus for operation at low temperatures under reduced pressure. A. HAMBLETON (J. Biol. Chem., 1932, 99, 289—294).—An apparatus, the joints of which are of flat glass, and an automatic manometer are described. F. O. H.

Micro-extraction apparatus. G. GORBAOH (Mikrochem., 1932, 12, 161-168).--Extraction apparatus designed for the determination of lipins in bacteria or yeasts, and for working with about 50 mg. of material, is described. F. L. U.

Influence of electrical charge in micro-gravimetric analysis. W. M. SPERRY (Mikrochem., 1932, 12, 151—152).—Pyrex glass readily acquires a persistent electrical charge, and its use in micro-gravimetric analysis should be avoided unless special precautions are taken. F. L. U.

Determination of mol. wt. by the microebullioscopic method. A. RIECHE (Mikrochem., 1932, 12, 129—132; cf. A., 1929, 167).—Improved apparatus is described. F. L. U.

Macro-micro-burette. W. EISSNER (Z. anal. Chem., 1932, 91, 172—173).—A double burette is constructed in the form of a U-tube with a 3-way tap at the bottom. One limb consists of a series of bulbs of 3 c.c. capacity joined by narrow necks carrying the graduation marks, whilst the other is a straight narrow tube of 3 c.c. capacity graduated to 0.01 c.c. Means are provided by which the liquid level in the first limb can be adjusted accurately to a graduation. J. W. S.

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Measuring flasks for large volumes of liquid. F. FRIEDRICHS (Chem.-Ztg., 1933, 57, 20).—A widenecked flask or bottle fitted with a normal ground joint is recommended as a large-capacity measuring flask. The ground joint is connected to a narrow calibrated tube fitted at the top with a ground stopper. Alternatively the same bottle can be connected by another normal joint with a burette with a device for automatic filling to the zero-mark. J. W. S.

Measurement of differences in level of liquid meniscus, and manometer for low pressures. H. KLUMB and T. HAASE (Z. tech. Physik, 1932, 13, 372-373; Chem. Zentr., 1932, ii, 2208).

Apparatus for separation of neon-helium mixtures and determination of the helium content of neon. W. MEISSNER and K. STEINER (Z. ges. Kälte-Ind., 1932, 39, 49–53, 75–78; Chem. Zentr., 1932, ii, 748).—Ne lines are faint in the spectrum of the He separated by the method described. The Ne contains < 0.5 vol.-% of He. The He in Ne is determined by condensation in liquid H₂ and measurement of its partial pressure. L. S. T.

Apparatus for the evolution and detection of gases and vapours. E. EINECKE (Z. anal. Chem., 1932, 91, 14—15).—The apparatus requires only a few mg. of material and is useful for the rapid detection of carbonates, sulphites, sulphides, cyanides, carbides, etc., and for carrying out the CrO_2Cl_2 reaction.

M. S. B.

Simple method of elutriation analysis H. LÖBER (Zentr. Min. Geol., 1932, B, 364-368; Chem. Zentr., 1932, ii, 1476).—An apparatus is described. A. A. E.

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Rapid determination of density. W. KRATSCH-MAR (Zentr. Min. Geol., 1932, A, 221-224; Chem. Zentr., 1932, ii, 1328).—Vals. of d are read directly on the scale of a balance. A. A. E.

Stirring of the bath by bubbling of gas in micro-electroanalysis. A. Οκάč (Mikrochem., 1932, 12, 205-210).—Two arrangements in which the electrolyte is stirred by a stream of gas are described. F. L. U.

Water-bath for micro-analysis. W. REICH-ROHRWIG (Mikrochem., 1932, 42, 189—192).—A water-bath constructed entirely of glass is described. The most important features are the use of distilled H_2O electrically heated, a reflux condenser, and a funnel inverted over the vessel being heated whereby vapour is carried off by a filter pump. F. L. U.

Determination of size of small particles by means of electron diffraction. M. VON LAUE (Z. Krist., 1932, 84, 1—7).—A method for determining the order of magnitude of minute particles, e.g., crystallites 10^{-6} to 10^{-7} cm. diameter, based on Thomson's results (cf. A., 1929, 1209; 1932, 955) is described. C. A. S.

Automatic water-level regulator for autoclaves. N.F. CONANT (Science, 1932, 76, 522-524). L.S.T.

Lecture experiment on the liquefaction of gases. H. KEEFER (Physikal. Z., 1932, 33, 967– 968).—An apparatus for producing liquid CO₂ is described. A. J. M.

Geochemistry.

Helium in Canada from 1926 to 1931. P. V. ROSEWARNE and R. J. OFFORD (Canada Dept. of Mines, 1932, No. 727, 42—54).—A discussion of the geographical distribution of He in Canada and the U.S.A. and of the economic aspect of production.

C. W. G.

Nitrogen content of rain water. H. H. FINNELL and H. W. HOUGHTON (Okla. Panhandle Bull., 1932, 34, 3–8).—At Goodwell, Okla., in 1931 1.42 lb. N per acre ($NO_3' 23.32$, $NO_2' 6.85$, $NH_3 69.82\%$) was added by a rainfall of 15.45 in. Nitrite was greatest during the cooler season; NH_3 was related to the dust content of the air. Ch. Abs.

Explanation of the structure of meteoric iron by means of the diagram of state of the ternary system iron-nickel-phosphorus. R. VOGEL (Abh. Ges. Wiss. Gottingen, Math.-phys. Kl., 1932, 3, No. 6, 1-31; Chem. Zentr., 1932, ii, 1409).—A discussion. A. A. E.

Springwater meteorite. H. H. NININGER (Amer. Min., 1932, 17, 396–400).—An analysis of the metallic portion is given. CH. Abs.

Age of the Meteor Crater. E. BLACKWELDER (Science, 1932, 76, 557-560).—The age and evolution of the Meteor Crater, N. Arizona, are discussed. L. S. T. Titaniferous mica in phlogopite. J. JAKOB and I. PARGA-PONDAL (Anal. Fis. Quim., 1932, 30, 827— 839).—Ti^{III} and Ti^{IV} occur in phlogopites, particularly those poor in Fe, to the extent of up to 4% (TiO)₂. It replaces Mg, but never Al or Si. The mineral occasionally contains an excess of SiO₂, and there are probably groups such as (SiO₂)₃ present. H. F. G.

Twinning of magmatic quartz with reference to its temperature of origin. O. MUGGE (Z. Krist., 1932, 84, 97-108; cf. this vol., 46). C. A. S.

Pitchblende and silver discoveries at Great Bear Lake, Northwest Territories. H. S. SPENCE (Canadian Dept. Mines, No. 727, 1932, 55—92).— Analyses are given. C. W. G.

Danbury granodiorite gneiss of Connecticut. W. M. AGAR (Amer. J. Sci., 1933, [v], 25, 1—19).— This rock is not a single unit, but consists of biotite schists and quartz-oligoclase-biotite gneisses, intersected by granite and pegmatite. Their history is discussed. C. W. G.

Calculation of the reflectivities of sulphide ore minerals. F. C. PHILLIPS (Nature, 1932, 130, 998). L. S. T.

Distribution of molybdenum. H. TER MEULEN (Nature, 1932, 130, 966).—Mo is widely distributed in plants and animals. Coal, peas and beans, and cereals contained 0.21, 3-9, 0.2-0.6 mg. per kg., respectively, whilst wood, beans, various fruits and vegetables contained traces. A fertile soil contained 0.1-0.3 mg., a moor 0.01, and a barren sandy waste 0.005 mg. per kg. Mineral waters and oils, but not sea-water, contained appreciable amounts of Mo. Liver, blood, bile, milk, eggs, cod's liver, and haddock contained amounts varying from 1.5 to 0.03 mg. per kg. An aquatic plant, Azolla, yielded 1.13 mg. per kg. L. S. T.

Contact-metamorphism by syenite-gneiss in the Lao tieh shan district near Ryojun, S. Manchuria. T. OGURA (Mem. Ryojun Coll. Eng., 1932, 5, 133—186).—A detailed description of the geology of the region is given. The metamorphic rock series has been produced by syenite intrusion.

C. W. G.

Hydrogen-ion concentrations caused by dissolution of silicate minerals. R. E. STEVENS (J. Washington Acad. Sci., 1932, 22, 540—547).— Silicate minerals, when ground under H_2O , give alkaline solutions of characteristic and reproducible p_{Π} , the vals. of which form a rough index of the weathering qualities of the minerals. C. W. G.

Thermo-magnetic properties of volcanic rocks. R. CHEVALLIER and J. PIERRE (Ann. Physique, 1932, [x], 18, 383—477).—The fact that the Curie points of specimens of lava from different sources cover the whole temp. range 580—0° and probably extend lower suggests that the magnetic material is a solid solution. The magnetism is determined by the Fe_2O_3 content. The Curie point (° abs.) is proportional to the ratio $Fe_2O_3/(Fe_2O_3+FeO)$ up to magnetite (853° abs.) and then remains const. The effects of TiO₂ and other oxides are also discussed. J. W. S.

Kuznetchikha (Russia) deposits of zinc-copper ores. D. K. SUSLOV and M. I. MERKULOV (Tzvet. Met., 1931, 1329—1347).—The ores (described) contain (average) Cu 1—3, Zn 4—13%, with Au (1—10) and Ag (30—140 grains per ton). CH. ABS.

Nikitova (S. Russia) mercury deposits. S. N. DANILOV and F. A. ABRAMOV (Tzvet. Met., 1931, 763-776). CH. ABS.

Barite. F. BRAUN (Neues Jahrb. Min., 1932, A, 65, 173—222; Chem. Zentr., 1932, ii, 1606).— Morphological, genetic, and paragenetic habit studies are described. a:b:c=1.63:1:1.31. A. A. E.

Bavenite, a beryllium mineral pseudomorphous after beryl, from California. W. T. SCHALLER and J. G. FAIRCHILD (Amer. Min., 1932, 17, 409–422).—The mineral (described), 9SiO₂,Al₂O₃,BeO,4CaO,H₂O, monoclinic, contains about 3% BeO. CII. ABS.

Rhodochrosite in the Emilian Apennines. L. GIROLAMI (Annali Chim. Appl., 1932, 22, 686—691).— This Mn mineral, mistaken first for a limestone encrusted with manganite and then for a manganesiferous siderite, must be regarded as a rhodochrosite containing variable proportions of FeCO₃. T. H. P.

Albitite from Ve Skerries, Shetlands. F. WALKER (Min. Mag., 1932, 23, 239–242).—Analysis is given of a rock composed mainly of albite (90%) with little quartz (2%), chlorite (2%), magnetite, and apatite. L. J. S.

Spherulitic rhyolites of Jersey. A. E. MOURANT (Min. Mag., 1932, 23, 227—237).—The origin of the various structures is discussed with particular reference to the rhythmic banding of felspar and quartz. L. J. S.

Metamorphism produced by the combustion of hydrocarbons in the Tertiary sediments of S.W. Persia. W. F. P. McLINTOCK (Min. Mag., 1932, 23, 207—226).—At various localities in S.W. Persia the escape and combustion of gas or oil has resulted in the breceiation, partial fusion, and crystallisation of calcareous marks with the formation of cryst. rocks consisting of diopside, aegirine, wollastonite, pseudowollastonite (α -CaSiO₃, not previously recognised as a mineral), bytownite, mclilite, and leucite, with glass, recryst. calcite, and anhydrite. In the field the rocks resemble vesicular igneous rocks, but microscopical examination and chemical analyses prove them to be metamorphosed sediments. L. J. S.

Structure of spherocobaltite. M. BACCAREDDA (Atti R. Accad. Lincei, 1932, [vi], 16, 248–252).— Analysis of the mineral from Valle del Neva gave : H_2O 1·30, CO_2 35·87, CuO 1·95, Fe_2O_3 0·27, CoO55·72, NiO 1·21, CaO 3·12=99·44%, with traces of MnO and MgO. X-Ray examination showed a rhombohedral structure, with a 5·72 Å., α 48° 14′, $d_{calc.}$ 4·10, 2 mols. CoCO₃ per unit cell. O. J. W.

Zeolites. III. Natrolite and metanatrolite. M. H. HEY [with F. A. B. BANNISTER] (Min. Mag., 1932, 23, 243-289).-Analyses of nine natrolites from various localities are accompanied by physical, optical, and X-ray data determined on the same samples of material. The unit cell, a 18.31, b 18.66, 6.60 Å., contains Na₁₆Al₁₆Si₂₄O₈₀,16H₂O. The Si : Al ratio is const., but there may be a replacement of Na₂ by Ca up to 4 atoms per unit cell and of Na by K up to 2 atoms. Crystallographic measurements agree with orthorhombic symmetry with a:b:c=0.9807:1:0.3537, and etch-figures show the c-axis to be polar, but X-ray study and v.-p. observations on natrolite and metanatrolite (dehydrated natrolite) suggest that the symmetry is really monoclinic with space-group C_{*}^{3} Base-exchange experiments are described, and the heat of hydration of metanatrolite is measured. L. J. S.

Terpenes as the source of petroleum, and their optically active constituents. M. FREUND (Petroleum, 1932, 28, No. 37, 1—8).—Current theories of the formation of petroleum oils are discussed with reference to the production of petroleum-like mixtures from turpentine. Treatment of lævorotatory French turpentines with AlCl₃ yielded dextrorotatory products with physical properties similar to those of crude mineral oils. Prolonged boiling of these products and subsequent fractionation gave dextro-, then lævo-, and again dextro-rotatory fractions with increasing b.p. of the fraction, a phenomenon exhibited by Java petroleum. By further treatment of the products with AlCl₃, or by refluxing the original turpentine with AlCl₃, oils having a striking resemblance in optical and general physical properties to Java and Argentine petroleums were obtained. It is concluded that the dextro-constituents of petroleum are the most stable. H. E. B.

Fish oil theory of the origin of petroleum from a study of brine waters from widely different oil-

Constitution and reaction of organic and especially tautomeric compounds. A. HANTZSCH (Z. anorg. Chem., 1932, 209, 213—224).—A correction and amplification of the article on tautomerism in Hückel's "Theoretischen Grundlagen der organischen Chemie," based on recent work of Hantzsch and others. A. R. P.

Action of hydrogen on wood charcoal and activated carbon, and methane synthesis. E. BERL and R. BEMMANN (Z. physikal. Chem., 1932, 162, 71-93).-Charcoal and activated C have a graphitic structure, but the edges of the planes of C hexagons are occupied by groups containing O and H as well as C; on ignition practically pure paracryst. C results. Hydrogenation at 350-675°/50-450 atm. gives good yields of practically pure CH4, which from ignited C can be regarded as formed by direct synthesis. The observed equilibrium between paracryst. C, CH₄, and H₂ agrees closely with data proviously recorded for macrocryst. graphite as solid phase. The H_2 attacks first the edge groups and unsaturated points, causing local overheating, which results in diminution of the activity of the remaining C and increase in size of the crystallites. Hydrogenation occurs the more readily the smaller is the degree of graphitisation and the higher is the content of O and H. There is no simple relation between adsorptive power, measured by the methylene-blue test, and ease of hydrogenation. R. C.

Addition of bromine vapour according to P. Becker. Micro-detection of active and inactive double linkings. E. ROSSMANN (Ber., 1932, 65, [B], 1847-1851).—The substance (1 or 10 mg.), evenly distributed over a weighed glass plate, is placed in a desiccator saturated with Br vapour in complete absence of light. Absorption of Br is usually complete in 30 min. Excess of halogen is mainly lost after exposure to air for 5 min., after which completion is assured with sensitive compounds by preservation over solid KOH, with volatile substances by evacuation at room temp., but usually by heating at 105°/ atm. pressure. Determination of the Br val. by this method permits differentiation between smaller C rings and conjugated double linkings. Carotene appears to contain eleven double linkings, but readily loses 3 HBr in vac. or at 110°; it reabsorbs Br when again exposed to the vapour. Sterols and other OHcompounds show the expected number of double linkings after a normal period of exposure, but an additional double linking when action is prolonged, probably owing to loss of H₂O and subsequent addition. Substitution is never observed. Numerous examples are cited. H. W.

fields in Japan. T. ISHIKAWA and T. BABA (Bull. Chem. Soc. Japan, 1932, 7, 362—373).—The composition of brine from Japanese oilfields is closely similar to that of the serum of fishes, especially Elasmobranchs. This supports the theory that both the brine and the petroleum have been formed by the decomp. of the bodies of fish. D. R. D.

Organic Chemistry.

Thermal conversion of ethylene and ethane into other hydrocarbons, with special reference to the formation of acetylene. F. FISCHER and H. PICHLER.—See B., 1933, 53.

Reaction between ethylene and bromine in carbon tetrachloride. D. M. WILLIAMS (J.C.S., 1932, 2911—2915; cf. A., 1928, 1351).—Interaction of Br and C_2H_4 in CCl₄ in the dark is autocatalytic, having an inhibition period of many min. in dil. and dry solution. H₂O (0.0065N) (concn. kept const. by Na₂SO₄-Na₂SO₄,10H₂O) catalyses the reaction (which, however, remains autocatalytic) to some extent, but is not as active as HBr, which, added in small amounts during the inhibition period, causes > 70% of the C_2H_4 to react in 2 min. The temp. coeff. of the reaction in the moist solvent between 0° and 18° is negative, which supports the view that addition of Br is preceded by addition of HBr (A., 1925, ii, 214).

J. L. D.

Polymerisation processes. F. HOFMANN (Chem.-Ztg., 1933, 57, 5—6).—BF₃ and C_2H_4 give *n*or *iso*- C_3H_6 or higher polymerides. BF₃, best with a little HF, gives with *cyclo*-pentene and -hexene di-, tri-, tetra-, and poly-merides. R. S. C.

Catalytic vapour-phase hydration of Δ^{β} -butene under high pressures. L. F. MAREK and R. K. FLEGE (Ind. Eng. Chem., 1932, 24, 1428—1431).— Vapour-phase hydration of Δ^{β} -butene at 427—538° under continuous flow at 211—352 kg. per sq. cm. gives small yields of butan- β -ol. Reaction is promoted by Cu₂Cl₂, Cu₃(PO₄)₂, ThO₂, and H₃PO₄. Increasing the proportion of H₂O to Δ^{β} -butene increases the conversion into hydrated products and decreases polymerisation, but the conc. of hydrated products decreases. Increase in pressure from 211 to 352 kg. per sq. cm. favours polymerisation rather than hydration. J. W. S.

Constitution of lycopene. R. KUHN and C. GRUNDMANN (Ber., 1932, 65, [B], 1880—1889).— Doubts regarding the normal structure of lycopenaloxime (A., 1932, 749) are removed by the observation that it resembles other syn- and anti-aldoximes and ketoximes in its behaviour towards MgMeI and differs from 3:5-diphenylisooxazoline. Lycopenal (I) in C_6H_6 -AcOH is oxidised by 0·1N-CrO₃ (O = 2) to bixindialdehyde (II), m.p. 220° (corr., Berl., vac.), and methylheptenone (p-nitrophenylhydrazone, m.p. 101°). Direct oxidation of (I) to the corresponding acid could not be effected, but its dioxime, decomp. 250—300°, is dehydrated by Ac₂O to the dinitrile, readily hydrolysed to β -norbixin. Lycopene has therefore the constitution

 $(:CH \cdot CH: [CMe \cdot CH: CH \cdot CH]_2: CMe \cdot [CH_2]_2 \cdot CH: CMe_2)_2,$ whilst (I) and (II) are respectively $CMe_2:CH\cdot[CH_2]_2$ [CMe:CH·CH:CH], [CH:CMe·CH:CH]_2·CHO and (:[CH·CH:CMe·CH]_2:CH·CHO)_2. The available phytol in plants does not appear adequate to account completely for the production of carotenoids. The amended prep. of lycopene from preserved tomatoes is recorded. Ripe tomatoes contain carotene (III), lycopene (IV), xanthophyll (V) and its ester (VI). The amount of (III) is about 1/10th that of (IV) and appears adequate to explain the vitamin-A action. (IV) is present in the unripe fruit in smaller amount than (III), whereas (VI) is absent. In the half-ripe condition the amount of (IV) exceeds that of (III), whilst formation of (VI) has commenced, the amount increasing rapidly, and subsequently exceeding that of (V). (V) contains predominatingly zeazanthin and lutein. (III) is nearly homogeneous β -carotene. The chlorophyll content is > 3 mg. per 100 g. of fresh green tomato. H. W.

Photo-chlorination of tetrachloroethylene in carbon tetrachloride solution. J. A. LEERMAKERS and R. G. DICKINSON.—See this vol., 132.

Action of peracetic and perbenzoic acids on unsaturated aliphatic and aromatic iodine compounds. J. BOESEKEN and C. SCHNEIDER (Proc. K. Akad. Wetensch. Amsterdam, 1932, 35, 1140-1143; cf. A., 1931, 207) .- Only those aliphatic compounds containing an I atom adjacent to a double linking yield iodoso- or iodoxy-derivatives on treatment with AcO₂H in AcOH or BzO₂H in CHCl₃. Thus, CHI₃ is destroyed, liberating I, oxidised to I_2O_5 , and C_2I_2 gives C_2I_4 , whereas $C_2H_2I_2$ yields a white explosive compound believed to be *di-iodoxyethylene*. Iodofumaric acid gives iodosofumaric acid (I), which in boiling H_2O loses CO_2 , forming β -iodosoacrylic acid, reduced by SO_2 to β -iodoacrylic acid, m.p. 65° (cf. Stolz, A., 1886, 531), and reoxidised by AcO₂H to (I). Di-iodofumaric acid adds 20 on oxidation with AcO_2H in AcOH, giving (?) di-iodosofumaric acid. Di-iodostilbene is not oxidised by AcO₂H in AcOH, but in CH($l_3 \alpha\beta$ -dichloro- $\alpha\beta$ -diphenylethylene oxide is obtained. D. R. D.

Oxidimetric determination of small amounts of alcohol. II. L. SMITH (Svensk Kem. Tidskr., 1932, 44, 272—279).—Improvements in the original method (A., 1931, 990) are described. The acid $K_2Cr_2O_7$ solution is diluted directly with the arsenite, and excess of the latter titrated with KBrO₃ after addition of Me-orange in HCl. The excess of $K_2Cr_2O_7$ can be determined colorimetrically, provided that the percentage of reduced chromate is not unduly small. H. F. H.

[Preparation of] isopropyl alcohol. G. A. KIRCHHOF and A. D. STEPANOV (Chem.-Pharm. Ind., Russia, 1932, No. 1, 21; Chem. Zentr., 1932, ii, 1609). —Electrolysis of $COMe_2$ (37.5 g.) and 15% H₂SO₄ (150 c.c.) is carried out at 6—7 volts for 9 hr. (8 amp. per hr.) using Hg as cathode and Pb in 15% H₂SO₄ as anode, the axis of the stirrer being passed through a porous vessel. The cathode liquid is neutralised with conc. NaOH and distilled; yield 33%.

A. A. E.

[Configurative relationships of methyl-, phenyl-, methylcyclohexyl-, and methylhexylcarbinols and of their homologues.] P. A. LEVENE and R. E. MARKER (J. Biol. Chem., 1932, 99, 321; cf. A., 1932, 1027).—The corr. vals. of [M] for methyl-, ethyl-, propyl-, butyl-, and amyl-*iso*propylcarbinols are $+4.7^{\circ}$, -16.7° , -27.1° , -35.9° , and -38.2° ; and for their phthalates, $+98^{\circ}$, $+10^{\circ}$, -22° , -36° , and -44° , respectively. J. W. B.

 Δ^{δ} -Pentenol and pentane- $\alpha\beta\epsilon$ -triol. R. PAUL (Ann. Chim., 1932, [x], 18, 304-394).-Me y-chloroand -bromo-propyl ether are conveniently obtained from propane-ay-diol. Grignard reagents obtained from these with AlCl₃ as catalyst on condensation with the appropriate nitriles give az-dimethoxy- (I), b.p. appropriate methods give ac-atmethody (1), 0.p. $89^{\circ}/14$ mm. (yield 23%) [semicarbazone, m.p. $88\cdot5^{\circ}$; oxime, b.p. $141-143^{\circ}$ (corr.)/15 mm.], ε -methoxy- α -ethoxy-, b.p. $95-96^{\circ}/13$ mm. (yield 23%) (semi-carbazone, m.p. $59-60^{\circ}$; oxime, b.p. $140-141^{\circ}/9$ mm.), ε -methoxy- α -isoamyloxy- (II), b.p. $131-132^{\circ}/17$ mm. (yield 30%) (gives amyloxymethyltetrahydrofuran on distillation with P_2O_5), and ϵ -ethoxy- α -iso-amyloxy-pentan- β -one, b.p. 134°/14 mm. (from chloroethoxypropane; cf. A., 1931, 819). Some ROH corresponding with the RO·CH₂·CN employed is always obtained, together with products of the type di-(y-methoxypropyl)ethyleneimine, b.p. 119-132°/9 mm. The mechanism of the interaction of nitriles and Grignard reagents is discussed. No difference could be detected in the rates of oximation of (I) and (II). (II) with gaseous HBr gives MeOH and isoamyl alcohol, whilst with NaNH₂ and EtI it gives the γ -*Et* derivative, b.p. 135–139°/12 mm. Reduction of the above ketones in AcOH with Pt-black gives dimethoxy-, b.p. 94-95°/13 mm. (p-nitrobenzoate, m.p. 194-195°), methoxyethoxy-, b.p. 99°/13 mm., and methoxyisoamyloxy-pentanol, b.p. 126-127°/10 mm., all converted by HBr into αε-dibromopentan-β-ol, b.p. 126-128°/11 mm., and 1-bromomethyltetrahydrofuran (A., 1931, 933), also obtained by distillation of the former. Δ^{δ} -Pentenol (III) (improved prep.) [Me ether (IV), b.p. 96-98°/764 mm.] from allylacetic acid contains β -allyl- Δ^{δ} -pentenol, b.p. 182°/760 mm. (pyruvate, b.p. 115-117°/13 mm., and its semicarbazone, m.p. 99-100°), and gives ad-dibromopentane, b.p. 82°/12 mm., with HBr. δ -Bromo- Δ^{δ} -pentenol (A., 1931, 1392) gives an allophanate, m.p. 136–139°. The corresponding bromide with Br in Et_2O gives $\alpha\beta\beta\epsilon$ -tetrabromopentane, b.p. 179-180°/17 mm. (IV) with HOCl gives a little $\alpha\beta$ -dichloro-, b.p. 81°/13 mm., and α -chloro- β -hydroxy- ϵ -methoxypentane (V), b.p. 102-103°/13 mm., converted by KOH into the $\alpha\beta$ -oxide of (IV), b.p. 156°/760 mm., which with HCl gives (V), containing 9% of the β -chloro- α -hydroxy-isomeride, detected by kinetic measurements. (III) similarly gives some Cl₂-derivative, and a mixture of monochlorohydrins, giving a small yield of chloromethyltetrahydrofuran with 15% H2SO4, and converted by dry KOH into hydroxymethyltetrahydrofuran. The physical properties of some of the above compounds are compared with those of their lower homologues. A. A. L.

Hydrogenolysis of oxygenated organic compounds. R. CONNOR and H. ADKINS (J. Amer.

Chem. Soc., 1932, 54, 4678-4690).-The effect of structure on the fission (hydrogenolysis) of C·C and C.O linkings in numerous glycols, OH-esters, malonates, and furans by H₂ and a Cu-Cr oxide catalyst is studied. ay-Glycols undergo hydrogenolysis at a lower temp. or more rapidly than $\alpha\beta$ - and $\alpha\delta$ -glycols. Both types of fission occur, but the C·C cleavage is facilitated (both for ay- and aB-glycols) by branching or lengthening the C chain. Et cyclohexanol-2-carboxylate and β-hydroxybutyrate (CH₂Ac·CO₂Et is used) undergo 100% C·O fission. With Et α -substituted- β -hydroxybutyrates, some C·C cleavage occurs (the amount increases with the size of the substituent), whilst Et aa-dialkylβ-hydroxybutyrates undergo 100% C·C fission. Et $\alpha \gamma$ - diacetyl - β - methyl - and - β - phenyl - glutarates undergo little or no C·C fission; di-primary glycols are produced. Hydrogenolysis of CHR(CO2Et)2 occurs thus: $CHR(CO_2Et)_2 + 4H_2 \longrightarrow CHR(CH_2 \cdot OH)_2$ (I); (I) + H₂ \longrightarrow CHMeR · CH₂ · OH + H₂O; (I) + H₂ \longrightarrow CH₂R·CH₂ · OH + MeOH; the amounts of the last two reactions vary with R. CR2(CO2Et)2 is completely converted into CHR, CH, OH+MeOH. Hydrogenolysis of furfuryl alcohol occurs at each of the three CO linkings present; some reduction to tetrahydrofurfuryl alcohol (which is relatively stable to hydrogenolysis) also occurs. The previously reported observation (A., 1932, 599) that PhEt is produced from CHPhEt·CO2Et is ascribed to the probable presence of $CH_2Ph \cdot CO_2Et$ in the ester used. The following are new : γ -, b.p. 83-86°/10 mm., and ε-, b.p. 84-86°/10 mm., -methyl-β-ethylhexyl alcohols; Et hexahydrosalicylhexahydrosalicylate, b.p. 192-196°/6 mm. (from o-OH·C₆H₄·CO₂Et in absence of EtOH); hexahydrobenzyl β-hydroxybutyrate, b.p. 149-150°/17 mm. (from CH₂Ac·CO₂Et+cyclohexylcarbinol); Et β -hydroxy- α -hexahydrobenzylbutyrate, b.p. 147—148°/10 mm.; Et β -hydroxy- $\alpha\alpha$ -diethylbutyrate, b.p. 87-89°/9 mm. H. B.

Preparation of ethers of vinyl alcohol. W. CHALMERS (Canad. J. Res., 1932, 7, 464-471).--Alkyl vinyl ethers are obtained in about 33% yield when alkyl β -bromoethyl ethers (prepared in 10-60%) vield from OAlk CH2 CH2 OH and PBr3 in Et2O in absence or presence of NPhMe2) are heated with solid NaOH; (OAlk CH2 CH2)2O is a by-product. Me, b.p. 12-14° (all b.p. are corr.), Et, b.p. 35.5°, Bua, b.p. 93·3°, Ph, b.p. 155·5°, and β-chloroethyl, b.p. 108° [from (CH₂Cl·CH₂)₂O], vinyl ethers are thus prepared. OAlk CH2 CH2Cl is unaffected by NaOH even at high temp. Bu^α β-chloroethyl ether, b.p. 153-154° (from OBu·CH2·CH2·OH and SOCl2); Buª β-bromoethyl ether, b.p. 173–174°, and $Bu^{\alpha} \beta \beta' n$ -butoxyethoxyethyl ether, b.p. 245-247°; are new. Physical data are recorded. H. B.

Polymerisation of vinyl ethers. W. CHALMERS (Canad. J. Res., 1932, 7, 472–480).—Et and Buavinyl ethers are almost completely polymerised by 0.2% of I in 24 hr.; β -chloroethyl vinyl ether is similarly only slightly affected during 6 days, whilst Ph vinyl ether (I) is unchanged. All the above ethers [except (I)] are polymerised slowly by heat or ultraviolet light and rapidly (explosively) by a trace of the volatile metallic halides; Na has no effect. The polymerides are usually sticky, pitch-like materials which are mobile above 100° and contain 18—82 units (mol. wt. by f.p. in C_6H_6); vals. of d and n are given. The structure of the polymerides is discussed.

H. B. "Radial" tetrathio-orthosilicic esters. H. J. BACKER and F. STIENSTRA (Rec. trav. chim., 1932, 51, 1197—1199).—SiCl₄ gives the following tetrathioorthosilicic esters with the corresponding Na alkylmercaptides in C_6H_6 (yield 35—40%): Me, b.p. 144—146°/12 mm., m.p. 31°; Et, b.p. 169—171°/12 mm., m.p. $-5\cdot8^\circ$; Pr° , b.p. 204—206°/17 mm.; Pr^β , b.p. 176—178°/13 mm., m.p. 33.5°. A. A. L.

Preparation of sodium argentothioglycerolsulphonate (Lumière's compound). J. B. COHEN (J. Pharm. Exp. Ther., 1932, 46, 283).—Epichlorohydrin, treated with NaHSO₃ in aq. solution, yields $CH_2CI \cdot CH(OH) \cdot CH_2 \cdot SO_3Na, 2H_2O$, from which, when treated with NaHS, $SH \cdot CH_2 \cdot CH(OH) \cdot CH_2 \cdot SO_3Na$ is obtained. When the solution of this compound is treated with moist Ag_2O , and EtOH is then added, Na argentothioglycerolsulphonate is pptd. as a yellow powder. W. O. K.

Esterification with chloroformic esters. M. J. KRAFT and B. A. ALEXEEV (J. Gen. Chem. Russ., 1932, 2, 726—729).—Me and CH_2Cl chlorosulphonates are obtained in good yield from the acid and the appropriate chloroformate. BzOH with $ClCO_2CH_2Cl$ gives BzO·CH₂Cl (I), BzCl, and $CH_2(OBz)_2$; the lastnamed is probably formed from BzCl and CH_2O , produced by the decomp. of (I). $ClCO_2CCl_3$ gives acid chlorides in every case : with MeHSO₄ it forms $ClSO_3Me$, also obtained with $ClCO_2CH_2Cl$.

G. A. R. K.

Mechanism of oxidation processes. XXXII. Enzymic oxidation of acetic acid by yeast. H. WIELAND and R. SONDERHOFF.—See this vol., 32.

Raman effect and problems of constitution. III. Carboxylic anhydrides. K. W. F. KOHL-RAUSCH, A. PONGRATZ, and R. SEKA (Ber., 1933, 66, [B], 1-12).—Examination of the Raman spectra of eleven acid anhydrides shows (a) the presence of two different frequencies in the region of double linkings (1400-1900 cm.⁻¹), (b) that both frequencies are unusually strongly increased in comparison with the vals. obtained for acids, and (c) that the exaltation is about 40 cm.-1 greater for cyclic than for simple anhydrides, but that the difference between the two frequencies remains approx. const. Methylsuccinic anhydride is exceptional in showing a third C:O frequency at 1726 cm.⁻¹ and Bz₂O in a depression of both vals. consequent on the presence of the aryl group. The exaltation under (b) compared with the CO frequency of ketones is consequent on the sp. action of the vicinal O [cf. MeCHO and HCO, Me; COMe₂ and CO(OMe)₂; COPhMe and BzOMe]; it is particularly marked when the vicinal O is either very sensitive to hydrolysis or is concerned in ring closure. Exaltation is not observed when O is not in immediate union with CO (cf. furfur- and cinnam-aldehyde; Et cinnamate). Certain duplication of the C.O frequencies of the type observed in anhydrides is not observed when the bridge O is replaced by CH, or NH [CH₂(CO₂Me₂); CH₂(CO₂Et)₂; NHAc₂; succinimide; K phthalimide]. It appears most probable

Unsaturated fatty acids and their derivatives. VIII. Constitution of clupanodonic acid. Y. INOUE and K. SAHASHI (Proc. Imp. Acad. Tokyo, 1932, 8, 371-374).-Ozonolysis of clupanodonic acid (cf. A., 1929, 294) does not lead to EtCO₂H, whilst the proportion of succinic acid is high enough to be due to a repetition of the same grouping of 4 C atoms in the chain. The I val. is low for 5 ethylenic linkings, and consideration of the bromination products of partly hydrogenated clupanodonic acids indicates the presence of 1 acetylenic and 3 ethylenic linkings as in the following suggested formula : CPr:C[CH2]5 CH: $CH \cdot [CH_2]_2 \cdot CH \cdot CH \cdot CH_2 \cdot CH \cdot [CH_2]_2 \cdot CO_2H.$

A. C.

Preparation of sarcolactic acid. W. FREUDEN-BERG (J. Biol. Chem., 1932, 99, 153-154).-This acid (yield 4-5%) is readily prepared by continuous extraction of a suspension of 200 g. of meat extract in 1000 c.c. of H₂O acidified with H₂SO₄ (Congo-red) with Et₂O in a vac. at 25-30°, repetition of the process on the residue from the Et₂O solution, and distillation at 98-100°/0.2 mm. J. W. B.

Desmotropy of some α -keto-acids. C. FROMA-GEOT, M. PELLETIER, and P. EHRENSTEIN (Bull. Soc. chim., 1932, [iv], 51, 1283-1302).-The ultra-violet absorption of dimethyl- (I) and methylethyl- (II) but not of trimethyl-pyruvic acid in H₂O, EtOH, Et_2O , and dioxan varies with the p_{π} and is not comparable with the content of enolic form determined by titration with Br in presence of FeCl₃. It is con-cluded that (I) and (II) exist partly in the form $CRR:C-C(OH)_2$, and that only this form under-goes biological decarboxylation to the aldehyde.

R. S. C.

Derivatives of β -keto- $\gamma\gamma$ -dimethylvaleric acid. E. WAHLBIRG (Ber., 1932, 65, [B], 1857-1864; cf. A., 1911, i, 707).—Accumulation of Me groups so masks the CO group that Et β -keto- $\gamma\gamma$ -dimethylvalerate (I) scarcely reacts with CH₂O or PhCHO, with difficulty and at a high temp. with NH₂Ph or PCl₅, and not with NH₃, $CO(NH_2)_2$, AcCl, HCO_2Et , HCN, or NaHSO₃. β -Keto- $\gamma\gamma$ -dimethylvaleronitrile (II) and HCN afford the unstable β -hydroxy- β -cyanoyy-dimethylvaleronitrile, m.p. 85° after softening when rapidly heated. With NH₂OH in AcOH (II) gives 5-imino-3-tert.-butyl-4: 5-dihydroisooxazole, m.p. 93-93.5°. Et a-imino-y-keto-88-dimethylamyl ether, m.p. 58-59°, is obtained from the hydrochloride (loc. cit.) and Na₂CO₃. The Na derivative of (I) and bromo-pinacolin in Et₂O afford Et γ -keto- α - $\beta'\beta'$ -dimethylpropionyl-88-dimethylhexoate, b.p. 155.5-156°/15 mm.; the corresponding acid, m.p. 61-62° (decomp.), readily loses CO2 with formation of BBnn-tetramethyloctane-yz-dione, m.p. 19-19.5° to a cloudy liquid which becomes transparent at 25-25.2° [dioxime, m.p. 265° (decomp.)]. COPh CH₂Br and the Na derivative of (I) in Et₂O yield, after hydrolysis, β-keto-yy-dimethyl-α-phenacylvaleric acid, m.p. 108.5°

(decomp.), whereas with $CH_2Cl \cdot CO_2Et Et \beta'\beta'$ -dimethylpropionylsuccinate, b.p. 157-160°/16 mm., is produced; the corresponding acid, m.p. 108° (decomp.), readily loses CO2 with production of y-keto-88-dimethylhexoic acid, m.p. 66.5-68°. (I) and o-OH·C₆H₄·CHO yield 3-ββ-dimethylpropionylcoumarin, m.p. 89.5-90°, from which the salt CMe₃·CO·C(CO₂Ag):CH·C₆H₄·OH is derived. With 3-nitrosalicylaldehyde, Et β -keto- $\gamma\gamma$ -dimethyl - α - 3 - nitro - 2 - hydroxybenzylidenevalerate, m.p. 118-119°, is produced, readily transformed into 6-nitro - 3 - ββ - dimethylpropionylcoumarin, m.p. 150° (indef., decomp.). 5-Nitro-3-ββ-dimethylpropionylcoumarin, m.p. 157.5-158°, and 6-nitroacetylcoumarin, m.p. $194-195^{\circ}$, are described. (I) and NH₂Ph in CO₂ at 160-170° yield β -keto- $\gamma\gamma$ -dimethylvaleranilide, m.p. 82-83°. (I) cannot be nitrosated with N₂O₃ or amyl nitrite but is transformed by NaNO2 in AcOH into Et β -keto- α -oximino- $\gamma\gamma$ -dimethylvalerate, b.p. 162-164°/20 mm., m.p. 92–92.5°. 3-tert.-Butylisocazol-5-one, m.p. 106–107°, is derived from (1), NH₂Ph, and NH₂OH,HCl in MeOH. Et β -keto- $\gamma\gamma$ -dimethyl-valerate semicarbazone has m.p. 117–117.5°. β -Keto- $\gamma\gamma$ -dimethylvaleric acid in EtOH-H₂O is reduced by Na-Hg to 4- β -hydroxy- $\gamma\gamma$ -dimethylvaleric acid, m.p. 81.5—82°, resolved by quinine with production of the 1-acid, m.p. 81–82°, $[\alpha]_D^{\mu}$ -25° (±2°) (quinine salt, m.p. 166—166.5°, $[\alpha]_{19}^{19}$ —145° in EtOH). H. W.

Walden inversion. IV. Conversion of bromosuccinic acid into malic acid. V. Conversion of aspartic acid into chloro- or bromo-succinic acid. H. N. K. Rørdam (J.C.S., 1932, 2931-2940, 2940-2945).-IV. Halogenosuccinic acid is converted into malic acid (I) through the lactonic acid (prep. of Et_2O solution described) which can be hydrolysed to (I) both by acid and alkali. $[\alpha]_D$ of the (I) produced under varying concns. of H' and OH' is determined. In agreement with the author's view (cf. A., 1929, 1041), but contrary to older work (A., 1913, i, 824), acid hydrolysis affords either the (-)or (+) form, depending on the concn., whereas alkaline hydrolysis gives only the (+) isomeride. Other work (A., 1931, 935) supports the view that there is a region of slight basicity in which the stereochemical nature of the product varies with the p_{μ} . The vals. of n (cf. A., 1930, 1407) are calc. from $\alpha_{\rm D}$.

V. A N₂O₃-N₂ mixture passed into an aq. solution of (+)-aspartic acid (II) containing HCl and HBr at 0° for varying periods affords halogenosuccinic acids of const. $[\alpha]$ in spite of the changing ionic strength, the reaction being of type 2 (*loc. cit.*). The conversion of (II) into (-)-malic acid by diazotisation in HNO₃ (A., 1928, 1216) is a reaction of type 1 (loc. cit.) because the stereochemical result of the reaction depends on the hydrolysis of an ester of (I) with HNO3 and hence on the concn. of HNO3. The conversion of *l*-phenylmethylcarbinyl *p*-toluenesulphinate into p-tolyl- α -phenylethylsulphone (A., 1930, 1177) and cases of auto-racemisation find an explanation in the theory (A., 1928, 1215). J. L. D.

Conjugated double linkings. XXV. Thermal degradation of carotene dyes. R. KUHN and A. WINTERSTEIN (Ber., 1932, 65, [B], 1873-1880).-The carotenoid is heated under 1 mm. pressure first at 110° and then slowly to incipient melting. Bixin,

β-bixin, dihydrobixin, azafrin, m.p. 212-214° (corr., Berl) [Me ester, m.p. 193° (corr., Berl)], crocetin, lycopene, carotene, and zeaxanthin yield PhMe and m-C₆H₄Me₂, determined approx. by oxidation to the corresponding acids, separated from one another by sublimation in vac. Terephthalic acid is never encountered, thus establishing the absence of Me groups in the $\alpha\delta$ position to one another. Azafrin and bixin give, in addition to hydrocarbons, small amounts of *m*-toluic acid, thereby establishing the arrangement \cdot CH:CH·CH:CMe·CH:CH·CO₂H or or ·CH:CMe·CH:CH·CH:CH·CO2H. Bixin yields also Me *m*-toluate, but not *p*-toluic acid, whereas methyl-bixin affords solely Me *m*-toluate. The relative position of the next Me to the free and esterified CO₂H group is therefore the same if the possibility of reesterification is excluded and also the assumption that only one end of the polyene chain tends to ring closure. At least 19 of the 25 C atoms of bixin are accounted for in the thermal degradation—9 between C_1 and C_6 to Me *m*-toluate, 8 from C_{13} to C_{18} to *m*-toluic acid, and 2 further (at C_7 or C_{12}) to m- $C_6H_4Me_2$. The possible production of o- $C_6H_4Me_2$ (from C_7 to C_{12}) could not be certainly established. The symmetrical distribution of the Me groups of bixin is regarded as established. Crocetin Me₂ ester is degraded to the hydrocarbons and the Me₂ ester, m.p. 135°, of a tetramethyloctatetraenedicarboxylic acid, $C_{14}H_{18}O_4$; no *m*-toluic acid H. W. is formed.

Derivatives of $\alpha \alpha'$ -diketoadipic acid. G. A. R. Kon and B. L. NANDI (J.C.S., 1932, 2958—2959; cf. A., 1932, 1234).—Me and Et diacetyladipates (J.C.S., 1890, 57, 204) with NO₂:SO₃H in H₂SO₄ at 0° (cf. A., 1904, i, 847) afford Me (diphenylhydrazone identical with the product of ozonisation of Me Δ^1 -cyclobutenel: 2-dicarboxylate) and Et $\alpha \alpha'$ -diketoadipate (diphenylhydrazone, m.p. 150°). J. L. D.

Polymerisation of acetaldehyde. II. W. H. HATCHER and M. G. KAY.—See this vol., 130.

New general reagent for enols; mercurous nitrate. II. Absorption spectra of normal and enolic forms of aldehydes and ketones. III. Influence of p_{π} on the stability of solutions of aldehydes. E. V. ZAPPI and A. T. WILLIAMS (Bull. Soc. chim., 1932, [iv], 51, 1258—1269).—II. The spectra of aldehydes and ketones in neutral and alkaline aq. solutions are of two types, corresponding with the enolic and ketonic forms. Neutral solutions of freshly-distilled MeCHO and EtCHO are completely ketonic, but the enolic bands appear on keeping and the pure enol is obtained on adding alkali. Acraldehyde is an equilibrium mixture, the influence of alkali being slight, except when polymerisation occurs. COMe₂ gives a purely ketonic spectrum, even in presence of alkali. On addition of NH₃, however, the enolic bands appear.

III. Data are given for the velocity of decomp. of MeCHO, EtCHO, and acraldehyde in presence of H_2O and aq. NaHCO₃, Na₂CO₃, NaOH, Na₂B₄O₇, and AcOH. Ultra-violet light does not accelerate decomp. appreciably. D. R. D.

Relations between acidity and enolisation. F. ARNDT and C. MARTIUS (Annalen, 1932, 499, 228-

- 287).—The tendency of enolisation of a ketone, *i.e.*, H:O
- the tendency of the (electronic) change $R: C: C: R \rightarrow H$

- R:C:C:R, is termed the "enotropic effect." The SO₂ H
- group is postulated as a non-enolisable group, e.g., H O
- R:C:S:R, and has, therefore, no enotropic effect;

SO₂ groups do, however, confer acidic properties. The work necessary for the transference of a proton from the C- to the enolic O-electrons is termed "prototropic expenditure of work"; this is the smaller the greater is the enotropic effect of the mol. The enotropic effect is independent of the acidity of the mol. The conferment of acidic properties by substituents is found (in accordance with theory) to be SO₃R> SO₂R>SO₂NR₂>CO₂R>CHO, COR, SO, and is influenced by the prototropic expenditure of work. The enotropic effects of the groups CHO, COR, and CO₂R decrease in the order quoted and so differ from their "acidifying action." The relationships between the above factors and constitution are discussed.

The following compounds undergo enolisation as shown by FeCl₃ and Br (the limits of accuracy of these methods are discussed) : CH(CO₂Me)₃ (the Et₂O solution contains 0.7% of enol by indirect Br titration), converted by moist or dry Et₂O-diazomethane into about 80% of Me $\beta\beta$ -dimethoxyethylene- $\alpha\alpha$ -dicarboxylate (I), b.p. 142—145°/13 mm., m.p. 48° [readily hydrolysed to CH(CO₂Me)₃], and 20% of Me ethane- $\alpha\alpha\alpha$ -tricarboxylate, b.p. 123—124°/15 mm., m.p. 39° [also formed when (I) is heated at 180°]; Me p-toluene-sulphonylmalonate, m.p. 65—66°, from CHCl(CO₂Me)₂ and p-C₆H₄Me-SO₂Na in MeOH, which is readily sol. in 2N-NaOH and with Et₂O-CH₂N₂ gives Me α -p-toluenesulphonylethane- $\alpha\alpha$ -dicarboxylate, m.p. 131° (insol. in 2N-NaOH); Et 3-hydroxythionaphthen-1: 1-dioxide-2-carboxylate (Me ether, m.p. 119°), which with CHN₂·CO₂Et in CHCl₃ affords the 3-O-carbethoxymethyl derivative, m.p. 121°; formylmethanedisulphon-N-ethylanilide, CHO·CH(SO₂NPhEt)₂ (enol Me ether, m.p. 88°); CO₂Et·CO·CH(SO₂NPhEt)₂, m.p. 98—99° (lit. 103—105°) (alcoholate, m.p. 145—146°), converted by Et₂O-CH₂N₂ into the C-Me derivative, m.p. 131—132°, which is non-acidic and with Et₂O-CH₂N₂ affords the oxide,

 $O \subset CH_2$ m.p. 136° (corresponding glycol diacetate, m.p. 165°, formed by the action of Ac₂O and anhyd. FeCl₃); 4-hydroxy-m-toluenesulphon-N-ethylanilide, m.p. 65°, prepared from 4-acetoxy-m-toluenesulphonyl chloride (II) and NHPhEt with subsequent hydrolysis (EtOH-KOH); Ph 4-hydroxy-m-toluenesulphonate, m.p. 55°, from (II) and PhOH in C₅H₅N with subsequent hydrolysis.

The following are non-enolisable (the Me ethers prepared from compounds of the type RSO_2 ·CH₂·COR and Et₂O-CH₂N₂ are RSO₂·CH:CR·OMe and are hydro-

lysed by acid to the parent ketone) : Me o-carbomethoxybenzenesulphonylacetate; Me di-p-toluenesulphonylacetate, m.p. 160°, from CHCl₂·CO₂Me, p-C₆H₄Me·SH, and MeOH-NaOMe followed by oxidation (H_2O_2-AcOH) , converted by moist $Et_2O-CH_2N_2$ into $Me \ \alpha\alpha$ -di-p-toluenesulphonylpropionate, m.p. 179°, and by diazoethane in Et₂O-CH₂Cl₂ into Me aa-di-p-toluenesulphonylbutyrate, m.p. 193°; Et di-p-toluenesulphonylacetate, m.p. 131°, which with CH_2N_2 gives Et aa-di-p-toluenesulphonylpropionate, m.p. 92°; Ph carbomethoxymethanedisulphonate, m.p. 56°, from ClCO₂Me and CHNa(SO₃Ph)₂, converted by Et $_{2}O-CH_{2}N_{2}$ into Ph α -carbomethoxyethane- $\alpha\alpha$ -di-sulphonate, m.p. 88-89°; p-toluenesulphonylacetone (Me ether, m.p. 122°, which when heated at 100°/vac. passes into an isomeride, m.p. 77° ; ω -p-toluenesul-phonylacetophenone, m.p. 110° (Me ether, m.p. 89— 90°), from BzCH₂Cl and p-C₆H₄Me·SO₂Na; $\alpha\gamma$ -di-p-toluenesulphonylacetone (*Me ether*, m.p. 122-123°); ether, m.p. 215° , hydrolysed by 2N-NaOH to $o-CO_2H\cdot C_2H\cdot SO_2Me$ and o-CO₂H·C₆H₄·SO₂Me and converted by MeOH-NaOMe into the Me_2 acetal, m.p. 144°, of the ketoform of (III), which is also formed from (III) and the mercurichloride of formimino Me ether in MeOH]; ωω-di-p-toluenesulphonylacetophenone, m.p. 196-197° (Me ether, m.p. 169°), prepared by oxidation $(H_2O_2-$ AcOH) of the mercaptal from BzCHCl₂ and p-C₆H₄Me·SNa or from BzCHO, p-C₆H₄Me·SH, ZnCl₂, and AcOH-HCl; Ph benzoylmethanedisulphonate (Me ether, m.p. 118-119°; O-carbethoxymethyl derivative, m.p. 107-108°, obtained by the action of CHN₂·CO₂Et in CHCl₃); acetylmethanedisulphon-N-ethylanilide (enol Me ether, m.p. 131°); p-toluenesulphonylacetaldehyde, an oil (dihydrate, m.p. 86-88°; semicarbazone, m.p. 213-214°), prepared by hydrolysis (conc. HCl-AcOH) of its acetal which is obtained

by oxidation $(\text{KMnO}_4-\text{aq. AcOH})$ of $p\text{-C}_6\text{H}_4\text{Me}\cdot\text{S}\cdot\text{CH}_2\cdot\text{CH}(\text{OEt})_2$, b.p. 166°/15 mm. [from $\text{CH}_2\text{CI}\cdot\text{CH}(\text{OEt})_2$, $p\text{-C}_6\text{H}_4\text{Me}\cdot\text{SH}$, and EtOH-NaOEt at 120°]. Non-enolisable SO₂-compounds do not react with Br in OH-free solvents but do so (often very rapidly) in H₂O. Bromination of the CO-free SO₂-compounds is retarded or suppressed by acid (whereas acceleration occurs with the SO₂-free ketones).

CH₂(SO₃Me)₂, most conveniently prepared from the acid and Et₂O-CH₂N₂, reacts further with Et₂O-CH2N2 to give Me ethane-aa-disulphonate, b.p. 178-180° (slight decomp.)/12 mm. Trimethylenetrisulphone and Et₂O-CH₂N₂ afford triisopropylidenetrisulphone. Disulphones of the type CH₂(SO₂R)₂ do not react with CH₂N₂, whilst p-toluenesulphon-amide and -anilide are converted into the N-Me derivatives. NH2·SO2·CH2·SO3Ph is converted by CH2N2 into the NN- Me_2 derivative, m.p. 65°, also prepared from $CH_2(SO_3Ph)_2$ and $NHMe_2$ in C_6H_6 at 135°. $CH_2(SO_2NPhEt)_2$ is unaffected by CH_2N_2 . Com-parison of sulphonylketones with the analogous dilatones with the analogous diketones, sulphonylaldehydes with oxymethyleneketones, and disulphonylketones with triacylmethanes shows that the effect of SO2 groups is "acidification " and not enolisation; this is due to the SO₂ group lacking a double linking and thus being unable to form part of a conjugated system. H. B.

Polarographic studies with the dropping mercury cathode. II. Reduction of acetone. G. SEMERANO.—See this vol., 131.

Mol. wt. of *l*-erythrose. V. DEULOFEU (J.C.S., 1932, 2973-2975).—Erythrose triacetate with EtOH-NH₃ during 24 hr. affords erythrosediacetamide (Ac₃ derivative, m.p. 147°, $[\alpha]_{1}^{pe}$ +31·7°), hydrolysis of which with boiling dil. H₂SO₄ and treatment with CH₂Ph·NPh·NH₂ affords erythrosebenzylphenylhydrazone (I), also obtained from Ca arabonate (A., 1900, i, 139). (I) with CH₂O affords erythrose, $[\alpha]_{1}^{pe}$ in H₂O +1·3° to +22·1°, which gives a normal mol. wt. in H₂O. J. L. D.

Preparation of *l*-arabinose and *l*-ribose by oxidation of *l*-arabinal with perbenzoic acid. W. C. AUSTIN and F. L. HUMOLLER (J. Amer. Chem. Soc., 1932, 54, 4749—4750).—Oxidation of *l*-arabinal with BzO_2H using Levene and Tipson's method (A., 1931, 1400) gives *l*-arabinose and *l*-ribose. H. B.

Utilisation of xylose. H. C. FANG (Iowa State Coll. J. Sci., 1932, 6, 423-424).—Xylose was oxidised to xylonic acid with Cl_2 , NH_3 being used as neutralising agent; the yield of NH_4 xylonate (I), which depended on the $p_{\rm ff}$, was about 30%. Dry distillation of (I) produced 25% of the theoretical yield of pyrrole. A method for the determination of COMe₂, EtOH, and BuOH in the products of fermentation of xylose is described. CH. ABS.

Two new colour tests for hexoses. J. H. FOULGER (J. Biol. Chem., 1932, 99, 207-211).-On the basis of Nakashima and Maruoka's colour reaction for $CO(NH_2)_2$ (A., 1924, ii, 708), sp. colour tests for hexoses are obtained with a reagent (I) prepared by boiling 40 g. of $CO(NH_2)_2$ in 80 c.c. of 40 vol.-% H_2SO_4 and 2 g. of $SnCl_2$ until clear, cooling, and diluting to 100 c.c. with 40% H₂SO₄. When 0.5 c.c. of the sugar solution and 3 c.c. of (I) are boiled for 45 sec. and shaken, ketohexoses give a greenish-blue (changing to blue or bluish-violet on cooling), whereas aldohexoses give a yellow or olive-green, changed by alternate boiling and shaking to amethyst. Pentoses and furfuraldehyde give only an intense yellow, and disaccharoses give the colours of their component sugars. A similar reagent prepared from guanidine gives a distinctive colour for each hexose (yellow only with pentoses), but without distinction between ketoand aldo-hexoses. The absorption spectra of the various colours are plotted. J. W. B.

Mechanism of the hydrolytic degradation of sugars. E. MACOVSKI (Bull. Soc. Chim., 1932, [iv], 51, 1306—1309).—Hydrolytic degradation of sugars is probably preceded by ring-opening and then proceeds by the mechanism : CHO·[CH·OH]₄·CH₂·OH \rightarrow CHO·C(OH):CH·[CH·OH]₂·CH₂·OH \Rightarrow CHO·CO·CH₂·[CH·OH]₂·CH₂·OH \rightarrow

 $\begin{array}{c} \text{CHO}\text{\cdot}\text{CO}\text{\cdot}\text{CH:CH:CH(OH)}\text{\cdot}\text{CH}_2\text{\cdot}\text{OH} \xrightarrow{\text{H}_2\text{O}} \text{AcCHO} + \\ \text{CHO}\text{\cdot}\text{CH(OH)}\text{\cdot}\text{CH}_2\text{\cdot}\text{OH} \xrightarrow{} \text{CHO}\text{\cdot}\text{C(OH)}\text{:}\text{CH}_2 \rightleftharpoons \\ \text{AcCHO. Glycerol } \alpha\beta\text{-}\text{Me}_2 \quad \text{ether with } K_2\text{Cr}_2\text{O}_7 - \\ \text{H}_2\text{SO}_4 \text{ gives AcCHO.} & \text{R. S. C.} \end{array}$

Influence of temperature on the state of solution of methylated carbohydrates. M. ULMANN and K. HESS (Ber., 1933, 66, [B], 68-71; cf. A., 1932, 1117).—Determinations of the osmotic pressure of aq. solutions of a-methylglucoside by isothermal distillation at 20° and $p_{\rm fr}$ 4.0–4.5 show evidence of association at a concn. of 0.06%. At 0°, association of the carbohydrate or hendecamethylcellotriose (I) cannot be detected cryoscopically; association appears therefore to increase as the temp. rises. (I) does not appear to be a normal trisaccharide, but a mol. compound from C₆ mols. of unknown constitution.

H. W.

Carbohydrates. XIV. Action of mercaptan on acyl derivatives of cyclic sugars. P. BRIGL and R. SCHINLE (Ber., 1932, 65, [B], 1890-1895; cf. A., 1932, 147).-Glucopyranose pentabenzoate is unaffected by EtSH and HCl, whereas glucofuranose aβ-pentabenzoate readily affords 2-ethylthiolor glucose-1:1-diethylmercaptal 3:4:5:6-tetrabenzoate (I), m.p. 82–83°, $[\alpha]_{11}^{20}$ +57.63° in COMe₂. Under similar conditions, glucose 2:3:4:6-tetrabenzoate yields mainly (I) accompanied by small amounts of glucose-1: 1-diethylmercaptal 3:4:5:6-tetrabenzoate, m.p. 166°, $[\alpha]_{ii}^{30}$ +24.79° (a Bz group wandering from 2 to 5), and a chloroglucose-1: 1-diethylmercaptal tetrabenzoate, m.p. 167-168°, [a]²⁰ +40.06° in CHCl₃. isoPropylideneglucose 3:5:6-tribenzoate, EtSH, and HCl, preferably in CHCl₃, yield 2:4-diethylthiol-glucose-1:1-diethylmercaptal 3:5:6-tribenzoate, m.p. 92°, $[\alpha]_{11}^{20} - 1.23^{\circ}$ in COMe₂. (I) is transformed by alkaline hydrolysis into 2-ethylthiolglucose, m.p. 158° after slight softening, $[\alpha]_{p}^{20} + 48.8^{\circ}$ to $+64.4^{\circ}$ in H₂O in 24 hr., which at room temp. gives a phenylhydrazone, m.p. 187° (decomp.), $[\alpha]_{11}^{20} - 157.0^{\circ}$ in C_5H_5N , but is converted by NHPh·NH₂ in AcOH at 100° into EtSH and glucosazone. H. W.

Halogenoses of the β -series and their application to synthesis. VII. Crystalline β -aceto-bromo- γ -galactose. H. H. SCHLUBACH and E. WAGENITZ (Z. physiol. Chem., 1932, 213, 87–88; cf. A., 1930, 1412).—HBr reacts with γ -galactose β -penta-acetate in 15—20 min. at room temp. giving an 87% yield of β -acetobromo-y-galactose, m.p. 85–86°, $[\alpha]_{12}^{H}$ -122.7° ($\pm 0.5^{\circ}$) in CCl₄. J. H. B.

Synthesis of a C₉ sugar by isomerisation of disopropylideneglucoseen. H. OHLE and R. DEPLANQUE (Ber., 1933, 66, [B], 12–18).—6-p-Tolucnesuphonylidesopropylidenessoglucose is constructed by the second sec verted by distillation with NaOH-CaO at 150-195° high vac. into glucoseen diisopropylidene ether (I), m.p. 36–37°, $[\alpha]_{D}^{18}$ +137° in CHCl₃ (highest observed val.), the constitution of which is established by ozonisation to K isopropylidene-d-xyluronate (95% yield). It adds 13-15% more than the calc. amount of Br. The substance described as (I) (A., 1929, 1279) has a different constitution. (I) is stable towards alkali,



but very sensitive towards acids. It is transformed by 0.01N-H₂SO₄ at room temp. into isorhamnose iso-

propylidene ether (II), m.p. 99–100°, $[\alpha]_D^{IK}$ –106.7° in CHCl₃, which readily undergoes fission between C₄ and C₅ giving about 50% of AcOH in the determination of Ac (Freudenberg) and about 33% of MeCHO in the determination of $COMe_2$ (Elsner). Alkalis transform it into amorphous, complex compounds. With Na it yields an enolate from which isoamyl acetate results on treatment with isoamyl nitrite. The 3-Ac derivative, m.p. 65–66°, $[\alpha]_{\rm D}^{16}$ –76.3° in CHCl₃, 3-Bz derivative, m.p. 96°, $[\alpha]_{\rm D}^{16}$ –71.4° in CHCl₃, and 3-p-toluenesulphonyl compound, m.p. 71°, $[\alpha]_{15}^{s}$ -99.65° in CHCl₃, are described. Treatment of (I) in COMe₂ at -5° with conc. H₂SO₄ and immediate neutralisation of the product with KOH affords (II), a K ester sulphate of unestablished constitution, and 7:7-dimethyl-1:2-isopropylidene-3:7anhydro-d-gluptonose (III, R=Me), m.p. 116—117°, $[\alpha]_{10}^{18}$ +99.4° in CHCl₃. [It is



proposed to designate compounds $\begin{array}{c|c} H \cdot C \cdot O \\ H \cdot C \cdot O \\ \hline C \cdot H \end{array} \xrightarrow{(C+H)} O \\ \end{array} \left| \begin{array}{c} proposed to designate compounds \\ of this class by reference to the \\ hexose of similar configuration \\ and to express adherence to the \\ \end{array} \right|$ and to express adherence to the heptose series by insertion of pt, (III.) the middle consonants being omitted, e.g., glucose \longrightarrow gluptose; mannose \longrightarrow maptose;

galactose \rightarrow galaptose.] (III) is stable towards $KMnO_4$ in boiling $COMe_2$ or $H_2O-COMe_2$, vigorously oxidised after addition of NaOH to CO_2 and AcOH. It could not be acetylated with Ac₂O and C₅H₅N or with boiling Ac₂O. Its 2:4-dinitrophenylhydrazone has m.p. 176°. It gives non-cryst. products when hydrolysed. When titrated according to Willstätter-Schudel it consumes > 1 mol. of I without formation of CHI_3 in considerable amount. Its enolate gives small amounts of Et isovalerate when treated with Et nitrite. In the Ac determination (Freudenberg) it yields 30.8% of acid (probably $\beta\beta$ -dimethylacrylic). H. W.

Acetone [isopropylidene] sugars and other compounds of carbohydrates. XXIII. Synthesis of cellobiose. K. FREUDENBERG and W. NAGAI (Ber., 1933, 66, [B], 27-29).—A more detailed account of work already reported (A., 1932, 1021), and a reply to Hess and Ulmann (A., 1932, 1117). H.W.

Crystalline $\beta\beta$ -trehalose (isotrehalose). H. H. SCHLUBACH and W. SCHETELIG (Z. physiol. Chem., 1932, 213, 83-86).-Dry a-acetobromoglucose and β-glucose tetra-acetate, Ag₂CO₃, I, and CaCl₂ react in CHCl₃ to give a 50% yield of $\beta\beta$ -trehalose octa-acetate, m.p. 181° (corr.), $[\alpha]_D^{30} - 18.6°$ in CHCl₃, quantitatively hydrolysed by 0.003-N-NaOMe in MeOH to $\beta\beta$ -trehalose, m.p. 130–135°, $[\alpha]_D^{17}$ –41.5° J. H. B. in H_{20} .

Reactions relating to carbohydrates and poly-XLI. Structure of raffinose saccharides. lævan. W. MITCHELL and H. HIBBERT (Canad. J. Res., 1932, 7, 345-348).-The lævan synthesised by the action of B. subtilis on raffinose is identical with that obtained similarly from sucrose and therefore is a polymeric 2:6-anhydrofructofuranose (A., 1931, 827, 1276). The view that lævan formation occurs with sugars containing a terminal fructofuranose group is thus confirmed. A. C.

Biochemical synthesis of $\alpha\gamma$ -butylene glycol β -glucoside. J. VINTILESCO and N. IOANID.—See this vol., 93.

Nucleic acids. Ring structure of the pyrimidine nucleosides. H. BREDERECK (Ber., 1932, 65, [B], 1830-1833).—The applicability of Helferich's CPh_aCl reaction to the determination of the ring structure of the sugar component of nucleosides and nucleotides is regarded as established, since (1) theophyllineglucoside and CPh₃Cl in C_5H_5N afford triphenylmethyltheophyllineglucoside, m.p. 143° (indef.), $[\alpha]_D^{\alpha}$ +10.1° in CHCl₃ { Ac_3 derivative, m.p. 135— 145° (corr. indef.), $[\alpha]_D^{\alpha}$ + 37.6° in CHCl₃} and (2) the mixture of α - and β -methylribopyranoside does not react with CPh₃Cl when kept at room temp. or heated for 2 hr. at 100° as judged by polarimetric observation and the almost quant. recovery of CPh_3Cl as CPh_3OH . The possibility that the $CO\cdot NH\cdot CO\cdot$ group of uridine (I) reacts with CPh_3Cl is excluded by the inactivity of the similarly-constituted diacetamide. (I) affords triphenylmethyl-uridine, m.p. 115—116° (decomp.), $[\alpha]_{1}^{lp}$ +11.0° in CHCl₃, and is therefore uracil-*d*-ribofuranoside. Since (I) can be obtained by deamination of cytidine (II), during which ring change is improbable, (II) is cytosine-d-ribofuranoside. Cryst. compounds are obtained from (II) and adenosine with CPh₃Cl, but their structure is uncertain because of the presence of the NH₂ group. H. W.

Starch. XXVII. Diamylose and tetra-amylose. H. PRINGSHEIM and A. BEISER (Ber., 1932, 65, [B], 1870—1873).—EtOH may be present to the extent of 4% (calc. on wt. of carbohydrate) in the case of tetra- (I) and of 8% in the case of di-amylose (II) without affecting the f.p. of 1% aq. solutions. COMe₂ behaves similarly. The transformation of (II) into (I) is hindered by 2.3%, but not by 1.8%, of EtOH. Contrary to Miekeley (A., 1932, 255), tetra-amylose acetate, $[\alpha]_{11}^{20}$ +116° in CHCl₃, has been re-prepared. H. W.

[Highly-polymerised compounds. Dependence of the viscosity of cellulose solutions on temperature.] K. HESS and B. RABINOWITSCH (Ber., 1932, 65, [B], 1856).—Contrary to Staudinger (this vol., 55) the viscosity of solutions of limit dextrin acetate 2 is not independent of the temp. 0.5% cellulose solutions cannot be regarded as dil. and it is not valid to apply a relationship established for dil. solutions to such solutions.

H. W.

Highly-polymerised compounds. LXXV. Biosan acetate of Hess and Friese. H. STAU-DINGER and H. FREUDENBEBGER (Ber., 1933, 66, [B], 76—79).—In reply to Hess and Rabinowitsch (see above) it is pointed out that the cryoscopic and viscosimetric methods and the determination of terminal groups show that "limit dextrin acetate 2" is a polytriacetylglucan diacetate of mean degree of polymerisation 12—13. The determination of its viscosity in *m*-cresol by Hess and Rabinowitsch is incorrect. H. W.

Plant colloids. XXXI. Determination of mean particle size of some starch substances

and starch derivatives. M. SAMEC [with L. KNOP, B. LAVRENCIČ, and S. PREMRL] (Kolloid-Beih., 1932, 37, 91-118).-Determination of the apparent mol. wt. of starch ultra-fitrate, erythroamylose, achrodextrin, amylose acetate, deacetylated amylose and amylopectin acetate, isodi- and isotrihexosans, and other degradation products of starch by various methods showed that cryoscopy and isothermal distillation yield low, whilst diffusion and osmotic measurements yield high results. Consistent results were obtained by all these methods for the products of degradation with HCl. The tendency to association, shown by some of the degradation products, does not lead to reconstruction of the original starch mol. E. S. H.

Cryoscopy of glycogen and inulin in acetamide. J. REILY and P. P. DONOVAN (Ber., 1932, 65, [B], 1811—1815).—Determinations of the mol. wt. of glycogen (0.176% ash) in freezing NH₂Ac give vals. between 1 and $2C_6H_{10}O_5$ usually approximating more closely to the latter vals. Inulin with 0.07% ash gave vals. corresponding with $4C_6H_{10}O_5$. Further diminution of the ash content led to vals. between 4 and $6C_6H_{10}O_5$, in one instance to $8C_6H_{10}O_5$. An inulin with higher ash content gave the val. $2C_6H_{10}O_5$. H. W.

Cryoscopy of glycogen and inulin in acetamide. H. PRINGSHEIM and H. WEISS (Ber., 1932, 65, [B], 1807—1811).—Re-determination of the mol. wt. of glycogen (0.176% ash) in an all-glass apparatus confirms the aggregation corresponding with a glucose anhydride. Inulin containing about 0.07% ash is much more rapidly dried than that used previously (about 0.23% ash), but exhibits no other essential difference. Mol. wt. determinations fluctuated between $3C_6H_{10}O_5$ and $10C_6H_{10}O_5$ without apparent cause. Berner's criticisms are considered to be invalidated. H. W.

Glycogen triacetate. W. S. REICH (Compt. rend., 1932, 195, 1029—1031).—Glycogen (I) is converted by Ac₂O in C₅H₅N in presence of NaOAc in complete absence of H₂O and free acid into its triacetate, $[\alpha]_{3^{11}}^{3^{11}}$ +160.4° in C₅H₅N, hydrolysed by 0.5N-KOH-EtOH at 0° to (I), identical with the original material. The P content of impure liver (I) is considerably reduced by this treatment.

A. C.

Acetolysis of cellulose. K. FREUDENBERG and K. SOFF (Ber., 1933, 66, [B], 19–27).—Acetolysis of cellulose (I), β -glucosan (II), cellobiose (III), and glucose (IV) in Ac₂O, AcOH, H₂SO₄, and CHCl₃ has been followed polarimetrically. [a] of (IV) falls slowly owing to a slow decomp. (II) is very rapidly acetylated and converted into glucose penta-acetate, but [a] remains higher than that of (IV). The consts. of (I) and (III) do not ultimately reach that of (IV). For (II) $K_2=1.7\times10^{-4}$ during 15–80% fission. For (I) $K_n/K_2=2.3$, corresponding with a max. yield of rather < 72% of cellobiose octa-acetate. The yield is compatible with the view that the two terminal linkings are split according to K_3 , the mean const. of the trisaccharide, and all intermediate linkings according to K_n , and that K_3 is intermediate between K_2 and K_n . On this hypothesis, (I) in homogeneous system is degraded more at the terminals by 50% H₂SO₄, more in the middle by acetolysis. Starch in aq. acid resembles (I) in that the polysaccharide is hydrolysed more rapidly than the biose; the relationship may be reversed for the starch acetates. The possibility of β linkings in starch to any considerable extent is denied. H. W.

Reactions relating to carbohydrates and polysaccharides. XLII. Synthesis of cellulose o-chlorobenzyl ethers and mechanism of their formation. R. H. BALL and H. HIBBERT (Canad. J. Res., 1932, 7, 481-498).-The effects of time of heating, temp., concn. of NaOH in the steeping solution, and time of steeping on the reaction products from "soda cellulose" (I) and o-C6H4Cl·CH2Cl (II) are studied. Etherification proceeds to a much greater extent when the excess of NaOH in the steeping solution is removed from (I) before treatment with (II); the reaction is retarded by inert diluents $(C_6H_6, PhMe)$. At 90° and an alkali concn. of 20% NaOH, the amount of etherification increases regularly up to 9 hr. and then decreases. The extent of etherification increases (in a complex manner) with rises in temp. (for fixed concn. of NaOH) and alkali concn. (for fixed temp.); simultaneous increase in both factors gives a good yield of a highly substituted ether. The hemi- and mono-ethers are insol. in CHCl₃, whilst higher ethers are sol.; evidence is given for the exist-ence of a sesqui-ether, $C_{12}H_7O_{10}(C_7H_6Cl)_3$. Oxidation and depolymerisation probably occur during long steeping of (I); subsequent etherification gives more sol. ethers. The mechanism of ether formation is discussed with reference to the constitution of (I). H. B.

Higher fatty acid esters of cellulose and starch. II. E. LORAND (Cellulosechem., 1932, 13, 185-191).-Modified methods (lit.) of prep. of mixed cellulose esters and starch esters are given. H. B.

Glycerol degradation of lichenin. E. BERNER (Annalen, 1932, 500, 52-61).-When lichenin is heated with anhyd. glycerol at 240° (bath) in N₂, the resulting solution added to EtOH, the pptd. material extracted with H₂O, and the dissolved solid re-pptd. with EtOH, a substance (lichosan), M about 2000, containing about 3.5% of glycerol (even after further purification) is obtained. Acetylation and subsequent hydrolysis do not remove the glycerol, which is probably in combination : $\cdot O \cdot CH \cdot O \cdot C \cdot + C_3 H_5 (OH)_3$ \longrightarrow ·O·CH·O·C₃H₅(OH)₂+OH·C·; analyses of the lichosan acetate support this view. H. B.

Trimethylenetrinitroamine or "hexogene." L. DESVERGNES (Chim. et Ind., 1932, 28, 1038-1044).-Trimethylenetrinitroamine,

 $NO_2 \cdot N < CH_2 \cdot N(NO_2) > CH_2$, m.p. 203.5°, is obtained in 24-32% yield by the action of 96% HNO₃ on $(CH_2)_6N_4$. Nitration in presence of H₂SO₄ or AcOH is impossible. HNO2 or acid solutions of NaNO3 give di- and tri-nitroso-compounds. The NO2 content cannot be determined in the nitrometer or by reduction methods. C. I.

Attempted resolution of substituted hydroxyl-

MEISENHEIMER and H. DENNER (Ber., 1932, 65, [B], MEISENHEIMER and H. DENNER (Ber., 1932, 65, [B], 1799—1807).—NHMeEt is oxidised by 6% H_2O_2 to methylethylhydroxylamine, b.p. 36—38°/12 mm. {picrate, m.p. 104—107°; α -bromo-d-camphor- β -sul-phonate (I), m.p. 97—101°, $[M]_D$ +314° in H_2O }. NHMe·CH_2Ph (picrate, m.p. 113—116°) is similarly transformed into benzylmethylhydroxylamine, m.p. 41-42° [H d-tartrate (II), m.p. 86—91°, $[M]_{\rm p}$ +47° in H₂O; α -bromo-d-camphor- π -sulphonate semihydrate (III), m.p. 73—79°, $[M]_{\rm p}$ +273° in H₂O]. Na sulphanilate is converted by Me₂SO₄ (1·1 mol.) and 2N-NaOH (1·1 mol.) into dimethylsulphanilic acid, decomp. 270-271° with very rapid, and 263° with normal, heating (Na salt, anhyd., $+4H_2O$ and $+6H_2O$; Ba salt, anhyd. and $+4H_2O$). NHPhMe and H_2SO_4 give a mixture of methylmetanilic and methyl-sulphanilic acid (IV), decomp. 250°. The Ba salt of (IV) is transformed by CH₂PhCl and Ba(OH)₂ into benzylmethylsulphanilic acid (anhyd. and mono-hydrate), decomp. $248-250^{\circ}$ [Ba (+3H₂O) and Na $(+3H_2O)$ salts], oxidised by BzO_2H in aq. AcOH to the corresponding oxide, decomp. 218°, which is isomerised by hot 4N-NaOH to benzyloxymethylsulphanilic acid (Na salt, anhyd. and $+0.5H_2O$; Ag salt; Ba salt, anhyd. and $+H_2O$; dl- α -phenylethylammonium salt, m.p. 153—155°; d- α -phenylethyl-ammonium salt (V), m.p. 137—140°, $[M]_{\text{D}}$ +18·4° in EtOH). Benzylmethylmetanilic acid, m.p. 148—152°, is oxidised to the corresponding oxide, (anhyd.) decomp. 200°, (+ H_2O), decomp. 180–183°. Since indications of resolution are not obtained by repeated crystallisation of (I) from EtOAc, (II) from $Pr^{\alpha}OH$, (III) from H_2O , and (V) from EtOAc, it appears that tert. hydroxylamines have as little tendency to appear in mirror image isomerides as tert. amines. H. W.

Reaction of primary and secondary aminoalcohols and aminophenols with arylsulphonyl chlorides. K. H. SLOTTA and R. BEHNISCH.-See this vol., 61.

Complex chemical behaviour of the ethanolamines. W. HIEBER and E. LEVY (Annalen, 1932, 500, 14–34).— β -Aminoethyl alcohol (I) (0.09 mol.), CoCl₂ (anhyd. or +6H₂O) (0.03 mol.), and C₅H₅N (0.03 mol.) in EtOH give the red *chloride* (II) (+2H₂O) (A, X=Cl), which is an electrolyte (conductivity data given), slowly loses $2H_2O$ at $111^{\circ}/vac$. over P_2O_5 , and can be crystallised only from cold H_2O . When a hot aq. solution of (II) is cooled, a mixture of (II) and the dark-red chloride (III) (B, X=Cl) (also $+6H_2O$), results; (III) is also prepared from CoCl₂,6H₂O and a 5N solution of (I) in EtOH. The



bromide (anhyd. and $+5H_2O$) and iodide of type (A) amines into optically active isomerides. J. and the bromide of type (\vec{B}) are also prepared. The halides (A) are stable to conc. HCl, whilst the halides (B) are similarly coloured blue.

$$(B) \begin{bmatrix} OH & H_2 \cdot C_2 H_4 & OH_2 \cdot C_2 H_4 \cdot NH_2 \\ OH & OH & OH & OH \\ C_2 H_4 & Co & Co & Co & C_2 H_4 \\ NH_2 & OH & OH & OH_2 \cdot C_2 H_4 \cdot NH_2 \end{bmatrix} X_2$$

NH(CH₂·CH₂·OH)₂ and CoCl₂ in EtOH give a red

chloride (IV),
$$\begin{vmatrix} C_2H_4 \cdot OH \\ NH - C_2H_4 - O-H \end{vmatrix}$$
 Cl or

C₂H₄·OH·. NH

-----Co---OH₂ Cl (corresponding brom-C2H4-0/

ide), which when heated at 185° /vac. over P_2O_5 , passes slowly into the blue (non-electrolytic) chloride, $C_2H_4 = 0$

 $\dot{\mathrm{NH}}^{\mathrm{Co-Cl.}}$ A chloride, bromide, and

iodide (V), all green, of the composition $C_{12}H_{30}O_6N_3Co_2Hal, H_2O$ (alternative structures suggested), are prepared using a 5 : 1 ratio of

NH(CH₂·CH₂·OH)₂ and Co; (V) also results during attempted prep. of the iodide analogous to (IV). When (V) is digested with aq. MeOH (1:1), one diethanolamine residue is replaced by H₂O giving an iodide, $C_8H_{19}O_4N_2ICo_2,4H_2O$, green, which loses $3H_2O$ at 100° and passes into a reddish-violet iodide, containing 4- and 6-covalent Co atoms.

N(CH₂·CH₂·OH)₃ furnishes a red chloride,

 $C_{18}H_{45}O_{9}N_{3}Cl_{3}Co_{2}$ (containing two 6-covalent Co atoms) and a red bromide, $C_{6}H_{14}O_{3}NBrCo$ (in which Co is 4-covalent). H. B.

Ammines. X. Cobaltous and cupric compounds from tris-(\beta-hydroxyethyl)amine. New method of formation of ammino-cupric salts. J. C. DUFF and E. H. STEER (J.C.S., 1932, 2861-2862).—Tris-(B-hydroxyethyl)amine (I) with CoCl₂ and CoBr2 in H2O at 40° or 5% CoCl2 and 5% KCNS affords respectively chloro- (II), bromo- and thiocyanatocobaltotris- $(\beta$ -hydroxyethyl)amine. 20% NaOH con-taining (II) (saturated solution) during 0.5 hr. at 50° affords a dihydrate of the Na derivative of hydroxycobaltotris- $(\beta$ -hydroxyethyl)amine. (I) in H₂O gives with NiCl₂, ditris- $(\beta$ -hydroxyethyl)aminonickel chloride and with Cu(OH)₂, tris- $(\beta$ -hydroxyethyl)aminocupric hydroxide (III), which affords only basic Cu" salts with acids. The action of org. NH_4 salts on (III) in aq. EtOH affords the following compounds, hydrolysed by H_2O to basic Cu^{*} salts and NH_3 : diamminocupric formate and succinate; triamminocupric maleate and fumarate. J. L. D.

Decomposition points of amino-acids. M. S. DUNN and T. W. BROPHY (J. Biol. Chem., 1932, 99, 221-229).-An apparatus is described whereby a precise determination of the time and temp. required for an NH₂-acid to reach a standard state of decomp. (as judged by the shade of brown colour) may be determined. The time-temp. vals. are plotted, the decomp. point being given by the point where the graph becomes parallel to the time axis. Such decomp. points are claimed to be accurately reproducible and are true characteristics of the NH₂acid. J. W. B.

Action of glycuronic and galacturonic acid on alanine. C. NEUBERG and H. COLLATZ (Schweiz. med. Woch., 1932, 62, 4 pp.; Chem. Zentr., 1932, ii, 1431).—Both acids and their salts react with alanine forming CO_2 , NH_3 , and MeCHO; for 0.005M, and boiling for 6 hr., fission occurs to the extent of 6.5% of the theoretical. A. A. E.

Synthesis of glycylglycine. M. S. DUNN, A. W. BUTLER, and T. DEAKERS (J. Biol. Chem., 1932, 99, 217-220).-The improved prep. of glycylglycine (45% yield) by the action of $CH_2Cl \cdot COCl$ and N-NaOH on crude glycine at 0° is described.

J. W. B.

o-Benzoquinone test for cysteine. W. C. HESS and M. X. SULLIVAN (J. Biol. Chem., 1932, 99, 95-97).—Although the Dyer-Baudisch colour reaction (A., 1932, 530) differentiates cystine from other NH₂acids and glutathione, it is not sp., good positive reactions being given by 14 other compounds (tabu-lated). In all these cases the authors' test (A., 1925, ii, 1211) for cysteine, using Na 1:2-naphthaquinone-4-sulphonate in a reducing atm., is negative. J. W. B.

Formation of a homologue of cystine by the decomposition of methionine with sulphuric acid. L. W. BUTZ and V. DU VIGNEAUD (J. Biol. Chem., 1932, 99, 135—142).—dl-Methionine is decomposed by $18N-H_2SO_4$ at $125-135^\circ$ in N₂ to yield bis- γ -amino- γ -carboxy-n-propyl disulphide (homocystine) (I), decomp. $260-265^\circ$ (Bz₂ derivative, m.p. 184- 85° (corr)) reduced by N₂ in dry liquid NH cond 185° (corr.)], reduced by Na in dry, liquid NH₃ and subsequent treatment with CH2PhCl to dl-S-benzylhomocysteine, m.p. 190-191° (corr.), and oxidised by Br in H₂O to dl-homocysteic acid, decomp. 230-235°. J. W. B.

Mechanism of action of organo-magnesium compounds on N-disubstituted amides of $\alpha\beta$ -unsaturated acids. II. C. D. NENITZESCU and I. P. CANTUNIARI (Bul. Soc. Chim. România, 1932, 14, 62—64).—cis-β-Methyl-α-isopropylglutaric anhydride, m.p. 41-42°, unaccompanied by the trans-isomeride, is made by heating the acid, m.p. 112°, with AcCl. Interaction of MgEtBr with crotondiphenylamide (2 mols.) gives β -methyl- α -sec.-butylglutarotetraphenyldiamide, decomp. >250° (cf. A., 1930, 1433).

H. A. P.

Constitution of carbamide. P. MERKLEN and H. GOUNELLE (Bull. Acad. Med., 1931, [iii], 106, 384-385; Chem. Zentr., 1932, ii, 2171).-The structure $CO(NH_2)_2$ is supported by the fact that only urea derivatives having the carbamide structure have a narcotic action. A. A. E.

Violit, an open-chain analogue of murexide. D. D. KARVE (J. Univ. Bombay, 1932, 1, 48-51).-The Et esters or diamides of mesoxalic (1 mol.) and tartronic (1 mol.) acid with aq. NH₃ give "violit," (CO·NH₂)₂C:N·C(CO·NH₂):C(NH₂)·ONH₄ (Na salt) R. S. C. readily decomposed.

Cyanamide. G. BARSKY (Chim. et Ind., 1932, 28, 1032-1037).-The formation of dicyanodiamide (I) in an aq. solution of $CN \cdot NH_2$ is at a max. at p_{μ} 9.6. At $p_{\rm H} > 10 \, {\rm N}_2$ is lost by decomp. of the polymeride. Pure (I) is prepared by extracting CaCN₂ with H₂O, adding H₂SO₄, warming, maintaining the $p_{\rm H}$ at 9·0, evaporating, and crystallising. In very alkaline solutions CN·NH₂ is quantitatively hydrolysed at 50° to CO(NH₂)₂, the reaction velocity being independent of the alkali conen. CN·NH₂ is very stable in solution in range $p_{\rm H}$ 4—7. In solutions acidified with HCl hydrolysis proceeds at a rate proportional to the HCl conen. If CaCN₂ is treated in an autoclave with addition of Ca(CN)₂ the N₂ is recovered as NH₃ and an appreciable proportion of CaC₂O₄ is produced. The mechanism of this reaction is discussed. If a solution of CN·NH₂ is treated with H₂S at $p_{\rm H} < 9.6$ CS(NH₂)₂ is produced. C. I.

β-Hydroxy-αγ-hexamethyl di-iodoaminoisopropyl iodobismuthate. G. AURISICCHIO (L'Ind. Chimica, 1932, 7, 1358—1360).—Details are given of the prep. of OH·CH(CH₂·NMe₃I)₂,2BiI₃ from BiI₃ and hexamethyldiaminoisopropanol. O. F. L.

Action of magnesium ethyl bromide on thallous chloride and thallous ethoxide. R. C. MENZIES and (MISS) I. S. COPE (J.C.S., 1932, 2862—2866; cf. A., 1904, i, 656).—TIOEt (1 mol.) and MgEtBr (3 mols.) in dry Et₂O at 0° afford the best yield (22— 24%) of TIEt₂Br. About 50% of Tl is formed in the reaction. The less sol. TICI with MgEtBr in Et₂O at 0° affords up to 12% TIEt₂Br and 28·1% Tl. These facts point to the formation of TIEt₃ (cf. A., 1904, i, 544). TICl₃ and MgEtBr afford directly TIEt₂Br.

J. L. D.

Dicyclic hydrocarbons. cycloHexylidene-cyclohexane and dicyclohexyl. N. D. ZELINSKI, N. I. SCHUIKIN, and L. M. FATEJEV (J. Gen. Chem. Russ., 1932, 2, 671-680).—cycloHexenylcyclohexan-one (cf. A., 1927, 153) was converted through the hydrazone into cyclohexenylcyclohexane, b.p. 236-237°, reduced by H_2 (Pd-C) to dicyclohexyl (II). (II) was also obtained by reduction of cyclohexenylcyclohexane, resulting from the dehydration of 1-cyclohexylcyclohexanol by $KHSO_4$, and was very similar to the above and to (II) obtained by the Wurtz reaction : the existence of (II) in stereoisomeric forms is uncertain. Reduction of 2-cyclohexylcyclohexanol with HI at 100-110° gives (II) and at 260-280° mixtures of (II) with hydrocarbons of lower b.p., d, and n, perhaps containing 2-methylcyclopentylcyclohexane (III) (cf. A., 1930, 206). Mg cyclohexyl bromide and 2-methylcyclopentanone gave 2-methyl-1-cyclohexylcyclopentanol, b.p. 119°/8 mm., dehydrated by KHSO4 to the unsaturated hydrocarbon, reduced by H2 at 200° (Pd-C) to (III), b.p. 225.5-227°. G. A. R. K.

Action of concentrated sulphuric acid on cyclohexene. S. S. NAMETKIN and L. N. ABAKUMOV-SKAJA (J. Gen. Chem. Russ., 1932, 2, 608-613).— The hydrocarbon layer recovered (37%) after treating cyclohexene with conc. H₂SO₄ at 2-5° consists of : (I) C₁₂H₂₂, b.p. 216-219°/739 mm., saturated, giving a little C₁₀H₈ on dehydrogenation with Ni-Al₂O₂; (II) C₁₈H₃₂, b.p. 145-147°/1·5-2 mm., saturated; and (III) C₂₄H₄₀, very viscous liquid b.p. 200-203°/ 1·5-2 mm., containing one double linking.

G. A. R. K.

Transformation of benzene, toluene, and *m*-xylene into methane. A. MAILHE (Chim. et Ind., 1932, 28, 1263—1271).—Hydrogenation of $C_{6}H_{6}$, PhMe, and $m \cdot C_{6}H_{4}Me_{2}$ under standard conditions in presence of Ni gives CH_{4} , and shows a max. at 280° (% CH_{4} obtained, 69·8, 74·0, 75·1, respectively), a decrease, and then a second max. at 330° (% CH_{4} , 68·0, 68·0, 74·8). A resin, sol. in COMe₂, is deposited on the surface of the Ni at 270—280°, paralysing its activity, and this may be removed by H_{2} at 325°; at 320—330°, a deposit of C is then progressively formed. At lower temp. homologues of CH_{4} are also obtained. F. R. S.

Sodium phenylstyrylmethyl. E. BERGMANN and T. UKAI (Ber., 1933, 66, [B], 54—58).—Styryl-phenylcarbinol is converted by MeOH- H_2SO_4 into γ -methoxy- $\alpha\gamma$ -diphenyl- Δ^{α} -propene, b.p. 180—181°/11 mm., readily transformed by Na into Na phenylstyryl-methyl (I). COPh₂ and (I) yield δ -hydroxy- $\alpha\gamma\delta\delta$ -tetra-phenyl- Δ^{α} -butene, dimorphous, m.p. 130—131°, converted by boiling AcCl into $\alpha\alpha\beta\delta$ -tetraphenyl- $\Delta^{\alpha\gamma}$ -butadiene, m.p. 148-149°, oxidised to triphenylacralde-hyde, m.p. 177-178°. Similarly, (I) and fluorenone yield successively 8-hydroxy-ay-diphenyl-8-diphenylene- Δ^{a} -butene, m.p. 145—146°, $\alpha\gamma$ -diphenyl- δ -diphenylene- $\Delta^{a\gamma}$ -butadiene, m.p. 183—184°, and α -phenyl- β -di-phenyleneacraldehyde, m.p. 164—165°. δ -Hydroxyαγδ-triphenyl-Δα-butene, m.p. 109-111°, from PhCHO, affords αβδ-triphenyl-Δay-butadiene, b.p. 230-239°/11 mm., m.p. 103—104°. (I) and CH₂PhCl give $\alpha\beta\delta$ -triphenyl- Δr -butene, b.p. 240—242°/40 mm., whereas only C₂H₂Ph₄ could be isolated from the product of the reaction with CHPh2Br. With COPh2 chlorido (I) gives a $\lambda \delta \epsilon_{n}$ -hexaphenyl- $\Delta \alpha$ -heptadiene, m.p. 145°. Di-ay-diphenyl-Da-propenyl ketone, m.p. 183°, and aydiphenyl- Δ^{α} -propene are derived from (I) and $CO(OEt)_2$. The successive action of Hg and CO_2 on (I) leads to $\alpha\gamma$ -diphenyl- $\Delta\gamma$ -butenoic acid, m.p. 121°, and ayo ζ -tetraphenyl- $\Delta^{\alpha\epsilon}$ -hexadiene, m.p. 137—138°. H. W.

Fluorenes. E. BERGMANN, H. HOFFMANN, and D. WINTER (Ber., 1933, 66, [B], 46—54).—2-Nitrofluorenone and PCl₅ at 150—160° yield 2-nitrofluorenone chloride, m.p. 175—176°, not dehalogenated by Cu powder in C₆H₄Me₂ or NaI in boiling COMe₂, but transformed by SH·CH₂·CO₂H (I) in boiling C₆H₄Me₂ into 2 : 2'-dinitrobisdiphenylene-ethylene, im.p. >310°. 2 : 9 : 9-Trichlorofluorene is converted by (I) into 2 : 2'-dichlorobisdiphenylene-ethane, m.p. 274—275°, and by Cu powder in boiling C₆H₆ into 2 : 2' : 9 : 9'tetrachlorobisdiphenylene-ethane, m.p. 223—225°. 2-Aminofluorenone is transformed through the diazonium fluoborate, decomp. 160—170°, into 2-fluorofluorenone, b.p. 185°/10 mm., m.p. 117° (oxime, m.p. 204°). 9 : 9-Dichloro-2-fluorofluorene, m.p. 107°, is reduced by (I) in boiling C₆H₄Me₂ into 2 : 2'-difluorobisdiphenylene-ethane, m.p. 241°, and by Cu powder in boiling C₆H₆ to chloro-2 : 2'-difluorobisdiphenyleneethylene, 9 : 9'-dichloro-2 : 2'-difluorobisdiphenyleneethylene, 9 : 9'-dichloro 2 : 2'-difluorobisdiphenyleneethylene, 9 : 9'-dichloro 2 : 2'-difluorobisdiphenyleneethylene is attributed to the presence of crossed

 $(C_{g}H_{4})_{2}C:N\cdot N:CPh_{2}$, m.p. 115—116°, from $CPh_{2}:N\cdot NH_{2}$ and fluorenone at 150°, resembles K2Cr2O7 in colour; fluorenonehydrazone and COPh2 yield fluorenoneketazine and benzophenoneazine. Fluorenone is converted by Mg acetylenyl bromide into $\alpha\delta$ -bisdiphenylene- Δ^{β} -butin- $\alpha\delta$ -diol, m.p. 238°, transformed by I and HI at 100° into the dark red a8-bisdiphenylene- $\Delta^{\alpha\beta}$ -butatriene, reduced by Na and boiling amyl alcohol to ab-bisdiphenylenebutane, m.p. 218-2:2':7:7' - Tetrabromobisdiphenylenebuta-219°. diene, m.p. about 420°, is prepared by autoxidation of 2:7-dibromofluorene in presence of alkali. The hypothesis that the colour of the compounds under investigation depends on the partial or complete existence of the ethylenic linkings in the di-radical form (A., 1930, 939) generally requires that pairs of geometric isomerides shall not exist or not be stable. Unsuccessful attempts are described to obtain a second variety of 2: 5-dinitro-, m.p. 268° (decomp.), or 2-nitro-, m.p. 258°, -fluorenoneoxime. H. W.

Action of sodium in liquid ammonia on derivatives of optically active triarylmethanes. F. H. ADAMS and E. S. WALLIS (J. Amer. Chem. Soc., 1932, 54, 4753-4754).—The *l*-form, m.p. 184-185°, $[\alpha]_{li}^{20}$ -48.5° in COMe₂, of 12-phenyl- β -benzoxanthene-12thiolacetic acid, m.p. 187-188°, and Na in liquid NH3 in absence of O2 give an optically active Na triarylmethyl, since decomp. with dry NH4Br affords a trisubstituted methane, $[\alpha]_D^{20} - 11.7^\circ$ in COMe₂; the three groups and the methane C atom of the ion are, therefore, non-planar. H. B.

Structure of vitamin-A and the synthesis of ionenes. M. T. BOGERT (Science, 1932, 76, 475-476).—A study of the NO₂-, nitroamino-, and sulphoderivatives and the oxidation products of ionene and of its (NO₂)₂-derivatives has shown that the Barbier-Bouveault formula for ionene (I) is correct. This has been confirmed by the synthesis of ionene through the been confirmed by the synthesis of fourier through the steps $C_6H_4Me\cdotCHO \rightarrow C_6H_4Me\cdotCH\cdotCO_2R \rightarrow C_6H_4Me\cdot[CH_2]_2\cdotCH_2\cdotOH \rightarrow C_6H_4Me\cdot[CH_2]_3Br \rightarrow C_6H_4Me\cdot[CH_2]_3\cdotCMe_2\cdotOH \rightarrow C_6H_4Me\cdotCH_2\cdotCH_2 (I).$ L. S. T.

Autoxidation of hydrocarbons. Ι. Tetrahydronaphthalene peroxide obtained by autoxidation. H. Hock and W. SUSEMIHL (Ber., 1933, 66, [B], 61-68) .- Prolonged passage of air through technical tetrahydronaphthalene (I) at about 75° followed by removal of excess of (I) under greatly diminished pressure leads to the isolation of tetrahydro-



naphthalene peroxide (II), m.p. 56°. Reaction is not accelerated by light or contact substances. The use of active C and O_2 at 20-30 atm. involves danger of decomp. (II) is stable for a short time at $120-125^\circ$, loses H₂O at about 130°, and explodes

at a higher temp. With $KMnO_4$ in AcOH- H_2O it gives β -o-carboxyphenylpropionic acid, m.p. 166-167°. It is reduced by KI in AcOH-H₂O, better by NaHSO₃ in MeOH-H₂O, to ac-tetrahydro- α -naphthol, which yields 1:2-dihydronaphthalene when heated with freshly-melted KOH. Warm 2N-NaOH transforms (II) into 1-keto-1:2:3:4-tetrahydronaphthalene. Cold 22% NaOH yields the Na salt, from which (II) is obtained by acidification. It is considered that (II) is derived from a tetrahydronaphthalene of form A through B.



The indene from β -phenyl- $\alpha\gamma$ -bisdiphenylene-allyl alcohol. C. F. KOELSCH (J. Amer. Chem. Soc., 1932, 54, 4744–4749).— β -Phenyl- $\alpha\gamma$ -bisdiphenylene-allyl alcohol, m.p. 192—193.5°, from Mg α -phenyl- β -diphenylenevinyl bromide and fluorenone in Et₂O-PhMe, dissolves in AcOH-H₂SO₄ to a violet solution which slowly loses its colour and deposits 2-phenyl-



3: 4-phenylene - 1 - diphenyleneindene (I), m.p. 196-197° (Br₇-derivative, m.p. 328-331°). Oxidation (CrO3-AcOH) of (I) gives BzOH and 9-hydroxy-9-1'-fluorenonylfluorene (II), m.p. 222-224° [chloride, m.p. 200-203° (becoming red)], which with MgPhBr affords 9-hydroxy-9-phenyl-1-9'-hydroxy-9'-fluorenylfluorene (+EtOH), m.p. 260-262°.

Oxidation (CrO₃-AcOH) of (II) gives 1-o-carboxy-benzoylfluorenone, yellow, m.p. 208-209°, and orange, m.p. 210-212°, forms; the latter heated with CuCO₃ at 250° affords 1-benzoylfluorenone, m.p. 114-116°, also prepared from fluorenone-1-carboxyl chloride, $C_{6}H_{6}$, and AlCl₃. $o-C_{6}H_{4}Me^{-}MgBr$ and 3-methyl- Δ^{2} -cyclohexenone yield 3-o-tolyl-1-methyl- $\Delta^{1:3}$ -cyclohexa-diene, b.p. 145—148°/21 mm., dehydrogenated (S at 250°) to 2:3'-ditolyl. This is oxidised (KMnO4) to diphenyl-2: 3'-dicarboxylic acid, which with H_2SO_4 gives fluorenone-1-carboxylic acid. (I) contains a ring system hitherto considered impossible. H. B.

Spectrochemical study of the chemical constitution of a reaction product between centralite [diphenyldiethylcarbamide] and gaseous nitrogen peroxide. Dinitrodiphenyldiethylcarbamide. K. MASAKI (Bull. Chem. Soc. Japan, 1932, 7, 353-362).-A substance isolated from the products of the action of NO_2 on s-diphenyldiethylcarbamide (I) is shown to be the $4:4'-(NO_2)_2$ -derivative. Absorption spectrum data are given for (I), its 4:4'-dinitroand 2:4:2':4'-tetranitro-derivatives, p-nitro- and 2:4-nitro-phenylurethane, o-, m-, and p-nitro-, p-nitroethyl-, and 2:4:6-trinitro-acetanilide.

D. R. D.

Metallic salts of β -naphthylamine and its hydrochloride. E. B. DETWILER and M. L. WIL-LARD (Mikrochem., 1932, 12, 261-263).-FeCl₃, PdCl₂, and LiCl give amorphous ppts. with β-C10H7 NH2, HCl, whilst various other salts yield characteristic cryst. residues on evaporation.

F. L. U.

Acyl derivatives of arylamines. S. V. SHAH and D. G. PISHAVIKAR (J. Univ. Bombay, 1932, 1, 31-36).-K and Na derivatives of NHPhAc (I), o-(II), and p-(III) -C₆H₄Me·NHAc, α - and β -C₁₀H₋·NHAc are obtained by heating the Ac compound with Na or K in PhMe. Reaction is very slow in boiling C_8H_6 , and decomp. occurs in boiling xylene. The K derivatives of (I), (II), and (III) melt at 85° , 95° , and 130° , respectively, the others decomposing at or above 280° . The substances are considered to be derivatives of the enolic form. NHPh₂ does not react with Na or K. R. S. C.

Interaction between thionyl chloride and substances containing the reactive methylene group. IV. K. G. NAIK and V. B. THOSAR (J. Indian Chem. Soc., 1932, 9, 471-477).—Interaction of SOCl₂ in cold, dry Et₂O with compounds

COMe·CH₂·CO·NHAr and CH₂(CO·NHAr)₂ leads to sulphides of the type S(CHRR')₂, and with compounds CO₂Et·CH₂·CO·NHAr to sulphides of the type S:CRR' (cf. A., 1890, 582). The following are described : thiobisacetoacetanilide, m.p. 147° (loc. cit.); thiobisacetoacet-o-toluidide, m.p. 160°, -m-toluidide, m.p. 104°, -p-toluidide, m.p. 174°, - β -naphthylamide, m.p. 185°, and -1 : 3 : 4-xylylamide, m.p. 139° : thiobismalondi-n-propylamide, m.p. 123°, and -isobutylamide, m.p. 155° : Et o-tolyl-, m.p. 196°, p-tolyl-, m.p. 203°, β -naphthyl-, m.p. 208°, 1 : 3 : 4-, m.p. 175°, and 1 : 4 : 5-xylyl-thiomalonamate, m.p. 187°.

H. A. P. Attempted resolution of substituted hydroxylamines into optically active isomerides. J. MEISENHEIMER and H. DENNER.—See this vol., 150.

Solubility relationships amongst optically isomeric salts. II. Camphorates of α -p-tolylethylamine. A. W. INGERSOLL and F. B. BURNS (J. Amer. Chem. Soc., 1932, 54, 4712—4715).—dl- α -p-Tolylethylamine [dl-camphorate, m.p. 180° (all m.p. are corr.)] is resolved by d-camphoric acid into d-, b.p. 205°, [α]₂₀²⁵ +34.6° (d-camphorate, m.p. 187°), and l-forms, b.p. 205°, [α]₂₀²⁵ -34.3° [d-camphorate (+H₂O), m.p. (anhyd.) 173°; dl-camphorate (+H₂O), m.p. (anhyd.) 169°]. The four camphorates described illustrate case 7 (or 10) of the scheme previously given (A., 1932, 263); the order of solubility is lBdA < lBdlA < dlBdlA < dBdA. H. B.

Nitration of p-dimethylaminoacetanilide by nitrous acid. H. H. Hobgson and J. H. CROOK (J.C.S., 1932, 2976—2977).—p-Dimethylaminoacetanilide (1) (picrate, m.p. 224°) with HNO₂ (cf. A., 1930, 466) affords nearly 100% of 3-nitro-4-dimethylaminoacetanilide, m.p. 132° [hydrochloride, m.p. 180° (decomp.); picrate, m.p. 172°; chloropicrate, m.p. 149°] (also formed by heating 4-chloro-3-nitroacetanilide with NHMe₂ at 100° during 6 hr.), and only a trace of an N-NO-compound due to the NHAc group strongly inhibiting the displacement of an N-Me group (cf. A., 1932, 842). (1) with conc. HNO₃ in H₂SO₄ at 0° affords 2-nitro-p-dimethylaminoacetanilide, m.p. 116° (picrate, m.p. 185°; chloropicrate, m.p. 184°), hydrolysed to 3-nitro-4-aminodimethylaniline, m.p. 112° (picrate, m.p. 205°; chloropicrate, m.p. 204°). J. L. D.

Peroxidative action. II. Constitution of purpurobenzidine. H. WILLSTAEDT, F. REUTER, and K. L. ZIRM (Annalen, 1932, 500, 61–69).—o-Tolidine (I) and H_2O_2 , with phacophorbide (a+b) Fe salt as catalyst, in AcOH-NaOAc give a blue compound (II), C_3H_3ON , m.p. 70–72°, probably the quinhydronelike compound of equimol. amounts of (I) and the

corresponding NN'-diacetyldimethyldiphenoquinonedi-imine (III), a freshly-prepared specimen of which is reduced $(SnCl_2, HCl)$ to NN'-diacetyl-o-tolidine (IV). Treatment of solutions of (II) with alkali affords a brownish-red ppt., which is considered to be (III), and is re-convertible into (II) by dil. AcOH (rapid working). (III) does not show the calc. reduction equiv. (Schlenk, A., 1909, i, 36) probably because of its partial decomp. during the prolonged action of alkali. Attempted prep. of (III) by dehydrogenation of (IV) with PbO₂ was inconclusive. Purpurobenz-idine (A., 1932, 426), prepared by the action of alkali on the solution of the dye from benzidine, H_2O_2 , and hæmin in AcOH (after some time the colour of this solution changes from blue to Bordeaux red), is considered to be NN'-diacetyldiphenoquinonedi-imine; the mechanism of its formation is discussed. H. B.

Isomeric dinitrophenylhydrazones. H. BREDE-RECK (Ber., 1932, 65, [B], 1833—1838).—Instances are recorded of the occurrence of 2 : 4-dinitrophenylhydrazones of furfuraldehyde compounds in red and yellow forms. Since they differ in m.p. and one variety depresses the m.p. of the other, chromoisomerism is excluded. The stability of the forms in boiling org. solvents and in EtOH-KOH renders desmotropy improbable and *cis-trans* isomerism is provisionally assumed. The following 2 : 4-dinitrophenylhydrazones are described : furfuraldehyde, red, m.p. 230° (corr.) [Ac derivative, m.p. 171—172° (corr.)], yellow, m.p. 212—214° (corr.); 5-ethoxymethyl-, red, m.p. 208— 210° (corr.) [Ac derivative, m.p. 166—167° (corr.)], yellow, m.p. 160—161° (corr.); 5-triphenylmethoxymethyl-, red, m.p. 246—248° (corr.), yellow, m.p. 212— 215° (corr.) [triphenylmethoxymethylfurfuraldehyde has m.p. 139—141° (corr.)]; and 5-methoxymethylfurfuraldehyde-, red, m.p. 183—184° (corr.), yellow, m.p. 137—138° (corr.)]. The Ac derivative, obtained from both the red and yellow variety, belongs to the red series, into which it is re-converted by hydrolysis. H. W.

Oxidation of phenol with peracetic acid. J. BÖESEKEN (Proc. K. Akad. Wetensch. Amsterdam, 1932, 35, 750—755).—PhOH is oxidised by AcO_2H to a mixture of *cis-cis*-muconic acid (I) (new m.p. 187°), benzoquinone, and a little fumaric acid (II). Similar oxidation of pyrocatechol and quinol gives a mixture of (II) and (I) and quinhydrone, respectively, the latter being further oxidised with difficulty to (II) and a little maleic acid. As the yield of (I) from pyrocatechol is less than from PhOH it is suggested that the first tangible products of the oxidation are *p*- and *o*-quinones, the former yielding the oxidationresisting benzoquinone and the latter being further oxidised to (I). J. W. S.

Reactivity of aromatic hydroxyl groups. III. H. L. BASSETT and (MISS) A. O'LEARY (J.C.S., 1932, 2945—2946).—The half-reaction period of 22 phenols with AcBr in EtOAc at 0° (cf. A., 1930, 1033; 1931, 1410) is determined. In monosubstituted phenols a *m*-directing group accelerates the reaction when *m*to the OH group, and retards it when in the *p*-position, whilst *op*-directing groups have the converse effect. *o*-Substituents cause greater retardation than any others, the retarding effect being in the order Alk < $OR < hal < NO_2$, CO_2Alk . An electronic explanation is advanced. H. A. P.

Chlorination of iodophenols. V. m-Iodophenol. S. BUCHAN and H. MCCOMBIE (J.C.S., 1932, 2857-2860).-Chlorination of m-iodophenol in CCl₄ gives an unstable iododichloride, m.p. 59° (decomp.), which with KI in AcOH gives 6-chloro-3-iodophenol, m.p. 56°, and on keeping over-night 4:6-di-chloro-3-iodophenol (I), m.p. 104°, the iododichloride, m.p. 68-69° (decomp.), of which is converted by keeping into 2:4:6-trichloro-3-iodophenol, m.p. 104°; further chlorination of this gives finally tetrachloroiodo- and pentachloro-phenols without intermediate formation of an iododichloride. The constitution of (I) was proved by its synthesis from 4: 6-dichloro-3nitrophenyl 2-nitro-p-toluenesulphonate, by reduction, diazotisation, introduction of I (Sandmeyer), and tion, diazotisation, introduction of 1 (Sandmeyer), and fission by piperidine. 4-Chloro-3-iodophenol, m.p. 78°, is prepared from 2-iodo-4-nitroaniline by the Sand-meyer reaction. The following are also described : m-iodophenyl acetate, m.p. 38° [iododichloride, m.p. 91—92° (decomp.)], benzoate, m.p. 72—73° [iododi-chloride, m.p. 106° (decomp.)], p-toluenesulphonate, m.p. 60—61° [iododichloride, m.p. 97—99° (decomp.)], Et carbonate, b.p. 163—164°/11 mm. [iododichloride, m.p. 79—80° (decomp.)], carbonate, m.p. 141° [bis-iododichloride, m.p. 70° (decomp.)], benzyl ether, m.p. 52° [iododichloride, m.p. 70° (decomp.)]. Me ether, b.p. 52° [iododichloride, m.p. 70° (decomp.)], Me ether, b.p. 123°/14 mm. [iododichloride, m.p. 74° (decomp.)], Et ether, b.p. 133-134°/15 mm. [iododichloride, m.p. 64° (decomp.)], allyl ether, b.p. 154-156°/11 mm. [iododi-chloride, m.p. 86-87° (traces only formed)], dibromopropyl ether [iododichloride, m.p. 78° (decomp.)], and phenylcarbamate, m.p. 138° [iododichloride, m.p. 120° (decomp.)]; 3-iododiphenyl ether, b.p. $184^{\circ}/14$ mm. [from $m-C_6H_4Br\cdot NO_2$, NaOPh, and Cu (3-nitrodiphenyl ether, b.p. $189-200^{\circ}/14$ mm.), followed by reduction and Sandmeyer] (iododichloride, m.p. 58°); ω -3'-iodo-phenoxyacetophenone, m.p. 104° (iododichloride, m.p. 94°); 6-chloro-3-iodophenyl acetate, b.p. 149°/11 mm. [iododichloride, m.p. 89° (decomp.)], benzyl ether, h.p. 250-260°/11 mm. [iododichloride, m.p. 72° (decomp.)]; 4:6-dichloro-3-iodophenyl acetate, m.p. 12 (decomp.)], chloride, m.p. 104° (decomp.)], and benzyl ether, m.p. 82° [iododichloride, m.p. 86° (decomp.)]; 2:4:6-trichloro-3-iodophenyl acetate, m.p. 87°, and benzyl ether, m.p. 80-81°. H. A. P.

Reduction and hydrolysis of o-, m-, and pmitrophenetoles. D. H. RICHARDSON and F. W. SMITH (J.C.S., 1932, 2955—2958).—The yields of reduction products (azoxyphenetoles + phenetidines) obtained by heating the nitrophenetoles at 60° for 96 hr. with MeCHO-free 1·6N-KOH in EtOH are : m-, 92%, o-, 50%, and p-, 10%; very similar yields of azoxyphenetidines are obtained by electrolytic reduction. Hydrolysis to the nitrophenol accompanies reduction in the former case to the extent of p-, 24%, o-, 11·4%, and m-, 7·4%. Hydrolysis of the nitrophenetoles with 20% HCl at the b.p. for 72 hr. gives 10% p-, 8% o-, and 6% m-nitrophenol.

Bromination of 2-nitro-*p*-cresol. W. O. KER-MACK and W. T. SPRAGG (J.C.S., 1932, 2946—2948). —Bromination of 2-nitro-*p*-cresol in CHCl₃ gives a mixture of 5-Br- (I), m.p. 104° (Me ether, m.p. 94° ; Ac derivative, m.p. 121°), and (probably) 3-Br-derivative, m.p. 77° (Me ether, m.p. 74° ; acetate, m.p. 81°); the former is identified by synthesis of its Me ether from 2-nitro-5-amino-p-tolyl Me ether by the Sandmeyer reaction. Nitration of 3-bromo-p-tolyl p-toluenesulphonate, m.p. 121° , or carbonate, m.p. 77° , in conc. H_2SO_4 also gives (I), but 3-bromo-p-cresol itself gives the 5-NO₂-derivative. H. A. P.

Action of nitrous acid on aminophenyl-2hydroxy- α -naphthylmethane. Correction. F. E. RAY (J. Amer. Chem. Soc., 1932, 54, 4753).—The compound previously obtained (A., 1932, 263) from aminophenyl-2-hydroxy- α -naphthylmethane and HNO₂ is not a diazo-compound, but is a N-NO-derivative of a heterocyclic compound. H. B.

Alkylation of dihydroresorcinols. A. SONN (Ber., 1932, 65, [B], 1865—1866).—5-Methyldihydroresorcinol is converted by 20% KOH and allyl bromide into 5-methyl-2-allyldihydroresorcinol, m.p. 133—134°, and by 20% KOH and CH₂PhCl into 2-benzyl-, m.p. 132—134° after softening, and 2:2dibenzyl-, m.p. 129°, -5-methyldihydroresorcinol.

H. W. Mechanism of the catalysis of autoxidation processes by iron. A. BACH (Ber., 1932, 65, [B], 1788—1789).—Solutions of pyrogallol, quinol, and pyrocatechol in presence of Fe^{**} absorb O_2 with production of black, humus-like products. Pyrogallol Me₃ ether, quinol Et₂ ether, pyrocatechol Me and Me₂ ethers are not affected under like conditions, but give the same products as the free phenols when O_2 is replaced by H₂O₂. Autoxidation of the phenols is accelerated by Fe^{**} only when the OH groups are not replaced by alkyl, and this fact is not in harmony with the assumption of the primary formation of FeO₂. If the necessary conditions for the initial formation of H₂O₂ are not fulfilled, the autoxidation process is not accelerated by Fe^{**} and the hypothesis is justified that the catalytic action is due to acceleration of the effect of initially formed H₂O₂. H. W.

Derivatives of 1:2:3:4-tetrahydroxybenzene. II. W. BAKER, A. W. W. KIRBY, and (MISS) L. V. MONTGOMERY (J.C.S., 1932, 2876-2879).-1:2:3:4-Tetramethoxybenzene, m.p. 88-89°, is prepared by hydrolysis of 4-iodo- (1) or 4-bromopyrogallol Me₃ ether with aq. alkali at 210-215° the addition of Cu-bronze is not deleterious with (I)], or oxidation of resorcinol-2: 4-dialdehyde (II) with alkaline H_2O_2 , and methylation of the respective products; the orientation assigned to (II) (cf. A., 1878, 423) arises from its mode of oxidation. The action of aq. Ag_2O on (I) at 245° gives $vic - C_6H_3(OH)_3$. (I) is conveniently prepared by iodination of vic- $C_6H_3(OMe)_3$ in presence of HgO. 2:4-Diamino-resorcinol Me_2 ether hydrochloride, m.p. about 210°. (decomp.) (free base not isolated), could not be hydrolysed to a vic-C₆H₂(OH)₄ derivative. 4-Nitro-pyrocatechol dibenzyl ether, m.p. 98° (cf. A., 1884, 432), yields only 4-nitropyrocatechol by hydrolysis with HCl in AcOH; the corresponding NH_2 -compound, m.p. 112° [Ac derivative, m.p. 228° (decomp.)], could not be oxidised to benzyloxy-p-benzoquinone, nor could o-aminophenyl benzyl ether (prep. improved). 4-

H. A. P.

Nitro-2-benzyloxyanisole is slowly demethylated by 10% KOH at 150-200° to 4-nitropyrocatechol 2benzyl ether, m.p. 83-85°. H. A. P.

2-Aminocyclopentanol and its resolution. Resolution of 2-aminocyclohexanol. M. GODCHOT and M. MOUSSERON (Bull. Soc. chim., 1932, [iv], 51, 1270—1277, 1277—1282).—The first paper is a recapitulation (cf. A., 1932, 844). 2-Aminocyclohexanol (I), m.p. 66° (*H tartrate*, m.p. 152— 153°, $[\alpha]_{\rm b} \pm 17\cdot30^{\circ}$) (prepared, with some cyclohexadiene, from cyclohexene oxide), is resolved by d- and l-tartaric acids. The d- and l-bases have m.p. 83—84°, $[\alpha]_{\rm b} \pm 40\cdot12^{\circ}$ and $-40\cdot06^{\circ}$ (hydrochlorides, m.p. 147—148°, $[\alpha]_{\rm b} \pm 31\cdot47^{\circ}$ and $-31\cdot57^{\circ}$; *H tartrates*, *l*-acid-*d*-base and *d*-acid-*l*-base, m.p. 177—178°, $[\alpha]_{\rm b} \pm 2\cdot75^{\circ}$ and $-2\cdot70^{\circ}$, *d*-acid-*d*-base and *l*-acid-*l*-base, m.p. 170—171°, $[\alpha]_{\rm b} \pm 31\cdot20^{\circ}$). *d*-(I) with PCl₅ in CHCl₃ affords l-2-chlorocyclohexylamine, $[\alpha]_{\rm b} - 31\cdot60^{\circ}$, changed by Ag₂O into *l*-(I). R. S. C.

Synthesis of substances related to ephedrine. C. MANNICH and H. BUDDE (Arch. Pharm., 1933, 271, 51-55).-Ph α-bromoisopropyl ketone and NH₂Me in C₆H₆ (not in EtOH) give Ph α -hydroxy-isopropyl ketone, b.p. 122-123°/12 mm. (giving, when kept, a substance, m.p. 186°), and Ph α -methylaminoisopropyl ketone, m.p. 215°, each in 40-45% yield; the hydrochloride of the base is hydrogenated (PtO₂) in H₂O to β -hydroxy- β -phenyl-aa-dimethylethylmethylamine, m.p. 231°. p-Anisyl α-bromoisopropyl ketone, b.p. 169°/18 mm. (from p-anisyl Pr^{β} ketone and Br), leads similarly to panisyl a-methylaminoisopropyl ketone (I), m.p. 49-50° (hydrochloride, m.p. 237°), p-anisyl- α -hydroxyiso-propyl kelone, b.p. 184°/20 mm., and β -hydroxy- β -panisyl-aa-dimethylethylmethylamine, m.p. 143-144° (hydrochloride, m.p. 204-205°). (I) with HI gives p-hydroxyphenyl a-methylaminoisopropyl ketone, m.p. 210° (hydriodide, m.p. 218-219°; hydrochloride, m.p. about 235°), reduced to β-hydroxy-β-p-hydroxyphenyl-aa-dimethylethylmethylamine, m.p. 188° (hydrochloride, m.p. about 212-213°). All the OHbases are less active pharmacologically than is ephedrine. R. S. C.

Isomerism of the ketones in ring *B* of the cholesterol ring system. R. TSCHESCHE (Ber., 1932, 65, [*B*], 1842—1845).—The substance described previously as cholestan-6-one is oxidised to a dicarboxylic acid (I), which passes at 190—200°/1 mm. into an anhydride (cf. Schulze, Diss., Göttingen, 1928), but at 290—300° into a ketone. (I) is identical with the dihydro-acid of Diels and Abderhalden, now formulated $-CH-CH-CMe\cdot[CH_2]_2\cdotCO_2H$, $CH_2\cdotCH_2\cdotCH+CO_2H$

"Cholestan-6-one" from nitro- ψ -cholestene, must therefore be regarded as cholestan-4-one. Consequently ψ -cholestene is a 4 : 5-unsaturated cholestene. Only two ketones, 6- and 7-, are therefore known in which the CO group is present in ring *B*, and the difficulty of the new cholesterol formula vanishes. The true cholestan-6-one is reduced by Na and EtOH to cholestan-6-ol (II), m.p. 128-129°, $[\alpha]_{19}^{19}$ +34.8° in CHCl₃ (Ac derivative, m.p. 95°, $[\alpha]_{19}^{19}$ +69.5° in CHCl₃). (II) does not appear to be epimerised by NaOEt at 200°; it does not combine with digitonin. H. W.

Cerevisterol, a sterol accompanying ergosterol in yeast. E. M. HONEYWELL and C. E. BILLS (J. Biol. Chem., 1932, **99**, 71–78).—The improved isolation and purification of the hexane-insol. cerevisterol, $C_{28}H_{47}O_3$, m.p. 265·3° (corr.), $[\alpha]_{\rm Heff}^{2}$, $-57\cdot4^{\circ}$ in CHCl₃, from yeast (10 g. from 4500 kg.) is described (cf. A., 1929, 104). Solubility and crystallographic data are given, and the ultra-violet absorption spectrum shows a single band, max. 248 mµ. With Ac_2O it gives a Ac_2 derivative, m.p. 171°, $[\alpha]_{\rm steril}^{2}$ —163° in CHCl₃, the nature of the third O being undetermined. The sterol contains two double linkings, one of which is probably $\Delta^{1:2}$ (or $\Delta^{1:13}$) as in ergosterol and *iso*ergosterol, since with Rosenheim's CCl₃·CO₂H reagent the initial red colour develops immediately. Irradiation confers no antirachitic properties. J. W. B.

aci-Nitro-compounds. IV. Mechanism of conversion of nitro-derivatives into hydroxamic acids. C. D. NENITZESCU and D. A. ISACESCU (Bul. Soc. chim. România, 1932, 14, 53—62).—Interaction of phenylacinitromethane (I) or of its Na salt with HCl in dry Et_2O gives benzhydroxamic chloride, with intermediate formation of a blue coloration. The transformation is explained as follows: CHPh:NO·OH+HCl \rightarrow

Temporary formation of the azlactone ring in the racemisation of acyl derivatives of aminoacids with acetic anhydride. V. DU VIGNEAUD and C. E. MEYER (J. Biol. Chem., 1932, 99, 143-151). -That the failure to racemise proline by the Ac₂O method (A., 1932, 1238) is due to the presence of •NH• is confirmed by the similar failure to racemise the N-Ac derivative, m.p. $144-145^{\circ}$ (corr.), $[\alpha]_{D}^{31} - 76.5^{\circ}$ in EtOH, of N-methyl-l-phenylalanine (prepared by Fischer and Lipschitz's method, A., 1915, i, 242). This confirms the suggested mechanism of racemisation, which involves the intermediate formation of an azlactone : $CHR < \stackrel{CO_2H}{\underset{NHAc}{CO}} \Longrightarrow CHR < \stackrel{CO \cdot O}{\underset{N=CMe}{N=CMe}} \Longrightarrow$ $CR \ll_{N-CHMe}^{C(OH) \cdot O}$ or $CR \ll_{N-CHMe}^{CO \cdot O}$, thus destroying the asymmetry. Such a mechanism is possible only with derivatives containing primary NH2 groups. The similar mechanism proposed by Ashley and

Harington (A., 1930, 253) for the simultaneous acetylation-esterification of NH_2 -acids is confirmed, since *d*-phenylalanine with NaOEt in EtOH-Ac₂O gives the Et ester of acetyl-*dl*-phenylalanine (racemisation occurring as expected), whereas *l*-proline similarly treated gives only acetyl-*l*-proline, no esterification taking place. Under similar conditions β -phenylpropionic acid undergoes only 30% estcrification. J. W. B.

Attempted detection of free radicals with univalent sulphur. A. SCHÖNBERG (Ber., 1932, 65, [B], 1864).—Di- α -thionaphthoyl disulphide (I) (cf. Houben, A., 1906, i, 847) possibly undergoes radical dissociation, since its solutions in $C_{10}H_8$ at 95° do not obey Beer's law. Solutions in hot solvents show reversible change in shade and intensity of colour with alteration of temp. With metals the change, (I)— $\rightarrow C_{10}H_7$ ·CS·SX, can be effected. H. W.

Lactone formation in sunlight. D. B. LIMAYE (J. Univ. Bombay, 1932, 1, 52—53).—o-Bz·C₆H₄·CO₂H and o-p-toluoylbenzoic acid in EtOH in sunlight give the dilactones of $\alpha\beta$ -dihydroxy- $\alpha\beta$ -diphenyl- and - $\alpha\beta$ di-p-tolyl- $\alpha\beta$ -di-(o-carboxphenyl)ethane. The latter (m.p. 247—248°) is new. R. S. C.

Synthesis of alkamino-acids by cyanohydrin method. A. I. KIPRIANOV and G. I. KIPRIANOV (J. alcohol hydrochloride (I) can be employed in place of NH_3 in the Strecker NH_2 -acid synthesis, giving β -hydroxyethylamino- (" alkamino- ") acids. (I) and PhCHO in presence of aq. KCN give a viscous nitrile hydrolysed by HCl to the hydrochloride, m.p. 178-191°, of α -(β -hydroxyethylamino)phenylacetic acid, m.p. 217-218°. (I) and cyclohexanone with aq. KCN give $1 \cdot (\beta \cdot hydroxyethylamino)$ cyclohexane - $1 \cdot carboxynitrile$, m.p. $78-80^{\circ}$ (hydrochloride, m.p. $95-98^{\circ}$), hydrolysed by HCl to the acid, m.p. $252-254^{\circ}$. (I) and $COMe_2$ give α -(β -hydroxyethylamino)isobutyric acid, m.p. $243-245^\circ$, and α -(β -hydroxyethylamino)acetic acid, m.p. 174-175°, is similarly obtained from CH₂O and (I); in both cases the cyanohydrins are hydrolysed in situ. G. A. R. K.

Syntheses by means of the magnesium derivatives of phenyl- and o-chlorophenyl-acetic acid and saturated and unsaturated ketones. II. M. D. IVANOV, (MISS) M. MIHOVA, and (MISS) T. CHRISTOVA (Bull. Soc. chim., 1932, [iv], 51, 1321— 1325; cf. A., 1931, 726).—o-C₆H₄Cl·CH(MgX)·CO₂MgCl and COPr^a₂ give β -hydroxy- α -o-chlorophenyl- β -propylhexoic acid, m.p. 130—131°, yielding with hot NaOH o-chlorophenylacetic acid. COPhMe yields similarly β -hydroxy- $\beta\beta$ -diphenyl- α -o-chlorophenylpropionic acid, m.p. 141—141.5°. CHPh(MgX)·CO₂Na (I) and mesityl oxide give β -hydroxy- α -phenyl- $\beta\delta$ -dimethyl- Δr hexenoic acid, m.p. 128—129°, hydrolysed by NaOH to CH₂Ph·CO₂H; however, with phorone and dypnone 1:4-addition occurs, the products being δ -keto- α phenyl- $\beta\beta\zeta$ -trimethyl- $\Delta\delta$ -octenoic acid, m.p. 110·5—111.5° (oxime, m.p. 160—161°), and δ -keto- $\alpha\beta\delta$ -triphenylvaleric acid, m.p. 201—202° (decomp.) [oxime, m.p. 219° (decomp.)]. Benzoin and 2 mols. of (I) give the γ -lactone, m.p. 202—203°, of $\beta\gamma$ -dihydroxy- $\alpha\beta\gamma$ triphenylbutyric acid. R. S. C. Syntheses by means of the magnesium derivative of sodium phenylacetate. I. Preparation of aryl- β -hydroxyaliphatic acids (substituted β lactic acids). II. Preparation of mixed benzyl ketones and symmetrical trisubstituted β -hydroxyglutaric acids. D. IVANOV and N. I. NICOLOV (Bull. Soc. chim., 1932, [iv], 51, 1325—1331, 1331— 1337).—I. CHPh(MgX)·CO₂Na (I) (modified prep.) and aldehydes, R·CHO, give good yields of α -phenyl- β -lactic acids, CHR(OH)·CHPh·CO₂H; phenolic aldehydes with 2 mols. of (I) give 15—25% of the acid and about 30% of the stilbene derivative, CHR:CHPh; the latter is probably formed by loss of MgCO₃ and NaX from the primary product. e.g.

NaX from the primary product, e.g., (MgX)O·C₆H₄·CH(OMgX)·CHPh·CO₂Na, since this reaction occurs to a greater extent at a higher temp. The following were prepared : β -hydroxy- α -phenyl-hexoic (m.p. 155–156°) and -nonoic (m.p. 107–108°) acids; 3-hydroxy-a-phenyl-y-methylvaleric acid, forms A and B (in yields 5: 1), m.p. 139-140° and 171-172°, respectively; β-hydroxy-aγ-diphenylpropionic acid, m.p. 175° (Me ether of Me ester, m.p. 78.5-79.5°); β -hydroxy- α -phenyl- γ -p-chlorophenyl- (m.p. 138—139·5°), -γ-p-anisyl- (m.p. 136·5°), -γ-piperonyl-(m.p. 166—167°), -γ-p-hydroxyphenyl- (m.p. 172°), - γ -vanillyl- (40H) (m.p. 185°), and - γ -furyl- [m.p. about 175° (decomp.)] -propionic acid; β -hydroxy- $\alpha\delta$ diphenyl-Dy-pentenoic acid, m.p. 136-137° (from cinnamaldehyde); 4-hydroxy- (m.p. 189°) and 4-hydroxy-3-methoxy-stilbene, m.p. 132-133°. β-Hydroxy-a-o-chlorophenylbutyric acid, m.p. 129°, was similarly prepared.

II. (I) and acid chlorides give 50-75% yields of the ketones, $CH_2Ph\cdot CO\cdot R$, and 10-25% yields of β -hydroxyglutaric acids, $OH\cdot CR\cdot (CHPh\cdot CO_2H)_2$; the amount of the latter formed is not increased by use of an excess of (I). The following were thus prepared: benzyl Me, Pr^{β} , and Bu^{β} ketones; deoxybenzoin; *p*-bromophenyl benzyl ketone; $CO(CH_2Ph)_2$ (oxime, m.p. $122\cdot4-123\cdot6^{\circ}$); benzyl β -phenylethyl ketone, m.p. $43\cdot5-44^{\circ}$ (oxime, m.p. 120°); and the following β -substituted derivatives of β -hydroxy- $\alpha\alpha'$ diphenylglutaric acid: Me, m.p. about 204° (decomp.), Pr^{β} , m.p. about 174° (decomp.), Bu^{β} , m.p. about 170° (decomp.), $p-C_6H_4Br$, m.p. about $175-177^{\circ}$ (decomp.), CH_2Ph , m.p. about 187° (decomp.), and β -phenylethyl, m.p. about 187° (decomp.), chard β -phenylglutaric acid, m.p. about 175° (decomp.). Cinnamoyl chloride, however, reacts partly by 1: 4addition, yielding benzyl styryl ketone, m.p. $72\cdot5-73^{\circ}$ (lit. 71°), and δ -keto- $\alpha\beta\varepsilon$ -triphenylhexoic acid, m.p. $184-185^{\circ}$. R. S. C.

Oxidation products of 2:4:6-trinitro-mxylene. M. I. MURAVIEVA (J. Gen. Chem. Russ., 1932, 2, 691-696).-2:4:6-Trinitro-m-xylene in H₂SO₄ is oxidised by CrO₃ at 50-80° to 2:4:6-trinitro-m-toluic acid (I), m.p. 196-200° (decomp.), decomposed by boiling H₂O into 2:4:6-trinitrotoluenc, together with 2:4:6-trinitroisophthalic acid (II) (cf. A., 1922, i, 534); the yield of (II) increases with rise of temp. and increase in amount of CrO₃. (I) alone is obtained with HNO₃-H₂SO₄ at 140° or CrO₃ in HNO₃ solution. G. A. R. K.

Thermal and alkaline decomposition of symmetrical trisubstituted β -hydroxyglutaric acids.

M. D. IVANOV and N. I. NICOLOV (Bull. Soc. chim., 1932, [iv], 51, 1337-1340).—Acids of the type OH-CR(CHPh·CO₂H)₂ decompose to give

 $CH_2Ph \cdot CO_2H$, CO_2 , and $R \cdot CO \cdot CH_2Ph$, when heated above the m.p. or in alkaline solution. Both methods can be used quantitatively by determining the CO_2 evolved. This decomp. occurs more readily if R is aryl than if R is alkyl. R. S. C.

Condensation of chloral with 2-hydroxy-ptoluic acid and its methyl ether. A. N. MELDRUM and B. M. KAPADIA (J. Indian Chem. Soc., 1932, 9, 483-491) .- Interaction of 2-hydroxy-p-toluic acid with $CCl_3 \cdot CH(OH)_2$ in 95% H_2SO_4 at room temp. gives 3 - hydroxy - 4 - methyl - α - trichloromethylphthalide, m.p. 232° (Ac, m.p. 142°, and Bz, m.p. 154°, derivatives), hydrolysed by 20% aq. NaOH to 2-hydroxy-6-carboxy-3-methylmandelic acid, m.p. 115° (Ba salt), and reduced by Zn and AcOH to 2-hydroxy-3-BB-dichloroethyl-p-toluic acid (I), m.p. 184° [Ac, m.p. 185°, and Bz, m.p. 140°, derivatives; Ba salt (+3H₂O)], which with H₂SO₄ evolves HCl and gives 2-hydroxy-4-carboxy-m-tolylacetic acid, m.p. 213° (II) [Ba salt (+1H20); Bz, m.p. 126°, and Ac derivatives, m.p. 110°; Me ether, m.p. 206°]. This can react further with CCl₃·CHO in H_2SO_4 to give 5-hydroxy-4-methyl- α -trichloromethylphthalide-6-acetic acid, m.p. 249° [similarly obtained in poor yield from (I)], which is hydrolysed by alkali to 4-hydroxy-2-carboxy-3-carbomethoxy-5-methylmandelic acid, m.p. 246°, and converted as before into 2 - hydroxy - 4 - carboxy - 5 - $\beta\beta$ - dichloroethyl - m - tolylacetic acid, m.p. 203-205°, and 2-hydroxy-4-carboxytolylene-3:5-bisacetic acid, m.p. 220°.

2-Methoxy-p-toluic acid condenses with CCl₃·CHO under similar conditions in the 5-position. The following are thus prepared : 5-methoxy-4-methyl- α trichloromethylphthalide, m.p. 132° {hydrolysed by aq. NaOH to 5-methoxy-4-methyl- α -carboxyphthalide, m.p. 222° [Ba salt (+2H₂O)]}; 2-methoxy-5- $\beta\beta$ -dichloroethyl-p-toluic acid, m.p. 195° (Ba salt); and 6-hydroxy-4-carboxy-m-tolylacetic acid (III), m.p. 209° (demethylation having occurred during hydrolysis of the °CH₂·CHCl₂ group) (Ba salt; Bz derivative, m.p. 170°). The orientation of these derivatives is arrived at by the non-identity of (II) and (III), the oxidation of (III) by alkaline KMnO₄ to 4-hydroxy-5-methylphthalic acid, m.p. 244—245° (Ba salt) (different from the known 5-hydroxy-6-methylisophthalic acid), and the conversion of (III) by CCl₃·CHO in abs. H₂SO₄ into the known 3-hydroxy-4: 6-dimethylbenzoic acid, m.p. 170—171° (Ba salt; Ac derivative, m.p. 134°), which is accompanied by a polymeride of CCl₃·CHO, m.p. 120°. H. A. P.

Synthesis of 1:2:7-trihydroxy-5-methylanthrone-8-carboxylic acid. P. K. PAUL (J. Indian Chem. Soc., 1932, 9, 493—497).—Condensation of meconine with Et 3-methoxy-p-toluate in CHCl₂ by means of AlCl₃ results in the demethylation of 2 OMe groups, and formation of a dihydroxymethoxy-2'-carboxy-2-benzyl-p-toluic acid (I), m.p. 207°, converted by MeI and NaOMe into $Me_2 5:3':4'$ -trimethoxy-2'-carboxy-2-benzyl-p-toluate (II), m.p. 98— 99°. Cyclisation of (I) with H₂SO₄ at room temp. gives the Me ether, m.p. 225°, of 1:2:7-trihydroxy-5methylanthrone-8-carboxylic acid, m.p. 255° (decomp.);

the free $(OH)_3$ -compound did not give any recognisable product on oxidation with alkaline H_2O_2 . Condensation of opianic acid with Et *m*-cresotate gives *Et 5-hydroxy-3'*: 4'-*dimethoxy-2'-carboxy-2-benzoyl-p-toluate*, m.p. 93°; the free *acid*, m.p. 255°, also obtained from *m*-cresotic acid, is reduced by Zn-NaOH to the corresponding *-benzyl-p-toluic acid*, m.p. 183°, complete methylation of which gives (II). Condensation *products*, $C_{18}H_{18}O_8$, m.p. 137°, and $C_{18}H_{18}O_7$, m.p. 203—204°, from Et 3-methoxy-*p*toluate and 3:4:5-trimethoxy- and 3:5-dimethoxy-6-methyl-1:2-phthalide, respectively, are described. H. A. P.

Constitution of bile acids. XLV. 3:12-Dihydroxycholenic acid and *apo*cholic acid. H. WIELAND and E. DANE. XLVI. Acetylation of cholic acid and some reactions of its acetylated derivatives. H. WIELAND and W. KAPITEL (Z. physiol. Chem., 1932, 212, 263–268, 269–277; cf. this vol., 64).—XLV. Oxidation of the dihydroxyketotricarboxylic acid $C_{24}H_{36}O_9$ (I) (A., 1932, 614) with CrO₃ in AcOH gives a *tetracarboxylic acid* $C_{24}H_{34}O_{10}$ (II), m.p. 189–192° (*Me*₄ ester, m.p. 119°)



Oxidation of *apo*cholenic acid with BzO_2H in $CHCl_3$ gives apocholenic acid oxide, m.p. 167°. Oxidation with $KMnO_4$ gives a non-cryst. resin, $C_{24}H_{40}O_4$ (?). The double linking of *apo*cholic acid appears to lie between C_8 and C_9 .

between C_8 and C_9 . XLVI. Acetylation of Me cholate with Ac_2O in C₅H₅N affords Me triacetylcholate (I), m.p. 94°, [a]_D +78°. The free acid with AcCl gives the Ac₂ deriv-ative (II). Thermal decomp. of (I) at $340-360^{\circ}$ gives Me cholatrienate (III), converted into Me cholanate by hydrogenation (with PtO_2). (III) forms a hexabromide, m.p. 158—160° (decomp.). Me deoxy-cholate yields with Ac₂O and C₅H₅N or with AcCl a diacetyl derivative (IV), m.p. 117°. Thermal decomp. of (IV) at 300—335° affords Me choladienate, which forms a tetrabromo-derivative, m.p. 172°, decomp. 179–181°. Oxidation of (II) with CrO_3 gives 12-keto-3:7-diacetoxycholanic acid (V), m.p. 221-222° [Me ester (VI), m.p. 179°]. Hydrolysis of (VI) with KOH in MeOH gives 3:7-dihydroxy-12-ketocholanic acid, m.p. 218° [probably identical with Borsche and Feske's product (cf. A., 1928, 1008)]. After 1 hr. with 0.5N-NaOH (V) gives 3-hydroxy-12-keto-7-acetoxycholanic acid (VII), m.p. 239° (Me ester, m.p. 184°). At 310-335°, (VII) gives 12-ketocholadienic acid (VIII), m.p. 182° (Me ester, m.p. 138-140°). On hydrogenation (Pd-black) (VIII) gives 12-ketocholanic acid and a by-product, probably ketocholenic acid, m.p. 203°. Oxidation of (VII) with CrO3 in AcOH gives 3: 12-diketo-7-acetoxycholanic acid (IX), m.p. 190°, which on alkaline hydrolysis yields 7-hydroxy-3: 12-diketocholanic acid, m.p. 196°. With Na in EtOH the disemicarbazone of (IX) affords 7-hydroxycholanic acid. (II) is hydrolysed by 0.5N- NaOH to 7-acetylcholic acid, non-cryst. (Me ester, m.p. 181°), which on oxidation with CrO_3 gives (IX). J. H. B.

Lichen substances. XVI. Components of Ramalina species with particular reference to sekikaic acid. Y. ASAHINA and S. NONOMURA XVII. Squamatic acid, Y. ASAHINA and M. YANAGITA (Ber., 1933, 66, [B], 30-35, 36-39).-XVI. Extraction of Ramalina geniculata with Et₂O at room temp, and concn. of the extract yields d-usnic acid, m.p. 202°, $[\alpha]_D + 480.4^\circ$ in CHCl₃, and sekikaic acid (I), m.p. $143-144^{\circ}$ (Ac_2 derivative, m.p. $162-163^{\circ}$; *Me* ester, m.p. 124°). Treatment of (I) with EtOH at $125-130^{\circ}$ yields [2:3-dihydroxy-4-methoxy-6hydroxydivaricatic propylbenzoic] acid, m.p. 158°, unchanged material, and divaricatic acid, m.p. 148°. (I) and CH_2N_2 in Et_2O yield *Me sekikaate Me₂ ether*, m.p. 80—81°, hydrolysed to divaricatic acid Me ether, m.p. 63.5°, and Me hydroxydivaricatate Me ether (II), m.p. 88°, which is indifferent towards FeCl₃ but contains a free OH group; the corresponding acid, m.p. 119-120°, is decarboxylated to 4-hydroxy-3: 5-dimethoxypropylbenzene (Ac derivative, m.p. 87-88°), oxidised to 3:5-dimethoxy-p-benzoquinone, m.p. 249°. Hence



(I) has the annexed formula. (I) and Pr^{a} possibly usnic acid are $CO_{2}H$ obtained by extraction H of a species of R. farinacea with Et₂O. R. pollinaria when

R. pollinaria when similarly treated affords obtusatic acid, m.p. 203°, *d*-usnic acid, m.p. 195°, $[\alpha]_{\rm D}$ +488·4° in CHCl₃, and evernic acid, m.p. 170°.

XVII.—Extraction of the thalli of Cladonia uncialis (L.) with warm Et_2O affords *l*-usnic acid, m.p. 200°, $[\alpha]_{\text{D}}$ -500·2° in CHCl₃, and squamatic acid, $C_{19}H_{18}O_9$ (I) (instead of $C_{19}H_{20}O_9$ recorded by Hesse), m.p. 215° (decomp.), which contains 2 CO₂H groups. (I) is smoothly hydrolysed to 2-hydroxy-4-methoxy-6methylisophthalic acid, decomp. 207—208° (whence Me₂ 2 : 4-dimethoxy-6-methylisophthalate, m.p. 59°), β -orcinol, and CO₂. (I) and CH₂N₂ afford Me squamatate Me₂ ether, m.p. 132°, hydrolysed to 2 : 4-dimethoxy-6-methylisophthalic acid, m.p. 212° (decomp.), and Me 4-hydroxy-2-methoxy-3 : 6-dimethylbenzoate, m.p.



Salt-forming characteristics of doubly- and singly-linked elements of the oxygen group. IV. Oxonium phosphates of the carbonyl group, and derivatives of the type CH₂Ph·COR. J. W. BAKER and L. HEY (J.C.S., 1932, 2917—2923).— Cryst. phosphates of PhCHO and p-OMe·C₆H₄·CHO (m.p. 82°) are described (cf. A., 1898, i, 477); they are presumably of the type Ar·CR(OH)·O·PO₃H₂. Similar phosphates could not be obtained cryst. from BzOEt or p-OMe·C₆H₄·CO₂Et, but their existence is indicated by partition of the esters between H₃PO₄ and light petroleum. The salts with H₃PO₄ are less stable than those with H₂SO₄ (cf. A., 1931, 485,

486; 1932, 612), but the effect of a common ion $[(NH_4)_2HPO_4]$ is the same, and their greater stability in the case of the OMe-compounds is in accordance with the polar behaviour of the OMe group. The partition of CH₂Ph·COMe and CH₂Ph·CO₂Et between H₂SO₄ or H₃PO₄ and light petroleum, and their nitration in H₂SO₄ of varying concns. in absence and presence of $(NH_4)_2SO_4$, confirm the expected higher stability of the oxonium ion brought about by the +I effect of the 'CH₂Ph group. Benzyl Me ketone p-nitrophenylhydrazone has m.p. 143°.

H. A. P.

[Aluminium chloride, 3-methylcyclopentanone, cyclopentanol, and 3-methylcyclopentanol.] C. D. NENITZESCU and C. N. IONESCU (Bul. Soc. chim. România, 1932, 14, 65–68).—An apparatus for the sublimation of AlCl₃ is described. 3-Methylcyclopentanone is prepared in 83% yield by distillation of β -methyladipic acid with 6.6% of its wt. of CuO at 280—300°. Pinacone formation during reduction of cyclopentanone and 3-methylcyclopentanone to the alcohol with Na and aq. Et₂O is suppressed by added MeOH. H. A. P.

Asymmetric syntheses. I. Action of optically active nitrites on cyclic ketones. M. PEZOLD and R. L. SHRINER (J. Amer. Chem. Soc., 1932, 54, 4707—4711).—4-Methylcyclohexanone, d- β -octyl nitrite, and NaOEt in EtOH-Et₂O at -15° to -10° give a lævorotatory Na derivative of 2-oximino-4methylcyclohexanone; a dextrorotatory Na derivative is similarly prepared using *l*- β -octyl nitrite. Possible mechanisms for this type of asymmetric synthesis are discussed. The same inactive Na derivative is obtained from cyclohexanone and *dl*or *d*- β -octyl nitrite. H. B.

Peculiar bromination reaction. E. BERGMANN and W. SCHREIBER (Ber., 1933, 66, [B], 44-46).— 3-Phenylindene, amyl nitrite, and NaOEt yield 3-phenylindoneoxime, m.p. 143—144°, transformed by AcOH-HBr in presence of CuO into 2-bromo-3phenylindone, m.p. 112°. 2-Phenylindoneoxime, m.p. 178—180° (slight decomp.), similarly affords (?) 3-bromo-2-phenylindone, m.p. 73—74° (decomp.). When heated with AcOH and aq. HBr, CuO yields CuBr; the liberated Br attacks the phenylindones. Me α -phenylcinnamate (I) and Br in CHCl₃ give Me $\alpha\beta$ -dibromo- $\alpha\beta$ -diphenylpropionate, m.p. 110°, reconverted by NaOH-EtOH into (I). H. W.

Reducing action of the Grignard reagent. III. Hydrocarbons formed during reduction. C. R. NOLLER, W. E. GREBE, and L. H. KNOX (J. Amer. Chem. Soc., 1932, 54, 4690-4696).—Reduction of COPh₂ by MgBu^gBr in Bu^a₂O gives 1 mol. of *iso*butene (I) per 1 mol. of CHPh₂·OH. The nonproduction of benzpinacol and the occurrence of only 0.1% of C₄H₁₀ in (I) indicate that it is unlikely that free radical formation precedes reaction. H. B.

Colour and structure of oximes and semicarbazones. (MME.) RAMART-LUCAS and (MME.) M. GRUMEZ (Compt. rend., 1932, 195, 959-962).—The oximes of CH_2Alk ·COPh all show the same ultraviolet absorption curve as do the oximes of CAlk₃·COPh; the two series show large differences in colour and in the position and form of the absorption bands. The curve for α -methylstyrene is very similar to that for the former series (thus indicating CH₂R·CPh:N·OH or CHR:CPh·NH·OH), whilst that of β_{γ} -oxido- β_{γ} -diphenylbutane resembles that of the latter series (indicating CR₃·CPh $<_{O}^{NH}$). Oximes

(and semicarbazones) appear to exist not only in stereochemical forms, but also in two isomeric forms containing different functional groups. H. B.

Deoxybenzoin as a substance containing a reactive methylene group. M. V. IONESCU and O. G. POPESCU (Bull. Soc. chim., 1932, [iv], 51, 1215-1227, 1231-1245).-Deoxybenzoin (I) contains a weakly reactive CH2 group, since it reacts with aryl aldehydes in presence of gaseous HCl, but not of piperidine, and, additively, with substances containing the grouping CCH·CO, sometimes in presence of piperidine and always in presence of NaOEt. Mesityl oxide and (I) thus give $\alpha \varepsilon$ -diketo- $\alpha \beta$ -diphenylyy-dimethylhexane, m.p. 193-195°, which partly condenses further to yield 2: 3-diphenyl-4: 4-dimethyl-22-cyclohexenone, m.p. 128-131°. The following substances were similarly obtained : $Et_2 \gamma$ -keto- $\alpha\beta\gamma$ -triphenylpropylmalonate (II), m.p. 129–130°; Et₂ γ -keto- $\beta\gamma$ -diphenyl- α -p-anisyl- (m.p. 127–129°), -α-piperonyl- (m.p. 112-114°), -α-p-dimethylamino-phenyl- (III) (m.p. 149-151°), and -α-m-nitrophenyl-(m.p. 167–169°), -propylmalonate; $\alpha\varepsilon$ -diketo- $\alpha\beta\gamma$ -triphenylhexane, m.p. 209–211°; $\alpha\varepsilon$ -diketo- $\alpha\beta$ -di-phenyl γ -p-anisylhexane, m.p. 195–196°; 2- γ -ketoαβγ-triphenylpropylindan-1: 3-dione (IV), m.p. 188-190°; 2- γ -keto- $\beta\gamma$ -diphenyl- α -p-tolylpropylindan-1: 3-dione, m.p. 151—153°; 2- γ -keto- $\beta\gamma$ -diphenyl- α -p-anisylpropylindan-1: 3-dione, m.p. 144—146°; the following substituted phenylmethylpyrazolone derivatives: γ -keto- $\beta\gamma$ -diphenyl- α -p-anisyl-(m.p. 200–202°), - α -piperonyl- (m.p. 206–207°), and - α -p-dimethyl-aminophenyl- (m.p. 201–202°) -propyl; 3:4:5-triphenyl- Δ^2 -cyclohexenone, m.p. 139–140°; 3:4diphenyl-5-p-anisyl- Δ^2 -cyclohexenone, m.p. 137—139°; and the lactone (V), m.p. 164-166°, derived from (III). Reduction of (IV) with Zn dust and AcOH

(V.)
$$O-CO-CH \cdot CO_2Et$$

 $CPh \cdot CPh \cdot CH \cdot C_6H_4 \cdot NMe_2$
VI.) $C_9H_4 < O(OH) \cdot CPh(OH) > CHPh$

gives the substance $C_{30}H_{24}O_3$ (VI), m.p. 83° (phenylhydrazone, m.p. 246—247°), dehydrated by Ac₂O or AcOH-H₂SO₄ to the substance $C_{30}H_{20}O$ (VII), m.p. 222°. The additive products dissociate in EtOH

in presence of piperidine, since addition of another reactive component leads to separation of the least sol. of the various possible condensation products. Thus, (IV) with indandione gives benzylidenebisdiindone and *benzylidenebisdi-indandione*, m.p. 167— 169°, and with dimethyldihydroresorcinol yields benzylidenebisdimethyldihydroresorcinol *derivative*, $C_{23}H_{26}O_3$ (VIII). (II) and indandione give diindone, $CH_2(CO_2Et)_2$, and 2-(γ -keto- $\alpha\beta\gamma$ -triphenyl-

$$\begin{array}{c} \text{(VIII.)} \quad \begin{array}{c} \text{CH}_2\text{-}\text{CO}\text{-}\text{C}\text{\cdot}\text{CHPh}\text{\cdot}\text{C}\text{\cdot}\text{CO}\text{-}\text{CH}_2\\ \text{CMe}_2\text{\cdot}\text{CH}_2\text{\cdot}\text{C}\text{-}\text{O}\text{-}\text{C}\text{\cdot}\text{CH}_2\text{\cdot}\text{CMe}_2\\ \\ \text{(IX.)} \quad \begin{array}{c} \text{CO} < \begin{array}{c} \text{C}_6\text{H}_4 \\ \text{CHPh}\text{\cdot}\text{CH}\text{PhBz} \end{array} \end{array}$$

propyl)di-indone (IX), m.p. 186°. Similar dissociation occurs in cold, conc. H_2SO_4 , (IV) giving benzylideneindandione and (I), and (II) giving benzylidenedeoxybenzoin and $CH_2(CO_2Et)_2$. Et₂ p-dimethylaminobenzylidenemalonate, m.p. 111—112°, and Et mhydroxybenzylideneacetoacetate, m.p. 138—140°, were prepared by condensation in EtOH in presence of piperidine. R. S. C.

Economies effected in the synthesis of benzanthrone and its homologues by means of Friedel and Crafts' reaction. M. GALLOTTI and A. BERETTA (Annali Chim. Appl., 1932, 22, 691— 694).—The direct synthesis of benzanthrone (90% yield) is effected, without isolating $o \cdot C_6H_4Bz \cdot CO_2H$, by treating the product of interaction of $o \cdot C_6H_4(CO)_2O$, C_6H_6 , and AlCl₃ with H_2SO_4 and glycerol in presence of Al powder or a primary aromatic base. T. H. P.

Action of magnesium alkyl iodides on 1:9benzanthrone(-10). G. CHARRIER and E. GHIGI (Atti R. Accad. Lincei, 1932, [vi], 16, 257-262).—With anthraquinone, anthrone, and their homologues MgMeI gives the corresponding carbinols, but with benzanthrone it yields 4-methylbenzanthrone and 10-methylene-3: 4-dihydrobenzanthrene, m.p. 155-156°; the latter readily loses 2H to form 10-methylenebenzanthrene. The action of MgEtI on benzanthrone gives 4-ethylbenzanthrone, m.p. 100°, which yields an ethylanthraquinonecarboxylic acid, m.p. 195°, when oxidised with CrO₃. T. H. P.

Reaction between $\alpha\beta$ -unsaturated ketones and organic magnesium compounds. Structure of the additive products. E. P. KOHLER and W. E. MYDANS (J. Amer. Chem. Soc., 1932, 54, 4667-4678).-Treatment of the Mg derivative from MgPhBr and Ph α -phenylştyryl ketone with O_2 or 0.5 mol. of the peroxide OH.CPh.CHPh2, and subsequent 0-0 decomp. with dil. HCl at 0°, gives a 1:1-compound (A), m.p. 162°, of Ph $\alpha\beta$ -diphenylstyryl ketone (I) and α -hydroxy- $\alpha\beta$ -oxido- $\alpha\beta\gamma\gamma$ -tetraphenylpropane (II), m.p. 159°; (A) is not separable into (I) and (II) by fractional crystallisation. Oxidation of (A) with CrO_3 -AcOH affords the oxide of (I) together with benzil and COPh₂ [which are derived from (II)], whilst treatment with AcCl at 100° (sealed tube) yields 3-chloro-1:2:3-triphenylindene, m.p. 115-116°, convertible (McOH-KOH) into 3-methoxy-1:2:3-triphenylindene, m.p. 144° (lit. 153°). Treatment of (A) with 20% MeOH-KOH gives Ph α -hydroxy- $\alpha\beta\beta$ -triphenylethyl ketone-(III) [derived from (II)] and unchanged (I), whilst reduction with 45% HI affords 1:2:3-triphenyl-indene [from (I)] and unchanged (II) (which is separable). Reduction of (A) with red P and HI yields 1:2:3-triphenylhydrindene and $\alpha\alpha\beta\gamma$ -tetraphenylpropane, m.p. 121°, also prepared by reduction. (Na-Hg and EtOH- C_6H_6) of Ph $\alpha\beta\beta$ -triphenylethyl ketone (IV) to the corresponding carbinol, m.p. 160— 161°, and further reduction of this with red P and HI. Reduction of (A) with Zn dust and hot AcOH gives (IV) and unchanged (II) (which is separable by fractional crystallisation). MgPhBr and (A) afford (III) and (mainly) $\alpha\beta$ -dihydroxy- $\alpha\alpha\beta\gamma\gamma$ -pentaphenylpropane; with MgEtBr, unchanged (II) and an unidentified compound [derived from (I)] are produced. Treatment of the product from MgEtBr and Ph α -phenylstyryl ketone with O₂ and subsequent decomp. (dil. HCl at 0°) gives hydrocarbons, m.p. 123° and 143°, Ph $\alpha\beta$ -diphenylbutyl ketone, and (mainly) Ph α -hydroxy- $\alpha\beta$ -diphenylbutyl ketone, m.p. 154° (acetate, m.p. 160—161°; chloride, m.p. 93—95°; Me ether, m.p. 81—82°), also prepared from benzil and Mg α -phenylpropyl chloride. The structures of the Mg derivatives formed by

The structures of the Mg derivatives formed by addition of Grignard reagents to unsaturated ketones cannot, therefore, be determined by conversion into peroxides. H. B.

Hydration of primary acetylenic alcohols. E. D. VENUS-DANILOVA and S. N. DANILOV (J. Gen. Chem. Russ., 1932, 2, 645—658).—The hydration of acetylenic alcohols of the type CR:C·CH₂·OH (I) in presence of Hg(OAc)₂ yields in every case an alcohol of the type R·CO·CH₂·CH₂·OH (II), together with the unsaturated ketone R·CO·CH:CH₂ (III), none of the alternative α -keto-alcohol, R·CH₂·CO·CH₂·OH, being formed; the acetates behave in the same way. When R=Ph, (I) gives impure Ph β -hydroxyethyl ketone, b.p. 143—144°/20 mm. (semicarbazone, m.p. 170°), accompanied in some cases by a substance C₁₈H₁₈O₃, m.p. 89—90°, and Ph vinyl ketone (IV), b.p. 111—112°/20 mm., in a ratio of 1: 3·5. (IV) gives a semicarbazidosemicarbazone, m.p. 206° (decomp. with sintering at 195°); with NHPh·NH₂ it forms 1: 3-diphenylpyrazoline, m.p. 153·5—154°, and with the theoretical amount of NH₂OH a base C₁₈H₁₉O₃N, m.p. 122·5° (hydrochloride, m.p. 138°, becoming yellow at 128°; sulphate, m.p. 156°, becoming yellow at 133°). On further treatment with NH₂OH this forms a substance C₁₈H₂₁O₃N₃, m.p. 153°, also obtainable from (IV) with an excess of NH₂OH, and hydrolysed by HCl or H₂SO₄ to a salt of the base C₁₈H₁₉O₃N. For the latter the formula (COPh·CHMe)₂N·OH or

(COPh·CH₂·CH₂)₂N·OH are suggested; the highermelting substance is probably the corresponding dioxime. The acetate of (I) gives equal amounts of (IV) and the *acetate* of Ph β -hydroxyethyl ketone, b.p. 119—121°/19 mm., which cannot be purified and gives the same derivatives as (IV).

tert.-Butylacetylene, MgEtBr, and trioxymethylene in Et₂O yield tert.-butylpropinol ($\delta\delta$ -dimethyl- $\Delta\beta$ -pentinyl alcohol) (I, R=CMe₃), b.p. 78-79°/27 mm. (acetate, b.p. 106°/72 mm.). On hydration it gives equal quantities of β -hydroxyethyl tert.-butyl ketone (II, R=CMe₃), b.p. 94-97°/22 mm. [semicarbazone, m.p. 223° (decomp.)], giving a substance, m.p. 128·5-129·5°, after several distillations, and tert.-butyl vinyl ketone (V), b.p. 78-81°/100 mm., oxidised to CMe₃·CO₂H by CrO₃ and giving with NHPh·NH₂ a substance C₁₉H₂₆N₄, m.p. 134°, which is probably a phenylhydrazidophenylhydrazone. The acetate of (I) $(R=CMe_3)$ gives on hydration (V) and the acetate of (II), $(R=CMe_3)$, b.p. 120-122°/50 mm. (semicarbazone, m.p. 127°), forming the substance m.p. 134° with NHPh·NH₂. G. A. R. K.

Oxidative processes. VI. Mechanism of autoxidation and racemisation of a-ketols and steric hindrance. A. WEISSBERGER (Ber., 1932, 65, [B], 1815-1820; cf. A., 1929, 1301).-Autoxidation of benzoin in presence of excess of alkali is a reaction of the first order, the velocity of which is proportional to the inst order, the velocity of which is proportional to the conce. of alkali. The change is therefore expressed: $R \cdot CH(OH) \cdot COR + OH' =$ $R \cdot CHO' \cdot COR + H_2O$ and $R \cdot CHO' \cdot COR + O_2 \longrightarrow$ $R \cdot CO \cdot COR + HO_2'$. The second change can be further resolved into $R \cdot CHO' \cdot COR \Longrightarrow R \cdot CO':C(OH)R$ and $R \cdot CO':C(OH)R + O_2 \longrightarrow R \cdot CO \cdot COR + HO_2'$. The rate of reaction is governed by that of enclisation rate of reaction is governed by that of enolisation. The coloration observed in the solutions when O is only slowly available is attributed to the union of part of the enediol ions with diketone; if O is freely available this change does not occur and the solution remains colourless. If the rates of autoxidation of substituted benzoins are divided by the dissociation consts. of the carboxylic acids with the corresponding residues attached to the CO₂H group, a small systematic variation is observed which disappears when the 1.8th power of the const. is employed. With o-monoand di-substituted benzoins reaction proceeds more slowly than expected, steric hindrance being very marked. Racemisation of *d*-benzoin proceeds through the same intermediate stages and, under like conditions, with the same velocity as autoxidation. With optically active 2:2'-diethoxybenzoins (details subsequently) autoxidation and racemisation occur very sluggishly and at equal rates. Steric hindrance of the autoxidation is not caused by difficulty of approach of O to the reacting group, but occurs at ionisation or enolisation. Evidence is adduced in favour of the view that the doubly-charged enediol ion, R.CO'CO'R, H. W. reacts with O.

Thermal interconversion of mixed benzoins. P. L. JULIAN and W. PASSLER (J. Amer. Chem. Soc., 1932, 54, 4756).—Anisbenzoin (I), prepared by the methods of Asahina and Terasaka (A., 1923, i, 1023) and McKenzie *et al.* (A., 1929, 1067), has m.p. 89°. When (I) is heated slowly and then cooled the m.p. rises to about 101°. The anisbenzoin, m.p. 101°, of McKenzie *et al.* (*loc. cit.*) is considered to be a mixture of (I) and benzanisoin, m.p. 106°. H. B.

Chemical characterisation of stryphnone $(4-\omega - methylaminoacetopyrocatechol)$. H. K. BARREN-SCHEEN and W. FILZ (Biochem. Z., 1932, 255, 344 350).—Stryphnone, m.p. 215° (decomp.) (hydrochloride, m.p. 237—245°), gives with Folin's phenol reagent an intense blue colour which may be used for its colorimetric determination. Attempts to obtain the semicarbazone and thiosemicarbazone were unsuccessful, but the *phenylhydrazone*, m.p. 135—136° (decomp.), was obtained, the reaction thus differentiating it readily from adrenaline. P. W. C.

Anhydrobisbindone and the chemistry of the production of tribenzoylenebenzene (truxenequinone). W. M. FISCHER and A. CIRULIS (Ber., 1932, 65, [B], 1852—1855).—Bindone (anhydrobisindandione) is converted by 96% H₂SO₄ at room temp. into tribenzoylenebenzene and cis-anhydrobisbindone (I), m.p. 408°, which passes into the enol (Na

$$\begin{array}{cccc} C_{6}H_{4} < & CO \\ CO < & CO \\ CO < & C_{6}H_{4} \\ CO < & C_{C}H_{4} \\ CO < & C_{C}H_{4} \\ CO < & C_{C}O \\ CH_{6} \\ CO \\ CO \\ CH_{6} \\ CO \\ CO \\ CH_{6} \\ CO \\ CH_{6} \\ CO \\ CO \\ CH_{6} \\ CO \\ CO \\ CH_{6} \\ CO \\ CH_{6} \\ CO \\ CO \\ CH_{6} \\ CH_{6$$

salt) when heated with NaOMe or when its solution in CHCl₃ evaporates on exposure to air. (I) yields a Br_6 -compound, m.p. (indef.) 382—385°, which regenerates (I) when heated in solvents of high b.p. Prolonged boiling of (I) with EtOH in a SiO₂ flask results in quant. production of tribenzoylenebenzene and 1 mol. of indan-1: 3-dione (II). This is taken to be the course followed in the transformation of indan-1: 3-dione into tribenzoylenebenzene (contrast Stobbe and Zschoch, A., 1927, 347). In C₅H₅N or in AcOH, (II) is partly converted into bindone. H. W.

Derivatives of di-indone. II. Action of alcoholic alkalis and alkali alkoxides on bisdiindones. M. V. IONESCU and H. SLUSANSCHI (Bull. Soc. chim., 1932, [iv], 51, 1245-1258; cf. A., 1932, 1252).-Alkyl- and aryl-idenebisdi-indones (A) with NaOEt give di-indone and successively chocolatecoloured, amorphous products (B), yellow products (C), m.p. about 240°, and yellow products (D), m.p. about 300° . (A) and KOH-EtOH give only (D). The reaction consists in the elimination of 1 mol. of indandione, which is converted into di-indone; the successive products all have the same empirical formula, $R \cdot C_{28} \overline{H}_{15} O_5$, as the corresponding arylideneformula, $\mathbb{R}^{-1}\mathbb{C}_{28}\mathbb{H}_{15}\mathbb{O}_{5}$, as the corresponding arylidene-indandione-di-indone, $\mathbb{R}^{-}\mathbb{C}HO$ being the aldehyde. The following m.p. are recorded : $\mathbb{R}=\mathbb{P}h$, (C) m.p. 243° , (D) m.p. 325° (K, Na, and piperidine salts); $\mathbb{R}=\mathbb{M}eO^{-}\mathbb{C}_{6}\mathbb{H}_{4}$, (C) m.p. 245° , (D) m.p. 307° (K and piperidine salts; additive compound with EtOH); $\mathbb{R}=\mathbb{C}H_{2}\mathbb{O}_{2}^{-}\mathbb{C}_{6}\mathbb{H}_{3}$, (C) m.p. 246° , (D) m.p. 315° (Na, K, and piperidine salts); and $\mathbb{R}=\mathbb{M}e$, (C) m.p. 227° , (D) m.p. 298° (sincerding salt). The salts are formed (D) m.p. 298° (piperidine salt). The salts are formed by addition of 1 mol. of base and regenerate (D)when acidified. (B), (C), and (D) are also differentiated by their behaviour (colour) with alkalis.

R. S. C. Production of [di]aminoanthraquinone derivatives. IMPERIAL CHEM. INDUSTRIES, LTD., R. J. LOVELUCK, and J. THOMAS.—See B., 1932, 1115.

Action of ammonia on acenaphthenequinone. G. CHARRIER and E. GHIGI (Atti R. Accad. Lincei, 1932, [vi], 16, 262-265).—The action of NH_3 , as gas or in H_2O , on acenaphthenequinone gives acenaphthazine and naphthalimide; other *o*-quinones behave similarly. T. H. P.

Lupeol. II. H. DIETERLE and A. SALOMON [with C. COESTER, A. WILCKE, and W. DAUM] (Arch. Pharm., 1932, 9, 540—549).—Lupcol (I), $C_{30}H_{49}$ OH, m.p. 212—213°, with CrO_3 -AcOH gives COMe₂ and an unsaturated ketone, *lupone*, $C_{27}H_{42}O$, m.p. 170° (2:4-*dinitrophenylhydrazone*, m.p. 214°; *dibromide*, m.p. 246°), with O₃ in CCl₄ a dibasic acid, $C_{23}H_{28}(CO_2H)_2$, m.p. 135—137°, and with O₃ in AcOH an unsaturated ketone (II), $C_{21}H_{34}O_2$, m.p. 218°

(2:4-dinitrophenylhydrazone, m.p. 137° ; dibromide, m.p. 255°), and an aldehydo-acid (III), $C_{19}H_{30}O_3$ (2:4-dinitrophenylhydrazone, m.p. $168-169^{\circ}$; Me ester, m.p. $80-81^{\circ}$). (II) contains an indifferent O atom; with MgMeI it yields the carbinol, $C_{22}H_{38}O_2$, m.p. 192° (acetate, m.p. 234°), oxidised by CrO_3 -AcOH to the dibasic acid, $C_{19}H_{30}O_4$, m.p. $262-264^{\circ}$, corresponding with (III). (II) and alkaline K₃Fe(CN)₆ give a dibasic acid (IV), $C_{17}H_{26}O_4$, m.p. $137-139^{\circ}$ (Na salt), which with Zn dust gives 2-methylanthracene and possibly phenanthrene. (I), therefore, contains

the grouping CH·OH, and (IV) is probably a

phenanthrene acid.

Constitution of podophyllotoxin and picropodophyllin. W. BORSCHE and J. NIEMANN (Ber., 1932, 65, [B], 1846; cf. A., 1932, 1258).—A reply to Spath and others (this vol., 72). H. W.

[Dye from acacia wood.] K. BRASS and H. KRANZ (Ber., 1932, 65, [B], 1867; cf. B., 1932, 760).— A claim for priority against Schmid and Tadros (this vol., 72). H. W.

Reduction of phosphorus tetrachlorobromide and phosphorus pentachloride during their action on menthol and sodium menthoxide. J. H. KOLITOWSKA (Rocz. Chem., 1932, **12**, 896—901). —PCl₄Br converts menthol (I) or Na menthoxide (II) into menthyl chloride and bromide; at the same time about 14 or 30% of the PCl₄Br taken is reduced to PCl₃. A similar reaction takes place with PCl₅ and (II), but not (I). R. T.

Salt-forming characteristics of doubly- and singly-linked elements of the oxygen group. V. Rotation of camphor in strong mineral acids. J. W. BAKER (J.C.S., 1932, 2923—2927).—Partition of *d*-camphor between ligroin (b.p. 100—120°) and H_2SO_4 of different concns. indicates the formation of the oxonium cation : $HO \cdot SO_3H + C_9H_{16}C:O$ (sol.) $= C_9H_{16}C(OH)O \cdot SO_3H$ (insol.) $= C_9H_{16}C:OH +$ $O \cdot SO_3H$, the equilibria being displaced from right to left either by adding H_2O or $(NH_4)_2SO_4$. This refutes the argument put forward by Lucas (A., 1928, 816). Similar salt formation occurs with H_3PO_4 . *l*-Camphor exhibits *d*-rotation in H_2SO_4 and the rotation of Me *d*-camphorate is reduced from $[\alpha]_{5461} + 60\cdot3^\circ$ in ligroin to $+7\cdot5^\circ$ in H_2SO_4 , both attributed to conversion of C:O into ·C:OH.

F. R. S.

R. S. C.

Condensation of pernitrosocamphor with primary amines. P. LATINI (Annali Chim. Appl., 1932, 22, 728–730).—With o-C₆H₄Br·NH₂ (cf. A., 1932, 517), camphor-o-bromoanil, b.p. 236°/700 mm., is obtained. The more acid substituents in the amine, the more difficult such condensation becomes. T. H. P.

A triterpenediol monostearate from coca fruit (*Erythroxylon novogranatense*). J. ZIMMER-MANN (Rec. trav. chim., 1932, 51, 1200—1203).—The EtOH extract of coca fruit contains a *triterpenediol* monostearate, m.p. 124°, $[\alpha]_{10}^{20}$ +49.90°, hydrolysed to stearic acid and the triterpenediol, *erythrodiol*, m.p. 231°, $[\alpha]_{10}^{20}$ +75.38° (*diacetate*, m.p. 188°, $[\alpha]_{10}^{20}$ +59.41°). A. A. L.

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Azlactone from 6-aldehydocoumarin and its condensation with aromatic amines. S. K. BANERJEE (J. Indian Chem. Soc., 1932, 9, 479– 481).—The azlactone (I), m.p. 245°, is formed in

$$CO \longrightarrow O_{CH=CH} > C_0 H_3 \cdot CH: C < CO \cdot O^{N=CPh} (I.)$$

small yield from coumarin-6-aldehyde, hippuric acid, Ac₂O, and NaOAc at 100°, and is hydrolysed by boiling aq. NaOH to coumarin-6-pyruvic acid (isolated as the quinoxaline, m.p. $288-290^{\circ}$). Condensation products from (I) and o-C₆H₄Me·NH₂, m.p. 258°, α -C₁₀H₇·NH₂, and NH₂Ph, m.p. 178-180°, are prepared by heating it with the amine and Cu-bronze at 130-160°. H. A. P.

Comparison of the directive powers of elements having consecutive atomic numbers. IV. Nitration of 2:4:6-triphenylpyrylium perchlorate. (MRS.) C. G. LE FÈVRE and R. J. W. LE FEVRE (J.C.S., 1932, 2894-2899).-2:4:6-Triphenylpyrylium perchlorate, m.p. 288-290°, prepared from the ferrichloride, could not be mononitrated, but gave a (NO2)3-derivative, about 70% of which was 2:6-dim-nitrophenyl-4-p-nitrophenylpyrylium perchlorate (I), m.p. $276-278^{\circ}$, from which by oxidation p-NO₂·C₆H₄·CO₂H has been obtained. p-Nitrochalkone and COMePh treated with HCl and FeCl₃ yield 4-pnitrophenyl-2:6-diphenylpyrylium ferrichloride, m.p. $209-212^{\circ}$, which gives the *perchlorate* (II), m.p. > 300°. 4-m-, m.p. 237°, 2-m-, m.p. 216-218°, and 2:6-di-m-nitrophenyl-4-phenylpyrylium ferrichloride, m.p. 229-232°, and 4-m-, m.p. 241-242°, 2-m- (III), m.p. 277-278°, and 2:6-di-m-nitrophenyl-4-phenylpyrylium perchlorate (IV), m.p. 291°, are similarly obtained. Nitration of (II), (III), and (IV) yields (I), and the course of the nitrations is discussed. F. R. S.

Nitration of di-p-tolyl- and di-p-chlorophenylphenylpyrylium perchlorates. (MISS) H. E. JOHNSTON and R. J. W. LE FEVRE (J.C.S., 1932, 2900-2902).-4-Phenyl-2: 6-di-p-tolylpyrylium ferrichloride, m.p. $257-258^{\circ}$, prepared from *p*-methyl-acetophenone, PhCHO, Ac₂O, and FeCl₃, is converted by NaOAc into 4-phenyl-2:6-di-p-tolylpyranol [picrate, m.p. 259-260° (decomp.)], which forms the perchlorate (I), m.p. 278—280°, corresponding with the ferrichloride. Trinitration of (I) affords a $(NO_2)_3$ -derivative, m.p. 271—273°, oxidised to p- $NO_2 \cdot C_6H_1 \cdot CO_2H$, and identical with the product of nitrating 2: 6-di - (2'-nitro-p-tolyl) -4-phenylpyrylium perchlorate, m.p. 275-277°, obtained from PhCHO and 3-nitro-4-methylacetophenone. 2: 6-Di-p-chlorophenyl-4-phenylpyrylium perchlorate, m.p. > 300°, obtained through the ferrichloride, m.p. 295°, from C₆H₄Cl·COMe, gives a (NO₂)₃-derivative, m.p. 240-245° (decomp.), oxidised to p-NO2 C6H4 CO2H, and converted by C5H11N with loss of Cl into 4-p-nitrophenyl-2:6-di-(m-nitro-p-piperidinophenyl)pyranol, m.p. 76-78°. These results confirm the constitution assigned to the nitration product of 2:4:6-triphenylpyrylium perchlorate (cf. preceding abstract). F. R. S.

1:3-Dioxins. III. Condensation of p-nitroanisole with formaldehyde and the mechanism

of the formation of 6-nitro-1: 3-benzdioxin. F. CALVET and M. N. MEJUTO (Anal. Fis. Quim., 1932, 30, 767—777).—p-Nitroanisole and CH₂O in 75% H_2SO_4 at 100° yield 5:5'-dinitro-2:2'-dimethoxy-diphenylmethane (I), m.p. 180—182°. At 0° there is also obtained the intermediate product, 5-nitro-2methoxybenzyl alcohol (II), m.p. 122° (acetate, m.p. 72°), which condenses with p-nitroanisole to give (I). Oxidation of (II) with KMnO₄ gives 5-nitro-2methoxybenzoic acid. Demethylation of (II) could not be carried out; HCl has no action, HBr yields the bromide, m.p. 84°, HI reduces the NO2-group. 5-Nitro-2-hydroxybenzyl alcohol (III) and MeI yield (II). (III) and CH₂O yield 6-nitro-1: 3-benzdioxin. Oxidation of (I) with CrO_3 yields 5:5'-dinitro-2:2'-dimethoxybenzophenone, m.p. 184° [phenyl-hydrazone, m.p. 286° (decomp.)]. Reduction of (I) with Zn and HCl yields the (NH₂)₂-compound, m.p. 124—126° [dihydrochloride, m.p. 315° (decomp.); Ac_2 derivative, m.p. 200°]. Demethylation of (I) with HBr yields the amorphous (?) 2:2'-(OH)2compound, m.p. 230° (decomp.).

The course of these new condensations with CH_2O indicates that the formation of 1:3-benzdioxins in this and other cases takes place by direct entrance of CH_2O into the position ortho to the OH-group, followed by condensation of CH_2O with the OHgroup and ring-closure. The analogous condensations of chloral and dichloroacetal (A., 1926, 1242; 1927, 458, 967; 1928, 632, 750; 1929, 65, 573) may be similarly explained. R. K. C.

Rotenone. XXIV. Synthesis of tetrahydrotubanol. H. L. HALLER (J. Amer. Chem. Soc., 1932, 54, 4755).—2:6-(OMe)₂C₆H₃·CN and MgBu^gBr give (after hydrolysis) 2:6-dimethoxyphenyl Bu^g ketone, reduced to 2:6-dimethoxyisoamylbenzene, which is demethylated to 2-isoamylresorcinol. This is identical with tetrahydrotubanol (cf. A., 1932, 165, 739).

H. B.

Dismutation of some disulphides. II. J. L. D'SILVA and E. W. MCCLELLAND (J.C.S., 1932, 2883-2887).-2:2'-Thiobenzoic acid (I), Ac₂O, and KOAc give 3-hydroxy-2-acetyl- and 3-acetoxy-1thionaphthen, which is accounted for by an intramol. arrangement of S $\subset_{C_6H}^{CH}$ >COH, obtained by dismutation of (I); (I), Pr₂O, and KOPr yield 3-propionoxy-2-methyl-1-thionaphthen (also similarly obtained from 2: 2'-dithiobenzamide). Condensation of 2:2'-dithiobenzamide with Ac2O and KOAc gives the same products as (I) and 3-acctamido-1thionaphthen (II), showing that it undergoes dismutation to 2-keto-1:2-dihydrobenzisothiazole and 2-thiobenzamide. (II) is oxidised by H₂O₂ in AcOH to 3-hydroxy-1-thionaphthen 1-dioxide and nitrated to 2-nitro-3-acetamido-1-thionaphthen, m.p. 205-206°, hydrolysed to the 3-OH-compound, m.p. 104-105° (decomp.) (Na salt), which is reduced and subsequently oxidised to thionaphthaquinone. The Br-compound, C10H8ONBrS, obtained by bromination of (II) (McClelland, A., 1929, 1084) is oxidised by H₂O₂ to 2:2-dibromo-3-keto-2:3-dihydrothionaphthen 1-dioxide, confirming the entry of Br in position 2. Hydrolysis of C12H13ONS (III), obtained

New cyclic dipeptide of aspartic acid. C. RAVENNA and R. NUCCORINI (Gazzetta, 1932, 62, 1019—1024).—Diketopiperazinediacetic acid (I) (A., 1922, i, 180) with N/3-Ba(OH)₂ yields the β -dipeptide (A., 1920, i, 601), and a monocyclic *dipeptide*, decomp. 140—160° (*Ba*, *Cu* salts; *Et* ester), which at 210° slowly gives (I), and is therefore

 $CH(\tilde{NH}_2) \cdot CO > N \cdot CH(CO_2H) \cdot CH_2 \cdot CO_2H$, or possibly $CH_2 \cdot CO = N \cdot CH(CO_2H) \cdot NH \cdot CO$

 $\begin{array}{c} \operatorname{CH}_2^{\circ}\operatorname{CO}_2^{\circ}\operatorname{H})\cdot\operatorname{NH}\cdot\operatorname{CO} \\ \operatorname{CH}_2^{\circ}\operatorname{CO}\cdot\operatorname{NH} \end{array} > \operatorname{CH}\cdot\operatorname{CH}_2^{\circ}\operatorname{CO}_2^{\circ}\operatorname{H}. \qquad \text{E. W. W.} \end{array}$

Synthetical experiments in the indole group. IX. Synthesis of indolenines. T. HOSHINO. X. Synthesis of the eserine ring-system. T. HOS-HINO and K. TAMURA (Annalen, 1932, 500, 35–42, 42–52).—IX. A more detailed account of work previously reviewed (A., 1932, 952).

X. Partly an account of work previously reviewed (*loc. cit.*). The following is new. Mg 2: 3-dimethyl-indolyl iodide and CH₂Cl·CN give 2: 3-dimethyl-3-indoleninylacetonitrile, m.p. $81-83^{\circ}$ (picrate, m.p. 177-178°), which when reduced (Na, EtOH) affords 2:3-dimethylindole and not the expected amine. 2-Methyl-3-indolylacetonitrile, m.p. 85-86° (from Mg 2-methylindolyl iodide and CH₂Cl·CN), is hydrolysed (20% KOH) to the -acetic acid, decomp. 198-199°, and reduced (Na, EtOH) to \$-2-methyl-3-indolylethylamine, m.p. 107-108° (hydrochloride, m.p. 194-195°; acetate, m.p. 158-159°; picrate, decomp. 218-219°; benzylidene derivative, m.p. 94-95°), and a little 9-Methyldinordeoxycserolinc 2:3-dimethylindole. (salicylate, m.p. 178°; benzoate, m.p. 133-133.5°; formate, m.p. 119°; oxalate, decomp. 250°; resinous NO-derivative, reduced by Zn dust-AcOH to the original base) is resolved by successive treatment with d-tartaric and d-camphorsulphonic acids into d-, $[\alpha]_{li}^{so}$ +55.7° in EtOH (d-tartrate, m.p. 205°), and l-, $[\alpha]_{li}^{so}$ -54.1° in EtOH (d-camphorsulphonate, m.p. 219°), forms, both of which are non-cryst. H. B.

Condensation of acetophenone with isatin by the Knoevenagel method. H. G. LINDWALL and J. S. MACLENNAN (J. Amer. Chem. Soc., 1932, 54, 4739-4744).—Isatin (I) and COPhMe (II) in EtOH-NHEt₂ (piperidine, NH₃, or KOH) give 3-hydroxy-3phenacyloxindole (III), m.p. 169—172° (decomp.) (all m.p. are corr. unless stated otherwise), which when heated alone or with 10% EtOH-KOH regenerates (I) and (II). More prolonged heating of (III) with EtOH-KOH affords 2-phenylquinoline-4-carboxylic acid (IV). (III) is dehydrated by conc. HCl in EtOH or AcOH to 3-phenacylideneoxindole (V), m.p. 193— 194°, which is not converted into (IV) by EtOH-KOH and is, therefore, not an intermediate in the Pfitzinger synthesis (A., 1898, i, 207) of substituted cinchoninic acids. (V) is reduced (Na₂S₂O₄-aq. EtOH) to 3-phenacyloxindole, m.p. 177° [oxime, m.p. 198—199° (uncorr.)], which is unaffected by conc. EtOH-KOH. The following are prepared by the above methods : 3-hydroxy-3-phenacyl-1-methyl-, m.p. 168—170° (decomp.), 3-hydroxy-3-p-chloro-, m.p. 175—176°, -pbromo-, m.p. 178—181°, -p-methyl, m.p. 185—186°, and -p-methoxy-, m.p. 186—187°, -phenacyl-oxindoles ; 3-phenacylidene-1-methyl-, m.p. 127—128°, 3-p-chloro-, m.p. 209—210°, -p-bromo-, m.p. 218—219°, -p-methyl-, m.p. 182—183°, and -p-methoxy-phenacylidene-oxindoles ; 3-phenacyl-1-methyl-, m.p. 134—135°, 3-pchloro-, m.p. 182—183°, -p-bromo-, m.p. 191—192°, -p-methyl-, m.p. 145—146°, and -p-methoxy-, m.p. 164—165°, -phenacyl-oxindoles. H. B.

Action of nitric acid on the 1-acyl-2:3-diphenylindoles. R. C. G. FENNELL and S. G. P. PLANT (J.C.S., 1932, 2872-2876).-The p-nitrophenylhydrazone, m.p. 158-160°, of CH₂Ph·COPh is converted by Fischer's reaction into 5-nitro-2:3-diphenylindole, m.p. 211° (Ac derivative, m.p. 158°), whilst the o-nitrophenylhydrazone, m.p. 143°, does not similarly lose NH3; the m-NO2-derivative, m.p. 157-158°, gives a mixture of 4(or 6)- (I), m.p. 227-228°, and 6(or 4)-nitro-2 : 3-diphenylindole, m.p. 205° (1-Ac derivative, m.p. 187°). 1-Acetyl-2: 3-diphenylindole (II), m.p. 138°, in AcOH is nitrated by HNO₃, at 80° to 4(or 6)-nitro-1-acetyl-2: 3-diphenylindole (III), m.p. 210° , but when the solution is boiled for 5 min. there is obtained 15-nitro-16-hydroxy-15: 16-dihydrophenanthracarbazole (IV), m.p. 262° (decomp.), converted by boiling AcOH into the isomeric ?-nitro-16-hydroxy-15: 16-dihydrophenanthracarbazole, m.p. 227° (Ac derivative, m.p. 175-176°). Nitration of (II) in AcOH at 50° gives a mixture of (III), 15-nitro-9nitroso-16-hydroxy- (V), m.p. 170° (decomp.), ?-nitro-15: 16-dihydroxy-, m.p. 192°, and ??-dinitro-15: 16dihydroxy-15:16 - dihydrophenanthracarbazole, m.p. 215°. 1-Benzoyl-2: 3-diphenylindole, m.p. 153°, is nitrated to the 4(or 6)-NO₂-compound, m.p. 215°, hydrolysed to (I), and similarly Et 2:3-diphenylindole-1-carboxylate, m.p. 110°, yields the 4(or 6)-NO₂-derivative, m.p. 184°. 1-Cinnamoyl-2: 3-diphenyl-indole, m.p. 192°, on nitration at 80° affords (IV), and at 50° gives a mixture of 4(or 6)-nitro-1-cinnamoyl-2:3-diphenylindole, m.p. 254°, and (V). The complexity of the reaction makes it unsuitable for determining how far the simple indole nucleus undergoes additive reactions during nitration. F. R. S.

Octahydropyrrocoline. G. R. CLEMO and G. R. RAMAGE (J.C.S., 1932, 2969–2973).—*Et* β -2-*carbethoxypiperidinopropionate*, b.p. 116–118°/0·2 mm., prepared from Et piperidine-2-carboxylate,

CH₂Cl·CH₂·CO₂Et, and anhyd. NaOAc, and hydrolysed to β -2-carboxypiperidinopropionic acid, m.p. 210°, gives with Na in xylene 1-keto-octahydropyrrocoline, b.p. 93°/18 mm. Octahydropyrrocoline (I), b.p. 65—67°/18 mm., obtained by Clemmensen reduction of the keto-compound, gives a mixture of two picrates, m.p. 135° and 226° (decomp.), the latter being more readily obtained by keeping (I). The formation of two picrates suggests that (I) occurs as cis- and transforms. Et 2-pyridylacrylate, b.p. 153°/16 mm., prepared from pyridyl- ω -trichloro- β -hydroxypropane hydrochloride by hydrolysis and esterification, is reduced catalytically to 3-keto-octahydropyrrocoline. This is reduced by the Bouveault method to (I) (cf. Löffler and Flugel, A., 1909, i, 831), which gives only the pierate, m.p. 226°. Et piperidine-2-carboxylate and anhyd. K_2CO_3 give with $CH_2Cl \cdot CO_2Et$, *Et* 2-carbethoxypiperidinoacetate, b.p. 149°/17 mm., and with CHMeBr $\cdot CO_2Et$, *Et* α -2-carbethoxypiperidinopropionate, b.p. 151°/17 mm., 110°/0.2 mm. F. R. S.

[Supposed acetoneanil.] K. VON AUWERS (Ber., 1933, 66, [B], 59-60; cf. Auwers and Wunderling, A., 1932, 253).—The conception of Reddelien and Thurm (A., 1932, 1142) that the "acetoneanil" of Knoevenagel (A., 1921, i, 785) is 2:2:4-trimethyl-1:2-dihydroquinoline and its reduction product is a 2:2:4-trimethyl-1:2:3:4-tetrahydroquinoline is in harmony with the spectrochemical behaviour of the compounds. H. W.

Synthesis of quinoline derivatives. II. K. DZIEWONSKI, J. MOSZEW, G. DORTHEIMERÓWNA, and W. Rózycki (Rocz. Chem., 1932, 12, 925-935).----The o-tolil of COPhMe heated with PhNCS yields 4-anilino-2-phenyl-8-methylquinoline, m.p. 171° (hydrochloride, m.p. 191°; picrate, m.p. 260-261°; NO-derivative, m.p. 194°), which on fusion with KOH gives 4-hydroxy-2-phenyl-8-methylquinoline, m.p. 245-246°. 4-Anilino-2-α-naphthylquinoline, m.p. 219° (hydrochloride, m.p. 200-201°; nitrate, m.p. 163-164°; compound with $C_2H_4Br_2$, m.p. 258°; NO-derivative, m.p. 199—200°; Ac derivative, m.p. 132— NO- 133° ; 6-(?)NO₂-derivative, m.p. 314°), is obtained from α -naphthyl Me ketone or its anil, m.p. 134°, and CS(NHPh)₂. 4-p-Tolylamino-2-a-naphthyl-6-methylquinoline, m.p. 229-230° (hydrochloride, m.p. 297-298°; picrate, m.p. 247-248°; NO-derivative, m.p. Ac derivative, m.p. 218°), is prepared from 220°; α-naphthyl Me ketone and di-p-tolylthiocarbamide. β-Naphthyl Me ketone and CS(NHPh)2 yield 4-anilino-2-β-naphthylquinoline, m.p. 176° (picrate, m.p. 264-265°), and 3-acenaphthenyl Me ketone and CS(NHPh)₂ yield 4-anilino-2-(3'-acenaphthenyl)quinoline, m.p. 230° (hydrochloride, m.p. 236-237°; picrate, m.p. 263-265°; NO-derivative, m.p. 193-194°; Ac derivative, m.p. 178-179°). R. T.

Quinoline derivatives. XL. Synthesis of 2phenyl-4-quinolylaminoacetic acid. H. JOHN and G. BEHMEL (J. pr. Chem., 1932, [ii], 135, 215-221).-4-Amino-2-phenylquinoline, 40% CH₂O, and NaCN in EtOH at 100° give 2-phenyl-4-quinolylaminoacetic acid, m.p. 256-261° [26 salts described briefly; Me, m.p. 108-109°, Et, m.p. 128° (hydrochloride, m.p. 217-218°), Pr^{β} , m.p. 109.5°, and benzyl, m.p. 106°, esters; amide, m.p. 227° (sinters at 224°), from the Et ester and conc. aq. NH₃], decarboxylated to 4-methylamino-2-phenylquinoline, m.p. 135.5°.

H. B.

Alkylation of azomethine compounds. E. BERGMANN and W. ROSENTHAL (J. pr. Chem., 1932, [ii], **135**, 267–281).—*iso*Quinoline methosulphate and MgPhBr in C_6H_6 give 1-phenyl-2-methyl-1:2-di-hydroisoquinoline, whilst isoquinoline and MgPhBr afford some 1-phenylisoquinoline (by dehydrogenation of its 1:2-dihydro-derivative). CH₂Ph·MgCl and C_5H_5N in dioxan give some 2-benzylpyridine; quinoline similarly affords 2- (picrate, m.p. 151°) and 4-benzyl- and 2:4-dibenzyl-quinoline (picrate, m.p.

193°); isoquinoline yields 1-benzul-1: 2-dihydroisoquinoline, b.p. 213-215°/18 mm. (prerate, m.p. 153°) (in absence of dioxan, the yield is smaller and some 1-benzylisoquinoline is formed); acridine furnishes 9-benzyl-9:10-dihydroacridine (I). Addition of CHNaPh₂ to C_5H_5N , quinoline, or isoquinoline does not occur; acridine affords (after decomp. with EtOH and H_2O) 9-benzhydryl-9:10-dihydroacridine, m.p. 266°, which, like (I), is not dehydrogenated by HgO in EtOH. The product from 2-methylpyridine and LiPh treated with EtBr gives 2-n-propylpyridine, b.p. 165-168°, reduced (Na-EtOH) to dl-coniine; treatment with BzCl affords 2-phenacylpyridine, whilst PhCHO yields $2-\beta-hydroxy-\beta-phenylethylpyrid-$ ine, m.p. 110°. The product from 2:6-dimethylpyridine and LiPh treated with CH₂PhCl gives 2:6di-\beta-phenylethylpyridine, b.p. 230-240° (picrate, m.p. 137-138°), showing that two CH₂Li groups are present in the original product. CPh2:NPh and LiPh afford o-phenylbenzhydrylaniline (Gilman et al., A., 1929, 1056), whilst CHPh.NPh and CHNaPh. give β-anilino-ααβ-triphenylethane, m.p. 164-166°. 9-a-Naphthyl-, m.p. 242°, 9-anisyl-, m.p. 213°, 9-otolyl-, m.p. 207°, and 9-m-tolyl-, m.p. 159-160°, -acridines are prepared by dehydrogenation of their 9:10-dihydro-derivatives with HgO in EtOH.

H. B. Double linkings. V. Thermochromic ethylenes. E. BERGMANN and H. CORTE (Ber., 1933, 66, [B], 39—43).—The behaviour of thermochromic ethylenes is completely analogous with that of fulvenes, attributed to the occurrence of diradical forms. The presence of a crossed, conjugated system, particularly if associated with a ring, appears essential for the existence of a coloured variety. Repetition of the ring system usually favours the diradical state. The formation with Br of halogen-rich, labile compounds of the perbromide type is parallel with the thermochromic phenomenon. The thermo-

the thermochromic phenomenon. The thermo-chromism of benzhydrylideneanthrone (I) cannot be due to thermal disaggregation of an associated product, since it has an approx. normal mol. wt. in freezing dioxan and C_6H_6 . Na diphenylmethyl is caused to react with the requisite ketone and the carbinol is dehydrated with AcCl. Xanthone thus gives 9-hydroxy-9-benzhydrylxanthen, m.p. 226°, whence benzhydrylidenexanthen, $X < C_6H_4 > C:CPh_2$ (II) (II, X=0), m.p. 197°, yielding an unstable additive product, C₂₆H₁₈OBr₄, m.p. 143° (decomp.). Thioxanthone gives successively 9-hydroxy-9-benzhydrylthioxanthen, m.p. 208°, 9-benzhydrylidenethioxanthen (II, X=S), m.p. 243°, giving a dibromide, m.p. 210° (decomp.), and a red compound, decomp. 170°. N-Methylacridone yields impure 9-hydroxy-9-benzhydryl-N-methylacridan, m.p. about 218° (slight decomp.), whence 9-benzhydrylidene-Nmethylacridan (I, X=NMe), m.p. 249°, giving a hexabromide, decomp. 147°, passing when cryst. from

AcOH into a pentabromide, m.p. $>250^{\circ}$. 9:9-Diphenylanthrone yields 10-hydroxy-9:9-diphenyl-10benzhydryl-9:10-dihydroanthracene, m.p. 229-230°, whence the corresponding hydrocarbon (II, X=CPh₂), which is not thermochromic and does not absorb Br. 9-Hydroxy-2-methoxy-9-benzhydrylthioxanthen, m.p. 207—209°, from 2-methoxythioxanthone, and 2-methoxy-9-benzhydrylidenethioxanthen, m.p. 204—205°, are described. Bromination of (I) in CHCl₃ affords anthraquinone; ill-defined compounds are formed in CS₂. H. W.

Tyrosine-N-acetic acid. General method for preparing symmetrical and asymmetrical imino-dibasic acids. D. A. HAHN and A. LITZ-INGER (J. Amer. Chem. Soc., 1932, 54, 4663—4667).— Hydrolysis of 5-*p*-hydroxybenzyl-3-methylhydantoin-1-acetic acid with aq. Ba(OH)₂ at 100° (bath) gives *tyrosine*-N-acetic acid (+H₂O), m.p. 228—230° (decomp.) [hydrochloride, m.p. 212·5—213°; Me₂ ester hydrochloride, m.p. 163—165°, decomp. 200°; K (+2H₂O), m.p. 250—255° (decomp.), K₂ (+1·5H₂O), m.p. 174—200° (decomp.), Na (+H₂O), m.p. 180— 186° (decomp.), NH₄, m.p. 218·5—220° (decomp.), Ag (+H₂O), m.p. 243—227° (decomp.), salts; complexes C₁₁H₁₁O₅NPb,H₂O, m.p. 260—262° (decomp.), (C₁₁H₁₁O₅NCb)₂,Ba(OH)₂,H₂O, m.p. > 315°, (C₁₁H₁₁O₅NCu)₂,H₂O, m.p. 241—242·5° (decomp.), (C₁₁H₁₂O₅N)₂Cd,5H₂O],4H₂O, m.p. > 315°, and C₁₁H₁₁O₅NCd,2H₂O, m.p. 205—208° (decomp.)]. Phenylalanine-N-phenylacetic (+H₂O), m.p. 224—

226° (decomp.), and -N-acetic acid, m.p. 220-228° (decomp.), are prepared by similar hydrolysis of 5-benzyl-3-methylhydantoin-1-phenylacetic and -1-acetic acid, respectively. H. B.

Optically active 5:5-disubstituted hydantoins. H. SOBOTKA, M. F. HOLZMAN, and J. KAHN (J. Amer. Chem. Soc., 1932, 54, 4697-4702).-5-Phenyl-5ethylhydantoin is resolved by brucine into d- (I), m.p. 237°, $[\alpha]_{D}$ +123° in EtOH, and l- (II), m.p. 235– 237°, $[\alpha]_{D}$ -121° in EtOH, forms. dl- α -Amino- α phenylbutyric acid (III) [Cu salt ($+2H_2O$)] is resolved through its formyl derivative, m.p. 193°, by quinine into d- (formyl derivative, m.p. 212°; Et ester, decomp. about 270°, $[\alpha]_{D} + 36^{\circ}$ in $H_{2}O$ and l-forms; these are very resistant to racemisation and are convertible into, and also produced by hydrolysis of, (I) and (II), respectively. isoPropylcyanoacetamide (from CN·CHPr^g·CO₂Et and conc. aq. NH₃), allyl iodide, and NaOEt give isopropylallylcyanoacetamide, m.p. 87°, converted by NaOBr into 5-isopropyl-5-allyl-hydantoin, m.p. 187°, which is resolved by quinine into the d-form, $[\alpha]_{\rm b}$ +7° in EtOH. 5-isoPropyl-5- β -bromallylhydantoin, m.p. 214—215°, and 3:5-di-phenyl-5-ethyl-2-thiohydantoin, m.p. 143° [from (III) and PhNCS], are described. Pharmacological data are given for (I), (II), and the *dl*-form. H. B.

Preparation of optically active thiohydantoins and the racemisation of amino-acids as their azlactones. F. A. CSONKA and B. H. NICOLET (J. Biol. Chem., 1932, 99, 213—216).—When d-alanine is heated with NH₄SCN and 10% AcOH in Ac₂O at 100° d-2-thio-1-acetyl-5-methylhydantoin, m.p. 161— 162°, $[\alpha]^{30}$ +118.5° in EtOH, is obtained, but if the NH₄SCN is added only after heating with AcOH-Ac₂O for 0.5 hr., only the dl-compound is obtained. Thiohydantoin formation also occurs when < 2 mols. of Ac₂O are used, partial racemisation occurring. It is suggested that the active azlactone initially formed is then racemised by Ac₂O, such racemisation being prevented by its rapid quant. reaction with NH_4SCN (cf. this vol., 156). J. W. B.

Hydroxyarylazo-derivatives of the pyrazole group. G. B. CRIPPA and M. LONG [with G. PERRON-CITO] (Gazzetta, 1932, 62, 944-953).-4-Benzeneazo-1-phenyl-3-methyl-5-pyrazolone with Me₂SO₄ or Et₂SO₄ gives 5-Me and 5-Et ethers, m.p. 42° and 80°, respectively, both of which are reduced by Zn in AcOH to rubazonic acid, m.p. 181° (A., 1882, 602), Me being eliminated. The following 4-arylaze-1phenyl-3-methyl-5-pyrazolones are obtained by coupling 1-phenyl-3-methyl-5-pyrazolone with diazonium salts : o-, m-, and p-tolyl, m.p. 187°, 116°, and 137°; 1:3- and 1:4-dimethyldiphenyl, m.p. 159° and 131°; p-chlorophenyl, m.p. 140°; p-bromophenyl, m.p. 151° (Me ether, m.p. 119°); o- and p-anisyl, m.p. 109° and 135°; o- and p-phenetyl, m.p. 89° and 136°; p-acetamido- and p-benzamido-phenyl, m.p. 139° and 149°; p-acetophenyl, m.p. 136° (oxime, m.p. 187°; phenylhydrazone, m.p. 148°; semicarbazone, m.p. 260°); o-, m-, and p-nitrophenyl, m.p. 209°, 183°, and 196°; α-naphthyl, m.p. 200° (Et ether, m.p. 98°); β -naphthyl, m.p. 184°; β -nitro- α -naphthyl, m.p. 139°; 4'-nitro-a-naphthyl, m.p. 125°; 3-acenaphthyl, m.p. 146°, and pp'-azodiphenylbis-4-(1-phenyl-3-methyl-5-pyrazolone), m.p. 275° (Me ether, m.p. 204°). E. E. J. M.

Oxidation colours derived from 5 : 6-diaminouracil. M. T. BOGERT and D. DAVIDSON (J. Amer. Chem. Soc., 1932, 54, 4754).—5 : 6-Diaminouracil reacts with m-C₆H₄(NH₂)₂, m-NH₂·C₆H₄·OH, and m-C₆H₄(OH)₂ in presence of H₂O₂ to give substances which dye animal fibres purple, old rose, and salmon, respectively. H. B.

Application of calorimetry to pyrroles and pyrrole dyes. II. Calorimetric determinations with simple and polynuclear pyrrole derivatives. A. STERN and G. KLEBS (Annalen, 1932, 500, 91-108).—The following nos. give the mol. heats of combustion (kg.-cal. at 15°) at const. pressure and vol., respectively: Me 2:4-dimethylpyrrole-5-carboxylate, 1029.4, 1028.7; Me 5-carbomethoxy-2:4dimethyl-3-pyrrylpropionate, 1509.4, 1508.3; Et 2:4dimethyl-3-propylpyrrole-5-carboxylate, $1645 \cdot 3.$ 1643.4; 3:3'- dicarbethoxy-2:4:2':4'-tetramethylpyrromethene, 2414.4, 2412.6, -dipyrrylmethane, 2472.0, 2470, and -dipyrrylethane, 2628.5, 2626.2; 3-propionyl-2: 4-dimethylpyrrole-5-carboxylate, Et 1549.7, 1548.4; Et 5-propionyl-2: 4-dimethylpyrrole-3-carboxylate, 1549.3, 1548.0; Et 4-methyl-2-αhydroxyethylpyrrole - 3:5 - dicarboxylate, 1603.6,1602.1; 1-, 1286.6, 1285.6, and 2-, 1283.0, 1282.0, -phenylpyrroles; Me 2:4-dimethylpyrrole-3:5-di-1184.9, carboxylate, 1184.5; 5-carbomethoxy-2:4-dimethyl-3-pyrrylacrylic acid, 1288.2, 1287.8; Et (?)-hydroxy-2: 4-dimethylpyrrole-3-carboxylate, 1129.1, 1128.5; 2:4:2':4'-tetramethyl-3:3'-diethyldipyrryl ketone, 2361.8, 2359.2; dicryptopyrrylphorone, 3614.9, 3610; Me 2:4-dimethylpyrrole-3-carboxylate, 1029.4, 1028.7; Et 3-formyl-2:4dimethylpyrrole-5-carboxylate, 1233.8, 1233.1; Et 5-formyl-2: 4-dimethylpyrrole-3-carboxylate, 1233.7, 1233.0; Et 2:4-dimethyl-3-vinylpyrrole-5-carboxylate, 1436.4, 1435.1; 3:5-dipropionyl-2:4-diethylpyrrole, 1922.2, 1920; Me 5-carboxy-2: 4-dimethylpyrrole-3-carboxylate, 1023.4, 1023.2; Et 4-methyl-2-hydroxymethylpyrrole-3:5-dicarboxylate, 1459.9, 1459.2; Et 2:4:5-trimethylpyrrole-3-carboxylate, 1338.1, 1336.8; Et 5-carbethoxy-2:4-dimethylpyrrolc-3-glyoxylate, 1564.0, 1563.3; dipyrrylmethane, 1220.3, 1219.4; dipyrryl ketone, 1115.8, 1115.5; indole, 1021.1, 1020.4. The heats of formation of the above compounds are also given. The contributions of various groups to the mol. val. are calc. H.B.

Dyes derived from quinoxaline-2:3-dicarboxylic acid. P. C. DUTTA (Ber., 1932, 65, [B], 1791-1793; cf. A., 1926, 1153; 1927, 977; 1932 66).-Resorcinol, quinoxaline-2: 3-dicarboxylic acid, and anhyd. ZnCl, at 180-190° afford resorcinol-



quinoxalinedicarboxylein (I) (A, R=0, R'=OH, R'' R R'' Softening at 196°. Orcinol.,R' m.p. 206°, phloroglucinol-, R" m.p. above 290°, m-aminophenol- (A, R=NH, R'=OH, R"=H), m.p. above 290°, and m-diethylaminophenol- (A, $R=0, R'=NEt_2, R''=H),$ m.p. 178° after softening at 164°, -quinoxalinedicarboxylein are similarly prepared. (I) and Br in EtOH yield tetra-

bromoresorcinolquinoxalinedicarboxylein (A, R=0,R'=OH, R"=Br), m.p. above 290°. The dyes are paler than the pyrazinedicarboxyleins and their fluorescence is less intense. H. W.

Dyes derived from acenaphthenequinone. III. Azines and indigoid vat dyes. S. K. GUHA (J. Indian Chem. Soc., 1932, 9, 423-427). -9-Nitro-(I), m.p. > 310°, 3-chloro-9-nitro-, m.p. 287°, 3-bromo-9-nitro-, m.p. 295°, and 3:4:9-trinitroacenapthaphenazine, m.p. 300-301°, are prepared by con-



densation of appropriately substituted derivatives of (L) acenaphthenequinone and o- $C_{6}H_{4}(NH_{2})_{2}$. 9-Aminoace- $^{9}NO_{2}$ naphthaphenazine, m.p. > 310°, is prepared either from

(I) or by condensation of reduced chrysoidine with acenaphthenequinone. All are yellow dyes for wool. 3-Chloro-, m.p. 280°, 3-bromo-, m.p. 287°, and 3:4-dinitro-8-keto-7-acenaphthylidene-3'-oxythio(1')naphthen, m.p. $> 300^{\circ}$ (named thionaphthenacenaphthyleneindigos), are obtained from the acenaphthenequinones and oxythionaphthen in AcOH-HCl, and are red vat dyes of Ciba-scarlet G. type (cf. A., 1908, i, 674, 1011; G.P. 282,170).

H. A. P.

Isatide and isatol. G. HELLER (J. pr. Chem., 1932, [ii], 135, 222-224).—The conclusions of Sumpter (A., 1932, 951) are criticised. Structures are suggested for α - and β -isatols (cf. A., 1925, i, 1166; 1929, 1315). **H**. **B**.

Active hydrogen atoms of polymeric indoles. O. SCHMITZ-DUMONT and K. HAMANN (Ber., 1933, 66, [B], 71-76).-The behaviour of di-indole (I), diskatole (II), di-7-methylindole, and tri-indole (III) towards MgMeI in amyl ether, C₆H₄Me₂, and mixtures of Ph₂O and C₆H₄Me₂ indicates the presence of 2, 2, 2, and 3 active H atoms, respectively, whilst monomeric indoles are found to have 1 active H. Depolymerisation of the polymerides under the action of MgMeI does not occur, since they can be almost quantitatively recovered. Simple addition of the monomerides to cyclobutane and cyclohexane derivatives in the respective cases of (I) and (III) appears excluded, since with PhNCO, (I), (II), and (III) afford the carbamides, C23H19ON3, m.p. 179-180°, C25 H23ON3, m.p. 219°, and C₃₁H₂₆ON₄, m.p. 217°, respectively. H. W.

Dyes derived from acenaphthenequinone and isatin: fluorenoacenaphthazines and fluorenoindazines. P. C. DUTTA (Ber., 1932, 65, [B], 1793-1795; cf. A., 1932, 1043).—Acenaphthenequinone and 1: 2-diaminofluorene in boiling AcOH afford fluorenoacenaphthazine (I), m.p. 288°. The 5-nitro-, m.p.



295°, and 5:6-dinitro-, m.p. > 295°, com-> pounds, are derived similarly from the corresponding acenaphthenequinones. Fluorenoindazine (II), m.p. $> 295^{\circ}$, is prepared from isatin and 1:2-diaminofluorene in boiling AcOH. From substituted isatins the following fluorenoindazines are derived; 5-nitro-, m.p. > 295°; 5-bromo-, m.p. > 295°; 5:7-dibromo-, m.p. $> 290^{\circ}$; 5-bromo-7-nitro-, m.p. $> 295^{\circ}$; 5-chloro-, m.p. 290°. Comparison of the compounds of this series with the fluorenophenanthrazines shows that the depth of colour increases with the complexity of the mol. even without the presence of chromophoric or auxochromic groups. H. W.

Conversion of chlorophyll b into chlorophyll a. A. STOLL and E. WIEDEMANN (Naturwiss., 1932, 20, 889).—Phæophorbide b [as (I)] (or phæophytin b) and conc. HCl containing Et₂O give an anhydrophæophorbide b, $C_{35}H_{37}O_5N_4$ (±4H) [as (II)], which can be benzoylated but not oximated, is reduced (TiCl₃) to



phæophorbide a [as (III)], and is reduced (H₂, Pd) to hydrophæophorbide a. The formulæ previously proposed (A., 1932, 1266) are thus confirmed. The conversion of chlorophyll b (IV) into chlorophyll a (V) can be accomplished as follows : $(IV) \longrightarrow (I) \longrightarrow (II) \longrightarrow$ (III) $\xrightarrow{\text{Mg}}$ chlorophyllide $a \xrightarrow{\text{Figtol}} (V)$. H. B.

Chlorophyll. XXVIII. Synthesis of deoxo-phylloerythrin; bromovinylpyrroles. H. Fis-CHER and J. RIEDMAIR (Annalen, 1932, 499, 288-301).—Synthetic deoxophylloerythrin (I) (A., 1931, 1431) (hæmin; Cu salt) is $C_{23}H_{36}O_2N_4$; the Me ester, m.p. 264° (corr.) (hæmin), is identical with

"analytical" deoxophylloerythrin Me ester. Catalytic reduction of (I) (or the "analytical" product) results in the uptake of 5-6 mols. of H_2 ; some fission to dipyrrylmethane derivatives occurs. 1:3:5:8-Tetramethyl-2:4:6-triethyl-7-\beta-carboxyethylporphin (II) and 6-bromopyrroporphyrin (III) are by-products in the synthesis of (I). The amount of (II) is a min. when succinic acid is used at 140° (cf. loc. cit.), but is the main product with methylsuccinic acid at 140° or AcOH-HBr at 180°. The formation of (II) and (III) shows that the bromovinyl group (of the pyrromethene used) is partly eliminated and partly reduced to Et. The above results support the constitution assigned to (I). The mixture of basic porphyrins obtained from 5-carboxy-4: 3': 5'-trimethyl-4'-ethyl-3-bromovinyl- and 5-bromo-4: 3'-dimethyl-3: 4'-diethyl-5'bromomethyl-pyrromethene hydrobromides could not separated (without decomp. or change in structure).

Et 4-methyl-2-chloromethyl-3-β-bromovinylpyrrole-5-carboxylate (IV) (from the 2: 4-Me₂ derivative and SO₂Cl₂) and warm MeOH give the 2-methoxymethyl derivative, m.p. 141°, which, like (IV), is converted by boiling H₂O into di-(5-carbethoxy-4-methyl-3-β-bromovinyl-2-pyrryl)methane, m.p. 216°. (IV) and the product from MgEtBr and Et 4-methyl-3-ethylpyrrole-2carboxylate give 5:5'-dicarbethoxy-4:3'-dimethyl-4'ethyl-3-\beta-bromovinyldi-2-pyrrylmethane, m.p. 178°. 2-Formyl-4-methyl-3-β-bromovinylpyrrole-5-carboxylic acid (V) and cryptopyrrolecarboxylic acid with AcOH-48% HBr afford 5-carboxy-4: 3': 5'-trimethyl- $4' - \beta$ - carboxyethyl - 3 - β - bromovinyl pyrromethene hydrobromide, converted by Br in AcOH-HCO₂H into a compound, $C_{17}H_{20}N_2Br_4$ (Me ester). 5-Carboxy-4:4':5'-trimethyl-3'- β -carboxyethyl-3- β -bromovinylpyrromethene hydrobromide, from (V) and hæmopyrrolecarboxylic acid, is similarly brominated to a substance, $C_{17}H_{20}O_2N_2Br_4$. 5-Carboxy-4:3':5'-trimethyl-4'ethyl-3-β-bromovinylpyrromethene hydrobromide and Br in AcOH-HCO₂H give 5-bromo-4: 3': 5'-trimethyl-4' - ethyl - 3 - β - bromovinylpyrromethene hydrobromide, which when treated with KI in AcOH and then basified (10% aq. NH_3 in MeOH) affords the free base, m.p. 144° [reduced (H₂, PtO₂, AcOH) to a compound, $C_{16}H_{19}N_2Br_3$, m. p. > 280°]. H. B.

Occurrence of decomposition products of chlorophyll. I. Decomposition of chlorophyll in the digestive system of the cow. P. ROTHE-MUND and O. L. INMAN (J. Amer. Chem. Soc., 1932, 54, 4702–4706).—Traces of phylloerythrin (I) are isolated from the contents of the first and second stomachs of freshly-killed cows; (I), rhodo-, phyllo-, and pyrro-porphyrins, and traces of two other pigments (probably porphyrins) are extracted from the contents of the third and fourth stomachs. Prophorbides and (I) are isolated from the third and fourth stomachs of sheep. The stomach contents of a calf on a milk diet contain no porphyrins, indicating that these arise from chlorophyll. The view that the fivemembered ring attached to the porphin structure occurs in both (I) and chlorophyll a is favoured by the above results. H. B.

Porphyrin syntheses. XLVI. Synthesis of the parent substance [ætioprotoporphyrin] of protoporphyrin and hæmin. H. FISCHER, A. KIRSTAHLER, and B. VON ZYCHLINSKI (Annalen, 1932, 500, 1—14).—The hæmin of 1:3:5:8-tetramethyl-6:7-diethylporphin (improved prep. given; cf. A., 1931, 967), Ac₂O, and SnCl₄ give (after removal of Fe with HBr-AcOH) diacetylætiodeuteroporphyrin, m.p. >335° (Cu salt; hæmin), converted by conc. EtOH– KOH in H₂ at 140° into ætiohæmatoporphyrin [di- α hydroxyethylætiodeuteroporphyrin], which, when heated at 165°/high vac., is dehydrated to ætioprotoporphyrin [1:3:5:8-tetramethyl-6:7-diethyl-2:4-divinylporphin] (hæmin).

During the (nuclear) carbethoxylation of cryptopyrrole and 2:4-dimethyl-3-propylpyrrole, 20—30% of the respective N-carbethoxy-derivatives, b.p. 125— 135°/11 mm. and 144—149°/14 mm., are produced. Et 2-formyl-4-methylpyrrole-3:5-dicarboxylate (I) and N_2H_4 . H_2O in AcOH give the pyridazine,

NH·CO·C CMe N=CH·C·NH·C·CO₂Et, m.p. 318° (decomp.) (darkens at 295°) (all m.p. except this are corr.). The hydrazone of Et 2-formyl-4-hydroxymethylpyrrole-3: 5-dicarboxylate [oxime, m.p. 194° (decomp.)] and (I) in EtOH afford 3:5:3':5'-tetracarbethoxy-4'-methyl-4-hydroxymethylpyrroaldazine, m.p. 197° (Cu salt, m.p. 205°). (I), Br, and aq. KBrO3 in AcOH give Et 2-formyl-4bromomethylpyrrole-3: 5-dicarboxylate, m.p. 145°. Et 5-formyl-2: 4-dimethylpyrrole-3-carboxylate, hæmopyrrole, and HBr (d 1.49) in EtOH afford 4'-carbethoxy - 4:5:3':5' - tetramethyl - 3 - ethylpyrromethene hydrobromide, decomp. 214°. 3-Carbethoxy-4:5:3':5'tetramethyl-4'-ethylpyrromethene hydrobromide, m.p. 176° (decomp.), is similarly prepared from cryptopyrrole and Et 5-formyl-2: 3-dimethylpyrrole-4-carboxylate or (in small amount with m.p. 245°) from cryptopyrrolealdehyde (II) and Et 2:3-dimethylpyrrole-4-carboxylate. 2-Methyl-4-ethylpyrrole and (II) similarly give 5:3':5'-trimethyl-3:4'-diethylpyrromethene hydrobromide, m.p. 183° (decomp.). H. B.

Directive effect of [nuclear] substituents on cyclisation of s-diarylthiocarbamides. I. Effect of fluoro-, iodo-, and cyano-substituents on formation of anilinobenzthiazole derivatives from p-monosubstituted thiocarbanilides and bromine. R. F. HUNTER (J. Indian Chem. Soc., 1932, 9, 435-440).-p-Fluoro- and p-iodo-s-diphenylthiocarbamides, analogously with the p-Cl- and p-Br-compounds, undergo cyclisation with Br in the unsubstituted ring; the p-CN-group has a like effect. In every case the constitution of the resulting thiazole was confirmed by synthesis from 1-chlorobenzthiazole and the appropriately substituted aniline. The following are described : p-fluoro-, m.p. 175-176°, p-iodo-, m.p. 168°, and p-cyano-s-diphenylthiocarbamide, m.p. 161-162°; 4'-fluoro-, m.p. 200-201°, 4'-iodo-, m.p. 213°, and 4'-cyano-1-anilinobenzthiazole, m.p. 208° (the intermediate perbromides are described). H. A. P.

Constitution and classification of sulphur dyes. H. E. FIERZ-DAVID (Naturwiss., 1932, 20, 945—947).—A discussion. R. K. C.

Actinodaphnine: an alkaloid from Actinodaphne Hookeri, Meissn. S. KRISHNA and T. P. GHOSE (J. Indian Chem. Soc., 1932, 9, 429-433).-

Actinodaphnine, $C_{18}H_{19}O_4N$, m.p. 210—211°, $[\alpha]_{b}^{20}$ +37.77° in abs. EtOH [hydrochloride, m.p. 280—281° (decomp.); hydriodide, m.p. $264-265^{\circ}$ (decomp.); picrate (+1H₂O), decomp. $220-222^{\circ}$; sulphate (+3H₂O), m.p. $249-250^{\circ}$ (decomp.); methiodide, m.p. $243-244^{\circ}$; Bz, m.p. $232-233^{\circ}$, and Ac deriv-atives, m.p. $229-230^{\circ}$ (Ac₂O, not AcCl)], is extracted from the bark of A. Hookeri with 90% EtOH and Na-CO and purified by crystallisation from Na₂CO₃, and purified by crystallisation from aq. COMe₂. It is considered (Zeisel) to contain an OMe and NMe group. H. A. P.

Syntheses in the homoneurine series. II. Homoneurines of the Cinchona alkaloids. E. MACOVSKI and A. SILBERG (J. pr. Chem., 1932, [ii], 135, 237-244).—Dihomoneurine halides [dially] halides] of the following are described : quinine : iodide, m.p. 160° (decomp.); bromide, m.p. 159-160° (becoming yellow) (dihydrate, m.p. 152-155°); quinidine : iodide (+1.5H₂O), m.p. 155-156° (decomp.); bromide, m.p. 152° (decomp.); einchonine : iodide, m.p. 248—250° (decomp.); bromide, m.p. about 222° (decomp.); cinchonidine: iodide, m.p. 238—239° (decomp.); bromide, m.p. 225° (decomp.). Successive treatment of the above iodides with AgCl and H2PtCl6 gives the corresponding chloroplatinates (all $+2H_2O$), blackens at 220°, —, blackens $235-240^{\circ}$ (decolorised about 220°), and blackens and decomp. about 225°, respectively. The quaternary bromide from cinchonine (1 mol.) and allyl bromide (1 mol.) has m.p. 240-241° (decomp.). H. B.

Lupin alkaloids. VI. G. R. CLEMO, G. R. RAMAGE, and R. RAPER (J.C.S., 1932, 2959-2969).-Et pyridine-2-carboxylate (improved prep.), Et succinate, and NaOEt afford Et \$-2-pyridoylpropionate, b.p. 135-140°/0.2 mm. (picrolonate, m.p. 104°), reduced (Clemmensen) to Et γ -2-pyridylbutyrate (I), b.p. 145-150°/18 mm., 100°/0.2 mm. (I), on hydrolysis and subsequent reduction with Na-EtOH, yields 4-keto-octahydropyridocoline, b.p. 146°/20 mm., and reduction with Na-EtOH alone gives δ-2-piperidyl-n-butyl alcohol, b.p. 149°/17 mm., which with PBr₅ in C₆H₆ followed by aq. NaOH forms octa-hydropyridoculine "A," b.p. 72°/16 mm. [picrate, m.p. 194°, methiodide, m.p. 335°, chloroaurate, m.p. 167°, identical with those derived from norlupinane (A., 1931, 499; 1932, 178); picrolonate, m.p. 245°]. Octahydropyridocoline "B" (loc. cit.) gives a picrolonate, m.p. 191°. The Hofmann reaction on the meth-iodide of "A," followed by catalytic reduction, gives a mixture of three bases, $C_{10}H_{21}N$, "C" (picrolonate, a mixture of three bases, $C_{10}H_{21}N$, C^{-} (picrotonate, rhombs, m.p. 153°, converted by two crystallisations into monoclinic prisms, m.p. 147°; picrate, m.p. 88°; methiodide, m.p. 164°), "D" (picrolonate, m.p. 167°; picrate, m.p. 94°; methiodide, m.p. 168°), and "E" (picrate, m.p. 197°; picrolonate, m.p. 129°; methiodide, m.p. 263°), "C" and "D" being separated as the picrolonates and "E" as the picrate. Similar reduction of the methiodide of "B" affords a mixture of "D" and "E" (NBR gives with "A" a cryst of "D" and "E." CNBr gives with "A" a cryst. substance, m.p. 283°, but this is not formed with "B." 2-Crotylpyridine (improved prep.) is reduced catalytically to 2-*n*-butylpiperidine, b.p. 75°/14 mm. (hydro-chloride, m.p. 182°; picrolonate, m.p. 182°), which gives, with CH_2O and HCO_2H , 1-methyl-2-n-butylpiperidine

(II), b.p. 78-80°/15 mm. (chloroaurate, m.p. 90°; picrolonate, picrate, and methiodide are identical with



those obtained from "C"). "C" is there-fore identical with (II) and "D" and "E" are isomeric forms of 1-methyl-cycloazadecane or "E" may have the Me Me structure (III). This indicates that "A"

and "B" are structurally identical (III.) stereoisomerides and norlupinane occurs as cis- and trans-isomerides of the decalin type.

Me lupinate affords a mixture of a-, m.p. 240° (decomp.), and β-methiodides, m.p. 170°. Hofmann degradation of the a-methiodide results in a mixture of two bases, C10H19N (IV), b.p. 48°/1 mm. [picrate, m.p. 179°; methiodide, m.p. 258-259° (decomp.)], and a second fraction, b.p. 95°/1 mm. (IV), reduced (Pt-H) to "E." Similar treatment of the β -methiodide yields a β -base, b.p. $45^{\circ}/1$ mm. (picrate, m.p. 148—149°), also reduced to "E." The metho-chloride of "E" when heated isomerises to an openchain tert. base NMe2 C9H18Cl, the methiodide, m.p. 91°, of which gives with Ag₂O, NMe₃, and an oil, b) , of which gives with Ag_2O , NMe_3 , and an OI, possibly 9-hydroxy- Δ^{α} -nonene, since it is oxidised to suberic acid. Aminolupinane and HNO_2 afford *iso*norlupinene, $C_9H_{15}N$, b.p. $43-45^{\circ}/1$ mm. [forming a *picrolonate*, m.p. 189° (changing to the *picrolonate* of norlupinene, m.p. 229-230°, on repeated crystallis-ation), and a *picrate*, m.p. 147°], and a small quantity of hydroxynorlupinane, m.p. 109°. Norlupinene and Br give a Br_4 -derivative, m.p. 174°, from which a Br_2 -compound m.p. 84-85° is obtained whilst *is*onorcompound, m.p. $84-85^{\circ}$, is obtained, whilst isonor-lupinane forms a Br_3 -derivative, m.p. $156-157^{\circ}$. The bearing of these facts on the structure of lupinine is F. R. S. discussed.

Attempted synthesis of oxyprotoberberine and a synthesis of 3-methoxyoxyprotoberberine. S. CHAKRAVARTI and A. P. M. NAIR (J. Annamalai Univ., 1932, 1, 186-189; cf. A., 1927, 1096).-The acid chloride of phthalidecarboxylic acid in cold dry C_6H_6 during several hr. affords with β -phenyland β -m-anisyl-ethylamine, phthalidecarboxy- β -phenylethylamide (I), m.p. 155°, and phthalidecarboxy-β-manisylethylamide (II), m.p. 105°, respectively. (I) when treated with POCl₃ or P₂O₅ and then with Zn dust in AcOH affords no oxyprotoberberine; but when cyclised with PCl_5 gives a substance, m.p. 153°. (II) when heated at 100° with $POCl_3$, and the product reduced by Zn in boiling AcOH affords 3-methoxy-oxyprotoberberine, m.p. 143°. J. L. D.

Synthesis of 3: 10-dimethoxytetrahydroprotoberberine. S. CHAKRAVARTI, N. ANANTHAVAIDYA-NATHAN, and A. VENKATASUBBAN (J. Annamalai Univ., 1932, 1, 190-193; cf. A., 1929, 335).-β-m-Anisylethylamine with p-anisylacetic acid at 180° during 2 hr. affords p-anisylaceto-β-m-anisylethylamide, m.p. 81°, converted by POCl₃ during 2 hr. at 100° into 6 - methoxy - 1 - (4' - methoxybenzyl) - 3 : 4 - dihydroiso quinoline (picrate, m.p. 146°), which with Zn dust and dil. H₂SO₄ gives 6-methoxy-1-(4'-methoxy-benzyl)-1:2:3:4-tetrahydroisoquinoline (I) [hydrochloride, m.p. 196°; picrate, m.p. 192° (decomp.)]. (I) is converted into its N-formyl derivative, which with POCl, in boiling PhMe during 1.5 hr. affords 3: 10-dimethoxydihydroprotoberberine (not isolated), reduced (Zn-dil. HCl, 2 hr.) to 3:10-dimethoxytetrahydroprotoberberine, identical with a product previously described. J. L. D.

Strychnine and brucine. II. Dihydromethoxymethylhexahydrostrychnine and its derivatives. O. ACHMATOWICZ (Rocz. Chem., 1932, 12, 936—942).—Methoxymethyldihydroneostrychnine on electro-reduction yields in addition to methoxymethyltetrahydrostrychnidine (I) (A., 1932, 406), dihydromethoxymethylhexahydrostrychnine (II), m.p. 116—118° (methiodide, m.p. 249—250°; methochloride, m.p. 210—212°; nitrosoamine, impure; NO-diacetate, an oil). (II) yields (I) when treated with POCl₃, and methyldihydrostrychnidinium sulphate on prolonged treatment with 50% H₂SO₄.

Strychnos alkaloids. LXIX. Further experiments on the fission of brucine with cyanogen bromide and fission of dihydrobrucine. H. LEUCHS and H. S. OVERBERG (Ber., 1933, 66, [B], 79-84; cf. A., 1932, 866).-Treatment of brucine with CNBr and of the product with COMe₂ yields the cyanoamide $C_{24}H_{26}O_4N_3Br$ (I), $[\alpha]_D + 76\cdot 4^\circ/d$; the undissolved material with boiling MeOH gives brucine hydrobromide and a neutral compound, $C_{25}H_{29}O_5N_3$, m.p. about 80°, decomp. 90°, $[\alpha]_{11}^{21} - 88^{\circ}/d$ in AcOH. (I) is transformed by KMnO_4 in COMe_2 into much resinous matter and an *acid*, $\text{C}_{24}\text{H}_{26}\text{O}_7\text{N}_3\text{Br}$, $[\alpha]_{12}^{-1}$ +87.5°/d in AcOH, by AgOBz in boiling COMe₂ mainly into brucine, also obtained by the action of C_5H_5N at 100°. Dihydrobrucine and CNBr in C_6H_6 smoothly yield the cyanoamide $C_{24}H_{28}O_4N_3Br$ (II), m.p. 240—242° (decomp.) after softening at 230°, $[\alpha]_{D}^{\circ} + 58.2^{\circ}/d$ in CHCl₃, apparently identical with the compound of Wieland and Gumlich (A., 1932, 629). (11) is converted by C_5H_5N into the salt, C24H28O4N3Br,C5H5N, decomp. about 280° after becoming discoloured at 250°, $[\alpha]_p^a - 39 \cdot 2^{\circ}/d$ in H₂O, by NPhMe₂ into dihydrobrucine methobromide, $[\alpha]_{D}^{\infty}$ $+31\cdot6^{\circ}/d$ in H₂O, and a neutral substance, C₃₂H₃₈O₄N₄, m.p. 168-170° after softening, $[\alpha]_{10}^{20}$ -41.7°/d in CHCl₃, and by NHPhMe into dihydrobrucine hydrobromide and the compound C₃₁H₃₆O₄N₄, m.p. 178-180° (slight decomp.) after softening at 170°, [a] +40.8°/d CHCl₃. (II) and NH₂Ph yield diphenylguanidine and resin. H. W.

Reaction with Grignard reagent and other reactions of Strychnos alkaloids. XII. H. WIE-LAND and F. HÖLSCHER (Annalen, 1932, 500, 70–91). —The no. (mean val.) of active H atoms (Zerevitinov method using PhOMe as solvent in N₂) in the following are quoted in parentheses (where two nos. are given, the second is for C_5H_5N as solvent) : strychnine (I) (1·3, 0·7); brucine (II) (1, 1); vomicine (2, 1); dihydrostrychnine (III) (1), dihydrobrucine (IV) (1); dihydrostrychnine (1·5); strychnidine (V) (0); tetrahydrostrychnine (1·7); vomicidine (1); deoxyvomicine (1·7); the base $C_{16}H_{22}O_3N_2$ (A., 1932, 179) (1); the base $C_{16}H_{26}O_2N_2$ (loc. cit.) (1·1); the iodo-base, $C_{22}H_{25}O_3N_2I$ (A., 1929, 708) (1·1). The negative val. with (V) indicates that production of CH₄ is concerned with the lactam group of, e.g., (I). MgMeI and (I) in PhOMe-isoamyl ether and N₂ give deoxymethylstrychnine methiodide, $C_{22}H_{24}ON_2$, MeI, m.p. 245—246° (de-

comp.), $[\alpha]_{0}^{18} + 137 \cdot 3^{\circ}$ in H₂O [reduced (H₂, PtO₂, aq. EtOH) to its *tetrahydro*-derivative, m.p. 287° (decomp.), $[\alpha]_{0}^{19} - 69^{\circ}$ in H₂O], which may result from the change >N•CO•CH₂·→ >N•CMe(OMgI)•CH₂· → >N•CMe•CH• +MgI•OH; this also explains the production of CH₄ in the Zerevitinov determination, *i.e.*, it is not due to active H. The Grignard solution used could not be freed from MeI even in vac. Vomicine (which does not form a methiodide) does not give a deoxymethyl derivative. MgEtBr and (I) similarly give *deoxyethylstrychnine ethobromide*, m.p. 235° (decomp.) (sinters at 220°); MgPhBr does not react. MgMeI and (III) afford *deoxymethyldihydrostrychnine methiodide*, decomp. 241° (darkens at 200° and sinters at 231°), $[\alpha]_{15}^{18}$ +741° in 20% EtOH [*dihydro*-derivative, m.p. 295° (decomp.) (sinters at 285°), $[\alpha]_{15}$ +93° in 20% EtOH], whilst (II) gives *deoxymethylbrucine methiodide*, decomp. 263°, $[\alpha]_{15}^{18}$ +173° in H₂O [*tetrahydro*-derivative (anhyd. and +H₂O), m.p. 262-264° (decomp.), $[\alpha]_{15}^{21}$ (anhyd.) $-36\cdot2^{\circ}$ in 20% EtOH]. 1-Ethyloxindole, which contains one active H (Zerevitinov) is recovered unchanged after treatment with MgMeI. These new derivatives are very unstable. The methiodides of (I) and (II) have $\alpha = 0^{\circ}$, whilst those of (III) and (IV) (prepared by catalytic reduction) have $[\alpha]_{15}^{11} +30\cdot3^{\circ}$ and $[\alpha]_{16}^{10} +29\cdot4^{\circ}$ in 50% MeOH, respectively.

and $[\alpha]_{1}^{m}$ +29.4° in 50% MeOH, respectively. Dihydrovomicine and 20% MeOH-KOH in N₂ give (after neutralisation with dil. HCl) dihydrovomicinic acid, C₂₂H₂₈O₅N₂,H₂O, m.p. 291° (sinters at 165°), oxidised by CrO₃ (as previously described; A., 1932, 179) to bisdihydrovomicyl, C₄₄H₅₀O₈N₄, m.p. >310° (darkens gradually from 260°) (dihydrochloride). Deoxyvomicinic acid, C₂₂H₂₆O₄N₂,2H₂O, m.p. 205° (sinters at 165°), prepared from deoxyvomicine [Br-derivative, m.p. 266° (decomp.) (darkens at 200° and sinters at 260°)], is similarly converted into dideoxyvomicyl, C₄₄H₄₆O₆N₄,H₂O, m.p. >300° (darkens gradually above 200°). Bisdihydrodeoxyvomicyl, C₄₄H₅₀O₆N₄ [dihydrochloride (+H₂O), darkens above 200°], is prepared from dihydrodeoxyvomice.

[With W. MÜNSTER.] The acids $C_{17}H_{22}O_5N_2$ and $C_{17}H_{24}O_5N_2$ from vomicine (A., 1932, 179) and CH_2N_2 in Et₂O-MeOH give the *Me* esters, m.p. 261—262° (decomp.) and 178—179° (slight decomp.) (sinters at 176°), respectively, which with MeI afford substances, $C_{37}H_{51}O_{10}N_4I$, H_2O , m.p. 207° (decomp.), and $C_{37}H_{55}O_{10}N_4I$, H_2O , sinters at 183°, froths at 184°, and melts later to a clear liquid, respectively. The acid $C_{18}H_{24}O_7N_2$ (loc. cit.) and CH_2N_2 give a methylbetaine Me ester, $C_{20}H_{28}O_7N_2$, m.p. 283—285° (decomp.).

The formation of additive (1:1) compounds, decomp. 170—171° and 239—240°, respectively (cf. A., 1932, 629; Leuchs and Overberg, *ibid.*, 866), of brucine and dihydrobrucine with CNBr is confirmed. H. B.

Reductions in the morphine series. I. Dihydro- ψ -codeine. R. E. LUTZ and L. F. SMALL (J. Amer. Chem. Soc., 1932, 54, 4715—4730).—Catalytic reduction of ψ -codeine (I) and related compounds varies with the catalyst, solvent, and especially [H^{*}]. Thus, reduction (H₂, PtO₂, AcOH) of the hydrochloride of (I) at temp. up to 60° gives 76—85% of the nonphenolic dihydro- ψ -codeine (II) (+H₂O), m.p. 121122° (all m.p. are corr.), m.p. (anhyd.) 155° , $[\alpha]_{\rm B}^{36}$ -41·4° in EtOH [hydrochloride (+0·5H₂O), m.p. 239-241° (decomp.); hydriodide, m.p. 287° (rapid), 268-269° (decomp.) (slow heating)], and 5-15% of tetrahydro- ψ -codeine. The methiodide (+H₂O), m.p. 190-195° (rapid), 241-243° (decomp.) (slow heating), of (II) is converted by hot 12% NaOH into the nonphenolic dihydro- ε -methylmorphimethine (de-Nmethyldihydro- ψ -codeine) [hydriodide, m.p. 232-235° (decomp.); hydrochloride, m.p. 222-224°], reduced (H₂, Pd-CaCO₃, EtOH) to the non-phenolic tetrahydro- ε -methylmorphimethine (dihydrode-N-methyldihydro- ψ -codeine) (III) [hydrochloride (+0·5 and 3H₂O), m.p. 187°; hydriodide, m.p. 225-226° (decomp.); salicylate, m.p. 198°; H tartrate, m.p. 195·5° (decomp.)]. Tetrahydro- ψ -codeine, m.p. 115-120° (sinters at about 100°) [hydrochloride, m.p. 263° (decomp.); salicylate (+2H₂O), m.p. 135-136°,



 $\begin{array}{cccc} (+H_2O), & \text{m.p. } 165-166^\circ], & \text{is} \\ \text{best obtained by reduction} \\ (H_2, \text{PtO}_2, & \text{or Pd-BaSO}_4, & \text{dil.} \\ H_2 & \text{AcOH} & \text{of (I); its methiodide} \\ \text{is degraded by conc. aq. KOH} \\ \text{CH}_2 \cdot \text{NMe}_2 & \text{to the phenolic tetrahydro-s-} \\ \text{methylmorphimethine, m.p.} \\ \text{H} & 196-197^\circ & (\text{decomp.}) & (\text{lit. } 162-163^\circ), & [\alpha]_{12}^{21} + 192^\circ & \text{in EtOH}, \\ \text{which is reduced (H_2, Pd-163)} \\ \end{array}$

CaCO₃, EtOH) to hexahydro-smethylmorphimethine (IV), m.p. 166.5-167.5° (lit. 155°), $[\alpha]_D^{33}$ +28° in EtOH [hydrochloride, m.p. 250— 254° (decomp.) (lit. 213°); H tartrate (+H₂O), m.p. 114—115° (decomp.)]. Catalytic reduction of the hydrochloride, m.p. 211—212°, of ε -methylmorphi-methine gives (III) and (IV); the amounts vary with the conditions used. (II) results by addition of 2H to a double linking and is then as stable as dihydrocodeine and -isocodeine to further reduction. Tetrahydro- ψ -codeine must result from a primary 1:4addition of H₂ to O and C₇ or by direct reductive fission of the oxidic O; in the latter case, the 6:7double linking of (I) is not directly concerned with the addition of the first mol. of H₂, but is saturated in the second stage of the reduction. (II) can be demethyl-ated (HI) to the hydriodide of a new dihydro- γ -isomorphine (no details given). isoCodeine H tartrate, m.p. 185-186° (decomp.), and dihydroisocodeine H tartrate (+3H₂O), m.p. about 180°, are described.

H. B.

Solanthrine, an auxiliary alkaloid from potato sprouts. M. DIETERLE and K. SCHAFFNIT (Arch. Pharm., 1932, 9, 550—551).—Potato sprouts (40 kg.) yielded, besides solanidine (I), solanthrine (II) (0.2 g.), C₂₆H₄₁N, m.p. 172°, which does not contain a NMe group and is hydrogenated (Pd) to dihydrosolanthrine, m.p. 163°. Attempts to obtain (II) from (I) failed. R. S. C.

Constitution of tetrandrine and trilobine. F. FALTIS (Annalen, 1932, 499, 301-302).—Alternative structures (cf. Kondo and Tomita, A., 1932, 1048) are suggested for trilobine and *iso*trilobine. H. B.

Polymorphism of phenarsazine chloride (adamsite). R. FISCHER (Mikrochem., 1932, 12, 257—260).—Besides the stable rhombic form, m.p. 195°, there are two metastable modifications, viz., monoclinic, m.p. 186°, and (probably) triclinic, m.p. 182°. Photomicrographs are given. F. L. U.

p-Phenoxyphenyldichlorophosphine. W. C. DAVIES and C. J. O. R. MORRIS (J.C.S., 1932, 2880-2883).-p-Phenoxyphenyldichlorophosphine (I), b.p. 200°/12 mm., is obtained from Ph₂O, PCl₃, and AlCl₃, and gives with Cl₂ a solid dichloride, which is converted by H₂O into p-phenoxyphenylphosphinic acid monohydrate, m.p. 185°. This is brominated in CCl₄ to p-bromo-p'-phosphinodiphenyl ether, m.p. 209°, which yields 4:4'-dibromodiphenyl ether with Br and H₂O at 160°. Mg and *p*-bromodiphenyl ether give with AgBr in C_6H_6 and Et_2O , pp'-diphenoxydiphenyl, m.p. 150°, and with HgCl₂, Hg bis-p-diphenyl ether, m.p. 100°, is obtained. MaMJ and (I) afford *p* shows 192°, is obtained. MgMeI and (I) afford p-phenoxyphenyl-dimethylphosphine, b.p. 183°/13 mm. (methiodide, m.p. 242°; methylchloroplatinate, m.p. 226°); -diethyl-, b.p. 208°/13 mm., d.º 1-0711 (methiodide, m.p. 163° ; methylchloroplatinate, m.p. 222°), -di-n-propyl-, b.p. $218^{\circ}/13$ mm., d_4° 1.0562 (methiodide, m.p. 126° ; methylchloroplatinate, m.p. $221-222^{\circ}$), and -di-n-butyl-phosphine, b.p. $235^{\circ}/13$ mm. (methiodide, m.p. 227° ; methylchloroplatinate, m.p. 225°), are initially obtained. More a phononyuphony similarly obtained. Mg p-phenoxyphenyl bromide (II) and (I) give tri-p-phenoxyphenylphosphine, m.p. 111°, the methiodide, m.p. 115°, of which is identical with that derived from the action of PCl₃ on (II). F. R. S.

Diselenomesoxanilides and oxyselenanilides. A. BARONI (Atti R. Accad. Lincei, 1932, [vi], 16, 253– 256).—The action of Se₂Cl₂ on malonanilide gives diselenomesoxanilide, $CSe_2(CO\cdotNHPh)_2$, m.p. 209– 210°, and that on malono-*p*-toluidine, diselenomesoxp-toluidide, m.p. 211°. The action of SeOCl₂ (1) on NH₂Ph gives oxyselenoanilide, NPhSeO, b.p. 111°/26 mm., and (2) on o-NH₂C₆H₄Me gives oxyseleno-otoluidide, b.p. 130°/26 mm.; when heated with NH₂Ph or NHPh₂ in presence of ZnCl₂, these two compounds give greenish-blue dyes and thus behave similarly to the thionylamines. T. H. P.

Mol. wt. of the hæmocyanin of Octopus vulgaris. T. SVEDBERG and I. B. ERIKSSON (J. Amer. Chem. Soc., 1932, 54, 4730-4738).-The cryst. (o) hæmocyanin contains two components; one (A)has a sedimentation const. of $43 \cdot 2 \times 10^{-13}$ (mean val.) which is practically independent of $p_{\rm H}$ (range 4.3-9.7), whilst the sedimentation const. of the other (B)varies greatly with $p_{\rm H}$. (A) and (B) represent different (reversible) states of aggregation of the same protein; (A) predominates in the regions $p_{\rm H}$ 4.3-4.5 and 7.9-9.7, but has a low concn. at $p_{\rm H}$ 4.5-5.0 and 7.2-7.9. At $p_{\rm H} < 4.3$ and >9.7, only (B) exists. Analogous results are obtained using Octopus blood. (A) only is termed a distinct mol. species; a mol. wt. of about 2,000,000 is derived from sedimentation equilibrium measurements. The mol. of (A) is not spherical; the dissymmetry no. is 1.24. H. B.

Combination of certain proteins with hydrochloric acid. D. I. HITCHCOCK (J. Gen. Physiol., 1932, 16, 357–366; cf. A., 1930, 1459; 1932, 71).— E.m.f. measurements of cells without liquid junction of the type Ag, AgCl, HCl (0.1N)+protein [gelatin (I), edestin (II), or caseinogen (III)], H₂ at 30° indicate the const. combining capacity of each protein for H', the non-combination with Cl', and a linear relation of the log. of the mean activity coeff. of the acid with increasing protein concn. (A., 1932, 802). The combining capacities for H' are 9.6×10^{-4} for (I), 13.4×10^{-4} for (II), and 8.0×10^{-4} for (III) in equivs. of combined H[•] per g. of protein. F. O. H.

Effect of temperature on the titration curve of caseinogen. V. A. PERTZOFF and S. C. CARPENTER (J. Gen. Physiol., 1932, 16, 257-265).-The data of Hoffman and Gortner (A., 1925, i, 1479) indicate that the effect of temp. is accounted for by the Bjerrum and not by the classical theory of ampholytes.

F. O. H. Reaction of proteins with iodic acid. H. BAUER and E. STRAUSS (Biochem. Z., 1932, 255, 287-288).—When excess of HIO_3 is added to aq. solutions or suspensions of most proteins, oxidation of cystine, cysteine, and tryptophan occurs, I being therefore liberated. No reaction is obtained with glycine, proline, phenylalanine, tyrosine, histidine, and P. W. C. glucosamine.

Isolation of citrulline, δ -carbamido-ornithine, from tryptic digestion products of caseinogen. M. WADA (Proc. Imp. Acad. Tokyo, 1932, 8, 367-370).—This isolation (A., 1930, 1224) is described. Digestion in 0.2% Na₂CO₃ solution produces ornithine, presumably by alkaline hydrolysis of citrulline. The latter gives proline with boiling cone. acids, and is not obtained by tryptic digestion of arginine.

A. C. Laws regulating the behaviour of organic dyes towards proteins, proteids, albuminoids, and nucleins. F. HUNDESHAGEN (Collegium, 1932, 854-861).-By testing these different substances with a solution of a mixture of an acid and a basic dye, "basophilic" substances which combine with acid dyes, "acidophilic" or "oxyphilic," which combine with basic dyes, and "amphophilic" or "neutrophilic" substances can be differentiated. Triacid or eosin dyes are the most suitable acid dyes for the purpose of this test. The N compounds can be arranged in the following order: proteins (most oxyphilic), nucleoalbumins, nucleoproteins, nucleins, nucleic acids (most basophilic). The oxyphilic character depends on the basic N groups in the proteins. The basophilic property is attributed to an acid complex, which contains H₃PO₄, present in nucleic acids but not in the first-mentioned proteins. The basophilic nature of proteins is intensified by introducing acid groups into the protein mol. An intensely basophilic product is produced in vegetable tannin of collagen. Dormant basophilic groups may be present in purely oxyphilic and amphophilic compounds, respectively, which can be made to function under conditions as described, and these are termed "pseudochromatic." D. W.

Contributions of synthesis to the investigation of proteins and their enzymes. M. BERGMANN (Naturwiss., 1932, 20, 941-943).-A discussion. Certain synthetic dipeptides, including those of proline (A., 1932, 935), are not attacked by dipeptidases. No increase in Van Slyke N occurs when proline peptides are hydrolysed. In tryptic digestion of gelatin CO₂H and Van Slyke N increase equally, but

in subsequent erepsin treatment the increase is in the ratio 1:0.3-0.5. Proline and oxyproline therefore occur in the interior of peptide chains.

Synthetic glycyldehydrophenylalanine is not attacked by dipeptidases, but an enzyme from kidney yields glycine, phenylpyruvic acid, and NH₃. The kidney is, therefore, a source of keto-acids and NH₃ derived from dehydrogenated NH₂-acids.

R. K. C.

Phosphatides of human brain. II, III. Y. YOKOYAMA and B. SUZUKI.-See this vol., 176.

Micro-determination of mol. wt. Relationships between constitution and mol. depression of the m.p. of organic compounds. J. PIRSCH (Ber., 1932, 65, [B], 1839-1842; cf. A., 1932, 713, 714, 925).—The ratio E/M is approx. const. for dicyclic compounds in which the 1:4-ring atoms are united by their cis-valencies through a > CMe₂ bridge (bornylamine, bornyl chloride, camphor, pinene dibromide). Borneol falls approx. into line, but bornyl bromide, m.p. 89°, shows a higher E than expected. 3-Bromocamphor diverges widely in its behaviour. Similar regularities appear to exist in the camphene series. The val. of E/M is approx. const. for transdipentene dihydrochloride, m.p. 50°, and dihydrobromide, m.p. 64°, and dipentene tetrabromide, m.p. 125°, but markedly smaller than that in the camphane series, fission of the CMe_2 bridge causing E to fall to of its val. H. W.

Sucharda and Bobranski's semimicro-method of elementary analysis. F. CALVET and L. MOSQUERA (Anal. Fis. Quim., 1932, 30, 853-864).-The method ("Sammlung Vieweg," 1929, Heft 94) has been used with petrol gas as the source of heat. Ascarite (Na asbestos) is used instead of soda-lime, and decalin is used in the PbO₂ thermostat. Improvement has been obtained by mixing the substance with CuO. R. K. C.

Determination of halogens in organic substances. G. ILLARI (Annali Chim. Appl., 1932, 22, 673-679).-Further tests confirm the validity of the author's method (A., 1930, 101). Heller's criticisms (A., 1929, 528, 1158) are answered. T. H. P.

Detection and determination of fluorine in organic compounds. W. BOCKEMÜLLER (Z. anal. Chem., 1932, 91, 81-90).-A review of published methods. D. R. D.

Micro-determination of methoxyl. V. BRUCK-NER (Mikrochem., 1932, 12, 153-160).-Improvements in technique are described. F. L. U.

Gravimetric determination of formic acid in presence of higher fatty acids. R. RIGAMONTI (Annali Chim. Appl., 1932, 22, 744-746).-Scala's method of determining HCO₂H by the reduction of HgCl, to HgCl (A., 1891, 248) may be made more rapid and more exact by addition of NaOAc.

T. H. P.

Detection of lactic acid. E. TIKKANEN (Farm. Notisbl., 1927, No. 5, 4 pp.; Chem. Zentr., 1932, ii, 2213).—Brauer's reaction (A., 1920, ii, 517) is sp. Preferably, to 0.5 c.c. of dil. lactic acid are gradually added, with cooling, 3 c.c. of H₂SO₄, and on to the mixture are floated at >50° 2 c.c. of freshly prepared 1% pyrocatechol (I) (or, better, guaiacol) solution. Gastric juice is first shaken with 4 vols. of Et_2O , and the extract, after evaporation of the Et_2O , is dissolved in H_2O and treated as above. With (I) CH_2O , paraldehyde (cherry-red), EtCHO, PhCHO, and vanillin give blood-red colorations. A. A. E.

Folin-Denis and naphtharesorcinol reagents. H. VON EULER, D. BURSTROM, and H. HELLSTROM (Svensk Kem. Tidskr., 1932, 44, 288-290).-Small amounts of the following substances do not react with the Folin-Denis reagent (A., 1913, ii, 163): tyrosine, phenylalanine, histamine, thyroxine, tryptophan, l-histidine, yeast-nucleic acid, and glutathione. Equiv. to 1 mg. of uric acid are adrenaline (0.3 mg.), cysteine hydrochloride (2.4 mg.), and hexuronic acid (I) (0.8 mg.). (I) in aq. solution and in absence of O₂ does not respond to the Tollens reaction (A., 1908, ii, 638), but does so after oxidation by atm. O_2 . With <4 mg. of (I) the depth of colour produced by the reagent increases with time. Unlike (I), d-fructose yields only a brown colour which shows no absorption F. O. H. in the neighbourhood of the D-line.

Titrimetric determination of sugars. S. KRAUZE (Wiadom. Farm., 1932, 59, 267–269, 283–285).—Lactose is best determined by Fellenberg's modified method, which is now applied to the determination of sugar in urine. Adsorption of sugar is partly avoided by decolorising with $Hg(NO_3)_2$ instead of Pb(OAc)₂. The transition point is sharpened by addition of anhyd. Na₂SO₄ to the titrated liquid.

CH. ABS.

Colour reactions of some nitro-compounds. I. V. KULIKOV and S. V. PANOVA (J. Gen. Chem. Russ., 1932, 2, 736—740)—An adaptation of Flürscheim's method (J.C.S., 1908, 93, 1463, 1772) can be used to detect 2:3- and 3:4-dinitrophenols in 2:5-dinitrophenol; the coloured solution is acidified and shaken with CHCl₃, which is coloured yellow if these impurities are present. The test is sensitive to 1 in 660,000. Compounds reducible to *o*-diamines can also be detected by treating the acid solution with Zn dust and adding CH₂Ac₂, an intense violet colour being produced. The test is sensitive to 1 in 200,000.

G. A. R. K.

Use of ferrous sulphates and bromine water in detection of some substituted phenols. R. FOLCH and O. FERNÁNDEZ (Anal. Fís. Quím., 1932, 30, 851—852).—Dil. solutions of adrenaline, adrenalone, and thiocol give permanent colorations with $FeSO_4$ solution followed by Br-H₂O. R. K. C.

Microchemical detection of novocaine. M. WAGENAAR (Mikrochem., 1932, 12, 143—150).—Substances giving characteristic micro-cryst. ppts. with solutions of novocaine are enumerated. The most sensitive tests are those with H_2PtCl_6 (0.01 mg.) and aq. Br (0.001 mg.). Furfuraldehyde gives an intense red colour and can be used in examining minute quantities of a solid specimen. F. L. U.

Reactions for caffeic and chlorogenic acids. W. HOEPFNER (Chem.-Ztg., 1932, 56, 991).—In aq. acid (AcOH, H₃PO₄) solution, caffeic acid (I) gives with NaNO₂ a deep cinnabar-red or, in very high dilution, orange coloration; sensitiveness 1:10⁵. Under similar conditions, chlorogenic acid or its salts give a bright yellow coloration, becoming carmine on addition of excess of NaOH; sensitiveness at least 1:10⁶. Possible destruction of either colour by NO₂ is obviated by addition of much CO(NH₂)₂. EtOH disturbs the reactions. The first reaction serves to detect free (I) in treated coffee beans, and the second may be made quant. with the help of a Pulfrich photometer. Detailed procedure is given. T. H. P.

Microchemical identification of caffeine. H. J. SANDRUS and M. L. WILLARD (Mikrochem., 1932, 12, 137—142).—Of 23 residues obtained by evaporating mixed solutions of caffeine and metallic salts in presence of an acid the most characteristic are obtained with $PtCl_2$ and with nitrates of Al, Sr, Ba, Bi, Hg^{II}, Ag, and Tl^I. Photomicrographs are given. F. L. U.

Nephelometric determination of caffeine. E. HERNDLHOFER (Mikrochem., 1932, 12, 227–230).— The turbidity produced in a solution of caffeine by Na phosphotungstate is measured in a nephelometer. The method can be applied to 0.25 g. of plant material containing about 1% of caffeine. F. L. U.

Modification of the iodometric determination of caffeine by Wallrabe's method. G. MIKÓ (Magyar Gyog. Tars. Ert., 1932, 8, 291–294; Chem. Zentr., 1932, ii, 1484).—The caffeine salt (0·3 g.), dried at 100°, is dissolved in H₂O (20 c.c.), treated with $0\cdot 1N$ -KH(IO₃)₂ solution (50 c.c.), KI (2 g.), and 5N-H₂SO₄ (5 c.c.), diluted after 1 hr. to 100 c.c., shaken, and filtered. The first 25 c.c. of filtrate are rejected, and of the rest 50 c.c. are titrated with $0\cdot 1N$ -Na₂S₂O₃ [1 c.c. $0\cdot 1N$ -KH(IO₃)₂= $0\cdot 00485$ g. anhyd. caffeine]. A. A. E.

Microchemical identification of alkaloids [dilaudide]. F. AMELINK (Pharm. Weekblad, 1933, 70, 2—3).—Dilaudide (dihydromorphinone) gives characteristic, microcryst. ppts. (illustrated) in 0.1% solutions with Dragendorff's reagent (needles and quadratic platelets) and Na nitroprusside (hexagonal prisms). PtCl₄, AuCl₃, HgCl₂, KOH, K₃Fe(CN)₆, K₄Fe(CN)₆, and picrolonic acid give indefinite or sol. compounds. S. C.

Biochemistry.

Oxidation of hæmoglobin-iron by potassium ferricyanide and the equilibrium of the reaction. H. SCHÜLER (Biochem. Z., 1932, 255, 474-488).— When K_3 Fe(CN)₆ reacts with CO-hæmoglobin more $K_3Fe(CN)_6$ is used than corresponds with the CO liberated, the extra utilisation being equiv. to 2 mols. $K_3Fe(CN)_6$ per g.-atom of hæmoglobin-Fe. Globin separated from hæmin utilises 2 mols. $K_3Fe(CN)_6$ per

mol. of globin. The manometric and optical determinations of the dissociation const. and of the equilibrium const. are described. P. W. C.

Absorption of light by globin-hæmochromogen and its use for determination of blood-pigment. A. DÉNES (Biochem. Z., 1932, 255, 378-386).—The absorption curves for horse-, dog-, and cat-globinhæmochromogen are similar in form to, but differ somewhat from, those for pig and man. They show absorption max. at 555.8 and 527.1 m μ and min. at 540.0 m μ . A method for calculating the pigment content of blood using the extinction coeffs. and A-vals. is given. P. W. C.

Mol.wt. of the hæmocyanin of Octopus vulgaris. T. SVEDBERG and I. B. ERIKSSON.—See this vol., 171.

Change in physico-chemical properties of hæmoglobin and in the acid-base equilibrium after splenectomy in dogs. G. GROSCURTH and J. GLASS (Klin. Woch., 1932, 11, 1071; Chem. Zentr., 1932, ii, 1318).—HCO₃' increases and CO₂ tension falls. A. A. E.

Change in isoelectric point of hæmoglobin and its relation to acid-base economy. J. GLASS and G. GROSCURTH (Klin. Woch., 1932, 11, 1070-1071; Chem. Zentr., 1932, ii, 1196).

Osmotic pressure of globin. J. ROCHE, A. ROCHE, G. S. ADAIR, and M. E. ADAIR (Biochem. J., 1932, 26, 1811—1828).—There is a striking difference at $p_{\rm H}$ 7.7 and $p_{\rm H}$ 5.6 between the relationship of osmotic pressure to concen. of ox-globin (I) and hæmoglobin (II) equilibrated with the same buffer solution. In (I) the ratio of partial pressure of protein to concen. tends to diminish as the protein concen. is increased. At $p_{\rm H}$ 7.7 the mean mol. wt. of (I) may be greater than that of (II). At $p_{\rm H}$ 5.6 paraglobin is more highly aggregated than native globin. S. S. Z.

Vanadium chromogen of Ascidia blood. M. HENZE (Z. physiol. Chem., 1932, 213, 125—135).— The chromogen contains 39.0% C, 4.6% H, 7.4% N, and 10.1% V. After acid hydrolysis the humin-N was high (18.8% of the total). The V in the chromogen is bivalent and is oxidised to the V^{III} state by methylene-blue or indigo. The CO₂ content of *Phallusia* blood is < that of sea-water. J. H. B.

Modification of Yoshimatsu's potassium method with 0'1 c.c. of blood. S. YOSHIMATSU and Y. UGA (Tôhoku J. Exp. Med., 1932, 19, 156— 161).—K in the Kramer–Tisdall protein-free filtrate is pptd. as cobaltinitrite and redissolved in HNO_3 ; the colour is developed by adding dimethylglyoxime and Na₂S. The average error with 0.1 c.c. is 3%.

CH. ABS.

Diffusible calcium in the blood-stream. V. Influence of agents which affect blood-calcium on calcium distribution and inorganic phosphate of serum. D. M. GREENBERG and L. GUNTHER (Arch. Int. Med., 1932, 50, 855-875).—The authors' method (A., 1930, 361) for determination of diffusible Ca (I) gives reproducible and concordant results. In absence of bile (dog with fistula), there was little change in total Ca and in (I) over 2 months, and there was no daily rhythm of change in blood-Ca and -PO₄. On ingestion, the increase in Ca was equiv. to the Ca

given and was due to an increase in (I); the nondiffusible Ca (II) does not change. After injection of parathyroid extract, the increase in Ca was due to equal increases in (I) and (II). H. G. R.

Blood-phosphate compounds in health and disease. S. GERÉB and D. LASZLO (Klin. Woch., 1932, 11, 800—802; Chem. Zentr., 1932, ii, 1032).— Hyperphosphatæmia is regarded as a readily demonstrable symptom of phosphate poverty. A. A. E.

Determination of oxygen required to combine with oxidisable material in blood and to oxidise the intermediate products of metabolism. L. N. LAPIN (Biochem. Z., 1932, 256, 20-36).—A method for determining the amount (I) of O required to combine with the oxidisable substances in 100 c.c. of blood is described. By subtracting from (I) the amount of O consumed by the blood-sugar present (a table is given) the O required (II) for oxidising the intermediate products of degradation is obtained. (In the blood of birds account must be taken of the O required to oxidise uric acid.) Average figures for (I) and (II) in man, rabbits, guinea-pigs, and wethers are given. (II) is not identical with "differ-ence val." Serum contains 2.5 times as much sugar as do erythrocytes, but the val. of (I) is about the same in both. In human blood (I) usually increases as blood-sugar increases, but no relation has been found between (I) and (II). W. McC.

Manometric determination of residual and total nitrogen. R. IWATSURU, Y. NAKAI, T. ITO, and K. KOBAYASHI (Biochem. Z., 1932, 256, 18—19; cf. A., 1928, 912).—Prepared material (e.g., from 1.0 c.c. of serum or plasma) is heated with H_2SO_4 as in the micro-Kjeldahl method, and the solution, after being made first alkaline with conc. NaOH and then almost acid with 0.1N- H_2SO_4 , is diluted to known vol. 20 c.c. of the dil. solution are then treated with NaOBr in a Barcroft apparatus. Residual N is thus determined. Total N is determined in the same way but with addition of a few drops of 10% Na tungstate to the H_2SO_4 used for destruction of the org. matter. W. McC.

Determination of residual nitrogen and its fractions. I. Micro-determination of residual nitrogen in blood. F. RAPPAPORT (Klin. Woch., 1932, 11, 688—689; Chem. Zentr., 1932, ii, 747).— 0.2 c.c. of blood or serum is hæmolysed with Na₂SO₄ containing H₂SO₄ and treated with phosphomolybdic acid. After Kjeldahlisation the filtrate is distilled in a Parnas-Wagner apparatus. NaOBr is added and the excess determined iodometrically. L. S. T.

Determination of residual nitrogen and its fractions. II. Micro-determination of urea in blood and serum. F. RAPPAPORT and A. GLASER (Klin. Woch., 1932, 11, 814; Chem. Zentr., 1932, ii, 747; cf. preceding abstract).—Urea-N is converted into NH₃ by urease on warming. Urease and proteins are pptd. by Na tungstate and H_2SO_4 . The NH₃ formed is distilled and determined iodometrically.

L. S. T.

Micro-determination of blood-urea-nitrogen. A. G. KELLER (J. Lab. Clin. Med., 1932, 17, 1146-1147).—A modification of Karr's method (A., 1925, i, 323) permits the use of 0.2 c.c. CH. ABS.
Colorimetric determination of the true glucose content of body-fluids. E. HERZFELD (Biochem. Z., 1932, 256, 127–133; cf. A., 1932, 416). $-0\cdot1 0\cdot5$ c.c. of fluid (serum, plasma) is treated with NHPh·NH₂,2HCl and NaOAc and the osazone produced is dissolved during 1 hr. at 100°, after purification, in HCl-96% EtOH. For the colorimetric determination which follows, aq. K₂Cr₂O₇ is used as standard. The results, which are as accurate as those obtained in the Hagedorn and Jensen method, represent glucose but not other reducing substances. W. McC.

Normal renal threshold for glucose. R. A. CAMPBELL, E. E. OSCOOD, and H. D. HASKINS (Arch. Int. Med., 1932, 50, 952—957).—Filtrates by Somogyi's method (A., 1930, 801) of removing bloodproteins give true sugar vals. within a range of ± 7 mg. per 100 c.c. Tungstate pptn. averages 21 mg. higher. A probable range for the normal renal threshold is 105—200 mg. H. G. R.

Leech method of blood analysis. I. Cholesterol. T. SATO. II. Potassium. Y. UGA (Tôhoku J. Exp. Med., 1932, 19, 162—164, 165—167). —Vals. for rabbit or human blood recovered from leeches are correct to within 2% or 3%, respectively. CH. ABS.

Process for demonstrating lability in serum. G. A. BROSSA (Biochem. Z., 1932, 256, 55-63; cf. Sahlbom, A., 1911, ii, 100).—Normal serum can be distinguished from labile by addition of equal amounts of each to a solution of a positive hydrosol (e.g., night-blue) into which filter-paper is then dipped. The dye always rises higher in the case of the normal than in that of the labile serum. W. McC.

Critical temperature of serum. VI. Absorption spectra in the ultra-violet, visible, and near infra-red regions. P. LECOMTE DU NOÜY and M. LECOMTE DU NOÜY (Ann. Inst. Pasteur, 1932, 49, 762—777).—The wave-lengths of the max. and min. points on the absorption curves in ultra-violet light of normal horse or sheep serum are not affected by warming to 55—65°, although at the latter temp. the actual densities are increased. In strongylosis in sheep the curve is considerably flattened in the terminal stages of the disease. The curves in the visible and infra-red regions are far less const. even for normal serum, and no definite changes were observed in serum heated at 60° for 10 min.

P. G. M. Alleged transformation of serum-albumin into serum-globulins. S. B. HOOKER and W. C. BOYD (Science, 1932, 76, 517).—The addition of heparin to crude but not to pure horse-serum albumin at $p_{\rm H}$ 5 ppts. a substance sol. in salt solution and precipitable by half saturation with (NH₄)₂SO₄. The albuminheparin mixture or compound still reacted to the same degree as albumin with an anti-albumin serum, but did not react with anti-globulin sera prepared either by injecting isolated globulin or by absorbing

L. S. T.

Determination of serum-albumin and -globulin without using precipitating electrolytes. P.

an anti-horse serum with albumin. The latter reacted

readily with globulin.

MERKLEN, E. LE BRETON, and A. ADNOT (Compt. rend. Soc. Biol., 1931, **107**, 758—760; Chem. Zentr., 1932, ii, 1483).—Serum, diluted with an equal quantity of H_2O , is treated with 8 pts. of COMe₂ at 0°; the ppt. is centrifuged, dissolved in H_2O to the original vol., and again pptd. with 10 pts. COMe₂. If the serum contains much fat, 3 pptns. are necessary. The dried ppt. gives the total protein; it is pptd. in cold H_2O (10 pts. of H_2O to 1 pt. of serum) and CO₂ is passed through the solution for 6 min. The $p_{\rm H}$ val. becomes const. at 5.5. The ppt. contains the globulin. The albumin is calc., or is determined by pptn. of the acidified residual solution with COMe₂.

A. A. E.

Suspensions of proteins precipitated from serum by acetone. C. ACHARD and A. BOUTARIC (Compt. rend., 1932, 195, 1196—1197).—Comparisons of the physical properties of sera with fresh suspensions of the proteins freshly pptd. from them by COMe₂ show that proteins are not denatured by COMe₂ pptn. A. C.

Determination of direct and indirect bilirubin in blood-serum. B. VARELA and J. ESCULIES (Compt. rend. Soc. Biol., 1931, 107, 884—886; Chem. Zentr., 1932, ii, 1483).—Serum (1 c.c.) is mixed and centrifuged with CHCl₃ (4 c.c.), which dissolves the "indirect" bilirubin. After several repetitions the CHCl₃ is evaporated and the bilirubin determined in the residue by Ehrlich's reagent, whilst the aq. layer is freed from CHCl₃ and used for determination of the "direct" bilirubin (originating in the liver).

A. A. E.

Formation of leucocyte protease during immunisation. M. GAROFEANU and H. IOAN (Compt. rend. Soc. Biol., 1931, 108, 297–298; Chem. Zentr., 1932, ii, 1638).—In normal rabbits little or no protease was found; injection of horse serum causes an increase, the amount becoming const. or diminishing after several injections. A. A. E.

Hæmotoxic behaviour of glutamic acid. F. SULMANN (Z. Immunitāt., 1932, 74, 459—468; Chem. Zentr., 1932, ii, 735).—d-Glutamic acid (1:6000) in vitro is hæmotoxic towards the blood-corpuscles of warm-blooded animals. Urea in conc. solution and many protein degradation products, mainly NH₂acids, are not hæmolytic. L. S. T.

Relationship between structure of antigen and specificity of antibody. H. ERLENMEYER and E. BERGER (Biochem. Z., 1932, 255, 429–433).—The antigens prepared from diazotised *p*-aminophenylphosphinic and -arsinic acids, but not that from *p*-aminophenylantimonic acid, react with two antisera prepared against the antigen produced from diazotised atoxyl by coupling with horse serum and with cryst. ovalbumin. P. W. C.

Specific union of precipitins and chemospecific antigens *in vivo* by injections of simply constituted substances. E. BERGER and H. ERLENMEYER (Biochem. Z., 1932, 255, 434–445).—When rabbits are immunised with diazotised atoxyl coupled with cryst. ovalbumin, precipitins are obtained the specificity of which is determined by the arsinic acid and not by the injected protein. In neutralisation experiments the appearance of a sp. union is detected in vivo. A reduction or complete disappearance of precipitin from the blood-stream was obtained by injection of pure aminophenylarsinic acid (I), or of diazotised (I) coupled with tyrosine or with horse serum. Pure atoxyl is less active than the azoprotein and the arsinic acid coupled with tyrosine. P. W. C.

Role of lipoidal substances in complement fixation. W. S. STONE (Milit. Surg., 1932, 71, 61— 66).—Lipins normally present in the antiserum are essential to its reactivity. A hypothetical explanation of the Wassermann reaction is advanced.

CH. ABS.

Antibodies in the fibrinogen of immune serum. K. CHIHARA (Japan. Z. Mikrobiol. Path., 1932, 26, 733—739).—Agglutinin for typhoid bacilli, hæmolysin for goat's red blood-cells, and precipitin for horse serum were found in the fibrinogen of sera containing these antibodies. CH. ABS.

Metallic colloids. I. Influence on production of antibodies. Effect on production of agglutinins. II. Precipitins. III. Hæmolysins. R. YOSHIDA (Japan. Z. Mikrobiol. Path., 1932, 26, 196—218, 449—468, 561—582).—The behaviour of colloidal Ag, Sn, Sb, Hg, Bi, Au, Se, Pt, Fe, Pb, and Cu is recorded. CH. ABS.

Immunological reaction to the enzyme papain. R. P. WALTON and C. M. SEGURA (Biochem. J., 1932, 26, 1750—1753).—Continued injections (intravenous and intraperitoneal) of papain did not produce an anti-enzymic serum in dogs. S. S. Z.

Chemistry of the aqueous humour. Z. STARY and R. WINTERNITZ (Z. physiol. Chem., 1932, 212, 215-233).—The aq. humour of the horse contains 7.4 mg. of Ca, 1.7 mg. of Mg, 20.1 mg. of K, and 348 mg. of Na per 100 c.c. (average vals.). These figures (except Na) differ from those for serum and cerebrospinal fluid, but approx. to those obtained for the ultra-filterable portion of serum, and suggest this origin. J. H. B.

Phosphatides of human brain. II. Isolation of lecithins of the α -series. III. Isolation of lecithins of the β -series. Y. YOKOYAMA and B. SUZUKI (Proc. Imp. Acad. Tokyo, 1932, 8, 358— 360, 361—363).—II. The α -lecithins have been brominated in Et₂O, and fractionated by CHCl₃ and COMe₂, affording dioleo- α -lecithin tetrabromide, an oil; palmito-oleo- α -lecithin dibromide, an oil; oleoarachidono- α -lecithin decabromide, m.p. 189° (decomp.); palmitoarachidono- α -lecithin octabromide, m.p. 112° (decomp.).

III. The mixture of bromo- β -lecithins yields, on fractionation with solvents, dioleo- β -lecithin tetrabromide, an oil; palmito-oleo- β -lecithin dibromide, an oil; oleoarachidono- β -lecithin decabromide, m.p. 119°; and linoleoarachidono- β -lecithin dodecabromide, m.p. 124° (decomp.). A. C.

Cholesterol of the human brain. C. ANTONI-ANI and F. ZANELLI (Atti R. Accad. Lincei, 1932, [vi], 16, 150–153).—Cholesterol from the brain of the feetal or adult human has the same mol. wt. and % composition as that of the bile, but a slightly higher m.p. (150–151°), probably owing to its greater purity. Small (but insignificant) differences occur in the $[\alpha]_p$ of the two products. T. H. P.

Applications of the diamine dye group in histology. I. Vital stains. II. Electric charge of dyes, their chemical structure, and vital staining. III. Diffusibility and solubility in lipin of dyes and vital staining. K. FUJITA (Japan. Z. Mikrobiol. Path., 1931, 25, 1477-1504, 1505-1518, 1519-1536). CH. ABS.

Active substance from the lung. J. DADLEZ and W. KOSKOWSKI (Compt. rend. Soc. Biol., 1931, 107, 75—77; Chem. Zentr., 1932, ii, 1318).—The comminuted lung was repeatedly extracted with EtOH, the extract conc. in vac., the concentrate extracted with Et₂O, conc., centrifuged, and poured into much EtOH. The ppt. was repeatedly washed with EtOH and abs. EtOH. The last traces of histamine were removed by treatment of a 5% aq. solution with active C and centrifuging. The solution has a pressor effect in the chloralosed cat, and causes uterine contraction in the virgin guinea-pig, and expansion of the melanophores of the frog, thus behaving like posterior pituitary extracts. A. A. E.

Lipins of mammalian liver. II. Occurrence of lignocerylsphingosine in pig's liver. E. FRANKEL and F. BIELSCHOVSKY (Z. physiol. Chem., 1932, 213, 58-62; cf. A., 1932, 294).—Lignocerylsphingosine, $[\alpha]_{1}^{24}$ -2.5°, was isolated from pig's liver (0.06%). J. H. B.

Iron in the liver and spleen after destruction of blood and transfusions. S. A. GLADSTONE (Amer. J. Dis. Children, 1932, 44, 81—105).—The large amounts of Fe present in the livers of infants 1—10 weeks after birth appear to be due both to hæmorrhages into the tissues or cavities of the body of the fœtus or infant and to post-natal intravascular destruction of blood. Transfusion of blood in infants aged ≤ 3 months is followed by increased deposition of Fe in the liver and spleen. The total non-hæmoglobin Fe content of the liver of infants aged ≤ 3 days is 32 mg. CH. ABS.

Glycogen in cartilage. H. A. HARRIS (Nature, 1932, 130, 996—997).—Mainly a discussion on the association of glycogen (I) with phosphatase (II) in the senescent cell for the purpose of bone formation. In human and other embryos cartilage cells in the neighbourhood of the epiphysis store (I) in direct proportion to their age. The osteoblasts and highly vascularised bone contain no (I). It is suggested that the senescent or hypertrophic cartilage cells provide both the (II) and the (I); the latter yields on hydrolysis hexosephosphoric esters which by the action of (II) and the Ca of the circulating body-fluids deposit Ca phosphate on the matrix. L. S. T.

Muscle extractives. XXXII. Extractives of crucian flesh. H. TALANOVA (Z. physiol. Chem., 1932, 213, 8—10).—The flesh of *Carassius carassius* contains methylguanidine and traces of guanine, but carnosine and carnitine could not be detected.

J. H. B.

Melanin acids in binary systems. O. ADLER (Biochem. Z., 1932, 256, 228-235; cf. A., 1930, 493). --Mixed m.-p. or softening-point curves of melanin acids with pyramidone, benzidine, or urea indicate the possibility of distinguishing between these acids by the extents of the depressions produced. The sepia acid and the acid from sarcoma seem to be very similar.

W. McC.

Natural melanins. H. WAELSCH (Z. physiol. Chem., 1932, 213, 35-57).-Melanins were obtained from various sources (chorioid and retinal pigment of the horse's eye, liver metastases of malignant human eye melanoma) and were purified by digestion with pepsin hydrochloride, flotation of impurities, and extraction of fat. The elementary composition varied considerably. All samples contained a protein group, not hydrolysed by enzymes but removed by digestion with HCl. It has high amide- and non-NH2-N, but low NH2-acid content. It is digested after treatment with Br in AcOH. The chorioid melanin contained traces of Fe and all contained S. The pigmenting groups of sarcoma melanin were const. in composition, but differed from those of chorioid melanin and fuscin. J. H. B.

Cholesterol and water content of the adrenal cortex in mammals. C. I. PARHON and M. CAHANE (Compt. rend. Soc. Biol., 1931, 107, 836–837; Chem. Zentr., 1932, ii, 1462).—In females the H_2O content is >in males; generally a high H_2O content is associated with a low cholesterol content. A. A. E.

Lipolytic properties of the adrenals. I. PAR-FENTIEV and B. SOKOLOV (Compt. rend. Soc. Biol., 1931, 107, 114—115; Chem. Zentr., 1932, ii, 1317).— H₂O, glycerol, and EtOH extracts have no lipolytic action or lipase-inhibiting properties. A. A. E.

Iodine content of ox thyroids. I. I. NITZESCU and E. BINDER (Compt. rend. Soc. Biol., 1931, 108, 281—282; Chem. Zentr., 1932, ii, 1794).—The I content of the fresh gland is 0.076—0.088%; seasonal variations were not observed. A. A. E.

Effects of high-protein diets on the thyroidgland iodine. R. McCARRISON and K. B. MADHAVA (Indian J. Med. Res., 1930, 18, 619-661).—Highprotein diets *per se* do not regularly cause thyroid enlargement in growing rats, even if the diet is poor in fat-sol. vitamins or I. The increase occasionally noted is referable to deficiency of fat-sol. vitamin, and not to impaired absorption of I. The diets caused polyuria and albuminuria and stimulated urinary excretion of I. CH. ABS.

Comparison of the body constituents of parasite and host. II. Electrometric titration of extracts of *Balaninus dentipes*. T. SASAKI (Keijo J. Med., 1932, 3, 354—359).—The similarity between constituents of the chestnut (I) and those of its parasite, *B. dentipes* (II) (cf. A., 1932, 1275), is extended by the parallelism of the titration curves of extracts (10% NaCl, 1% AcOH, and 1% NaOH) of the fat-free (I) and (II). This is due to the protein constituents, for the N contents are 1.84 (I) and 9.61% (II). F. O. H.

Vanadium in some Tunicates. J. CANTACUZÈNE and A. TSCHEKIRIAN (Compt. rend., 1932, 195, 846— 849).—The H₂O-washed ash of nine species of Tunicates contains V in amount varying from 15.4% in *Ciona intestinalis* to 0.05% in *Styllopsis grossularia*. The V is detectable in an EtOH extract of the uncalcined animal. It seems to take the place of Cu, which is absent from these animals. No V was found in three Polyclinids (cf. A., 1911, ii, 740; 1930, 361). C. A. S.

Occurrence of the paralytic shell-fish poison in the common sand-crab. H. SOMMER (Science, 1932, 76, 574-575).—The poison may occur in a high concn. in *Emerita analoga*. L. S. T.

Detection of toxins in the milk of lactating women during menstruation. E. ELTZ (Jahrb. Kinderheilk., 1932, 86, 82—115; Chem. Zentr., 1932, ii, 1464).—A substance which arrests the growth of *Lupinus albus* seedlings is present. The substance can pass undecomposed through the intestinal wall.

A. A. E.

Influence of different levels of fat intake on milk secretion. L. A. MAYNARD and C. M. McCAY (New York [Cornell] Agric. Exp. Sta. Bull., 1932, No. 543, 40 pp.).-Cows fed on rations from which all but 1% of fat was extracted and replaced by an equiv. of starch produced heavily decreased milk and fat yields. In similarly treated rations in which 3% fat remained, milk yields were still subnormal. Partial replacement of fat in rations by starch produced milk-fat having a higher I val. There was also a gradual lowering of the total fatty acids, phospholipin fatty acids, and the cholesterol of the blood-plasma, the changes being closely parallel for the three constituents. The glucose contents of the whole blood, cells, and plasma were not affected by the above changes in the ration. A. G. P.

Effect of different planes of protein intake on milk production. E. S. HARRISON and E. S. SAVAGE (New York [Cornell] Agric. Exp. Sta. Bull., 1932, No. 540, 24 pp.).—Supplied in amounts > equiv. to 127% of the protein output in milk (after deduction for live wt. maintenance) there was no evidence that protein stimulated milk production. A. G. P.

Influence of arsenical dipping on yield of milk by dairy cows. P. T. D. ARNOLD, W. M. NEAL, and R. B. BECKER (J. Dairy Sci., 1932, 15, 407-412). —Dipping for the eradication of cattle fever ticks resulted in a small decrease (1.9%) in milk flow. The greatest reduction occurred in the second milking after dipping and is ascribed to absorption of As.

A. G. P.

Effect of feeding irradiated ergosterol to cows on the vitamin-D content of milk. W. E. KRAUSS, R. M. BETKE, and C. F. MONROE (J. Nutrition, 1932, 5, 467-477).—Irradiated ergosterol dissolved in maize oil, when fed to cows, increased the vitamin-D content of the milk. The vitamin-D of such milk was less effective than that of cod-liver oil for calcification in chicks. A. G. P.

Adsorption of calcium ions on caseinogen in milk. K. BALLOWITZ (Biochem. Z., 1932, 256, 64-74).—The $p_{\rm H}$ of milk is not altered by boiling but is lowered by addition of CaCl₂, which, at $p_{\rm H}$ 5.95— 6.05, ppts. the caseinogen (I). The boiling causes adsorption of the Ca in such a way that max. adsorption coincides with max. pptn. The inability of boiled milk to coagulate with rennet is removed by addition of an amount of CaCl₂ equiv. to the Ca adsorbed by the (I) during boiling. This explains why boiled milk is more difficult to assimilate than unboiled. The coagulation of milk by rennet is not affected by K and Na salts, but is accelerated by Ca > Ba > Mg. The order corresponds with the order of the sp. pptg. effect on (I) of these metals.

W. McC.

Effect of parathyroid hormone on milk-calcium. C. I. PARHON and I. ORNSTEIN (Compt. rend. Soc. Biol., 1932, 110, 921-822; Chem. Zentr., 1932, ii, 1317).—With bitches no change was observed.

A. A. E. Determination of calcium and phosphorus in saliva. F. KRASNOW, M. KARSHAN, and L. E. KREJCI (J. Lab. Clin. Med., 1932, 17, 1148—1152).— Salivary Ca is titrated with 0.005N-KMnO₄ after ashing or treatment with CCl₃·CO₂H. Tisdall's method is employed for the determination of P in ashed or unashed material; Fiske and Subbarow's method is applicable only to ashed material.

CH. ABS.

Bile-stimulating action of iodosalicylic acids. L. KAUFTHEL and F. RAPPAPORT (Arch. exp. Path. Pharm., 1932, 168, 654—667).—Administration of Na 5-iodo-, 5-iodo-acetyl-, and iodosalicyl-salicylates to dogs with a bile fistula markedly increases the amount of bile secreted, but other halogeno-salicylic acids are without appreciable action. W. O. K.

Dependence of the fermenting power of intestinal juice on the diet. I. Amylolytic enzyme. S. ANDREEV and S. GEORGIEVSKY (Pflüger's Arch., 1932, 230, 33—41; Chem. Zentr., 1932, ii, 1313).— 'The amylolytic val. (Wohlgemuth) rises on a breadmilk diet, falls when the carbohydrate is diminished, and is lowest on a meat diet. A. A. E.

Acid response of the stomach to test meals of protein, fat, and carbohydrate. W. H. BARROW (J. Lab. Clin. Med., 1932, 17, 1094—1100).—The character of the food does not affect the acid response of the stomach. CH. Abs.

Isolation of citrulline, δ-carbamido-ornithine, from tryptic digestion products of caseinogen. M. WADA.—See this vol., 172.

Bile acid of bear's bile. K. TANAKA (Z. physiol. Chem., 1932, 213, 199-200).—The chief constituent is taurocholic acid. J. H. B.

Cholagoguic action of guaiacol derivatives. E. CHABROL, R. CHARONNAT, M. MAXIMIN, and R. WAITZ (Compt. rend. Soc. Biol., 1931, 107, 1240—1243; Chem. Zentr., 1932, ii, 1652).—Guaiacol, eugenol, vanillin, vanillic acid, and vanillyl alcohol, and also o-vanillin, have the same cholagoguic action.

A. A. E.

Influence of food on the nutrition of insects [silkworms]. S. BITO (Bull. Sericult. Japan, 1932, 5, 5).—Leaves of *Cudrania triloba* contain less protein than mulberry leaves. Silkworms fed on the former have slower larval growth and poorer production of silk than those fed on the latter. Pupæ fed on *Cudrania* leaves contain more protein but less fat and glycogen than those fed on mulberry leaves.

B. P. R.

Relation between food plants and the properties of the cocoons of Anthereea Yamamai and A. Pernyi. K. KITAZAWA (Bull. Sericult. Japan, 1932, 5, 6).—Leaves of Quercus dentata contain less H_2O , ash, fat, and protein, but more fibre, tannin, and sol. N-free extract, than those of Q. serrata. Tussah silkworms fed with the former spin larger cocoons, whilst Yamamai silkworms fed on the latter spin the larger cocoons with a higher percentage of silk. The cocoons of both wild silkworms fed on leaves of Q. dentata are poor in silk and difficult to reel. B. P. R.

Wild silks. II. Isoelectric point of liquid silk. III. Viscosity of fibroin sol. S. Biro (Bull. Sericult. Japan, 1932, 5, 3, 3–4).—II. The isoelectric points of the liquid silk from the wild silkworms Antheræa pernyi and Dictyoploca japonica occur at $p_{\rm H}$ 2.6 and 2.8–2.92, respectively.

III. Wild silk is more resistant to Loewe's reagent than is true silk, the order of increasing resistance to dissolution being : true silk, Kuriwata, Yamamai, tussah, and Attacus cynthia. The viscosity of the fibroin sols decreases with increasing time and is represented by the equation $\eta = at^b$, where η is the viscosity, t the time in hr., and a and b are consts. B. P. R.

Effect of figs and small amounts of raisins on urinary acidity. L.G. SAYWELL (J. Nutrition, 1932, 5, 519–525).—Addition of raisins or figs to the ration increased the $p_{\rm H}$ of urine and decreased the total acids and NH₃ excreted. A correlation between ash alkalinity and physiological reaction is recorded.

A. G. P.

[Qualitative analysis of] urinary sediments. G. KLEYER (Pharm. Ztg., 1932, 77, 1312).—The sediment is extracted with warm dil. HCl and the residue tested for uric acid. The extract is diluted and tested for Ca oxalate and phosphate, Mg phosphate, and "triple phosphate," using a technique which dispenses with filtration. F. O. H.

Determination of contrast media [iodine compounds] in urine. J. H. C. NIEVERGELD (Pharm. Weekblad, 1932, 69, 1422—1425).—Na 5-iodo-2pyridoneacetate (Uroselectan), iodomethanesulphonate (Abrodil), "*N*-methyl-2:5-di-iodopyridoxyl-2:6dicarboxylate" (Uroselectan B), and diethanolamine 3:5-di-iodo-4-pyridone-*N*-acetate (Perabrodil), used as contrast media in X-ray diagnosis, are excreted in the urine, but not as iodides. To determine the amount excreted, 5 c.c. of urine are evaporated with 2 g. of K₂CO₃ and ignited. The melt is extracted with H₂O, I oxidised with KMnO₄ to HIO₃, and the latter determined by KI and Na₂S₂O₃. S. C.

Phosphorus metabolism. III. Determination of phosphorus in urine. G. E. YOUNGBURG (J. Lab. Clin. Med., 1932, 17, 1145—1146).—Phosphomolybdate is reduced by SnCl₂. CH. ABS.

Effect of hydrolysis on the sugars of normal urine. A. HASSAN and M. A. S. EL AYYADI (Biochem. J., 1932, 26, 1851—1856).—Hydrolysis with 10% HCl of charcoal-treated urine, except when sucrose is present, diminishes the reducing power. This is due at least in part to the destruction of "*iso*maltose" occurring normally in urine. S. S. Z.

Sugars of urine. I. Determination of reducing sugars of urine. E. S. WEST and V. L. PETER-SON. II. Factors affecting excretion of fermentable and non-fermentable sugars in urine. E. S. WEST, A. C. LANGE, and V. L. PETERSON. III. Nature of the fermentable sugar of normal and starvation urine. E. S. WEST and A. STEINER (Biochem. J., 1932, 26, 1720-1727, 1728-1741, 1742-1749).—I. The method is based on the prep. of HgSO₄-BaCO₃ filtrates followed by determination of fermentable and non-fermentable sugar using washed yeast and a sensitive Shaffer-Hartmann reagent. Fermentable sugar was present in almost all 24-hr. samples of normal urine, averaging 142 mg. per 100 c.c. (as glucose). The average non-fermentable sugar in such samples was 395 mg. calc. as glucose.

II. Non-fermentable sugars (I) are derived in some measure from most common foodstuffs, but in particular from dried fruits, apples, honey, and carbohydrate-containing foods which have been subjected to high temp. Their excretion is not increased by high nucleoprotein diets, by the ingestion of yeastnucleic acid, or by stimulation of the digestive The excretion is continued at a somewhat glands. lower level during starvation of man or dog. Intestinal stasis in dogs causes an increased output of (I). (I) of urine are very little changed by hydrolysis. Patients with kidney impairment show a decreased output of (I) in the urine. Conditions which lower the carbohydrate tolerance increase (I) and vice versa. A non-reducing polysaccharide is excreted in urine, which on hydrolysis yields a fermentable sugar.

III. The sugar is glucose.

Detection of glucose in urine by means of potassium permanganate. I. B. SCHUR (Mūnch. med. Woch., 1932, 79, 679–681; Chem. Zentr., 1932, ii, 747).—The glucose alone in urine gives a sp. red colour with alkaline KMnO_4 . L. S. T.

S. S. Z.

Clinical determination of urinary sugar. H. STEINMAURER (Med. Klinik, 1932, 28, 932; Chem. Zentr., 1932, ii, 1048).—The urine is boiled with KOH and the yellow to dark brownish-red colour is compared with that similarly developed in sugar solutions. A. A. E.

Occurrence in the urine of phenolic substances detected by Millon's reaction. O. FURTH, R. SCHOLL, and H. HERRMANN (Klin. Woch., 1932, 11, 1231; Chem. Zentr., 1932, ii, 1195—1196).—The increase in phenolic substances, insol. in Et_2O , is associated with increased degradation of protoplasm, and with disturbance of liver function. They are related to increased excretion of neutral S. A. A. E.

Rapid determination of phenol in urine. G. DENIGÈS (Bull. Soc. Pharm. Bordeaux, 1931, 69, 233– 236; Chem. Zentr., 1932, ii, 1047–1048).—The urine (2 c.c.) is shaken with 2 drops of 1% CuSO₄,5H₂O solution, 2 drops of H₂O₂ (10 vol.-%), and 2 drops of aq. NH₃ and after 10 min. is treated with 4 drops of glacial AcOH and then shaken with 2 c.c. H₂O. The colour is compared with that produced by standard PhOH solutions (50, 100, and 200 mg. per litre) similarly treated, except that the last 2 c.c. H₂O are replaced by 2 c.c. of the urine. Fæces are first diluted (1:40-50) and filtered with talc powder. The reaction indicates only free PhOH; combined PhOH needs preliminary hydrolysis. A. A. E.

Detection of porphyrin in urine. G. HOLLAND and A. SCHURMEYER (Klin. Woch., 1932, 11, 1221— 1222; Chem. Zentr., 1932, ii, 1331).—With Wood's filter urine containing porphyrin gives a red fluorescence, whilst otherwise the fluorescence is blue or bluish-green. A. A. E.

Colorimetric examination of sweat. W. RIE-DER and A. NEUMANN (Klin. Woch., 1932, 11, 1027— 1028; Chem. Zentr., 1932, ii, 1209).—The skin is painted with a paste containing FeSO₄, tannin, and ZnO; this acquires a bluish-black colour in presence of sweat. A. A. E.

Influence of acidosis on carbohydrate metabolism. M. L. GILCHRIST (Arch. Dis. Childhood, 1932, 7, 169—180).—The ability of the organism to utilise carbohydrates is unaffected by ingestion of NH_4Cl , but is markedly reduced after ingestion of ketogenic diets. The effect of the latter appears due to diminution of stored carbohydrate rather than to production of acidosis. CH. ABS.

Acid-base balance of new-born infants. II. Low alkaline reserve. E. MARPLES and V. W. LIPPARD (Amer. J. Dis. Children, 1932, 44, 31–39).— The acidosis which frequently occurs in breast-fed infants during the first 10 days of life appears to be due to accumulation of blood-Cl. The blood- $p_{\rm H}$ is normal and the serum-CO₂ is decreased. CH. ABS.

Albuminuria in pregnancy and its treatment. J. V. O'SULLIVAN (Lancet, 1932, 223, 1326-1328).— Fe given in addition to the usual treatment diminishes the amount of albumin and improves blood counts and hæmoglobin. L. S. T.

Allergically active substance in pollen. Phleum pratense (timothy) pollen. A. STULL, R. A. COOKE, and R. CHOBOT (J. Allergy, 1932, 3, 341-351).— The substance is an albumin similar to that of ragweed pollen (cf. A., 1931, 1186). It is the only active substance. H_2O extracts of 10-year-old timothy pollen were low in protein, N, and activity as compared with those of new pollens. Treatment of the pollen with EtOH greatly reduced the activity and the amount of extractable N. Heating lessened the activity of the extract. The precipitin test was negative with the purified albumin and a specifically sensitive serum. No albumin was found in cat-tail pollen, which has no clinical or skin reactivity.

CH. ABS.

Pollen and pollen extracts. VIII. Dialysability of pollen allergens. L. UNGER, H. W. CROMWELL, and M. B. MOORE (J. Allergy, 1932, 3, 252-256).—Active substances in pollen extracts are diffusible through celloidin, cellophane, or parchment membranes at various $p_{\rm H}$. Dialysis occurs more freely in slightly acid solutions. There is not a complete correlation in response of sensitive rabbits and man to the dialysable skin-reactive material. CH. ABS.

Biological identity of certain grass pollens causing hay fever. A. STULL, R. A. COOKE, and J. H. BARNARD (J. Allergy, 1932, 3, 352-356).—A single active substance is common to all extracts.

CH. ABS.

Effect of ovarian lipins on cholesterolæmia in amenorrhæa. C. I. PARHON and I. ORNSTEIN (Compt. rend. Soc. Biol., 1931, 107, 841—842; Chem. Zentr., 1932, ii, 1462).—Blood-cholesterol is increased by injection of the total Et₂O extract. A. A. E.

Experimental anæmia by artificial diets rendered free from iron. H. NAKAMURA (Keijo J. Med., 1932, 3, 375—384).—In mice fed on an Fe-free artificial diet with added vitamin-B the erythrocyte count decreases, whilst with A+B the count is unchanged. With such diets the absence of Fe has little influence on the rate of growth, the main changes occurring in the hæmoglobin index. F. O. H.

Treatment of anæmia with copper, quantitative comparison of anti-anæmic drugs, and a new copper-iron-protein preparation. H. HANDOVSKY (Klin. Woch., 1932, **11**, 981—984; Chem. Zentr., 1932, ii, 1036).—Cu, particularly when combined with aromatic NH₂-acids, greatly stimulates erythrocyte formation in anæmic animals, and slightly stimulates hæmoglobin formation. With Fe the reverse holds; its stimulating power is much < that of Cu. Good results are obtained with "cuvitan," which contains protein, Cu (0.1%), and Fe (1%).

A. A. E.

Microbial metabolism and its bearing on the cancer problem. A. J. KLUYVER (Science, 1932, 76, 527-532).—A lecture. L. S. T.

Insulin and carbohydrate metabolism in cancer of the skin. S. F. G. DA COSTA (Compt. rend. Soc. Biol., 1931, 107, 85–87; Chem. Zentr., 1932, ii, 1317).—Local application of insulin caused marked retrogression, particularly at the surface, but not complete disappearance of the tumour. A. A. E.

Technique of micro-incineration : its advantages in histochemical study of normal and malignant tissues. E. S. HORNING (J. Cancer Res. Comm. Univ. Sydney, 1932, 4, 118—121).—When sections of tissue are ashed on a glass slide and mounted dry the constituents of the ash can often be recognised under the microscope. Cancer cells yield more ash than normal cells, and its arrangement and nature are different. A. G.

Fat absorption in cœliac disease. C. E. KELLETT (Lancet, 1932, 223, 1270-1272).—Fat absorption curves in cases of cœliac disease are determined by a direct method which is described. Their shape can be explained by assuming impaired fat absorption which is enhanced by an increase of fat in the diet.

L. S. T.

Metabolism of carbohydrate. D. S. WALLER (J. Amer. Dietet. Assoc., 1932, 8, 119–132).—The proportion of fat in a diabetic diet has no effect on the amount of available glucose which can be metabolised by a definite amount of insulin. The action of insulin on glucose, like enzyme action, is more efficient in a high concn. of glucose, up to 100 g. > the tolerance of the patient. CH. ABS. Phosphates in the sugar-tolerance test. D. R. MCCULLACH and L. VAN ALSTINE (Amer. J. Clin. Path., 1932, 2, 277—286).—Curves indicating bloodinorg.-P after ingestion of 100 g. of glucose are normally regular; in metabolic disorders irregular variations are observed. CH. Abs.

Decreased glucose tolerance in acute infectious diseases. J. L. WILLIAMS and G. F. DICK (Arch. Int. Med., 1932, 50, 801-818).-Glycosuria, accompanied by a low carbohydrate tolerance, occurred in 41% of cases with acute infectious diseases. Administration of insulin improves the glucose tolerance. It is suggested that there is often an injury to the islets of Langerhans, with a lessened production of insulin. H. G. R.

Clinical evaluation of blood-phosphates and sugar tolerance curves. F. W. HARTMAN and D. P. FOSTER (Amer. J. Clin. Path., 1932, 2, 289—297). CH. ABS.

Eclampsia. V. Effect of placental antiserum on the glycogen content of the placenta. M. MURAKAMI (Tôhoku J. Exp. Med., 1932, 19, 113—128). —Rabbit antisera were produced against human and rabbit placental tissue, and a duck antiserum against rabbit liver. Injection of the liver antiserum into pregnant rabbits caused convulsions, but the blood-N and -sugar remained normal; the liver- and placental glycogen decreased. These effects were accentuated by simultaneous injection of an anti-placental serum, especially of the anti-rabbit serum. CH. ABS.

Carbohydrate metabolism in exophthalmic goitre. P. KRAMER (Z. klin. Med., 1932, 121, 472– 475; Chem. Zentr., 1932, ii, 1929–1930).—After injection of insulin in hypoglycæmia and after administration of sugar in hyperglycæmia the difference, in exophthalmic goitre, between capillary and venous blood-sugar is < the normal; the absorption of sugar by the tissues is much retarded. Thus the thyroid takes part in the regulation of the carbohydrate metabolism of muscle, and is antagonistic to insulin.

A. A. E.

Enzootic hæmaturia (Hæmaturia vesicalis) of cattle in S. Australia. L. B. BULL, C. G. DIOKIN-SON, and A. T. DANN (Counc. Sci. Ind. Res. Australia, Pamphlet, 1932, No. 33, 24 pp.).—Occurrence of "red-water" cannot be ascribed to any sp. abnormality of soil or herbage. Urine analyses indicate that low protein and S intakes are characteristic of affected animals. A. G. P.

Arrest of hæmorrhage by hypertonic glucose solution. J. EASON (Lancet, 1932, 223, 1272).— Various types of hæmorrhage are arrested by the application of a 50% aq. solution of glucose.

L. S. T.

Use of disodium hydrogen phosphate as an antidote for hypercalcæmia in dogs. I. H. PAGE and J. P. Scorr (J. Pharm. Exp. Ther., 1932, 46, 431— 434).—Intravenous administration of solutions of Na₂HPO₄ lowers the serum-Ca in normal dogs and in dogs in which this has been raised by parathyroid extract. Na₂HPO₄ is an antidoto against the symptoms of hyperparathyroidism. W. O. K. Hyperproteinæmia due to Bence-Jones protein in myelomatosis. J. W. SHIRER, W. DUN-CAN, and R. L. HADEN (Arch. Int. Med., 1932, 50, 829-835).—In two cases of myelomatosis the bloodserum was high in protein, due to large amounts of Bence-Jones protein, and in Ca. H. G. R.

Endemic nutritional œdema. I. Clinical findings and dietary studies. J. B. YOUMANS, A BELL, D. DONLEY, and H. FRANK (Arch. Int. Med., 1932, 50, 843—854).—The œdema was due to a chronic dietary deficiency, particularly to a shortage of protein. H. G. R.

Formation of renal calculi. I. TRAUBE, K. SKUMBURDIS, and V. GOLDBERG (Münch. med. Woch., 1932, 79, 1083; Chem. Zentr., 1932, ii, 1034).— Chondroitinsulphuric acid contains a substance which hinders the formation of flocks and calculi.

A. A. E.

Plasma-phosphatase in rickets and scurvy. J. SMITH and M. MAIZELS (Arch. Dis. Childhood, 1932, 7, 149—159).—Normally the average plasma-phosphatase is 0·23 unit during the first year of life, 0·24 in the second, and 0·17 up to the twelfth; in active rickets it is 0·3—1·4, the vals. decreasing during treatment. In scurvy, vals. increase with the onset of calcification of the hæmorrhages. Vals. are at first normal after fracture, but become higher as the callus appears. CH. ABS.

Treatment of rachitic infants with milk produced by cows fed with irradiated ergosterol. H. J. GERSTENBERGER and A. J. HORESCH (J. Nutrition, 1932, 5, 479–483).—The milk examined had a definite but small antirachitic action when fed to infants. A. G. P.

Autogenous urinary proteose in rheumatoid arthritis. G. R. P. ALDRED-BROWN and J. M. H. MUNRO (Lancet, 1932, 223, 1211—1214).—Autogenous urinary proteose does not produce skin reactions in rheumatoid arthritis similar to those produced by antigens in allergy. L. S. T.

Nitrogen metabolism in skin diseases. G. TEMESVARY (Magyar Orvosi Arch., 1932, 33, 194– 210; Chem. Zentr., 1932, ii, 1651).—Retention of uric and NH_2 -acid was chiefly observed, but in many cases of eczema no disturbance of N metabolism was detected. A. A. E.

Relation between creatinine and lactic acid in horse's blood in tetany. S. GRZYCKI (Klin. Woch., 1932, 11, 865; Chem. Zentr., 1932, ii, 1032).—Increase in creatinine is accompanied by decrease in lactic acid, blood-Cl remaining const. A. A. E.

Magnesium content of blood, especially in tetany. B. SJOLLEMA and L. SEEKLES (Klin. Woch., 1932, **11**, 989—990; Chem. Zentr., 1932, ii, 1037).— Human blood in tetany contained 0.5—0.7 mg. Ca per 100 c.c. A. A. E.

Carbohydrate metabolism in human trypanosomiasis. A. WORMALL (Biochem. J., 1932, 26, 1777—1787).—There is no general hypoglycæmia during the earlier stages of this disease, although in certain cases a definitely low blood-sugar val. was obtained. Treatment with "Baeyer 205" gave

variable results. There is no relationship between blood-sugar level and the presence in or absence from the blood of trypanosomes. There is no very marked impairment of the capacity of the liver to deal with glucose in trypanosomiasis. S. S. Z.

Urticaria. I. Acid-base balance. II. Blood chemistry. L. H. CRIEP (J. Allergy, 1932, 2, 219— 226).—The CO_2 -combining power of the plasma does not definitely indicate a disturbance in the acidbase balance in urticaria. The blood-sugar, nonprotein-N, and urea are normal. The uric acid is slightly high and the blood-Cl is low during the acute paroxysm. Total blood-Ca is normal. Diffusible Ca may be slightly high. CH. ABS.

Chemistry and metabolism in experimental yellow fever in monkeys. VI. Bromsulphalein liver function test and the Van den Bergh reaction. A. M. WAKEMAN and C. A. MORRELL (Arch. Int. Med., 1932, 50, 876–883).—Loss of hepatic function is indicated by reduced rate of excretion of bromsulphalein and the onset of jaundice. The clotting time of the blood is increased, associated with lower fibrinogen content. COMe₂ is not excreted in the urine, supporting the view that the liver is the chief site of COMe₂ formation.

H. G. R.

Growth and chemical constituents. I. Silkworms. A. AKAO (Keijo J. Med., 1932, 3, 360-374).—The silk-worm attains a max. wt. (greater in the male than in the female) just before cocoonformation, following which it decreases in wt. and remains fairly const. during metamorphosis. The total N and P contents follow a somewhat parallel course, but divergences occur in the purine- and uric acid-N during the period following cocoon-formation. These variations are related to phases of the worm's development. F. O. H.

Effect of a high intake of manganese on the growth of rats. J. T. SKINNER (J. Nutrition, 1932, 5, 451-457).—Retarded growth of rats ascribed to the toxicity of Mn (Skinner *et al.*, A., 1931, 516) was due to an unsuitable source of milk solids. With suitable diet addition of 2000 p.p.m. of Mn did not affect growth rates. A. G. P.

Artificial diet for experiments of long duration on the relation between nutrition and growth, maintenance, and, particularly, reproduction. L. RANDOIN and H. SIMONNET (Compt. rend., 1932, 195, 1328—1330).—For experiments extending over a period of years, a diet of 10—15 g. per rat per day of the following mixture maintains uniform growth and reproduction through several generations : pancreatic peptone 15, caseinogen 2, dry yeast 3, pure butter-fat 12, pure rice starch 32, sucrose 32, and Osborne and Mendel salt mixture 4%. A. C.

Regeneration. IV. Oxidation-reduction potential of the tissue of the regenerating extremity of the axolotl. N. OKUNEV (Biochem. Z., 1932, 255, 387-392).—The oxidation-reduction potential is lower for tissue of the regenerating than for tissue of the normal extremity, due probably to the local accumulation of reducing substances (glutathione).

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P. W. C.

Variation of $p_{\rm H}$ of brain tissue. E. G. HOLMES (Biochem. J., 1932, 26, 2010—2014).—The $p_{\rm H}$ vals. of mouse brains which have been fixed in liquid air are higher in the case of hypoglycæmic than of normal or hyperglycæmic animals. The changes in $p_{\rm H}$ are of the same order as those calculated from the titration curve of brain tissue and lactic acid. S. S. Z.

Metabolic activity of the cells of the trigeminal ganglion. E. G. HOLMES (Biochem. J., 1932, 26, 2005–2009).—The trigeminal ganglia of sheep show very poor powers of oxidation, although the cells contain indophenol-oxidase. Their power of forming lactic acid from glucose is < that of the white matter of the central nervous system. S. S. Z.

Action of uric acid on metabolism of tissues. L. KURTI and C. SELLEI (Biochem. Z., 1932, 256, 209–213).—In mice, uric acid, especially when intramuscularly injected, inhibits the aërobic and anaërobic metabolism of the liver and also acts on the kidneys as a mild poison. W. McC.

Diets of college women in relation to their basal metabolism. C. M. COONS and A. T. SCHIEFELBUSCH (J. Nutrition, 1932, 5, 459-465).-Lowered habitual food consumption of the present day as compared with 20 years ago is shown more notably by the deficiency of protein rather than calorie content. A. G. P.

Influence of alcohol on oxidation [in the animal organism]. A. BICKEL and I. KANAI (Biochem. Z., 1932, 255, 289—294).—When smaller (1.7 c.c.) and larger (2.7 c.c.) amounts of EtOH are added to the rabbit's diet, the oxidation quotient in the former cases usually decreased and in the latter in two cases decreased, in one remained unchanged, and in one increased. P. W. C.

Combustion of alcohol by the small mammal. Mouse. M. NICLOUX (Compt. rend. Soc. Biol., 1931, 108, 14—17; Chem. Zentr., 1932, ii, 1651).— Combustion is much more rapid than with large mammals. Of 1 mg. EtOH per g. injected, the animal being kept at 30°, 20.4% had undergone combustion in 15 min. and 95.6% in 2.5 hr.

A. A. E. Combustion of alcohol by poikilothermic animals. Effect of temperature. M. NICLOUX (Compt. rend. Soc. Biol., 1931, 108, 17—21; Chem. Zentr., 1932, ii, 1652).—Combustion of EtOH by the frog is much slower than by the mouse. At 1° combustion amounts to 14.7% in 24 hr., and at 29° to 97%. A. A. E.

Reaction velocity and van 't Hoff's temperature coefficient of the combustion of alcohol in the organism of the poikilothermic animal. M. NICLOUX (Compt. rend. Soc. Biol., 1931, 108, 21— 24; Chem. Zentr., 1932, ii, 1652).—Between 1° and 29° the temp. coeff. is approx. 2. A. A. E.

Morphology of sclerotic cartilage. V. Influence of aqueous nutrients on the development of sclerotic cartilage in *Hynobius leechii*. T. YATABE (Keijo J. Med., 1932, **3**, 393-402).—The growth of the sclerotic cartilage in *H. leechii* is retarded by restriction to aq. (1%) nutrients which form the following increasing order of inhibition: EtOH, peptone, vitamin-B prep., glucose. A still greater retardation is effected by starvation.

F. O. H.

Urinary composition and acid-base equilibrium. IV. Acid excess of urine. V. Effect of muscular work on the composition of the urine. S. M. NEUSCHLOSZ (Biochem. Z., 1932, 256, 37-50, 51-54; cf. A., 1931, 1444).—IV. Theoretical considerations as well as examination of the urine of persons suffering from acidosis and of that of dogs receiving intravenous injections of acid show that most of the acid excreted leaves the organism as NH_4 salt, and that the function of the acid excess in the urine is to provide for the rapid and sharplydefined regulation necessary for maintaining the normal reaction of the blood.

V. Vigorous bodily exercise results in increase in the acidity and NH_3 content of human urine, preferential excretion in it of the weaker amongst the moderately strong acids concerned, and decrease in the ratio of excess of acid to NH_3 . The views previously expressed are thus confirmed.

W. McC.

Nitrogen excretion of the hypophysectomised dog after a meat meal. B. BRAIER (Compt. rend. Soc. Biol., 1931, 108, 128—130; Chem. Zentr., 1932, ii, 1793—1794).—During fasting, hypophysectomised dogs excrete 30% less N per hr. and kg. than do normal animals. By feeding with meat the N excretion of hypophysectomised dogs is at first retarded, but afterwards accelerated, so that the total N excretion in 24 hr. is unchanged. A. A. E.

Cystine and wool production. H. E. WOODMAN and R. E. EVANS (Nature, 1932, 130, 1001).—A criticism (cf. A., 1932, 646). In England, the cystine content of the pasturage, although low, is sufficient to account for wool production. L. S. T.

Fatigue of skeletal muscle. M. OSAWA (Arbeitsphysiol., 1932, 5, 357-369; Chem. Zentr., 1932, ii, 1470).—The toad's gastrocnemius yields to perfusion liquid a substance identical with Haberlandt's heart hormone. Acids reduce the contractability of the muscle; alkalis increase it. Lactic acid increases the sugar-mobilising action of adrenaline on the perfused toad liver. A. A. E.

Nutrient value of certain animal protein concentrates. P. B. CURTIS, S. M. HAUGE, and H. R. KRAYBILL (J. Nutrition, 1932, 5, 503-517).-Nutrient vals. of various tankages and meat scrap are determined. The hot-H₂O-sol. protein (I) contents are recorded and their significance is discussed. The (I) in a tankage ration having 15% protein is inadequate even for maintenance and is deficient in tryptophan and cystine. Tankage may be used as a supplement to certain grain rations. A deficiency of tryptophan is associated with a type of blindness in rats. A. G. P.

Biological values of proteins. III. Method used to measure the nitrogenous exchange of rats. IV. Biological values of the proteins of wheat, maize, and milk. M. A. B. FIXEN and H. M. JACKSON (Biochem. J., 1932, 26, 1919–1922, 1923–1933).—III. Modifications of the previous method are described (cf. A., 1931, 256, 271). IV. The following vals. have been obtained: whole wheat (6% protein in diet) 68, wheat embryo (7%) 69, wheat endosperm (7%) 61, whole yellow maize (8%) 67, (5%) 84, yellow maize endosperm (7%) 70, whole milk (7%) 86, lactalbumin (7%) 65, caseinogen (6%) 76, heated caseinogen (7%) 54.5, "whole rat" prep. (7%) 55. S. S. Z.

Influence of administration of arginine and histidine on excretion of creatinine. B. G. SHAPIRO and H. ZWARENSTEIN (Biochem. J., 1932, 26, 1880—1885).—Injection of arginine and histidine into adult male rabbits gives rise to 10-40% increase in the elimination of urinary creatinine. Feeding with glycocyamine has no effect on creatinine excretion, but leads to a large output of creatine. Injected glycine and alanine or ingested tyrosine, cystine, and glutamic acid have no effect on creatine or creatinine excretion. S. S. Z.

Possible formation of glucose from lecithin. M. VRIART (Compt. rend. Soc. Biol., 1931, 108, 136— 137; Chem. Zentr., 1932, ii, 1651).—Increased excretion of sugar from depancreatised or phloridzinised dogs was not observed. A. A. E.

Tryptophan content of the thyroid gland and other organs after a meat meal. D. POTIOK and P. M. RE (Compt. rend. Soc. Biol., 1931, 108, 135; Chem. Zentr., 1932, ii, 1646).—In dogs the tryptophan content of the thyroid and the red blood-corpuscles was markedly increased, whilst that of certain other organs was decreased. A. A. E.

Nitrogenous and fat metabolism. Influence of muscular work on the blood-nitrogen and -fat content. T. HIRAMATSU (Biochem. Z., 1932, 255, 304-306).—The N and fat contents of the blood of rats fed on a rice diet in the fasting condition are considerably < those of animals on a flesh diet. The total and residual N and the fat contents of the blood of the rice-fed rats do not change with muscular work, whereas with flesh-fed rats the N contents increase and the fat content decreases. P. W. C.

Effects of fatty acid on nutrition. U. TANGE (Sci. Papers Inst. Phys. Chem. Res. Tokyo, 1932, 20, 13-28).—Rats fed on a fat-free diet develop a condition characterised by extensive dermatitis, loss of hair, and loss of wt., but the administration of small quantities of linoleic or linolenic acid prevents and cures the condition. Oleic and elaidic acids produce a growth response, but do not effect complete cure. Stearic and clupanodonic acids are also non-curative.

W. O. K.

Fat metabolism in fishes. I. Fatty acid composition of the fats of a number of fishes. II. Peritoneal, pancreatic, and liver fats of the sturgeon (*Acipenser sturio*). J. A. LOVERN (Biochem. J., 1932, 26, 1978—1984, 1985—1988).—II. The most noticeable differences in fatty acid composition between the oils from fresh-water fish and from marine species are the increased proportions of oleic, linoleic, and palmitoleic acids and the reduced amounts of acids of the C_{20} and C_{22} series in the former oils. There is no linoleic acid and the low ratio of C_{22} to C_{22} acids does not occur in halibut-liver oil.

 C_{20} to C_{22} acids does not occur in halibut-liver oil. II. The analytical data of the component fatty acids do not support the theory of desaturation in the liver. They show an interrelationship between palmitic and palmitoleic acids. A relationship is maintained between the amount of total saturated acids (24%) and total unsaturated acids (76%).

S. S. Z.

Fat metabolism of the herring. I. H. J. CHANNON and M. K. EL SABY (Biochem. J., 1932, 26, 2021-2034).-The % of fatty acids in the liver and "mesentery" increases for about 3 weeks after the gonads are empty to a max. (15 and 39%, respectively) and then falls to about 1% by the time of spawning. In the case of the muscles the max. of 17.4% is reached after about 5 weeks and then progressively falls to approx. the initial val. The % of fatty acids of the ovaries and testes varies during the period of maturation, whilst that of cholesterol continuously rises to a max. The cholesterol in the liver and mesenteric fat disappears at a much slower rate than do the fatty acids of these tissues. The % in the muscle remains approx. const. The degree of unsaturation of the fatty acids of the ovaries and testes rises steadily to a max. (I val. 137-200) before the fish spawns. The I vals. of other tissues (liver 128, "mesentery" 108, muscle 118) remain S. S. Z. const.

Carbohydrate metabolism. Influence of muscular work on the blood-sugar and glycogen contents and of injection of sugar and phosphate on the blood-sugar and glycogen contents after muscular work. T. HIRAMATSU (Biochem. Z., 1932, 255, 295-303).-A table gives the blood-sugar (I) and glycogen [of the liver (II) and of the rest of the animal (III)] contents of normal fasting white rats on rice and flesh diets. All the vals. decrease during muscular work. With rice-fed animals 1 hr. after cessation of work (I) is not greatly increased, (II) is unchanged, whilst half the loss of (III) has been replaced. With flesh-fed animals, (I) has regained normal vals., half the loss of (II) has been replaced, but (III) is unchanged. After 3 hr. rest, (I) is normal with both types of diet, but with the rice diet (II) and (III) have not shown further change, whereas with the flesh diet (II) is almost normal and loss in (III) is > half replaced. When glucose is injected into animals on a rice diet during work, the amounts of (I), (II), and (III) utilised are small and the time of recovery after work is shortened. With flesh-fed animals during injection, (I) and (II) increase and hyperglycæmia results, whilst the amount of (III) P. W. C. used is very small.

Antiketogenic action of carbohydrates. A. GOTTSCHALK (Klin. Woch., 1932, 11, 978–980; Chem. Zentr., 1932, ii, 1034).—The point of attack is the $CH_2Ac \cdot CO_2H$ stage, probably by the formation of a condensation product of this with a degradation product of the carbohydrate. A. A. E.

Nutritive value of wheat embryos. V. FAMIANI (Atti R. Accad. Lincei, 1932, [vi], 16, 275–278).— Rats fed on wheat alone show limited growth and lowered powers of resistance. Addition of 25% of wheat embryo to the diet effects improved growth and increased resistance, and further addition of 4% of Pappenheimer, McCann, and Zucker's saline mixture results in almost normal growth and reproduction, but does not render suckling possible; further addition of 5% of caseinogen is without effect.

T. H. P.

Re-formation of muscle-glycogen after exercise is an insulin action. J. HOET and H. ERNOULD (Compt. rend. Soc. Biol., 1931, 107, 921-923; Chem. Zentr., 1932, ii, 1469).

Glucosone. K. C. DIXON and K. HARRISON (Biochem. J., 1932, 26, 1954-1958).-Glucosone was prepared from fructose by oxidation with selenious acid. It can be detected and determined in dil. solution (0.03%) by pptn. with 2:4-dinitrophenylhydrazine in HCl after keeping at 37° for 1 hr. Glucosone occurs to an extent of < 0.01% in the blood of rabbits suffering fron convulsions caused by insulin. It is not formed by the liver even in presence of insulin, nor does it occur in the fresh liver (cf. A., 1927, 480). S. S. Z.

Behaviour of the piperidine ring in metabolism. H. STEUDEL (Z. physiol. Chem., 1932, 213, 11-15).—Treatment of 1-piperidinomethyl-5:5-diethylbarbituric acid (I) with aq. NaOH affords veronal, CH₂O, and methylenedipiperidine. When (I) was administered to dogs δ -methylaminovaleric acid was isolated from the urine. J. H. B.

Oxidative metabolism in hunger and on an insufficient diet. Influence of replacement of food protein by amino-acids on intermediate metabolism. I. KANAI (Biochem. Z., 1932, 255, 307-318).-In a fasting animal and on an insufficient diet, less material is oxidised, but the oxidation is more complete than normal. By replacement of the food protein with glycine or glycylglycine, incomplete utilisation, especially of the N, was recorded, whereas replacement with a mixture of NH₂-acids led to incomplete utilisation, particularly of the C.

P. W. C.

Regulation of sodium by muscle. R. MOND and H. NETTER (Pfluger's Archiv, 1932, 230, 42-69; Chem. Zentr., 1932, ii, 736-737).-Frog's muscle is free from Cl; it contains 30 (max.), 15 (average) mg. Na per 100 g., depending on the season and the con-dition of the animal. The Na is localised at the surface of the muscle fibre. In muscular activity this Na does not serve directly as a buffer for the excreted lactic acid. During recovery Na becomes associated with the muscle. A. A. E.

Apparent digestibility of, and nitrogen, calcium, and phosphorus balance of dairy heifers fed on, artificially dried pasture herbage. R. E. HODGSON and J. C. KNOTT (J. Agric. Res., 1932, 45, 557-563).-Grass dried at 38-93° for 12 hr. had the following digestibility coeffs. (heifers) : crude protein, 74.9%; N-free extract, 74.5%; Et_2O extract, 21.9%; crude fibre, 72.7% The N balance of heifers was negative (average 0.63 g. per day) in two cases out of three. Ca and P balances were positive in two cases and negative in the third. A. G. P.

Spectrographic proof of the formation of substances by excitation of the cardiac nerves. Z. M. BACQ and V. HENRI (Compt. rend., 1933, 196, 135-137).-The absorption curve of the Ringer's

solution used for perfusing a stimulated (excitation of the vago-sympathetic trunk) frog's heart shows a max. at about 3150 A., a min. at about 3000, and then rises rapidly towards the ultra-violet; the positions of the bands are similar to those of the polyphenols. The perfused solution from a non-stimulated heart shows general absorption in the far ultra-violet.

H. B. Potential toxicity. I. G. KAHLSON. II. Significance of the polarity of the concentration gradient in the activity of a potential poison. H. HAAG and G. KAHLSON (Arch. exp. Path. Pharm., 1932, 169, 44-55, 56-69).-I. The potential toxicity of choline is dynamic in nature and is exhibited only during the penetration phase.

II. Acetylcholine has all the properties of a potential poison, in the action of which the direction of the concn. gradient is important. P. G. M.

Relation of taste and chemical constitution. S. MICHAEL (Biochem. Z., 1932, 255, 351-377).-The taste intensity (I) of undissolved inorg. salts is for the most part determined by and follows their heats of dissolution. In org. substances (I) is dependent on the no. and position of O- and N-containing substituents. With the same no. of such substituents, (I) decreases with increasing no. of C atoms and increases the more closely together are the substituents. With saturated dicarboxylic acids, (I) increases the nearer the carboxyl groups are together, and those acids with an odd no. of C atoms have a greater (I) than those with an even no. Of the unsaturated dibasic acids, the cis have a greater (I) than the trans. With di-substituted C_6H_6 compounds, the *m*-substituted are more intense than the \hat{o} - or *p*-. P. W. C.

Toxicology of o-tolyl phosphate. E. GROSS and A. GROSSE (Arch. exp. Path. Pharm., 1932, 168, 473-514).-o-Tolyl phosphate (I) exerts a marked toxic action with extensive lesions in various organs in animals and in man, whilst the m- (II) and pisomerides (III) are relatively harmless. (I) is relatively readily absorbed through the mucous membrane or unbroken skin and from the peritoneal cavity, whereas the (II) and (III) are not. After intravenous administration (I) disappears from the blood-stream within 40 min. and is stored partly in the wall of the stomach and intestine and in the liver and spleen, and partial excretion of unchanged (I) takes place W. O. K. through the kidneys.

Synergism and antagonism of drugs. I. antagonism Non-parasympathetic between atropine and the miotic alkaloids. T. KOPPANYI (J. Pharm. Exp. Ther., 1932, 46, 395-405).-Atropine antagonises the action of pilocarpine and other miotic alkaloids even in cases where parasympathetic action W. O. K. is excluded.

Changes in diastase of blood and urine after various types of surgical anæsthesia. T. CASTRO (Arch. Ist. Biochim. Ital., 1932, 4, 361-374).-An increase in the diastatic activity of blood and urine is found in human patients after Et_2O or spinal anæsthesia, but with C_2H_4 -N₂O little or no change occurs. Local anæsthesia has no effect. The changes are probably due to the toxic action of the anæsthetic on the pancreatic cells. R. K. C.

Relative pre-anæsthetic values of the sodium salts of ethylisoamylbarbituric acid (amytal), pentobarbital, phenobarbital, and barbital. E. E. SWANSON (J. Pharm. Exp. Ther., 1932, 46, 387— 394).—The pre-medication vals. of Na amytal and Na pentobarbital, *i.e.*, their powers in terms of their respective toxic doses to facilitate anæsthesia by N_2O-O_2 and $C_2H_4-O_2$ in animals (rats or cats), are approx. equal, but Na barbital and Na phenobarbital have lower vals. W. O. K.

Colloid chemistry of the nervous systems. VI. W. D. BANCROFT and J. E. RUTZLER, jun. (J. Physical Chem., 1932, 36, 3162—3174; cf. A., 1932, 1061).— —Anæsthesia and recovery phenomena have been studied on goldfish anæsthetised by Na amytal, Et_2O , nembutal, EtOH, or urethane. Although Na citrate, Na tartrate, and $Al_2(SO_4)_3$ revive the fish more rapidly than does NaCNS, NaCl, or NaBr, the effects of the former compounds are due to processes other than the counteraction of anæsthesia. The action of the peptising agents NaCNS, NaCl, and NaBr is consistent with the reversible coagulation theory of anæsthesia. Osmotic pressure changes appear to have no influence. E. S. H.

Response of the isolated intestine to cocaine and novocaine at different $p_{\rm H}$ levels. W. SALANT and W. M. PARKINS (J. Pharm. Exp. Ther., 1932, 46, 435-446).—The effect of cocaine on the isolated intestine (cats, rabbits, and rats) varies with the $p_{\rm H}$, but the action of novocaine on the rat intestine is not influenced by $p_{\rm H}$. W. O. K.

Action of some hypnotics on blood-sugar and blood-lactic acid. L. HÖNIGHAUS (Arch. exp. Path. Pharm., 1932, 168, 561-568).—In rabbits, subcutaneous administration of morphine hydrochloride raises the blood-sugar (I) and -lactic acid (II), whilst luminal lowers (I) and dionin (II). Codeine phosphate and urethane are without definite effect on (I) or (II). Similar results are obtained when Na lactate solution is injected intravenously 1 hr. after the administration of the hypnotic. W. O. K.

Parasympathicotonics and blood-lactic acid. I. I. NITZESCU and N. MUNTEANU (Compt. rend. Soc. Biol., 1932, 109, 314—315; Chem. Zentr., 1932, i, 1799).—Pilocarpine and eserine and, to a smaller degree, choline increase blood-lactic acid similarly to the blood-sugar increase. L. S. T.

Pharmacological action of eseridine. R. ST. A. HEATHCOTE (J. Pharm. Exp. Ther., 1932, 46, 375— 385).—Eseridine (I) in general acts by stimulating the parasympathetic nerves, but its slowing action on the heart of the toad or rabbit is probably exerted directly on the muscle. The action of (I) runs closely parallel to, but is only about one tenth as strong as, that of eserine. W. O. K.

Comparative pharmacological study of some related ephedrine compounds. E. E. SWANSON (J. Amer. Pharm. Assoc., 1932, 21, 1125–1134).— The pharmacological activity of six analogues of ephedrine, two stereoisomeric forms of $3-\alpha$ -hydroxybenzylpiperidine, and 2-amino-1-hydroxyindane is recorded. R. S. C.

Ergotamine and the adrenaline-controlled increase of blood-lactic acid. I. I. NITZESCU and N. MUNTEANU (Compt. rend. Soc. Biol., 1932, 109, 311-313; Chem. Zentr., 1932, i, 1799).—Ergotamine arrests adrenaline hyperglycæmia but not the lactic acid excretion in blood. Glycogen accumulation in the muscles has a mechanism different from that produced by adrenaline in the liver. L. S. T.

Action of tyramine on the excitability of the cardiac vagus, and influence of this amine on the effects of nicotine. M. RAYMOND-HAMET (Compt. rend., 1932, 195, 1330—1333).—The electric excitability of dog's cardiac vagus is progressively diminished by intravenous injection of tyramine (I) in doses increasing from 20 to 300 mg. per kg., the highest dose completely abolishing excitability. (I) simultaneously destroys the effect of nicotine on arterial pressure and intestinal motility. The effect of a moderate dose of acetylcholine is, however, not influenced by 444 mg. of (I) per kg. body-wt., and adrenaline (0.05 mg.) still induces a distinct, though reduced, hypertension. A. C.

Determination of alkaloids, especially atropine, in the animal body. H. A. OELKERS, W. RAETZ, and K. RINTELEN (Arch. Pharm., 1932, 9, 520-539). --Various alkaloids give with KI-I and phosphomolybdic acid ppts., which can be used for approx. nephelometric determination of the alkaloid. Centrifuging of the ppt. with the latter reagent and titration with alkali allows accurate determination of very small quantities. Details are given for determination of atropine (I) in the blood, serum, organs, and urine of the guinea-pig and rabbit. The concn. of (I) in the blood of rabbits after subcutaneous injection rises to a max. in 20-30 min., and thereafter falls to 0 in about 2 hr.; 24-33.7% of the (I) injected (independent of the dose) is excreted in the urine in 72 hr. (I) is unstable in aq. or alkaline solution. R. S. C.

Detection of choline and acetylcholine. G. KAHLSON (Arch. exp. Path. Pharm., 1932, 169, 34–43).—Choline can be quantitatively extracted from tissue by $COMe_2$. After removal of the solvent it is acetylated and the acetylcholine is determined by its action on the frog's heart. P. G. M.

Action of various uric acid eliminants on experimental uric acid storage in the kidney. H. O. SCHROEDER (J. Pharm. Exp. Ther., 1932, 46, 461–469).—In various animals the accumulation of uric acid in the kidneys after its administration is decreased by cincophen and neocincophen and to a smaller extent by NaHCO₃ and Na salicylate (I), but not by $(CH_2)_6N_4$ or piperazine. The increased elimination of uric acid produced by (I) in man is probably due to increased purine metabolism and also possibly to decreased uricolysis. W. O. K.

Rapid detection of diethylbarbituric acid and phenylethylbarbituric acid in neural substance. G. VITTE (Bull. Soc. Pharm. Bordeaux, 1931, 69, 279-283; Chem. Zentr., 1932, ii, 1048).-Pulped cerebral substance is ground to homogeneity with 5 c.c. of 20% CCl₃·CO₂H, further quantities of acid being gradually added until the total vol. is about 100 c.c. After 30 min. 50 c.c. H_2O are added, and the mass is stirred for 30 min. After filtration, extraction with Et₂O, and filtration of the extract, the Et₂O is evaporated and the residue is dissolved in dil. aq. NH₃ and heated for 15 min. on the water-bath with a little animal C. The residue is again taken up with dil. aq. NH₃, slightly acidified with HCl, and again extracted with Et₂O. The Et₂O residue is treated with 1 drop of aq. NH₃ (1:10) and 1 drop is treated under the microscope with H_2SO_4 (1:10). Diethyland phenylethyl-barbituric acid crystals are readily distinguishable. A. A. E.

Influence of Chinese antidiabetic drugs on rabbit's blood-sugar. I. P. MIN (Korean Med. J., 1932, 2, 50-56).—Rapid hyperglycæmia followed the oral administration of Lonicera japonica, Paeonia abovata, Trichosanthes kirilowii, Coptis teeta, Licium chinense, Phyllostachys bambusoides, Liriope graminifolia, and Bupleurum falcatum. CH. ABS.

Clinical evaluation of convallatoxin. B. WEICKER (Arch. exp. Path. Pharm., 1932, 168, 731— 742).—The action of convallatoxin from *Convallaria majalis* on frogs and cats has been examined quantitatively and its effect on human cardiac cases investigated. It resembles strophanthin and exhibits the phenomenon of cumulation. W. O. K.

Evaluation on the frog of glucosides acting on the heart. K. FROMHERZ (Arch. exp. Path. Pharm., 1932, 168, 743—744).—Evaluation of the activity of glucoside preps. by the frog method may lead to different results depending on whether spring or autumn frogs are employed (see preceding abstract). W. O. K.

Catatonin, a toxic substance of the lipoid extract of urine, tissue-fluids, and organs. J. FREUD and E. DINGEMANSE (Biochem. Z., 1932, 255, 464—473).—The prep. of catatonin from urine is described. It is extracted quantitatively by fat solvents from alkaline media. Injected into rats in oil or aq. solution it brings about all the symptoms of experimental catatonia in a few min. P. W. C.

Anaphylaxis and calcium. I. S. YUN (Korean Med. J., 1932, 2, 14—18).—The serum-Ca increases after sensitising by normal horse serum (I) in the guinea-pig and decreases after reinjection of (I). Anaphylactic shock was inhibited by injection of "vigantol," " parathormone," and CaCl₂.

CH. ABS.

Effects of certain toxic gases on the blood of the cockroach, *Periplaneta orientalis*, Linn. W. E. SHULL, M. K. RILEY, and C. H. RICHARDSON (J. Econ. Entom., 1932, 25, 1070–1072).—Of a no. of org. materials examined few produced any visible changes in the blood of cockroaches. In those killed by AcOH vapour the blood did not coagulate, and cells were fixed in an apparently normal condition. Crystals of MgNH₄PO₄ occurred in blood from insects killed by NH₃. A. G. P.

Relation of respiratory metabolism of insects to their susceptibility to fumigants. R. T. COTTON (J. Econ. Entom., 1932, 25, 1088-1103).-- The susceptibility of an insect to a fumigant varies with the rate of respiratory metabolism. Among known factors increasing susceptibility, the most important are rise of temp. and an increased CO_2 or decreased O_2 content of the atm. A. G. P.

Action of carbon dioxide on the human organism and its importance in public health. H. LEHMANN (K. Mitt. Ver. Wasser-, Boden-, Luft-hyg., 1932, 8, 145—158; Chem. Zentr., 1932, ii, 1197).— 8—10% or more of CO_2 in inhaled air can be tolerated. Many animals can tolerate 50% for 1—1.5 hr. Town and country air both contain about 0.04% CO_2 .

A. Ä. E.

Carbon monoxide poisoning, with special reference to chronic injury to health. BEINTKER (Gasmaske, 1932, 4, 75—77; Chem. Zentr., 1932, ii, 1037).—Chronic CO poisoning cannot be diagnosed with certainty, since CO vanishes rapidly from the blood. A. A. E.

Alkaline-earth salts and their biological action. K. MULLI and F. STANDENATH (Klin. Woch., 1932, 11, 990—991; Chem. Zentr., 1932, ii, 1035).—Citric acid should not be regarded as a Ca-pptg. acid, since it probably forms in the organism a sol. Na Ca citrate complex. A. A. E.

Chemotherapeutic examination of rare metals. V. FISCHL (Z. Hyg., 1932, 114, 284—288).—Relationships between the periodic classification of metals and their therapeutic action are examined.

A. G. P.

Assimilation of dust by the respiratory passages. I. Assimilation of dust containing lead and copper. O. EHRISMANN (Z. Hyg., 1932, 114, 224-268).—After exposure to Cu-containing dusts the Cu content of dogs' stomachs varied considerably, that of the lungs remained practically const. (approx. 0.1 mg.), and other organs examined were Cu-free. Cu is quickly eliminated and disappeared from the lungs within 8 days after exposure. Similar conditions were observed after exposure to dusts containing PbO. A. G. P.

Mortality of *Rhagoletis completa*, Cress., through ingestion of certain solid materials. A. M. BOYCE (J. Econ. Entom., 1932, 25, 1053— 1059).—Solid particles of common insecticides and of diluents (bentonite, talc, etc.) are shown to pass, undissolved, into the stomachs of adult flies. Colloidal dilutents (CaO and S) were highly injurious. Pb arsenate had a somewhat slower action. Fish oil incorporated with $BaSiF_6$ dust reduced its speed of action. Natural cryolite had a smaller lethal action than the synthetic product. Nicotine preps. were relatively slow-acting as stomach poisons.

A. G. P.

Radiation and enzyme activity. M. COPISAROW (Nature, 1932, 130, 1001-1002).-Metabolic radiation is a general function of normal org. metabolism; it is exhibited by blood, milk, eggs, brain, bonemarrow, lung, the pituitary lobes, the parathyroid gland, urine, yeast, etc. It decreases with a fall in temp., is inhibited at -5° to 10°, and destroyed by heating at 98-100° for 2 hr., by CO in the dark, H₂O₂, KMnO₄, and KCN. Pure cholesterol, vitamins-*C* and -D, sucrose, hormones, and alkaloids as such show no radiation. Radiation is an inseparable part of normal enzymic activity. The bearing of this conclusion on malignant growth is discussed. L. S. T.

Triose-dehydrogenase. I. F. P. CLIFT and R. P. COOK (Biochem. J., 1932, 26, 1804—1810).—An extract from ox-liver possesses three distinct dehydrogenases, one acting on glucose, another on glyceraldehyde and dihydroxyacetone, and a third on hypoxanthine and MeCHO. S. S. Z.

Hydrogenlyases. II. Some factors concerned in the production of the enzymes. J. YUDKIN (Biochem. J., 1932, 26, 1859—1871).—Whilst aërating washed suspensions of bacteria does not destroy the enzymes, aërobic conditions during growth prevent their formation in some cases and greatly decrease it in others. In most cases no hydrogenlyases are present in organisms grown on a simple inorg. medium; those grown in broth contain them. The presence of substrates on which hydrogenlyases act favours the production of the enzymes.

S. S. Z. Amylase in barley and malt. K. MYRBACK and S. MYRBACK (Woch. Brau., 1932, 49, 246-247).-The functions of α - (I) and β -amylase (II) in barley (III) and malt (IV) are discussed. Non-germinated (III) contains practically only (II) whilst after 2-5 days' germination considerable amounts of (I) are present. Differences in the limit of sugar formation do not appear to be due to amylokinase. With (III) and green malt of short growth, but not with (1V), there is a marked difference between the rate of hydrolysis of sol. starch and that of potato-starch paste. The amylase of (IV) is totally sol. in H₂O, whilst that of (III) is partly in a bound and inactive form which, together with the sol. form, is extracted by digestion in presence of papain. A method for the determination of (II) in (III) and (IV) is given.

F. O. H.

Effect of hydrogen-ion concentration on the activity of amylase. A. OPARIN and A. KURS-SANOV (Biochem. Z., 1932, 256, 190—195).—Within the limits $p_{\rm H}$ 3.5—6.2 the changes in the activity of amylase produced by altering [H^{*}] are only apparent, and depend on changes in the physical condition of the impurities. Outside these limits changes in [H^{*}] irreversibly decrease the activity of the enzyme.

W. McC.

Enzymic amylolysis. III. Amylokinase. E. WALDSCHMIDT-LEITZ and A. PURR (Z. physiol. Chem., 1932, 213, 63—70; cf. A., 1932, 304).—The action of amylokinase (I) on pancreatic amylase is due to its Ca salt content, and is destroyed by purification (adsorption and elution). The purest (I) obtained activates α - and β -amylase; it is non-dialysable and gives carbohydrate but not protein reactions.

J. H. B.

Do $p_{\rm H}$ changes play a part in the loss of activity of diastase solutions submitted to prolonged electrolysis? F. MAIGNON and D. CROIZÉ (Compt. rend. Soc. Biol., 1932, 109, 195—197; Chem. Zentr., 1932, ii, 1925).—They do not. Diastase differs in this respect from trypsin. A. A. E.

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Comparative effect of electrolysis on diastase and inactivated protein solutions. F. MAIGNON (Compt. rend. Soc. Biol., 1932, 109, 93—95; Chem. Zentr., 1932, ii, 1925).—For 100 volts 4—5 hr. suffice for complete demineralisation of ovalbumin or serumprotein solutions, whilst 4—5 days are necessary for that of pancreatic juice or an extract of germinated barley. A. A. E.

Rôle of thiol compounds in carbohydrate degradation. H. K. BARRENSCHEEN and H. BENE-SCHOVSKY (Biochem. Z., 1932, 255, 453-463).— AcCO₂H added to mammalian muscle pulp or muscle extract is only to a small extent converted into lactic acid, the conversion being, however, greatly increased by addition of thioglycollic acid and cysteine, but unaffected by addition of adenosinetriphosphoric acid. P. W. C.

Fate of added methylglyoxal in blood and muscle. H. K. BARRENSCHEEN, K. SCHEPPACH, and J. CLAUDATUS (Biochem. Z., 1932, 256, 196-208; cf. A., 1931, 766, 1455).-The very rapid disappearance of added AcCHO (I) in blood in the presence or absence of CH2Br·CO2H is confirmed. This disappearance is not due to combination with NH2-acids or proteins, since the amount of NH3 produced is not appreciably > when there is no addition. In the earlier stages (up to about 1 hr.) of the process lactic acid (II) equiv. to about 50% of the (I) consumed is produced in the blood; later, production of (II) is slower. $CH_2Br\cdot CO_2H$ does not affect the disappearance of (I), but restricts production of (II). Muscle (pulp and extract) decomposes (I) more slowly than does blood, and at first the amount of (II) produced is equiv. to > half of the (I) consumed; later (1 hr.) this amount likewise becomes equiv. to 50% of the (I) added. The production of (II) in the muscle extract is < that in the pulp, although in both cases (I) disappears at the same rate. W. McC.

Mechanism of deamination in heart and skeletal muscle. P. OSTERN (Naturwiss., 1933, 21, 14-15).-At 40° frogs' heart-muscle pulp deaminates muscle-adenylic acid (I), adeninenucleotide (II) from yeast-nucleic acid, and adenosine (III) equally rapidly, but mammalian heart-muscle does not proportionately deaminate (II). From this and other cases of sp. action it is concluded that a mechanism exists in which the H_3PO_4 compounds are deaminated after dephosphorylation. The addition of phosphate inhibits the deamination of (II) by frog heart-muscle, but at the same $p_{\rm H}$ increases the deamination of (I). This is also true for skeletal muscle. It appears that (II) directly undergoes dephosphorylation and deamination, whilst the (I) is first combined with H3PO4 to form adenosinetriphosphoric acid (IV). Three deaminases probably exist in muscle acting respectively on (III), (I), and (IV). Extracts made from rabbit muscle with NaHCO3 solution deaminate (I), but have practically no action on (IV), whilst the residual muscle contains an enzyme which deaminates (I) only in presence of added phosphate and presumably acts on (IV). W. O. K.

Cellulase from the symbiotic intestinal flagellates of termites and of the roach, Cryptocercus punctulatus. W. TRAGER (Biochem. J., 1932, 25, 1762-1771).—The enzyme is present in four flagellates. It hydrolyses cellulose or cellobiose to glucose. It can be adsorbed on $Al(OH)_3$ and eluted with 3% KH_2PO_4 . The effect of enzyme concn. and of temp. has been studied. S. S. Z.

Hydrolysis of caseinogen by pepsin and by trypsin-kinase. J. D. STIRLING and G. M. WISHART (Biochem. J., 1932, 26, 1989—1999).—The action of trypsin-kinase (I) and pepsin on caseinogen produces substances which are not completely sol. in $CCl_3 \cdot CO_2H$. With pepsin the rate of liberation of acid-sol. N is > that of acid-sol. P, whilst with (I) the opposite is true. S. S. Z.

Action of pectase. II. A. MEHLITZ (Biochem. Z., 1932, 256, 145-157; cf. A., 1930, 957).-Although slight purification of pectase (I) from extracts of lucerne can be effected by filtration through membanes, the process has no practical val. Pptn. of (I) with EtOH and subsequent drying increases the time required for (I) to cause coagulation, but has little effect on the stiffness of the jelly produced. Treatment of the extracts with decolorising C does not affect the activity of (I). Jellies containing < 50% of sugar can be produced with (I). The time required for jelly formation increases with increasing sugar content, but the stiffness of the jelly remains unaffected. In the presence of AcOH also, jellics are produced, the time required for jelly formation being dependent on the [H^{*}] only. Alteration of the $p_{\rm H}$ from 4.88 to 3.95 by addition of the acid results in a ten-fold increase in this time. W. McC.

Specificity of phosphatase. Enzymic fission of a heterocyclic phosphoric ester by animal phosphatase. K. P. JACOBSOHN and F. B. PEREIRA (Compt. rend. Soc. Biol., 1931, 107, 1168—1170; Chem. Zentr., 1932, ii, 1925).—Kidney- and liverphosphatase cause fission of di-8-hydroxyquinoline pyrophosphate. A. A. E.

Specificity of phosphatases. Enzymic hydrolysis of a hydroxyquinoline phosphate by vegetable phosphatase. F. B. PEREIRA and A. DA CRUZ (Compt. rend. Soc. Biol., 1931, 107, 1170-1171; Chem. Zentr., 1932, ii, 1925).—Phosphatase of dried yeast caused 37%, that of pea-flour 79%, fission.

A. A. E.

Specificity of mammalian phosphatases. J. ROCHE (Compt. rend. Soc. Biol., 1931, 107, 1144-1145; Chem. Zentr., 1932, ii, 1925).—Tests of phosphatases from red and white blood-corpuscles, serum, kidney, intestine, and bone with various PO₄-compounds differentiated several types. A. A. E.

Photochemical methods for investigation of oxygen-transportases (use of acetic acid bacteria and yeast-cells). F. KUBOWITZ and E. HAAS (Biochem. Z., 1932, 255, 247-277).—A further 22 wavelengths are added to the 15 already described (A., 1929, 1475) of the respiratory enzyme, the spectral range being now from 193 to 671 mµ. The methods whereby the 37 wave-lengths are determined and the absorption coeffs. calc. are described. The absorption spectra of the CO compound of the respiratory enzyme of *B. Pasteurianum* and *Torula utilis* are given and compared with those of hæmoglobin, chlorocruorin, and cytochrome. P. W. C.

Conversion of acetaldehyde by yeast. Action of co-zymase. II. F. ZUCKERKANDL and L. MESSINER-KLEBERMASS (Biochem. Z., 1932, 255, 330—343).—The reduction of MeCHO to EtOH is always dependent on the presence of glucose or glycogen, glucose being first split into a 3C complex (I). Poisoning the yeast with NaF or $CH_2I \cdot CO_2H$ prevents the formation of (I), and therefore of EtOH. The formation of (I) is again made possible by addition of $PO_4^{\prime\prime\prime}$ or substances containing an imine group and the reduction then again takes place. (I) passes partly into $AcCO_2H$ by oxidation. Enzymic processes which are not inhibited by NaF or $CH_2I \cdot CO_2H$ are not affected by addition of imines. P. W. C.

Mechanism of oxidation processes. XXXII. Enzymic oxidation of acetic acid by yeast. H. WIELAND and R. SONDERHOFF.—See this vol., 32.

Enzymes and salt ions. IV. Invertase concentration in *Penicillium glaucum* in nitrogen deficiency. G. VON DOBY (Z. physiol. Chem., 1932, 213, 71-83; cf. A., 1932, 665).—The variation in invertase production by *P. glaucum* was studied when the nutrient solution was varied in respect of sucrose concn. (4-20%) and in source and concn. of N (0.0035-0.28%). The optimum $p_{\rm fl}$ of the invertase was 4.5, the temp. optimum 50° in all cases. The invertase concn. on 5% sucrose was an inverse function of the N concn., and was higher for org. N sources. It was less dependent on the N concn. with 20% sucrose. J. H. B.

Presence of factor Z in grape juice and fermented liquors. J. BRISOU and L. GENEVOIS (Compt. rend. Soc. Biol., 1931, 107, 865–867; Chem. Zentr., 1932, ii, 1641).—Euler's observation of the presence of factor Z in liquids fermented aërobically with yeast was confirmed for Gironde wine yeast and grape juice (I). Fresh (I) contains as much Z as yeast juice; fermented (I) contains much less, and the finished wine contains very little. A. A. E.

Chemical composition of Aspergillus niger as modified by zinc sulphate. N. PORGES (Bot. Gaz., 1932, 94, 197—205).—Addition of 0.01% of ZnSO₄ to a 10% sugar medium tended to retard spore formation and increase vegetative growth in A. niger. Under these conditions there was a greater utilisation of sugar and larger yield of citric acid. Treatment with ZnSO₄ increased the Et₂O-sol. and cold-H₂O-sol. constituents and the hemicellulose content of the mycelium. The lignin content was considerably depressed. A. G. P.

Influence of potassium salt anions on the mycelium growth of Aspergillus niger. E. Lowig (Landw. Jahrb., 1932, 76, 181–210).—The presence of 0.1—1.0% of citric acid in the nutrient or soil extract does not affect the growth of mycelium of A. niger. The growth increases caused by K citrate, silicate, chloride, and sulphate are attributable to the action of the cation alone. The greatest relative growth increase due to K was shown in solutions containing 0.0035% K₂O. Max. growth intensity is reached in 3—4 days. The abs. and relative K₂O

and P_2O_5 contents of the mycelium decrease and the Cl' and SO_4 " contents increase with age. In the early stages the K_2O and P_2O_5 contents of the mycelium are approx. 10 times those of the nutrient medium. Where K is supplied as sulphate the SO_4 " content of the fresh mycelium in the early stages is approx. the same as that of the nutrient, but rises considerably with increasing age of the culture, and finally exceeds the equiv. of the K content. Where KCl is supplied the Cl' content of the mycelium never exceeds that of the nutrient, and ultimately equals $\frac{1}{4}$ — $\frac{1}{2}$ of the K content. A. G. P.

Chemical production of a growth-promoting substance of the *B* group. N. NIELSEN and V. HARTELIUS (Biochem. Z., 1932, 256, 2—10; cf. A., 1932, 661).—A substance which promotes the growth of *Aspergillus niger* is produced by the interaction of carbohydrate (glucose, fructose, or arabinose, but not inositol, mannitol, or EtOH), org. acids (tartaric, citric, succinic, lactic, oxalic) or their NH, salts, and filter-paper or filter-paper ash, especially at high temp. (135°). The substance contains no N and, like the similar (or identical) substance produced by Rhizopus suinus, is insol. in Et₂O and is destroyed by H₂O₂. W. McC.

Biochemistry of micro-organisms. XXV. 3:5-Dihydroxyphthalic acid, a product of the metabolism of glucose by *Penicillium brevi-compactum* and related species. A. E. OXFORD and H. RAISTRICK. XXVI. The formation from glucose by members of the *Penicillium chrysogenum* series of a pigment, an alkali-soluble protein, and penicillin. P. W. CLUTTERBUCK, R. LOVELL, and H. RAISTRICK (Biochem. J., 1932, 26, 1902—1906, 1907—1918).—XXV. The product $C_8H_6O_6$ (A., 1932, 1289) is 3:5-dihydroxyphthalic acid.

(A., 1932, 1289) is 3: 5-dihydroxyphthalic acid. XXVI. The pigment chrysogenin, $C_{18}H_{22}O_6$, $[\alpha]_{5461}$ -762°, gives a brown coloration with FeCl₃ and contains two weakly acidic groups. The protein resembles a typical alkali-sol. leaf-protein. Penicillin is an extremely labile substance very readily inactivated by oxidation. It is moderately stable at $p_{\rm m}$ 5-6 and less stable in acid or alkaline solutions. The synthetic media contained glucose and mineral salts with NaNO₃ as a source of N. S. S. Z.

Chemistry of mould tissue. I. Soluble carbohydrate constituents. A. G. NORMAN, W. H. PETERSON, and R. C. HOUTZ. II. Resistant cellwall material. A. G. NORMAN and W. H. PETERSON (Biochem. J., 1932, 26, 1934—1945, 1946—1953).— I. The H₂O- and alkali-sol. fractions of Aspergillus fischeri grown on a glucose-NH₄NO₃ medium have been examined. Except for a trace of pentose the only sugar unit found was glucose. Interrupted hydrolysis of one of the fractions indicated the presence of two types of sugar linking, one easily hydrolysed and the other more resistant.

II. The resistant cell-wall material of A. fischeri does not contain ordinary cellulose. It is probably a mixture of two components, one containing hexosamine, glucose, and Ac units, and the other more readily hydrolysed glucose units alone. S. S. Z.

Chemistry of the white rots of wood. III. Effect on wood substance of Ganoderina applanatum (Pers), Pat., Fomes fomentarius (Linn.), Fr., Polyporus adustus (Willd.), Fr., Pleurotus ostreatus (Jacq.), Fr., Armillaria mellea (Vahl.), Fr., Trametes pini (Brot.), Fr., and Polystictus abientinus (Dicks), Fr. W. G. CAMPBELL (Biochem. J., 1932, 26, 1829—1838).—The examination of this series shows that fungi of the white rot type decompose carbohydrates as well as lignin, although there is no general uniformity with regard to either the order or proportion in which the several wood components are decomposed. In white rots the total alkali-solubility of the decayed wood as a % of oven-dry sound wood rises to a max. and begins to decline at a much earlier stage than in brown rots. S. S. Z.

Arsenic fungi of Gosio. C. THOM and K. B. RAPER (Science, 1932, 76, 549—550).—As fungi are more numerous in soil than has previously been supposed. Many species or strains of *Scopulariopsis* and *Aspergillus sydowi* produce As-containing gas. Other common fungi such as *Penicillium expan*sum, P. chrysogenum, etc. grow well on As substrates without producing gas. Accumulation of As in soil may be expected to occur only when large amounts of As are used, or under special conditions favourable to the development of a varied microflora.

L. S. T.

Aëration train for the study of products of bacterial metabolism. H. H. WALKER (J. Bact., 1932, 24, 169—184).—Apparatus for determining the NH_3 and CO_2 produced in aërated bacterial cultures is described. A. G. P.

Effect of iodoacetic acid on bacterial lactic acid production. K. MEYER (Biochem. Z., 1932, 256, 105-114).—CH₂I·CO₂H, in closes far below the lethal, specifically inhibits the production of lactic acid by otherwise unaffected bacteria. W. McC.

Lactic acid fermentation. Effect of potassium chloride. G. P. LE GALLIC (Compt. rend. Soc. Biol., 1932, 108, 1138—1140; Chem. Zentr., 1932, ii, 1642).—The yield of lactic acid is diminished; it is max., independently of the quantity of KCl, in 65 hr. A. A. E.

Fermentation products of Actinomyces sp. Saito. T. TARAHASHI and T. ASAI (J. Agric. Chem. Soc. Japan, 1932, 8, 652—655).—Glucose afforded CHAcMe·OH and *l*-lactic acid (I); the yield of (1) was 36% of the glucose consumed. CH. ABS.

Formation of fructose and kojic acid by acetic acid bacteria. T. TAKAHASHI and T. ASAI (Proc. Imp. Acad. Tokyo, 1932, 8, 364—366).—Fructose and kojic acid have been isolated from mannitol cultures of several species of AcOH-bacteria which also produce gluconic acid from glucose. A. C.

Gluconic acid fermentation. IV. Bacterium hoshigaki var. glucuronicum II and III nov. sp. T. TAKAHASHI and T. ASAI (J. Agric. Chem. Soc. Japan, 1932, 8, 703—719).—II produces acid from arabinose, glucose, fructose, galactose, sucrose, raffinose, glycerol, mannitol, sorbitol, EtOH, and PrOH, but not from maltose, lactose, dextrin, starch, inulin, or MeOH. It inverts sucrose and oxidises AcOH. The yield of gluconic acid is 89% of the glucose used, or 100% for the culture solution containing glucose and peptone or NH_4 phosphate. III does not produce acid from raffinose, glycerol, mannitol, or sorbitol, and it does not oxidise AcOH. The yield of gluconic acid in the solution containing 10% of glucose is 76.5%. Both II and III produce hydroxygluconic and glycuronic acids in culture solution with CaCO₃. CH. ABS.

Chemistry of the diphtheria bacillus. II. Aqueous extracts of the bacillus. J. HIRSCH (Z. Hyg., 1932, 114, 195–223).—Aq. extracts of dried culture contain considerable proportions of N and P and are toxic to guinea-pigs. The toxic action is not associated with the N-constituents. The P content of the extract decreases and its toxicity increases with the age of the culture used. In older cultures the ratio of inorg. to total P rises considerably. A. G. P.

Composition of the diphtheria bacillus. A. LEULIER, P. SÉDALLIAN, and A. FINCK (Compt. rend. Soc. Biol., 1931, 107, 1135—1136; Chem. Zentr., 1932, ii, 1927).

Paratyphoid-A-inhibiting properties of paraphoid cultures. A. ROCHAIX, P. SEDALLIAN, and (MME.) CLAVEL (Compt. rend., 1932, 195, 1111-1112). —The filtrate of 24-hr. mixed cultures of paratyphoid-A and -B inhibits the growth of A, but not of B. Blood cultures from a guinea-pig injected subcutaneously with A and B are positive with respect to B only. The inhibitory power of the filtrate is transmissible in series of cultures, is destroyed at 60° , and considerably weakened by incubation at 37° for 24 hr. A. C.

Chemistry of bacteria. III. Lipin content of various types of tubercle bacillus. E. CHARGAFF and J. DIERYCK (Biochem. Z., 1932, 255, 319—329).— Tables summarise the fat, phosphatide, wax, and polysaccharide contents of 28 strains of tubercle bacillus. The strains may be divided into three groups with total lipin contents of 24, 16, and 11% (dry wt.), the groups containing strains of Calmette-Guérin, of the bovine, and of the human tubercle bacillus, respectively. P. W. C.

B. paratuberculosis of Moeller and Grassberger. E. DARZINE (Ann. Inst. Pasteur, 1932, 49, 743—749).—Moeller's bacillus (A) is strongly acid-resisting and Grassberger's strain (B) but feebly so. A withstands the action of 10.5% H₂SO₄ for 24 hr., whilst B is killed in 5 min. When A is fixed and stained with Ziehl's fuchsin it is not decolorised in 24 hr. by 2% aq. Na₂SO₃, whilst under similar treatment B is decolorised in 5 min. These differences are due to the nature of the fatty envelopes. The fat from A, extracted by CHCl₃, has m.p. 45—46°, that from B has m.p. 30°. The staining properties of A and B correspond with those of free palmitic and oleic acids, respectively, *i.e.*, the more saturated the fat of the envelope the more permanently it will stain and the more acid-resisting will be the strain.

P. G. M.

Occurrence of a specific carbohydrate in Bacterium perfringens. M. E. JIMENEZ (Compt. rend. Soc. Biol., 1931, 106, 140-141; Chem. Zentr., 1932, ii, 724).—Extraction of cultures of *B. perfringens* with salt solution and pptn. with EtOH+1.3% NaOAc gives a ppt. containing a sp. carbohydrate. L. S. T.

Bacteria fermenting urea. E. N. MISCHOUSTIN (Zentr. Bakt. Par., 1932, II, 87, 150—166).—Soil organisms fermenting urea may be differentiated according to the nature of C compounds which they are able to assimilate. The organism examined (? nov. sp.) utilises salts of org. acids far more readily than carbohydrates, and in general shows a preferential assimilation inversely related to the no. of constituent C atoms linked to O. NH₄ salts are more readily utilised than urea, asparagine, or peptone, which are taken up after preliminary hydrolysis. No evidence of the formation of MeCHO from acetates was obtained. A. G. P.

Factors influencing the reduction of nitrates and nitrites by bacteria in semi-solid media. C. E. ZOBELL (J. Bact., 1932, 24, 273—281).—Many strains of organisms are examined. In a no. of cases, NO₂' produced is further reduced by the same organism, notably those of the *Brucella* and *Salmonella* groups. A. G. P.

Metabolism in the Brucella group. III. Viability in aqueous solutions. C. E. ZOBELL and M. H. ZOBELL. IV. Bacteriostatic action of dyes. V. Production of hydrogen sulphide. VI. Nitrate and nitrite reduction. VII. Glucose utilisation. K. F. MEYER and C. E. ZOBELL (J. Infect. Dis., 1932, 50, 538-541; 51, 72-90, 91-98, 99-108, 109-116).-V. The test can be used in conjunction with the dye tolerance test.

VI. Differences in the effects of different strains are recorded; they may be used for characterisation.

VIII. Various strains show no significant differences in glucose utilisation or in terminal reactions after growth in glucose media. CH. ABS.

Fermentation of α -methyl-*d*-glucoside by members of the coli-aerogenes group. S. A. KOSER and F. SAUNDERS (J. Bact., 1932, 24, 267— 271).—*B. aerogenes* but not fæcal *B. coli* can ferment α -methyl-*d*-glucoside with the production of acid and gas. A. G. P.

Influence of aëration and of sodium chloride on the growth curve of bacteria in various media. C. E. A. WINSLOW, H. H. WALKER, and M. SUTER-MEISTER (J. Bact., 1932, 24, 185–208).—Aëration of cultures of *E. coli* prolongs the "lag period" of the growth curves and subsequently accelerates and prolongs the period of logarithmic increase. 0.1M-NaCl has a stimulating and 0.5M-NaCl a toxic action during the period of increase. Both concns. are toxic during the "lag period." A. G. P.

Metabolic activity of the bacterial cell at various phases of the population cycle. H. H. WALKER and C. E. A. WINSLOW (J. Bact., 1932, 24, 209-241).—In a stable culture of *E. coli* addition of lactose to a peptone medium decreased the NH₃ produced by the organisms without affecting CO₂ production. Effects of sub-toxic quantities of NaCl are recorded. A. G. P.

Factors determining the rate of mortality of bacteria exposed to alkalinity and heat. J. H.

WATKINS and C. E. A. WINSLOW (J. Bact., 1932, 24, 243-265).—Effects on the toxicity of NaOH to *E. coli* of variations in age of culture, concn. of bacteria and of NaOH, and of temp. are examined. A. G. P.

Multiplication and respiration of soil bacteria in presence of protozoa. L. von T. Kovács (Mezog. Kutat., 1932, 5, 203—214; Chem. Zentr., 1932, ii, 1641).—In presence of protozoa (I) the CO₂ evolution was increased, particularly with mixed cultures; it was higher with glucose– $(NH_4)_2SO_4$ than with peptone– $(NH_4)_2SO_4$ solutions (on sand). CO₂ evolution was diminished by excess of (I). The bacterial count and the CO₂ developed were related in peptone (but less so in glucose) solutions, particularly in presence of (I). A. A. E.

Effect of Colpidium on ammonia production by soil bacteria. J. MEIKLEJOHN (Ann. Appl. Biol., 1932, 19, 584—608).—Bacterial nos. in soil are depressed in the presence of Colpidia, but NH_3 produced by cultures was not reduced. In general, NH_3 and CO_2 production per organism and the no. of bacteria in the colony bear an inverse linear relationship. A. G. P.

Carbohydrate metabolism of parasitic protozoa. I. Behaviour of glycogen in cysts of *Amoeba butschlii*, Prowazek. T. VON BRAND (Z. Parasitenk., 1932, 4, 753—775).—Rate of disappearance of glycogen from cysts is largely dependent on temp. and is not influenced by the O₂ supply. Glycogen probably acts as an energy source. A. G. P.

Particle size of biological units. J. H. FERGU-SON (J. Physical Chem., 1932, 36, 2849-2861).—A review of the ultramicroscopy, ultrafiltration, and sedimentation of viruses and bacteriophage.

E. S. H.

Action of aliphatic and aromatic compounds on diphtheria toxin. S. SCHMIDT (Biochem. Z., 1932, 256, 158–189).—The toxic and other effects, at const. $p_{\rm H}$, of equimol. solutions (suspensions, mixtures) of a large no. of compounds (aliphatic, carbocyclic, heterocyclic) have been examined. Many of the compounds have pronounced toxic effects. Purified toxin should always be used in such experiments. W. McC.

Effect on solutions of diphtheria toxin and diphtheria antitoxin of contact with certain surfaces. P. J. MOLONEY and E. M. TAYLOR (Biochem. J., 1932, 26, 1754—1761).—Diphtheria toxin or antitoxin disappears from solution in contact with a sufficiently large surface of paraffin wax, or of glass which has been first in contact with light petroleum, or of glass tubes which have been plugged with cotton wool or filter-paper and heated for 1 hr. at 180°. Glass, cleaned with chromate- H_2SO_4 and heated at 180° for 1 hr., has relatively little effect on the toxin. S. S. Z.

Purification of diphtheria toxin. A. LEULIER, P. SÉDALLIAN, and CLAVEL (Compt. rend. Soc. Biol., 1931, 107, 1136—1137; Chem. Zentr., 1932, ii, 1927). —The whole of the active toxin fraction is obtained from a bouillon culture by centrifuging at $p_{\rm H}$ 4.7. The ppt. contains chiefly the nucleoproteins sol. in dil. alkali. A. A. E.

Action of salicylsalicylic acid on tetanus toxin. L. VELLUZ (Compt. rend. Soc. Biol., 1932, 109, 178— 179; Chem. Zentr., 1932, ii, 1926).

Oligodynamic action of distilled water and its practical significance. F. HODER (Z. Immunitats., 1932, 74, 455—458; Chem. Zentr., 1932, ii, 724).— H_2O and NaCl solutions prepared in a Cu apparatus are useless for bacteriological purposes on account of their oligodynamic action. NaCl also has an effect on bacteria. L. S. T.

Intake of dissolved substances by bacteria. III. H. HABS (Z. Hyg., 1932, 114, 358–370; cf. A., 1932, 1170).—Factors concerned in the absorption of disinfectants by bacteria are discussed.

A. G. P.

[Antiseptic properties of] thymol. J. SILBER-STEIN (Pharm. Zentr., 1932, 73, 727-728).-1% Thymol solution kills Streptococcus pyogenes in 0.5min., whilst 1% antiformin solution requires >5 but <15 min., and 1% EtOH and 1% PhOH solutions are ineffective after 15 min. The val. of thymol, particularly as a fatty acid ester, for disinfection etc. is emphasised. R. S. C.

Mechanism of chemotherapeutic action. III. Differentiation between parasiticidal and virulence-decreasing action of arsenicals. L. REINER and C. S. LEONARD. IV. Effect of blockade on the chemotherapeutic action of the plasma of animals treated with arsenicals. L. REINER, C. S. LEONARD, and S. S. CHAO. V. Rate of methylene-blue reduction and decrease in virulence of trypanosomes treated with arsenicals with and without sodium thioglycollate. L. REINER and C. S. LEONARD. VI. Binding of arsenicals by trypanosomes *in vitro*. VII. Binding of arsenicals by arsenic-resistant trypanosomes in vitro. L. REINER, C. S. LEONARD, and S. S. CHAO. VIII. Variation in size of the spleen following treatment with arsenicals, blockade with India-ink, and infection with T. equiperdum. L. REINER and S. S. CHAO (Arch. Int. Pharm. Ther., 1932, 43, 10-36, 37-48, 49-62, 186-198, 199-208, 209-215).-III. Tervalent arsenicals decrease the virulence of trypanosomes (I), but increase the time of infection. If the (I) are pretreated with arsenicals (II) in broth, this property cannot be demonstrated. It is suggested that, in presence of plasma, some form of (II) acts directly on the (I), possibly a combination of (II) with globulin.

IV. Blockade of the reticulo-endothelial system increases the As content and the chemotherapeutic activity of the plasma of animals treated, after blockade, with (II). It does not inhibit the formation of the active chemotherapeutic agent. Storage of (II) in the spleen and liver is not changed.

V. (I) treated in vitro with (Π) show a decrease in virulence but no change in their capacity to reduce methylene-blue anaerobically. Na thioglycollate (III) inhibits this decrease completely.

VI. Dead (I) bind more As [of tervalent (II)] than

living ones. The relative amount bound runs parallel with the toxicity *in vitro*. The binding to living (I) corresponds with a closely-packed unimol. layer. It is inhibited by the presence of (III). VII. As-resistant (I) bind slightly less As than

VII. As-resistant (I) bind slightly less As than normal strains, but the figure is of the same order. This indicates an increase in tolerance rather than a decrease in affinity for arsenicals. The methyleneblue reduction rate is identical with that of normal strains.

VIII. Size of the spleen increases with the duration of (I) infections. Treatment with (II) tends to decrease the size of the spleen, whilst blockade has the opposite effect. H. G. R.

Mechanism of chemotherapeutic action. IX. Rôle of NH_2 , OH, and As:As groups in parasitotoxic action of arsphenamine derivatives. X. Toxic action of hydrogen peroxide on trypanosomes. L. REINER and C. S. LEONARD (Proc. Soc. Exp. Biol. Med., 1932, 29, 946–950, 951–953).—IX. Hiramatsu's reaction (A., 1930, 370) is given by compounds possessing aminophenol groups (I) and the presence of As is not necessary. p-NH₂·C₆H₄·OH is not toxic to trypanosomes, but its autoxidation product is. Reducing agents inhibit the toxic action. Various org. arsenious oxides, not capable of giving on oxidation iminoquinone structure, are more toxic than are (I) and quinone. Toxicity of arsphenamine derivatives is due chiefly to As¹¹ and not to (I).

X. $H_2\dot{O}_2$ is toxic to trypanosomes. In vivo the formation of traces of $H_2\dot{O}_2$, where the catalase content is low, might be involved in the rate of the AsO-formation and be concerned indirectly with the chemo-therapeutic action of arsenicals. H. G. R.

Trypanocidal action and chemical constitution. XIV. Relative velocity of oxidation of arylarsenoxides. A. COHEN, H. KING, and W. I. STRANGEWAYS.—See this vol., 130.

Properties of adrenal lipin. J. STEFL (Compt. rend. Soc. Biol., 1931, 106, 406—409; Chem. Zentr., 1932, ii, 732).—When oxidised adrenaline, which no longer shows the chemical or physiological properties of adrenaline, is treated with an aq. emulsion of adrenal lipin adrenaline is re-formed, slowly at room temp. and quickly when heated. L. S. T.

Resynthesis of adrenaline. J. STEFL (Compt. rend. Soc. Biol., 1931, 106, 410—412; Chem. Zentr., 1932, ii, 732).—The new synthesis of adrenaline (cf. preceding abstract) occurs when oxidised adrenaline is heated in dil. HCl solution. The adrenal lipin is also weakly acidic. L. S. T.

Effect of adrenaline on lactic acid content of blood and urine in rabbits. J. A. COLLAZO, J. PUYAL, and J. CASTELLANO (Anal. Fís. Quím., 1932, 30, 759—763).—After injection of 0.5 mg. per kg. of adrenaline, lactic acid rises to 97.5 mg. per 100 c.c. in the blood and to 65 mg. per 100 c.c. in the urine. Blood-sugar rises to 260 mg. per 100 c.c. and glycosuria is observed. R. K. C.

Effect of adrenaline on lactic acid content of blood in normal man. J. A. COLLAZO, J. PUYAL, and J. CASTELLANO (Anal. Fís. Quím., 1932, 30, 764-766).—After injection of 1 mg. of adrenaline the lactic acid in the blood rises to twice the normal val. A corresponding rise in blood-sugar and urinary lactic acid is observed. R. K. C.

Effect of adrenal operations on blood-calcium in man. A. JUNG and A. C. HAKKI (Compt. rend. Soc. Biol., 1931, 108, 40—42; Chem. Zentr., 1932, ii, 1796).—Adrenalectomy or resection of a subthyroid artery diminishes abnormally high blood-Ca, but scarcely affects normal vals. A. A. E.

Function of adrenal tissue. V. Rôle of adrenal tissue hormones in sulphur metabolism. K. A. WINTER and M. REISS (Endokrinologie, 1932, 10, 404—409; Chem. Zentr., 1932, ii, 732).—In rabbits removal of one or both adrenals markedly increases the S obtainable from protein-free blood. The addition of adrenal extract lowers the S level in normal animals by 25%. L. S. T.

Gastric secretion caused by insulin. E. B. BOLDYREV and J. F. STEWART (J. Pharm. Exp. Ther., 1932, 46, 419—429).—In dogs with gastric fistulæ administration of commercial or cryst. insulin (2 units or more) stimulates gastric secretion having a high free and total acidity and high pepsin content. This action of insulin is inhibited by atropine, but not by intravenous administration of glucose.

W. O. K.

Vagus control of pancreatic function. Experimental insulin resistance. E. B. BOLDYREV and J. F. STEWART (J. Pharm. Exp. Ther., 1932, 46, 407— 418).—Cryst. insulin administered to animals or man produces symptoms characteristic of vagus stimulation, and these effects as well as the hypoglycæmic action are inhibited by blockage of the vagus surgically or by administration of atropine. W. O. K.

Effect of insulin on phloridzin glycosuria in the normal dog. F. RATHERY and Y. LAURENT (Compt. rend. Soc. Biol., 1931, 108, 643-645; Chem. Zentr., 1932, ii, 1648).—Large doses of insulin increased or diminished urinary sugar. A. A. E.

Relation of phosphorus to the metabolism of sugar in the animal body, and the action of insulin and synthalin. Z. Y. TSEN (Acad. Sinica Inst. Chem. Mem., 1930, No. 1, 1—47).—Normal human plasma contained total P 8·2, org. P 4·7, inorg. P. 2·9, whilst diabetic plasma contained, respectively, $15\cdot9$, $11\cdot6$, $1\cdot5$ mg. per 100 c.c. The total P was parallel to the sugar. Insulin and synthalin decreased org. and increased inorg. P. Experiments *in vitro* with guinea-pig plasma exhibited none of these changes. CH. ABS.

Determination of the thyroxine content of thyroid and thyroid preparations. I. ABELIN (Arch. exp. Path. Pharm., 1932, 168, 722-725).— The material is hydrolysed by aq. NaOH, the thyroxine extracted with BuOH according to the method of Leland and Foster (A., 1932, 432), and then determined by measurement of its I content.

W. O. K.

Mechanism of effect of thyroxine on tissue metabolism. T. EBINA (Tôhoku J. Exp. Med., 1932, 19, 139—154).—Injection of thyroxine (0.01 mg. per 100 g.) into rats increases the respiration and anaërobic glycolysis of kidney tissue, but affects only the respiration of liver tissue. When added to these organs *in vitro*, it increases the respiration and anaërobic glycolysis of both. CH. ABS.

Effect of thyroxine on blood-sugar. E. ZUNZ and J. LA BARRE (Compt. rend. Soc. Biol., 1931, 108, 225—227; Chem. Zentr., 1932, ii, 1794—1795).— Hyperglycæmia (max. vals. 0.044—0.083 mg. per 100 c.c.) which occurs on injection of thyroxine into normal (chloralosed) dogs is not observed with adrenalectomised dogs, but is then replaced by hypoglycæmia. After adrenaline and other hyperglycæmic substances there is an increase in the insulin content of pancreatic venous blood. Injection of thyroxine causes an increase in insulin secretion. A. A. E.

Changes in the weight, pulse, respiration, and blood- $p_{\rm H}$ and -alkali reserve in hyperthyroidised animals treated with thyroxine or "parathormone" or with thyroid and parathyroid gland. C. I. PARHON and H. DEREVICI (Compt. rend. Soc. Biol., 1932, 107, 386-388; Chem. Zentr., 1932, ii, 1194).

Change in blood-sugar, -cholesterol, -calcium, -potassium, and -phosphorus on treatment with thyroid or thyroxine and "parathormone" and on combined treatment. C. I. PARHON and H. DEREVICI (Compt. rend. Soc. Biol., 1932, 107, 388— 389; Chem. Zentr., 1932, ii, 1194).—In dogs, thyroid increases the blood-sugar, -K, and -P and decreases the -cholesterol and -Ca. "Parathormone" decreases the -sugar and -cholesterol, and increases the others.

A. A. E.

Effect in man of the parathyroid hormone on the plasma-, corpuscle-, and cerebrospinal fluid-chlorine. C. I. PARHON and M. CAHANE (Compt. rend. Soc. Biol., 1931, 107, 835-836; Chem. Zentr., 1932, ii, 1463-1464).—Plasma- and corpuscle-Cl are slightly, and cerebrospinal fluid-Cl is not, increased. A. A. E.

Estimation of the functional activity of the thyroid by means of urine or serum and investigation of the relationship between the thyroid and other endocrine organs. M. L. KOH (Korean Med. J., 1932, 2, 45-48).-The function of the thyroid is determined by way of the atropine-neutralising substance (I) in the urine by adding atropine sulphate to the urine and examining its effect on the cat's eye. Feeding thyroid to rabbits increases (I) in the urine and serum; thyroidectomy decreases it. Transplantation of rabbit's thyroid gland into a thyroidectomised rabbit, or injection of thyroxine or thyroid extract before thyroidectomy, causes transitory reappearance of (I). (I) is not the thyroid hormone itself; it is sol. in H₂O, but not in EtOH or Et₂O. It is stable at $>80^\circ$ for 30 min., but is destroyed at 100°. In serum it is combined with albumin, from which it cannot be separated by adsorption with CH. ABS. siliceous earth.

Are the substances designated as "anterior pituitary hormone" in the urine identical with the pituitary substances having a similar action ? J. FREUD (Deut. mcd. Woch., 1932, 58, 974-975; Chem. Zentr., 1932, ii, 731).—The similarity is admitted, but the identity is not proved. A. A. E.

Appearance of thyroid substances in the blood after the action of the anterior lobe of the pituitary. W. GRAB (Arch. exp. Path. Pharm., 1932, 168, 715-721).—The blood of animals which have been treated parenterally with pituitary anterior lobe when fed to tadpoles accelerates their metamorphosis, thus indicating the presence in it of thyroid secretion. W. O. K.

Equilibrium between anterior pituitary and thyroid hormones in the normal and pathological organism. M. ARON, C. VAN CAULAERT, and J. STAHL (Compt. rend. Soc. Biol., 1931, 107, 64-66; Chem. Zentr., 1932, ii, 1317).—Administration of thyroid arrests the action of the anterior pituitary thyreotropic hormone (I). By evaluation of urine or blood with rabbit's thyroid there is determined not the abs. content of (I), but its excess over thyroid hormone. In the blood and urine of hyperthyreotics there is therefore found little, and in that in myxcedema much, (I), much thyroxine being present in the former case. A. A. E.

Presence of the luteinising factor in the guineapig pituitary. A. LIPSCHUTZ (Compt. rend. Soc. Biol., 1931, 108, 646—647; Chem. Zentr., 1932, ii, 1792).—Injection of the anterior pituitary lobe of male or female guinea-pigs into infantile rats did not cause the formation of corpora lutea. Either this factor is not present, or its amount is only 10% of that in the rat pituitary. A. A. E.

Activity of the anterior pituitary gland in various animal species and in various ages by comparison of the hormone present in the organism with the morphological development of the thyroid. M. ARON (Compt. rend. Soc. Biol., 1932, 106, 609-611; Chem. Zentr., 1932, ii, 1463).

Effect of parathyroidectomy on blood-calcium. A. G. WEISS, J. MONGUIO, and L. BERNARD (Compt. rend. Soc. Biol., 1931, 108, 12–14; Chem. Zentr., 1932, ii, 1796).—Ligation of the sub-thyroid artery and adrenalectomy in the cat did not affect the blood-Ca. A. A. E.

Acidity and calcium content of gastric juice in thyro-parathyroidectomised animals or animals treated with parathormone. C. I. PARHON and M. CAHANE (Compt. rend. Soc. Biol., 1932, 109, 243— 245; Chem. Zentr., 1932, ii, 1795).—The acidity was little affected; parathormone slightly increased the Ca content. A. A. E.

Cardiovascular and metabolic reactions of man to the intramuscular injection of posterior pituitary liquid (pituitrin), pitressin, and pitocin. A. GROLLMAN and E. M. K. GEILING (J. Pharm. Exp. Ther., 1932, 46, 447-460).—In man therapeutic doses of pitressin and pituitrin cause a brief fall in the O_2 consumption, pulse rate, and cardiac output followed by a more prolonged rise. Pitocin causes a slight rise in O_2 consumption only. W. O. K.

Clinical significance of pituitrin hyperglycæmia. B. ASCHNER and L. JASO-ROLDAN (Z. klin. Mcd., 1932, 121, 495-503; Chem. Zentr., 1932, ii, 1793).—The effect is due partly to mobilisation of adrenaline from the adrenals and partly to a direct mobilisation of glycogen. A. A. E.

Presence in the blood and cerebrospinal fluid, and distribution in these liquids and in urine, of the anterior pituitary hormone having an excitosecretory action on the thyroid gland. C. VAN CAULAERT, M. ARON, and J. STAHL (Compt. rend. Soc. Biol., 1932, 106, 607-609; Chem. Zentr., 1932, ii, 1463).-Under normal and pathological conditions in guinea-pigs the urine contains half as much as the blood; the amount in the cerebrospinal fluid is variable. A. A. E.

Does the hormone of the corpus luteum affect the blood-cholesterol? M. KNELL (Arch. Gynäkol., 1932, 150, 176-185; Chem. Zentr., 1932, ii, 1928).-Injection of the hormone into rabbits did not affect A. A. E. the blood-cholesterol.

Excretion of follicular and anterior pituitary hormone at the end of pregnancy. H. RUNGE, H. HARTMANN, and K. SIEVERS (Arch. Gynakol., 1932, 149, 608-622; Chem. Zentr., 1932, ii, 1193).-As parturition approaches the excretion of follicular hormone increases, whilst that of anterior pituitary hormone varies considerably. A. A. E.

Estrus-producing and luteinising action of preparations of the anterior lobe of the pituitary. K. COESTER (Arch. exp. Path. Pharm., 1932, 168, 745-752).-Details are given of the biological assay on rats of preps. from the anterior lobe of the pituitary or from urine of pregnancy in respect of their æstrusproducing and of their luteinising activities. The vals. found in the case of certain trade preps. are Ŵ. Ó. K. stated.

Is there a follicle-ripening hormone as well as a luteinising hormone in the anterior pituitary gland? M. ARON (Compt. rend. Soc. Biol., 1932, 108, 1218-1220; Chem. Zentr., 1932, ii, 1645).-Differences in the effects produced in rabbits by gonadostimulin are attributed to dosage; the existence of a sp. luteinising factor is improbable.

A. A. E.

Occurrence of growth-promoting substances in urine of pregnancy . E. WEHEFRITZ and E. GIER-HAKE (Klin. Woch., 1932, 11, 1106-1108; Chem. Zentr., 1932, ii, 730).—Urine of pregnancy is treated with Mg mixture to remove $PO_4^{\prime\prime\prime}$, and the hormones are salted out by $(NH_4)_2SO_4$ and dissolved in 5% $(NH_4)_2HPO_4$. Fractional adsorption then separates the sexual hormones from that which produces increased growth in hypophysectomised rats and other animals. L. S. T.

Effect of follicular hormone on pregnancy. M. MAINO (Arch. Ist. Biochim. Ital., 1932, 4, 347-360).—Administration to rabbits of 2000—2400 units of cryst. æstrin per day for 10 days, from the 1st, 10th, or 20th day of gestation, causes resorption of the foetus. No permanent effect is produced on the reproductive organs. Urinary excretion of the hormone in pregnancy may be the result of a mechan-R. K. C. ism protecting the foctus.

Pituitary sexual hormone. A. A. SCHMIDT and E. DERANKOVA (Endokrinol., 1932, 11, 1-15; Chem. Zentr., 1932, ii, 1316).-Dog's gastric or intestinal juice did not inactivate anterior pituitary sexual hormone (from urine of pregnancy), but pancreatic juice inactivated it rapidly. A. A. E.

Rabbit as test for pituitary hormone and pregnancy hormone. T. MARTINS (Compt. rend. Soc. Biol., 1931, 107, 180-182; Chem. Zentr., 1932, ii, 1316).—After two intravenous injections of 5 c.c. of urine the result can be observed after 24 hr. or less. Et,O extraction of the urine, which presumably removes an inhibitor (? folliculin), is preferred.

A. A. E. Crystalline hormone from urine of pregnancy. Ι. A. LEJWA (Biochem. Z., 1932, 256, 236-238).-To the urine, after treatment with 10% AcOH and filtration, $(NH_4)_2SO_4$ (40 g. to 100 c.c. of urine) is added, the ppt. is dissolved in H₂O, and the solution, adjusted to $p_{\rm H}$ 3.5-4.0 with dil. AcOH, is shaken for 2 hr. with permutit. The pure hormone is obtained by successive pptn. with aq. EtOH and $COMe_2$, extraction with EtOAc, and crystallisation at 0° from aq. EtOH after removal from the adsorbent from aq. Etoli and 0.125% aq. NH₂. W. McC.

Female sexual hormones. G. SANDULESCO, W. W. TCHUNG, and A. GIRARD (Compt. rend., 1933, 196, 137-140).-The following derivatives of equilenin (I) (this vol., 98) are prepared : Me ether, m.p. 197-198° (corr.); semicarbazone, m.p. 268° (decomp.); picrate, m.p. 205-208° (corr.; decomp.); styphnate, m.p. 212-213° (decomp.); acetate picrate, m.p. 106-107°. (I) heated in air passes into equilenin-red; a colorimetric method for determination of the amount of (I) in mixtures of hormones involving the formation of the red compound is described. Folliculin from the urine of pregnant women does not contain (I).

H.B.

Progestin. W. M. ALLEN (J. Biol. Chem., 1932, 98, 591-605).—An improved method (cf. Amer. J. Physiol., 1930, 92, 174) of preparing progestin is described, and the assay of progestin is discussed. A. L.

Splenic hormone and calcium metabolism. T. MIWA (Keijo J. Med., 1932, 3, 403-444) .- The blood-Ca of rabbits is decreased by withdrawal of blood and, to a greater extent, by starvation. Splenectomy is followed by a temporary rise in the serum-Ca (I) and a temporary decrease in body-wt. Subcutaneous injection of extracts from cow's spleen and, to a smaller extent, of those from liver, kidney, and muscle produces a decrease in (I), partly due, however, to the content of inorg. salts. Injection of venous blood-serum of the spleen but not that of the ear produces a decrease in (I). There exists an antagonism between the splenic and parathyroid hormones. The thymus gland appears to synergise the action of the spleen on Ca metabolism. Stimulation or blocking of the reticulo-endothelial system has no influence on (I). The splenic hormone is probably a sterol.

F. O. H.

Influence of the gonads on protein metabolism. II. Effect of injections of saline suspensions of testes and testicular extracts on urinary creatinine after castration. I. SCHRIRE and H. ZWAREN-STEIN (Biochem. J., 1932, 26, 1886-1889).-The

injections cause the high urinary creatinine of castration to decrease to the normal pre-castration level. S. S. Z.

Detoxicating hormone of the liver [yakriton]. XXXII. Difference of detoxicating mechanism by yakriton in ammonia and phenol poisoning. A. SATO and S. YOSHIMATSU. XXXIII. Chloroform and detoxicating liver power. S. YANA-GAWA. XXXIV. Counteracting effect of yakriton on the anticoagulant heparin. T. SATO. XXXV. Effect of yakriton on milk secretion. K. ASAKURA. XXXVI. Effect of yakriton in maintaining the highest agglutinin titre. G. MORO (Tohoku J. Exp. Med., 1932, 19, 1-9, 10-14, 15-31, 32-35). CH. ABS.

Physical methods in vitamin research. E. H. REERINK, A. VAN WIJK, and J. VAN NIEKERK (Chem. Weekblad, 1932, 29, 645-650).—A review.

H. F. G.

Availability of vitamins in plant tissues. J. E. RICHARDSON and H. L. MAYFIELD (Science, 1932, 76, 498—500).—Changes in potency of vitamins in carrots and potatoes after boiling, storing under different conditions, and canning are recorded. L. S. T.

Carotenoids of hen's egg-yolk after carotenoidfree feeding. E. VIRGIN and E. KLUSSMANN (Z. physiol. Chem., 1932, 213, 16—20).—The egg-yolks of hens on a diet containing carotene contained more carotenoid than those of hens on a carotene-free diet owing to the presence not of carotene but of xanthophylls. On both diets xanthophylls were found in the liver. J. H. B.

Rôle of carotenoids in the animal body. H. von EULER and E. KLUSSMANN (Biochem. Z., 1932, **256**, 11–17).—Birds (chicks, pigeons) utilise xanthophyll for part (in some cases perhaps for all) of their vitamin-A requirements and store it in their livers, whilst they very rapidly convert carotene into the vitamin. There is also a close relation between xanthophyll and vitamin-E. W. McC.

Hydrogenation and oxidation products of carotene as precursors of vitamin-A. R. KUHN and H. BROCKMANN (Z. physiol. Chem., 1932, 213, 1-7).—Hydroxy- and β -carotene show vitamin-A activity when fed to rats, but β -carotenone is inactive. The activity of α - and β -dihydrocarotenes is doubtful. J. H. B.

Extraction of vitamin-A from animal tissue. H. SIMONNET, A. BUSSON, and ASSELIN (Compt. rend. Soc. Biol., 1932, 108, 1123—1124; Chem. Zentr., 1932, ii, 1649).—The finely comminuted tissue is kept overnight at 0° in COMe₂; the mixture is filtered and the residue treated with dry Et₂O. After 1 hr. the extract is separated, dried with Na₂SO₄, and the Et₂O is removed. This residue is dissolved in a little abs. Et₂O, filtered, and the residue dissolved in oil. Unminced tissue can be kept for 48 hr. at 10—12° without loss of vitamin-A. A. A. E.

Vitamin potency of certain Lofoten (Norwegian) cod-liver oils. G. E. Éwe (J. Amer. Pharm. Assoc., 1932, 21, 1145—1146).—23 commercial samples of this oil had vitamin-A and -D activities (determined biologically) of 800–1200 and 108–271 units per g., respectively. R. S. C.

Carotene (vitamin-A) and thyroxine. H. VON EULER and E. KLUSSMANN (Z. physiol. Chem., 1932, 213, 21-34).—Carotene increases and thyroxine injections lessen the body-wt. of rats. The administration of both substances together may maintain equilibrium. J. H. B.

Cause of infections in cases of vitamin-A deficiency. P. ARONS and M. P. J. VAN DER RIJST (Arch. néerl. Physiol., 1932, 17, 578—613).—These infections are not the result of diminished powers of resistance but of local changes caused by accumulation of secretion products in consequence of keratinisation of the glandular ducts and atrophy of the glands.

H. G. R.

Biological testing of vitamin-A. J. UENO, Y. OTA, K. TONE, and S. YOKOYAMA (J. Soc. Chem. Ind. Japan, 1932, 35, 491—492B).—The use of the carp (Cyprinus caprio) for the assay of vitamin-A is recommended. The increase in wt. due to the vitamin is greater when the fish are kept in darkness than in daylight. F. O. H.

Colorimetric and biological assay of vitamin-A. E. C. WISE and F. W. HEVL (J. Amer. Pharm. Assoc., 1932, 21, 1142—1145).—The SbCl₃ determination of vitamin-A in seven cod-liver oils gave results comparable with the biological activity, if the unsaponifiable fraction, but not if the crude oil, was used. R. S. C.

Antimony chloride colour reaction for vitamin-A. V. Evaluation of a colorimetric unit on the basis of the biological unit for vitamin-A. E. R. NORRIS and A. E. CHURCH (J. Nutrition, 1932, 5, 495-501).—Colorimetric and biological units are correlated. A. G. P.

Pyruvic acid and vitamin- B_1 deficiency. A. P. MEIKLEJOHN, R. PASSMORE, and R. A. PETERS (Biochem. J., 1932, 26, 1872—1879).—The depressed O_2 uptake by the minced brain from deficient pigeons in the presence of pyruvate (I) is always lower than when lactate (II) is present. On the other hand, whilst the addition of vitamin- B_1 concentrates is incapable of restoring the lowered O_2 uptake with (I) as substrate, it does so in the case of (II). The change in the O_2 uptake in the presence of (I) is not due to blockage by (II). Pyruvic acid is not a stage in the oxidation of lactic acid in the pigeon's brain.

S. S. Z. Vitamin- B_1 content of the organs of white rats fed on normal and B_1 -free diets. H. G. K. WESTENBRINK (Arch. néerl. Physiol., 1932, 17, 560— 577).—The vitamin- B_1 contents of heart, liver, kidneys, brain, muscle, lung, spleen, stomach, and intestine were examined. The heart, liver, and kidneys have the highest content, the two last-named evidently acting as vitamin reserves. All these organs, with the exception of the brain, lose their vitamin content after feeding for 5 weeks on a B_1 -free diet.

P. G. M. Tissue respiration in beriberi. II. H. G. K. WESTENBRINK (Arch. néerl. Physiol., 1932, 17, 549– 555).—The O_2 uptake of the liver tissue of normal rats and pigeons is the same as that of animals with beriberi, and the respiration of tissues in this disease is unaffected. P. G. M.

Antiscorbutic value of fresh lime juice. A. HASSAN and R. BASILI (Biochem. J., 1932, 26, 1846— 1850).—The protective dose for juice expressed daily from ripe Egyptian limes gathered not more than 2 days previously was 1.5 c.c. per guinea-pig daily. A daily dose of 3 c.c. of juice from West Indian limes grown in Egypt and kept during the experimental period of 2 months in a refrigerator did not protect. S. S. Z.

"Hexuronic acid" (ascorbic acid) as the antiscorbutic factor. A. SZENT-GYÖRGYI and W. N. HAWORTH (Nature, 1933, 131, 24).—The name ascorbic acid is suggested for the cryst. substance $C_6H_8O_6$ which prevents scurvy in guinea-pigs.

Ľ. S. T.

Vitamin-C and hexuronic acid. T. MOORE and S. N. RAY (Nature, 1932, 130, 997—998).—Suprarenal glands from normal but not scorbutic guinea-pigs are blackened by 0.4% AgNO₃, supporting the view that hexuronic acid and vitamin-C are identical. Suprarenals from rats fed for long periods on diets completely deficient in vitamin-C always stain with AgNO₃ in agreement with the view that rats can synthesise this vitamin. L. S. T.

Methylnornarcotine, glycuronic acid, and vitamin-C. W. J. DANN (Nature, 1933, 131, 24-25). —Contrary to the observations of Rygh (A., 1932, 1294), daily administrations of methylnornarcotine or glycuronolactone alone or in conjunction failed to prevent scurvy in guinea-pigs fed on a scurvyproducing diet. L. S. T.

Effects of feeding irradiated ergosterol to animals. G. PALLASKE (Klin. Woch., 1932, 11, 1060—1063; Chem. Zentr., 1932, ii, 736).—Hens, cats, rabbits, and dogs did not exhibit injury.

A. A. E.

Effect of irradiated ergosterol on the tetany in rabbits following parathyroidectomy. E. LESNÉ, R. DUBOIS, and H. SIMONNET (Compt. rend. Soc. Biol., 1931, 107, 441—443; Chem. Zentr., 1932, ii, 1320).—Administration of irradiated ergosterol to parathyroidectomised rabbits does not arrest the fall in blood-Ca, but prevents tetany. A. A. E.

Effect of irradiation on the metabolism of carbohydrates and its relation to vitamin-D. L. PINCUSSEN (Klin. Woch., 1932, 11, 1231; Chem. Zentr., 1932, ii, 1196).—In the organs of irradiated animals the glycogen increases and the lactic acid decreases. Similar effects are caused by administration of irradiated foods or vitamin-D.

A. A. E.

Parathyroidectomy and vitamin-D. Effect on blood-calcium. A. ARTHUS and A. JEDRZEJOVSKA (Compt. rend. Soc. Biol., 1931, 107, 105—106; Chem. Zentr., 1932, ii, 1320).—In rabbits which have received vigantol before parathyroidectomy tetany does not occur and the fall in blood-Ca is much smaller than normally. A. A. E.

Functions of radiation in the physiology of plants. I. Methods and apparatus. F. S. BRACKETT and E. S. JOHNSTON. II. Effects of

near infra-red radiation on plants. E. S. JOHN-STON (Smithson. Miscel. Coll., 1932, 87, Nos. 13 and 14).—I. The ways in which changes in intensity and wave-length of light may affect plant behaviour are discussed and a suitable form of apparatus for such tests is described.

II. Tomato seedlings were grown in a nutrient solution containing salts of Ca, Mg, K, Mn, together with H_3BO_3 and Fe humate, and submitted to either visible radiation alone or visible combined with near infra-red radiation. Plants grown under the latter conditions show some characteristics of shade-grown plants (long internodes), although there is also an evident destruction of chlorophyll and the H_2O requirement is less than normal. P. G. M.

Study of photosynthesis in connexion with photoperiodism. S. V. TAGEEVA (Bull. Appl. Bot., Leningrad, 1931, 27, No. 5, 197—245).—Variation of the length of day did not affect the daily photosynthetic course or the energy of photosynthesis in oats and millet; hence photosynthesis does not determine the differences in photoperiodical response observed between short-day and long-day plants. With different daylight durations there was no correspondence between the energies of photosynthesis and of accumulation of org. substances. CH. ABS.

Influence of desiccating winds on photosynthesis. S. S. SKVORTZOV (Bull. Appl. Bot., Leningrad, 1931, 25, No. 3, 45—66).—Dry winds in the absence of sufficient soil- H_2O lead to leaf dehydration and retardation or cessation of photosynthesis. Slight leaf injury produces decreased photosynthesis. CH. ABS.

Attenuation of chlorophyll in green parasitic plants. M. MOLLIARD (Compt. rend., 1932, 195, 1190—1192).—The chlorophyll content of leaves of radish grown on extract of carrot tubercles is one tenth of that of leaves from a plant grown on mineral salt and sucrose medium. The CO_2 assimilation of the former plant is also proportionately lower. When grown on radish extract, the radish gives normal leaves. These results support the view that parasitic plants are derived from what were originally autotrophic plants, which have been modified by absorption of substances from other species. A. C.

Relation between starch synthesis and weight of seeds of *Pisum* hybrids. (MLLE.) C. BOURDOULL (Compt. rend., 1932, **195**, 1317—1319; cf. A., 1932, 201).—The wt. of ripe seeds of second generation hybrids of two varieties of pea depends on the ability of the sol. carbohydrates to polymerise to starch. This ability is transmitted by the parents according to Mendelian rules. A. C.

Influence of nitrogenous and mineral nutrition on the time of heading in barley and millet with different daylight durations. I. N. BORODINA (Bull. Appl. Bot., Leningrad, 1931, 27, No. 5, 171– 193).—Lack of N accelerates the appearance of the earing stage in barley, whilst lack of P, or lack of K with long daylight duration, delays it. The effect of exclusion of nutrients is marked with a short day. The C: N ratio does not account for photoperiodism. Millet plants are not affected by lack of N or K; lack of P caused depression. CH. ABS. Opening of stomata in severely wilted plants. W. S. ILJIN (Jahrb. wiss. Bot., 1932, 77, 220—251).— Inter-relationships between humidity, respiration rates, and the transformation of sugars into starch and vice versa associated with the opening and closing of stomata are examined. A. G. P.

Effect of ethylene chlorohydrin vapours on dormant lilac tissues. F. E. DENNY and L. P. MILLER (Contr. Boyce Thompson Inst., 1932, 4, 513— 528).—Treatment with $CH_2Cl\cdot CH_2 \cdot OH$ increased the catalase and invertase activity of bud tissues and to a small extent that of twig bark. Amylase activity was not affected. Considerably increased respiratory activity occurred in young twigs. Corresponding chemical changes in buds included increased H_2O and sol. N contents and decreased sugars, especially sucrose. A. G. P.

Growth-promoting substances. E. MASCH-MANN and F. LAIBACH (Biochem. Z., 1932, 255, 446– 452).—A substance which accelerates the growth of the coleoptile of *Avena* is detected in Ringer's solution in which a slice of surviving tumour (carcinoma, sarcoma) tissue has been kept for 24 hr. at 37°, but is not present in aq. extracts of the tissue pulp. Such a growth-promoting substance is detected in liver, kidney (guinea-pig, mouse), heart-muscle, breastmuscle (hen), and blood (hen, guinea-pig) in 10-day embryo chicks, but not in egg-yolk or in brain of hen and guinea-pig. P. W. C.

Formation of growth-promoting substance by Aspergillus niger. T. SAKAMURA and T. YANAGI-HARA (Proc. Imp. Acad. Tokyo, 1932, 8, 397-399).-The growth-promoter of Avena coleoptiles is formed in aerobic and anaerobic peptone cultures of A. niger at 30°. It is inhibited by addition to the culture of glucose (in contradiction to Boysen-Jensen, A., 1931, 1091, 1334), sucrose, fructose, maltose, galactose, or glycerol, but not by mannitol or lactose. Alanine, asparagine, aspartic and glutamic acids do not, and Na nucleate does, stimulate its production. It is also formed when peptone is incubated at $p_{\rm H}$ 4 and 35° with the pulped mycelium, and when peptone is treated with H_3PO_4 to $p_{\rm H}$ 3.8 in the prep. of agar A. C. cubes.

Occurrence of decomposition products of chlorophyll. I. Decomposition of chlorophyll in the digestive system of the cow. P. ROTHE-MUND and O. L. INMAN.—See this vol., 168.

Ionic concentration as a factor in resorption. M. GRAČANIN (Compt. rend., 1932, 195, 1311—1313). —The velocity of adsorption of $PO_4^{\prime\prime\prime}$ by young plants of *Hordeum distichum* and *Zea mays* from solutions of CaHPO₄ is max. in the first 24 hr. Adsorption increases with the concn. of CaHPO₄, and is in excess of the plant's requirements. The ratio of adsorbed to available $PO_4^{\prime\prime\prime}$ falls from 100% to about 50% as the salt concn. increases from 0.001% to 0.1% (as P_2O_5).

Absorption and accumulation of solutes by living plant cells. III. Respiration of cut discs of potato tuber in air and immersed in water, surface : volume effects and salt accumulation. F. C. STEWARD, R. WRIGHT, and W. E. BERRY (Protoplasma, 1932, **16**, 576—611; cf. A., 1922, 664).— Respiratory activity of potato discs under various conditions is examined. Absorption of KBr as measured by cell sap concen. is associated with and is probably dependent on increased metabolic activity, notably on increased aerobic respiration. A. G. P.

Mechanism of transport of organic materials in plants. T. H. VAN DER HONERT (Proc. K. Akad. Wetensch. Amsterdam, 1932, 35, 1104—1112).— When the surface-active substance K oleate is added at one end of a horizontal tube containing dil. HCl covered with Et_2O its rate of transport along the H_2O-Et_2O interface is about 70,000 times its rate of diffusion through the H_2O layer. It is suggested that a similar mechanism may account for the high rate of transport of sugars and other substances through the sieve tubes. A. G.

Biological detoxication of ammonia in higher plants and its relationship to the [H'] of the cell sap. M. KULTZSCHER (Planta [Z. wiss. Biol.], 1932, 17, 699-757).-Equilibrium between NH3 and amide in plants is largely controlled by the $[H^*]$ of the sap. In highly acid plants detoxication of NH_3 results from neutralisation by acids present and storage as NH₄ salts ("ammonium plants," Ruhland and Wetzel, *ibid.*, 1926, **1**, 558). There occur also intensive deamination and deamidation processes. In plants of $p_{\rm H} > 5.0$ the NH₃ \implies amide equilibrium is displaced in the opposite direction and NH₃ is detoxicated as amide ("amide plants"). Intermediate classes (" mixed type ") of plants are characterised by variations in the amide : NH3 ratio associated with variations in the p_{π} of the sap. The ratio amide : NH_3 corresponding with a particular $p_{\rm H}$ is not const., since inherent plant characteristics and other factors may be concerned. Nutritional experiments indicate great differences in the val. of urea and asparagine for the higher plants. A. G. P.

Arginine metabolism and urea formation in higher plants. II. G. KLEIN and K. TAUBÖCK (Biochem. Z., 1932, 255, 278–286; cf. A., 1932, 1179).—Arginine fed to sterile cultures of Zea mays: and Phaseolus vulgaris is absorbed unchanged by the roots, but is quickly hydrolysed by the plants. A small part of the urea arising is found in the plants, but most is quickly utilised and is not converted into NH_3 . P. W. C.

Nitrogen distribution in the leaves of Philippine camphor trees. J. MARANON (Philippine J. Sci., 1932, 49, 461—468).—No sp. differences were apparent between the N distribution of camphor leaves yielding a mixture of camphor and oil and those yielding a lævorotatory oil only. In old leaves showing chlorophyll degradation there was a higher proportion of NH_2 -acid-N and lower humin-N than in young or full-grown leaves. Young leaves have less NH_3 -N than full-grown or old leaves.

A. G. P.

Distribution of nitrates and "organisation" of nitrogen in the leaves of green plants. E. PARISI and G. DE VOTO (Atti R. Accad. Lincei, 1932, [vi], 16, 270-274).—The leaf itself of sunflower, wheat, or beet is relatively poor in NO_3 , but the

petioles and veins are rich in NO_3' and often contain more than any other organ, even than the root. Thus, the HNO₃ probably undergoes "organisation" on passing into the leaf itself. Sunlight accelerates the formation of NH_2 -compounds in the green parts of plants. The petioles contain more sugar than the leaves and more in the afternoon than in the morning. T. H. P.

Relationships between tree response and internal composition of shoots of the peach. F. P. CULLINAN (Proc. Amer. Soc. Hort. Sci., 1931, 28, 1-5).—In trees subjected to varying amounts of pruning the vals. for total N and sugar increased from base to tip of shoots. Application of N fertilisers increased the N content of the new growth.

CH. ABS.

Fruiting responses of the peach to applications of sodium nitrate. R. V. LOTT (Proc. Amer. Soc. Hort. Sci., 1931, 28, 23—27).—Increase in the amount of NaNO₃ was accompanied by an increase in the H_2O -sol. and total N, and a decrease in the total and reducing sugars, in the fruit. CH. ABS.

Vegetative responses of the peach to applications of sodium nitrate. F. E. ASHLEY (Proc Amer. Soc. Hort. Sci., 1931, 28, 28–33).—The % and amount per unit length of both H_2O -sol. and total N in the shoots increased, whilst the starch content decreased, as the rate of application of NaNO₃ was increased. CH. ABS.

Seasonal variations in nitrogen concentration in twigs of peach trees under sand-hill conditions. C. F. WILLIAMS (Proc. Amer. Soc. Hort. Sci., 1931, 28, 39-44). CH. Abs.

Nitrogen intake and translocation in apple trees following autumn, winter, and spring sodium nitrate applications. W. W. ALDRICH (Proc. Amer. Soc. Hort. Sci., 1931, 28, 532—538).— Transfer of N from storage tissues to terminal growing points does not take place to any great extent until growth starts. Ch. Abs.

Carbohydrate and nitrogen relationships in apple shoots as influenced by soil management. J. T. SULLIVAN and F. P. CULLINAN (Proc. Amer. Soc. Hort. Sci., 1931, 28, 519—525).—The total N in the terminal shoots was greater, and the starch less, for trees receiving tillage with cover crop than for trees in sod or lucerne. CH. Abs.

Variations in amounts of carbohydrates in maize leaves. L. F. PUHR and A. N. HUME (S. Dakota Agric. Exp. Sta. Bull., 1932, No. 270, 33 pp.). —Daily variations in the sugar and starch contents were similar in early and late maturing varieties. Insol. carbohydrates reached a max. val. later in the day than did the sugars. Non-reducing always exceeded reducing sugars in quantity and their variations were more regular. A. G. P.

Effect of nitrate applications on soluble carbohydrate in apples. E. F. HOFKINS and E. W. GREVE (Proc. Amer. Soc. Hort. Sci., 1931, 28, 501— 506).—Little correlation was found. CH. ABS. Changes in green lima beans subjected to various storage conditions. R. L. CAROLUS (Proc. Amer. Soc. Hort. Sci., 1932, 28, 367-374).—Total sugars decrease most rapidly during the first 24 hr., but do not show any significant additional losses. Total and insol. N tend to increase and sol. N to decrease during storage. However, actual loss of total N occurs. CH. Abs.

Mineral nutrition of plants. E. BOTTINI (L'Ind. Chimica, 1932, 7, 1634—1637).—Compositions of the mineral constituents of a no. of cereals, root and leguminous crops, grass, etc. are given, the functions of each constituent in vegetable biochemistry being described and the proportions in which it is absorbed by plants indicated. T. H. P.

Catalase in barleys of different origins. N. N. IVANOV and M. I. LISHKEVICH (Bull. Appl. Bot., Russia, 1929, 21, No. 4, 3—32).—Northern barley contains more catalase than southern, except that grown in a mountainous southern region. Amylase activity is also greater. The enzyme content serves as an index of maturity. CH. ABS.

New vegetable principle : uric acid. R. Fosse, P. DE GRAEVE, and P. E. THOMAS (Compt. rend., 1932, 195, 1198—1200; cf. A., 1932, 662).—Uric acid occurs in the following seeds in the amounts given : broad bean 0.23, melitot 0.25, purple clover 0.24, aleppo 0.176, coronilla 0.13, garden cress 0.108, field maple 0.054, castor oil 0.061, white lupin 0.048, and soya bean 0.03 mg. per kg. The uric acid is the origin of allantoin in plants and also of part of their urea and NH₃. A. C.

Biochemical variability of castor seeds due to geographical factors. Z. P. PRIZEMINE (Bull. Appl. Bot., Leningrad, 1929, 21, No. 4, 391—426).— The yield of oil depends on the maturity of the seeds, but little on geographical factors. Increase in oil content is accompanied by decrease in protein. In northern climates the free fatty acid is higher, the lipase activity greater, and the amount of cellulose in the testa of immature seeds is smaller.

CH. ABS.

F. O. H.

Food value of Phaseolus vulgaris. P.JUNKERS-DORF and K. MEYER (Biochem. Z., 1932, 256, 100-104).—The "black bean" of Central America (Mexico) has a high starch content, whilst the protein content approaches that of the soya bean. Its composition shows that it is a valuable food. W. McC.

Determination of iodine in blood, foods, and urine. E. J. BAUMANN and N. METZGER [with L. K. BALDAUF] (J. Biol. Chem., 1932, 93, 405—416).—The dried material is electrically burned in an atm. of O_2 in a closed vessel connected with absorption flasks containing aq. KOH. The aq. extract of the ash and the absorption fluids are treated with KOH and H_2O_2 , taken to dryness, and the residue is again incinerated etc. as before. The I content of the final residue is determined by slight modifications of standard methods (A., 1925, i, 183; 1926, 1284).

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