

Research Items.

THE BRAIN OF NEANDERTHAL MAN.—Prof. R. Anthony of Paris, who has for some time been engaged in the study of the endocranial cast of the skull from La Chapelle aux Saints, has published a summary of his results in the Bulletin of the Société d'Anthropologie of Paris. He compares the brain of Neanderthal man with that of the primates and of modern man in some considerable detail. Subject to the limitation that material is scanty and that our information is derived from Europe only, and further that Neanderthal man represents a vanished race rather than a stage in human evolution, it would appear that by the middle Pleistocene, or even before, man had already developed a brain of normal volume, and the essential features of the Neopallium had become apparent. The distinctive characters of the Neanderthal brain are its form as a whole and certain details in the folds which recall more primitive types. As regards the intellectual capacity of Neanderthal man, while the volume of the brain would support a favourable view of his intelligence, allowance must be made for the character of the convolutions, which are such as to suggest a mentality of low development. The frontal lobes, the centres of intellectual development, are restricted as compared with modern man. On the other hand, the parietal areas of association which are connected with vision and hearing are well developed.

NATIVE CULTURE IN CALIFORNIA.—Among the contributions to the Phœbe Apperson Hearst Memorial Volume which is published as vol. xx. of the University of California Publication in American Archaeology and Ethnology, is a study of Californian culture by Mr. A. L. Kroeber, in which he has attempted a classification of local ethnic data in their developmental sequence. He suggests, with reservation, four successive stages. The first period is one of a relatively simple and uniform culture resting on a food supply of seeds, molluscs, fish and small game. In the second period, northern influences (probably Athabascan and Algonkin) from the Pacific coast, and South-Western affiliations, not yet specifically Pueblo, become apparent, while coiled basketry and a totemic sib organisation fall within this period. In the third period, localised cultures become differentiated, and although the cultural flow from the North Pacific coast and the South-West continues, its effects are restricted geographically by these local cultures. In the south it is marked by the growth of cosmogonies showing the influence of Mexico in the death of a great god. Along the Colorado agriculture, with other elements, was introduced from the Pueblos, or from Sonora. The fourth period is marked by the growth and completed development of the special features of modern Californian culture, while the absorption of northern and south-western culture, though continuing, becomes less direct. Dates are suggested tentatively: for Period I., 2000–1500 B.C. to B.C. 500; for Period II. 500 B.C.–A.D. 500; for Period III. A.D. 500 to approximately A.D. 1200, and for the fourth from that date to the present day.

ARCHÆOLOGICAL DISCOVERIES AT BYBLOS.—In the *Times* of January 29, Prof. Pierre Montet describes the principal results of the excavations at Jebel, the ancient Byblos. Among the early discoveries in 1919 was a bas-relief representing a Pharaoh in adoration before the god and goddess of Byblos, and two shrines, one Syrian and one Egyptian. These yielded a number of objects, among which were vases from Egypt bearing the names of kings of the Ancient Empire, such as Unas, Pepi I., and Pepi II. What is, however, unquestionably the most important dis-

covery was made in the present season when an underground chamber, which proved to be a royal burial place, was entered and an obsidian jewel casket mounted in gold was found, on the lid of which was an hieroglyphic inscription embodying the name Maākherurā, the prenomens of Amenemhat IV., who reigned from 1800–1792 B.C. This is the first definite evidence of date to be found, and enables an Amenemhat mentioned on a vase previously discovered in another chamber to be identified as Amenemhat III. The name of the Prince who was a contemporary of Amenemhat IV. is given on a bronze sickle or *harpé* as Yp-schemu-Abi. These inscriptions establish the fact that the Phœnicians employed hieroglyphic script with phonetic values identical with those of Egypt, three centuries before the adoption of cuneiform.

JĀBIR IBN HAYYĀN.—Vol. xv. (December, 1923) of Sudhoff's *Archiv f. Gesch. d. Med.* contains an article by Prof. Ruska on the list of writings ascribed to Jābir in the "Kitāb al-Fihrist," and on the authenticity of some of the tracts published by Berthelot in "La Chimie au moyen âge" (1893). Most of his results are in agreement with those of E. J. Holmyard (*Proc. Roy. Soc. Med.*, 1923, xvi. 46–57; cf. *NATURE*, 112, 876), and the following points may therefore be taken as definitely established: (1) Jābir lived in the second half of the eighth century, under Hārūn al-Rashīd. (2) His reputation as the founder of Islāmic chemistry is justified. (3) In his treatment of the subject, Berthelot made many grave errors, which completely vitiate his arguments. (4) Geber and Jābir are one and the same. (5) The Latin works ascribed to him may or may not be genuine. (6) They are, however, based on previously existing Arabic works and do not represent (as Berthelot maintained) *European* contributions to chemistry. The Geber problem has thus advanced a further stage towards solution.

PROTECTIVE COLOUR.—Some apparently meaningless pictures in *The Brooklyn Museum Quarterly*, vol. x., No. 4, directed attention to an article on "Camouflage in Nature and in War" by Mr. Gerald H. Thayer, son of the late Abbott H. Thayer. While defending the reality and the selection-value of protective colour, he is not such "an extremist" as he holds his father to have been. After dealing with the well-established principles of counter-shading and picture-pattern, Mr. Thayer discusses change of shape by appendages and distortion or dazzle, both of which are the methods suited to moving objects. Admitting the value of Mr. Norman Wilkinson's work on ships, he revives and enforces his father's suggestion of spotless white and counter-shading of horizontal fully-illuminated surfaces with a delicate grey. "The belief that white is bound to show, and especially at night," is, he says, "a popular error." We agree that it is an error, and it seems a pity that Mr. Thayer's plan has never been given a fair trial.

FUNCTIONS OF PITUITARY GLAND.—There has been much divergence of opinion among investigators as to the effects of removal of the pituitary gland. N. M. Dott reports a careful reinvestigation of the question from the University of Edinburgh in the *Quarterly Journal of Experimental Physiology* (vol. xiii., 1923, p. 241). He finds that complete removal is always fatal within a fortnight. The posterior lobe (pars nervosa and pars intermedia) may be excised without producing any obvious effects. Partial removal or injury of the anterior lobe (pars glandularis) was regularly followed by characteristic symptoms: depression of temperature, lethargy, fatness, delay in

bone growth, and degenerative changes in the thyroid and genital glands. The polyuria, which is such a marked feature of some pituitary derangements, is attributed to irritation of the pars intermedia, the removal of which has no obvious effect on the animal.

GROWTH IN VITRO OF SINGLE CELLS.—The fact that organisms, up to a certain point of crowding, have a favourable influence on one another has been illustrated by a variety of observations. Pearl, for example, showed that the fly *Drosophila* lives better at a concentration of individuals in space much above the minimum. Brailsford Robertson with the protozoon *Enchelys* found that the number of individuals arising from two is much more than twice those generated from one in the same time in drops of water of equal volume; Cutler and Crump (*Bioch. J.*, xvii., 1923, 878) have failed to confirm this with *Colpidium*. More bacteria must be transferred to a litre of culture medium to start a successful subculture than are required for 5 c.c. A. Fischer now publishes (*Journ. Exp. Med.*, xxxviii., 1923, 667) an interesting example of what is doubtless the same general phenomena. By an ingenious technique he isolates individual connective-tissue cells in artificial cultures and finds that the single cells never grow, whereas growth takes place readily when the cells are numerous and close to one another. Loneliness is evidently undesirable. The observations of Carrel, Drew and others have shown that extracts of tissues contain varying quantities of substances which promote the growth of cells in artificial cultures, and it may be presumed that it is something of the same kind diffusing out from living cells which stimulates their immediate neighbours.

SEX CHROMOSOMES IN PLANTS.—It has until recently been supposed that sex chromosomes were only found in animals. But in 1917 Allen found an unequal XY pair in the liverwort *Sphaerocarpos*. Santos (1923) demonstrated that a pair in *Elodea*, Kihara and Ono in *Rumex acetosa*, and Miss Blackburn (NATURE, Nov. 10, 1923, p. 687) in *Lychnis alba*. Winge (*Comptes-rendus Lab. Carlsberg*, vol. 15, No. 5) has now described sex chromosomes in the common and the Japanese hop, in *Melandrium* (*Lychnis*) *album* and in *Vallisneria spiralis*. It is therefore likely that they will be found in dioecious plants generally. In all these cases except the last, an unequal XY pair has been observed. In *Vallisneria*, however, there appears to be no Y chromosome present. It is thus a remarkable fact that where the dioecious condition has developed independently in different families it is accompanied by a differentiation of sex chromosomes.

MOLLUSCA FROM THE SALT RANGE, PUNJAB.—A considerable collection of molluscs was made in the Salt Range by Theobald so long ago as 1850-52, and now Dr. Sunder Lal Hora has brought back thence further collections. These gatherings have just been dealt with in a paper, followed by a supplemental note, by Dr. Annandale and H. Srinivada Rao (*Rec. Ind. Mus.*, xxv., pp. 387-98 and 601-602). The authors record some twenty-four species of gastropods, four of which are apparently endemic and two bivalves. They describe two new species in the paper, but have regretfully to acknowledge in the supplemental note that one, the form which they mistook for a new *Eulota*, was after all a well-known *Bensonia*. The study of the Indian land snails is not so easy by far as that of the aquatic. In their note, too, the authors direct special attention to the existence of *Limnaea gedrosiana*, A. and P., and of a dwarf form of *Bithynia tentaculata*, Linn., on the east side of the Indus and south of the Himalayas, but as regards the latter fail to define its relationship to the *B. tentacu-*

lata, var. *kashmirensis* of Nevill (Hand List, ii. p. 39), likewise a dwarf form, from Sringer, which lies also, we believe, in the district just specified.

INHERITANCE RATIOS IN PEAS.—In 1905 the late Mr. A. D. Darbishire began a series of experiments in determining the frequency of the four types derived in successive generations from a cross between a yellow-wrinkled (YW) and a green round (GR) pea. Since his death in 1915, the experiments have been continued by others, and Mr. G. Udny Yule (*Journ. Genetics*, Nov. 1923) has now published a biometrical analysis of the results obtained in F_{12} to F_{17} . The types of plants obtained are found to differ significantly from the 9:3:3:1 ratio. There is a deficiency of GW and an excess of YR seeds, but differential death-rates will apparently not explain the result. In following lines of descent through several generations, some lines agree very well with Mendelian expectation, while others are shown by a variety of tests to depart significantly from it. An analysis of the distributions in individual pods shows no significant divergencies, but in the "populations" of the various generations unexplained divergencies are found to occur.

RHINE PLANTS AND ANIMALS IN EASTERN ENGLAND.—Dr. W. G. N. v. d. Sleen writes to us from Haarlem, directing attention to the occurrence in Eastern England of Rhine plants and molluscs which do not occur in the rest of Great Britain. The evidence is contained in a paper by Dr. Th. J. Stomps, of Amsterdam, in the November (1923) issue of *Tijdschrift van het Koninklijk Nederlandsch Aardrijkskundig Genootschap*, on the plants, and in an earlier paper by Dr. v. d. Sleen, on the Cromer Forest Beds, the Chillesford Clay, etc. Of the species known to Dutch botanists as typical "Rhine plants," *Silene Otites*, *Artemisia campestris*, *Eryngium campestre*, and *Erucastrum Pollichii* are found in England only in the east. Other important species occurring along the Dutch and the German Rhine are confined, or nearly confined, to the "Breckland," a sandy area in south-west Norfolk and north-west Suffolk. Among these are *Ornithogalum umbellatum*, *Herniaria glabra*, *Scleranthus perennis*, *Phleum Boehmeri*, and *Muscari racemosum*. Among freshwater molluscs we find *Segmentina nitida*, *Vivipara vivipara*, *V. connecta*, *Assemanina grayana*, *Bythinia leachi*, *Unio tumidus*, *U. pictorum*, *Anadonta anatina* (*piscinalis*), *Sphaerium rivicola*, *Dreissensia polymorpha*, which are common along the German and Dutch Rhine and in eastern England, but not in the waters draining into the Irish Sea. Dr. v. d. Sleen considers that these facts support the conclusions of Harmer and Prestwich, that in pre-glacial times the Rhine entered England in the neighbourhood of Walton and left it at Cromer. He would like to see a comparison of the small freshwater Crustacea and of the fishes of eastern England with those of the Dutch and German Rhine, and would be glad to help any English student of the subject with information on distribution of the species in the latter areas.

CRUDE OIL OF SARAWAK.—Sarawak is to-day second on the list of oil-producing countries included in the British Empire, yielding, in 1922, 403,394 tons of petroleum. The present weekly output is about 11,000 tons. Comparatively little is generally known of this oil or of the conditions under which it occurs and is produced. Mr. J. Kewley's paper on this subject at a recent meeting of the Institution of Petroleum Technologists was therefore welcome. The oil of Sarawak comes from the Miri district, 150 miles south of Brunei Bay. It is obtained from Miocene beds. It is a reddish brown liquid of average

specific gravity of 0.902, and is of the naphthenic type; but a paraffin base oil occurs in deeper sands, as is frequently the case with East Borneo petroleum. The products obtained from the Miri crude oil are benzine (about 14 per cent.) with specific gravity 0.786, kerosene with 0.850 gravity (very high and consequently not of too good a burning quality), and fuel-oil, which is valuable for furnace work and also for Diesel engine use. The gravity of the fuel-oil is 0.930. This oil is refined at the Lutong refinery, where there are two plants of the Trumble type in operation. From the refinery the products are loaded by means of submarine pipe-lines on to tankers anchored off the shore. The crude oil, like the petroleum of Borneo generally, is of more than ordinary technical interest.

MILK TESTING BY HYDROGEN-ION DETERMINATIONS.—In 1921 Mr. Cooledge devised a method for the control of milk supply based on hydrogen-ion determination and taking the place of bacteriological examination. A special broth culture medium is prepared and is brought to a P_H value of 7.0 by the addition of acid or alkali by comparison with a colorimetric standard, brom-thymol blue being used as the indicator. Test-tubes of standard size (1.8 × 16 cm.) receive 10 c.c. of this broth, and to each is added 1 c.c. of a 1 in 10 dilution (= 0.1 c.c. of milk) of the milk to be examined. The tubes are then incubated at 37° C., and hourly observations up to 8 hours are made to determine the change of tint of the indicator. By comparison with a set of standards, nine P_H values ranging from 7.2 to 5.8, with intervals of 0.2, can be determined. The greater the number of bacteria present in the milk, the greater and quicker will be the change of P_H value in the direction of acidity. For the different readings, "scores" are given. Thus a milk giving a P_H value of 5.8 after one hour's incubation receives only 25, while one which after eight hours' incubation does not exceed 6.7 receives 100. The method seems to work well in practice, and milks containing a large number of bacteria, and therefore of poor keeping and hygienic qualities, can be picked out in the course of an hour or two, whereas a bacteriological examination necessitates a delay of at least twenty-four hours (Michigan Agriculture College, Technical Bull. No. 52). In a later study by Mr. Cooledge, the method has been applied to check the temperature conditions in pasteurising plants, samples being taken from various points in the apparatus. In this way faults in the process may be located to a particular point in the apparatus (*ib.* No. 124).

RAIN IN THE NETHERLAND INDIES.—In Verh. No. 8, vol. 1, Part 3, of the Royal Magnetic and Meteorological Observatory of Batavia, published under the superintendence of Dr. C. Braak, there is a brief English summary as well as the full discussion in Dutch. The discussion deals with rainfall in varied considerations, its yearly and seasonal amounts, changes with monsoon, variation of amount with height above sea level, daily variation, intensity during short intervals, periods of drought, rain observations made at sea, and influence of forests on precipitation. During the monsoon changes, rainy periods are experienced, and on exposed mountain ranges continuous rains are frequent, where the monsoon when passing obstructing mountain ridges is forced to ascend. On the mountain sides the amount of rain in 24 hours ranges above 14 in., and in many places is between 16 and 18 in., the maximum being 20.1 in. observed at Besokor on January 31-February 1, 1901. The high monthly rainfall totals in places are due to the same fact, the continuous forced ascension of the wind. The

mountainous nature of most of the Islands has a marked influence on the rainfall. It is suggested that the high rainfall in the East Indian Archipelago is unique in comparison with any other extensive connected area. The annual amounts in places exceed 118 in.; the largest amount, 270 in., occurs at Kranggan (Java). Rainfall is shown to increase usually with height above sea level, but at great heights rainfall decreases again. The discussion adds much valuable information to the study of the world's rainfall.

SPECTRA AND ATOMIC STRUCTURE.—In his address at the conference of German Physicists at Bonn in September 1923, Prof. Paschen dealt with recent progress in the attempt to discover the structure of the atom by spectroscopic investigation. The issue of the *Physikalische Zeitschrift* for October 1, 1923, reproduces the address. Prof. Paschen contrasts the unchanged experimental methods with the great advances which have been made in the interpretation of the results they have given during the last ten or twenty years. The development of the Combination Principle by Ritz and its interpretation in terms of the dynamics of the atom by Bohr and Sommerfeld, the discovery in Bohr's laboratory that the Stark effect produces lines excluded by that principle, the investigation of the "terms" which reproduce the lines of elements with higher atomic numbers, the discovery of the duplication and triplication of these "terms," and the recent work of Landé extending the law of doublets to quartets, sextets, and octets, are all dealt with. While Prof. Paschen believes that Bohr's interpretation of the experimental facts is of permanent value and stimulates research to an extraordinary degree, he thinks the necessity for the introduction of new hypotheses to explain the facts accounts for the sceptical attitude of many towards it.

STABILITY OF AMMINES.—Mr. G. L. Clark describes in the *American Journal of Science* (vol. vii. p. 1, January 1924) a long series of measurements of the stabilities of ammines of inorganic salts, as indicated (usually) by the temperature at which the vapour pressure of the ammine rises to 100 or to 760 mm. He finds that in ammines of comparable type, the stability increases with diminishing atomic volume of the co-ordinating metal, e.g. in the series Cs, Rb, K, Na; Tl, Ag, Cu; Ba, Sr, Ca; Cd, Zn, Mn, Cu, Fe, Co, Ni. On the other hand, it also increases as the anion becomes more bulky, e.g. from Cl to Br to I and from MoO_4 to WO_4 , CrO_4 , SO_4 and SeO_4 , the last series of radicals being arranged in the order of increasing molecular volumes of the acid anhydrides MoO_3 , etc. In some cases regular numerical relations are observed, e.g. the stabilities of the bivalent anions $[Co_6NH_3]$ and $[Ni_6NH_3]$, as measured in absolute temperatures for the same vapour pressures, are in the ratio 1:1.075, the nickel forming the more stable ammines. In general, it appears that the ammonia is attracted solely by the cation, unlike water, which may also be attracted by the anion, and therefore shows more complex relationships; the smaller the metallic cation the more room there is to pack molecules of ammonia round it without breaking up the lattice; increase in the size of the anion also leaves more room for the ammonia, and hence increases the stability of the ammines. Exceptions occur in the case of some of the lower ammines, e.g. chlorides give more stable monammines and diammines than do iodides. On the other hand it is quite in accord with the rule that only the iodide of barium can form a decamine. The paper includes a list of thirty-three new, or formerly doubtful, ammines, some of which are only stable at low temperatures, even in an atmosphere of ammonia.