

Research Items.

PALÆOLITHIC MAN IN CENTRAL EUROPE.—L'Abbé Breuil continues his account of his "voyage paléolithique" in Central Europe in *L'Anthropologie*, t. 34, No. 6. He now deals with finds in the loess of Moravia and Bohemia, which are to be described in two sections, the first, which is the present instalment, covering open-air shelters, and the second the caves. Three stations in Moravia are described: Premost, Ondraditz, and Brno (Brünn). As regards the human remains found at Premost, L'Abbé Breuil is of the opinion that the view of Dr. Hrdlička and Dr. Matiegka, that Premost man represents a cross between Neanderthal man and the Aurignacian races, cannot be maintained. The prominent supraorbital ridges cannot be regarded as a decisive criterion against the absence of characters such as the remarkable platycephaly, the development and specialised character of the face, of the nose and orbits, and the receding chin of Neanderthal man—characters which are far more significant than the prominence of the supraorbital ridges. The same applies to the Brno man. Both must be regarded as Aurignacian, differing from Aurignacian man in Western Europe, it is true, but also exemplifying the highly diversified character of the Cro-Magnon race, which was probably already a mixed race when it penetrated Europe.

ANTHROPOLOGY OF THE CHINESE.—Mr. W. W. Cadbury, of the Canton Christian College, contributes to the *Philippine Journal of Science* for December a study of the height, weight, and chest measurements of Mongolian peoples, with special reference to the Southern Chinese. He has made a valuable digest of the literature dealing with these points and has added to it the results of his own observations on the students of the Canton Christian College. The general conclusions at which he arrives are that the Chinese people average 165 cm. in height, the people south of the Yangtze being generally taller than those to the north of the river. Cantonese students of 20 years or more average 163.6 cm. The average weight for the Chinese is 56.9 kgm. in the north, 52.6 kgm. in the south, Cantonese students 51.9 kgm. The weight-for-height index varies from 313 in the south to 384 in soldiers of the north. Cantonese students average 317. Chest circumference is relatively small, varying from 77.4 to 86.9 cm. Cantonese students have an average circumference during rest of 78.9 cm. with a play of about 6 cm.

CANCER AND GOITRE.—In a recent number of *Biometrika* (vol. 16, 1924, p. 364), Dr. Percy Stocks concludes, from a statistical examination of the data of several countries, that there is a distinct positive correlation between the rate of mortality from cancer of the stomach and œsophagus and indices of the prevalence of goitre. An analysis of post-mortem records also leads to the conclusion that enlargements and other anomalies of the thyroid, the anomalies being usually of the type associated with depressed functioning, are more frequent in cases of cancer than in other cases. On the other hand, there is some evidence of a negative correlation between the incidence of cancer and of Graves' disease. Dr. Stocks thinks that these findings "seem to indicate that defective functioning of the thyroid gland is favourable to the incidence of cancer of the stomach, and possibly of other organs also."

SOUND PRODUCTION BY INSECTS.—An interesting critical paper on this subject by Mr. Frank E. Lutz is to be found in the Bulletin of the American Museum

of Natural History, vol. 50, 1924, pp. 333-372, and the conclusions arrived at by this observer may be briefly mentioned. He remarks that, leaving out of account the Orthoptera and the cicadas, there are few or none of the sound-making insects that have well-authenticated organs of hearing, or the sound-producing organs of which may not quite conceivably produce the sounds by pure accident and without any purpose or profit. Until we have proof that insects in general purposely make sounds, or that they profit by sounds which they make without intention, there is nothing in our present knowledge of the biology of insects that furnishes good ground for believing that the few cases in which we hear insect-sounds are really exceptions to a rule that insects do not communicate by that means. In the cases of Orthoptera and cicadas, the presence of extreme specialisations, wonderfully efficient in producing sound and apparently not used for any other purpose, gives us a reason for thinking that there is a purpose. The presence of what seems to be a definite ear in the stridulating Orthoptera is an additional reason. However, when we see that the termites, which are not known to stridulate, have the same sort of an ear as crickets and long-horned grasshoppers, and that the cicadas, which produce a loud (to us) sound, probably have no ear (unless it be connected in a deafening way with the sound-producing structure), this latter reason loses some of its force. If these structures have not arisen for the purpose of making sounds, why have they arisen, and how? There is at present no certain answer to this question. In a former paper (Lutz, *Annals N.Y. Academy of Sciences*, 39, pp. 181-282) an attempt was made to show that complicated and definite structures, including details of wing-venation, had arisen by mutation or through the action of developmental factors without any "purpose" or favouring action of natural selection. The author does not say that this is true of the cricket's wing and the cicada's drum, but he does not deny the possibility.

CHROMOSOMES OF *PARIS QUADRIFOLIA*.—Mr. Bolles Lee contributes another paper (*Quart. Journ. Micro. Sci.*, vol. 69, part 1) on the structure and division of chromosomes. In a study of *Paris quadrifolia*, he finds that the chromosomes contain a spiral periaxial filament and are surrounded by a sheath. Various observers have described such a spiral, others have interpreted it as a row of alveoli. The small sizes of these structures renders their interpretation one of great difficulty. The most surprising conclusion drawn is that the chromosomes always divide transversely in the telophase of mitosis, and never longitudinally at all. We can only say that much more convincing evidence would be required before such a view could be regarded as at all probable. Practically all of these results have been controverted by Martens (*C.R. Paris Acad. Sci.* t. 179, p. 1280) in a preliminary paper in which it is also claimed that a reticulum of delicate threads can be demonstrated in the living "resting" nucleus and is therefore not created by fixation methods.

SOME NEW GREGARINES.—B. L. Bhatia and S. Setna (*Parasitology*, vol. 16, p. 279, 1924) record the occurrence of a cephaline gregarine, probably a species of *Leidyana*, in the alimentary canal of a carpenter bee, *Xylocopa æstuans*—the first gregarine to be described from a hymenopteran host. The parasite occurs in large numbers throughout the length of the alimentary canal in every carpenter bee examined, but although the investigation extended

over several months, neither cysts nor spores were met with. The authors suggest that these stages probably occur within the larvæ of *Xylocopa*. They also record the occurrence of a species of *Leidyana* in the parenchyma of the polyclad *Leptoplana*.

COPEPODA OF THE CHILKA LAKE.—Major R. B. Seymour Sewell records (Mem. Ind. Mus., vol. 5, pp. 771-851, 16 plates, 1924) the results of his examination of the copepod Crustacea of the Chilka Lake. Of the fifty-seven species present in the collection twelve are regarded as new, and five new varieties are also described. The author gives an account of the changes in the copepod fauna correlated with the varying conditions of the water, e.g. the influx of sea-water during the winter months causes a disappearance of the purely fresh-water species which had been carried into the lake during the monsoon. He remarks upon the number of species, hitherto regarded as being typical inhabitants of north temperate or even arctic seas, present in tropical waters. The breeding seasons of many of the species are noted.

HYDRA CHIMÆRAS.—Mr. V. Issayer describes an extended series of experiments (*Journ. Genetics*, vol. 14, No. 3) in producing animal chimæras by grafting together in various ways two species of *Hydra*, a stalked form of brown colour (*Pelmatohydra oligactis*) and a red variety of *Hydra vulgaris* found near Leningrad the cells of which contain carotinoid and lycopinoid pigments. The former species also has longer tentacles. By pinning together two specimens which had been opened out flat, by inserting an individual of one species into the cavity of another, and by other methods, chimæras were obtained the components of which could be followed by their colour. Mosaics were also obtained by cutting up Hydras into fine pieces and moulding the fragments together. Parts of some chimæras were intermediate in character and were called cytomyxical. (It may be pointed out that the term cytomyxis is already in use in cytology in another sense.) Such individuals frequently reverted in buds to *oligactis* but never to *vulgaris*. The bearing of these results on problems of individuality, divisibility, regulation, somatic mutation, and other topics is discussed. A cytological study of these forms is being made which will throw more light on their nature.

SOUTH AMERICAN FUNGI.—Under the title "Fungi Paraguayenses," Carlos Spegazzini describes in the *Anales del Museo Nacional de Historia Natural de Buenos Aires*, vol. 31, some 267 species and forms of fungi collected by him during a visit to Asuncion in 1920. Many new species are described and figured, spore sizes and figure as well as other microscopic data being supplied.

POISONOUS PLANTS AND LIVE-STOCK.—In the *Kew Bulletin* (No. 1, 1925), J. Burtt Davy has an interesting note underlining the value of scientific investigation of the causes of losses to live-stock as the result of local peculiarities in the quality of the grazing grounds. He uses as a text the important reports upon "Gauwziekte Veld," by Sir Arnold Theiler and Dr. Pole Evans, which have recently been published by the Department of Agriculture, South Africa. The nature of the injury to stock thus produced may be estimated by the fact that one farmer lost 1047 sheep (59 per cent. of his flock) after grazing them for less than twenty-four hours on gauwziekte veld. After prolonged inquiries lasting over ten years and feeding tests with 98 species of plants, these investigators definitely proved that the cause

of the losses of stock was *Vangueria pygmaea* (Rubiaceæ). This plant appears to contain a toxic principle, acting directly on the heart, though the toxin has not yet been isolated. Other cases of toxic species in grazing grounds are referred to by the author, who is thus able to make out a strong case for the work of a Government Department of Agriculture by which alone long and extensive investigations, involving the co-ordination of the work of specialists in different fields, can be both promoted and maintained until success is reached.

SYMBIOSIS OF SEEDS AND BACTERIA.—Gilbert J. Fowler and Miss R. K. Christie raise this question on very general lines in their paper in the *Journal of the Indian Institute of Science*, vol. 7, part xiii. They say that every seed they have examined so far has proved to be associated with specific bacteria either within the seed (poppy), within the husk (rice) attached to the seed by the mucilage coat (*Cassia tora*), or on the testa (indigo-seed). These bacteria are not essential to the germination, but do appear to be helpful in the growth of the seedling. Little difficulty appears to be raised by the authors' conclusion that these bacteria can break down protein reserves, but it is not clear how this property could be utilised by the germinating seedling. An interesting point is raised by the suggestion that the growth of these bacteria is associated with the specific seed extractive, apparently of basic or glucosidic nature, and removable by water or other suitable solvent, which every seed examined appeared to contain. This extractive did not prove on examination to be invariably antiseptic, but it is suggested that, on dilution during germination, it may stimulate the growth of the bacteria associated with the seed whilst holding them in check so long as it is concentrated, as in the resting seed.

CLIMATIC CONDITIONS FOR COTTON GROWING.—Mr. E. E. Canney has carried out a useful piece of work in analysing the climatic conditions required for the growth of cotton without irrigation (*Journal of the Textile Institute*, vol. 15, p. 1533). He finds that three conditions are essential: freedom from frost during the growing season, adequate but not excessive rainfall, and abundant sunshine. The cloudy, humid climate of large areas of the tropics is fatal to the economic production of cotton of good quality. The mean annual temperature should be above 60° F., the rainfall between 20 and 60 inches per annum, and the mean cloudiness less than five-tenths. On this basis he has prepared maps showing the areas where climatic conditions are favourable for cotton growing, and he finds that there are large parts of the British Empire, awaiting development, with suitable climates for growing as much cotton as is likely to be required for a long time. In the text, and still more strongly in an accompanying letter, Mr. Canney points out the urgent need for trustworthy meteorological observations from many more stations than at present exist in tropical regions. The lack of information as to climate retards development, and may lead to expensive failures owing to attempts to grow crops in regions which are climatically unsuitable.

ATOMIC WEIGHT OF BROMINE.—The January number of the *Journal of the Chemical Society* contains a paper by H. V. A. Briscoe and P. L. Robinson on the atomic weight of bromine. Ammonium bromide was subjected to 2700 fractional crystallisations from water, the object being to test Richards and Hall's conclusion that isotopes are inseparable by fractional crystallisation. No evidence of separation

was obtained. From the ratio Ag/AgBr, the atomic weight of bromine was found to be 79.914 ± 0.01 .

CHLOROPHYLL SPECTRA.—Jan Wlodek has an ingenious suggestion to account for the differences observed between the spectra of chlorophyll in the living leaf and in various solvents. By combining the absorption spectra given by Willstätter and Stoll for chlorophylls *a* and *b*, he obtains a spectrum with absorption bands very closely coinciding with those of the living leaf, far more so than does the absorption spectrum of the alcoholic solution of the mixed pigments. He suggests therefore that in the living leaf the two chlorophylls are present in separate solvents, and that the changes in the absorption spectrum of the leaf under insolation are due either to the proportion of the two pigments changing, a fact that Willstätter and Stoll failed to establish by their classical analyses of the pigments, or that new spectra are developed as the result of temporary combination with carbon dioxide. The paper is published in English in the *Bulletin de l'Académie Polonaise des Sciences et des Lettres, Séries B, Science Naturelles*, pp. 407-423, 1924, as a contribution from the Jagellonian University of Cracow.

ABSORPTION OF RADIATION BY THE EMITTING ATOM.—In the *C.R. Acad. Sci. Paris* of January 19 M. de Broglie and J. Thibaut describe measurements of the intensities of the corpuscular lines, due to the conversion of the *K* radiation of tungsten (doublet *a*) in an element, and of the *K* fluorescence lines of the element itself. The relative intensity of the second, with respect to the first, increases regularly with the atomic number for copper, silver, iodine, and barium. Bragg's law, combined with that of Moseley, would indicate a variation in the opposite direction. In the case of radioactive transformations giving β - and γ -rays simultaneously, the β -ray spectrum being due to a photoelectric action of the γ -rays on the electronic shells of the disintegrating atoms, it is found that when the γ -radiation is converted into secondary photoelectrons in an isotope of the disintegrating substance, producing an identical β -spectrum, the intensities of the lines are much less than in the original spectrum of the radioactive substance. Using mesothorium and lead, the ratio of the intensities was found to be very roughly 1 : 10, indicating a much more intense absorption of mesothorium γ -rays in mesothorium than in lead. Ellis has come to a somewhat similar conclusion on this subject, though he considers that in a γ -radiator the γ -rays are absorbed most strongly in the actual atom from which they are emitted, a point to which the authors have not directly given attention in their paper.

THERMOPILES IN THE LARGE SCALE MANUFACTURE OF GASES.—In the manufacture of hydrogen by the electrolytic process, it is very important to know at every stage the percentage of oxygen in the gas, and highly desirable to have an arrangement for sounding an alarm signal when the proportion of this impurity becomes too large. Dr. P. Gmelin, in the *Festschrift* number (January) of the *Annalen der Physik*, describes apparatus in which a small quantity of the gas is passed constantly through pressure regulators, half of the stream being sent through a tube of hard glass containing eight alternate thermal junctions of copper and constantan, and half through a similar tube, parallel to the first, which contains the remaining junctions. The two tubes are surrounded by an electric furnace, and in one of them pure platinum is deposited in the neighbourhood of the thermal junctions, to act as a catalyser for the combustion $O_2 + 2H_2 = 2H_2O$, the heat of the reaction being given

up to the junctions. When no oxygen is present the registering millivoltmeter, to which the thermopile is connected, is not affected, and when the amount of this gas reaches 2 per cent. the deflexion is sufficient to make an electric contact and ring an alarm bell. It is arranged that this bell shall also ring when the current through the electric furnace is too low and when the gas stream is interrupted. The apparatus can be adapted to show the presence of 0.1 to 2 per cent. of oxygen in nitrogen manufactured by the Linde process. Enough hydrogen is added to the test stream to combine with the oxygen and leave a small excess. Instead of the single pair of tubes described, as many as twenty-four pairs have been employed, to register from 0.01 to 0.5 per cent. of oxygen in mixtures of nitrogen and hydrogen.

THE PHYSICS OF SPRAY FLUIDS.—Rowland Marcus Woodman has two further papers upon this subject in the *Journal of Pomology*, vol. 4, No. 2, January 1925. In the first paper is studied the influence of various substances in maintaining a suspension of lead arsenate, that is, in preventing its sedimentation, and it is pointed out that this is by no means the same property as that of lowering the surface tension of the liquid air surface so that the spray fluid readily wets the surface of the plants upon which it is discharged. As the results of experiment, gelatine and calcium caseinate were found the most effective substances in promoting both these desirable ends; by fine grinding lead arsenate could be got into permanent suspension in water alone, but calcium caseinate, gelatine, or some other substance would still be necessary, in this case, to promote spreading. In the second paper the advantages of the method of intermittent shaking for the preparation of emulsions of oil in water are studied and elucidated. Gelatine and potash soaps prove to be much better emulsifiers than sodium soaps.

A NOVEL T-SQUARE AND DRAWING-BOARD made by Axene Ltd., Maxwell House, Arundel Street, W.C., has been brought to our notice. The object of the invention is to "free the hands of" the draughtsman by providing a T-square which will retain its position on the board without any complication of cords or pulleys. This is accomplished by the use of a magnet as the stock of the square, running on a steel strip in the edge of the board. The principle is not new, and previous inventions on these lines have not come into general use. The distinction of this square lies in the utilisation of the new magnetic cobalt alloy said to retain its magnetism almost indefinitely, and the whole of the stock is composed of this alloy. An examination of one of these boards suggests that, provided the length of the stock be proportioned to the length of the T in a ratio not less than found in ordinary squares, the T-square retains its position unaided, and assuming the retention of its magnetic properties, should be of considerable value to draughtsmen. These T-squares can be made with movable heads, but the leverage on the fixing screw on a long square is so great that a fixed head is usually preferred, at least for work which is mostly rectangular, and we did not observe any notable improvement in this respect in the square under discussion. Another useful feature of "The Axene" is the bevelling of the under side of the back edge of the square, enabling it to slide over drawing-pins. The drawing-board can be made with a steel strip on the bottom as well as on the left-hand edge, enabling the T-square to be used vertically and set squares to be dispensed with for work in which this position of the T-square is more convenient.