

Research Items.

HAWAIIAN JAWS AND TEETH.—Mr. H. G. Chappel has examined the collection of Hawaiian mandibles, both those attached to crania and those without crania, and mostly dating from before the coming of the white man, in the Bernice P. Bishop Museum, Honolulu, with a view to the study of the teeth and dental disease. The results are published in *Memoirs of the Bernice P. Bishop Museum*, vol. 9, pt. 3. The teeth show comparatively little irregularity, only 9.9 per cent. Only 17.2 per cent. have the incisor knocked out as a sign of grief for a relative. This custom was more prevalent among the men than the women, and on Hawaii than on the other islands. There is little caries owing to developmental faults. From forty to sixty years of age it increases considerably, and is more prevalent in mandibular than in the maxillary teeth. Alveolar abscesses grow more prevalent as age advances, as does pyorrhoea; between forty and sixty years of age only 6.57 per cent. are free from it. As regards the jaws, there are more orthognathous females than males and little prognathism in either sex. The majority of males and females show a greater height and width of the ramus of the mandible on the left side and a greater height of the body of the mandible on the right side. The males of the island of Hawaii show a greater bigonal width than those of the other islands.

CANCER STATISTICS.—The Ministry of Health has issued two further reports on cancer. One of these (*Reports on Pub. Health and Med. Subjects*, No. 46) deals with cancer of the rectum, and is based on an examination, by the Departmental Committee, of the records of rather less than 6000 cases of this disease. It is found that, on an average, the patients did not come to operation until twelve months after the occurrence of the first symptoms, and that rather less than half the patients when seen by the surgeons were considered to be operable. Of those operated on, about one-sixth died as the result of such operation, sepsis being the cause of half these deaths, but two out of every five were alive three years afterwards. The other report (*ib.*, No. 47) deals with the treatment of cancer of the uterus at the Samaritan Free Hospital, and has been prepared by Dr. Janet Lane-Claypon and Mr. W. M'K. H. M'Cullagh. Again the same fact emerges that something like half the patients are inoperable when they present themselves, and that the first symptoms were noticed six months previously. The operative mortality in cancer of the cervix was only about 6–7 per cent., and the number surviving five years after hysterectomy was about 34 per cent. for the vaginal, and 44 per cent. for the abdominal operation. For cancer of the body of the uterus, the number surviving five years after operation was 61.5 per cent. It has long been recognised that childbirth is a predisposing cause of cancer of the cervix, and the data here collected suggest that there is also a definite association of the disease with early miscarriage before the foetus is viable. Many other details have also been analysed in the two reports, such as the earliest symptoms of the disease noticed by the patients, the mortality of various operative procedures and the chief causes of death therefrom, and the duration of life without operation.

HARMFUL NOISE.—The Engineering Section of the National Safety Council, at its sixteenth annual congress, held at Chicago on Sept. 26–30 last, reports the results of a research committee set up to deal with the elimination of harmful noise. The report begins by attempting to define noise, but admits that

the line of demarcation between musical sound and noise cannot be sharply drawn. The interest in noise elimination is widespread, and many articles have appeared throughout America during the year. Dr. E. E. Free made a noise survey of the city of New York, and Mr. R. F. Novis of Chicago. Such surveys, however, cannot be utilised as a basis for determining which noise should be eliminated and which may be tolerated. People who are ill can tolerate only a minimum of noise, but no one knows what noises are harmful, or how much noise is harmful to people who are not ill. Several attempts have been made to measure the effect of noise upon the human organism, but so far the data for formulating a definition of harmful noise are not available. The report suggests that the services of physiologists, neurologists, otologists, psychologists, and physicists should be enlisted in order to investigate the problem. Prof. John J. B. Morgan, of Northwestern University, has made a preliminary study of the effects of noise by comparing the electrocardiograph records of subjects in a quiet and in a noisy environment. The noises were produced by Western Electric audiometers, the sound being amplified and given to the subjects through a loud-speaking telephone. Prof. Morgan's tentative conclusions are (1) that the heart action is modified by the noise, but that the effect is more apparent in the irregularity of the action than in the average rate; (2) that subjects vary in the way they respond and that different sounds have different effects; (3) that the suggestion of a 'horrible din' to a hypnotised subject quickens the pulse, thus indicating that the emotional attitude towards the sound may be of greater significance than the quality of the sound itself. The report concludes that the method indicates a way of approach to the very difficult problem of harmful noise.

ZOOLOGICAL STUDIES OF CENTRAL ASIA.—The Commission for the Study of Natural Resources of the Russian Academy of Sciences has just published a list of literature on animals of Turkestan, compiled by M. M. Ivanova-Berg, under the editorship of Prof. Leo Berg. The list comprises a volume of large size, 235 pp. in all, and covers all literature on animals of Central Asia, both wild and domestic. Central Asia is given wide limits, and includes the Kirghiz steppes, Turkestan, Dzhungaria, Kashmir, N.W. India, Afghanistan, and northern Persia, but the literature on the fauna of the Caspian Sea is not included, except that dealing with fisheries on the eastern coast. Russian literature is dealt with very exhaustively, but it is not claimed that foreign papers are fully represented. The total number of entries is 4894. Titles are classified; first are quoted systematic, zoogeographical, and similar papers on each group; then a section on pests of agriculture follows; another special section on locusts (more than 300 entries); then fisheries; animal breeding generally and by branches; bee-keeping; silkworm industry. Two supplements bring the bibliography practically up to the end of 1927. Two indexes, one of geographical names mentioned in titles, another of species of animals, conclude this volume, which will be found very useful by anyone working on scientific or economic problems of Central Asia.

POLYZOA FROM THE ADRIATIC AND MEDITERRANEAN.—Dr. Antonia Neviani ("La *Schizotheca serratumargo* Hks. sp. nell' Adriatico e suoi ospiti." *Memorie della Pont. Accademia delle Scienze—I nuovi Lincei*, Ser. 2, vol. 10) redescribes this interesting species, first discovered by Hincks in 1886 from the Adriatic,

and, although only fragments were then obtained, attributed by him to the genus *Schizoporella*. Dr. Neviani, having succeeded in finding several fine specimens in the Mediterranean, gives a detailed account of these, together with other encrusting polyzoa growing on them. *Schizotheca serratumargo*, as it is now called, is a calcareous polyzoon living in the coralline zone attached to various stones, shells, madrepores, and nullipores from the Mediterranean and the Adriatic Seas, the Suez Canal, and the coast of Morocco, also occurring fossil in the Pliocene and post-Pliocene of Italy. A full list of records is given, showing that from 1909, when it was recorded by Waters from the Red Sea, it was not again mentioned until 1925, when Canu and Bassler included it in their list of Bryozoa from Morocco and Mauritius. It is unfortunately exceedingly delicate to handle and breaks up at the slightest touch. The 'guests' or animals growing upon it include Spirorbis and serpulids and five species of calcareous polyzoa, all belonging to different genera.

PARASITES OF THE EUROPEAN CORN BORER.—*Circular No. 14* (Oct. 1927) of the United States Dept. of Agriculture embodies a résumé of the present status of imported parasites of the European corn borer. The authors, Messrs. D. W. Jones and D. J. Caffrey, mention that since native parasites do not effectively attack this insect, it has been deemed necessary to import certain species which parasitise it in its original habitat in France, Belgium, Italy, and Hungary. Twelve different species of parasites have been introduced into the United States between 1920 and 1927, numbering more than 355,000 individuals. All these were sent to the Corn Borer Laboratory at Arlington, Mass., and from there distributed, after they had mated, among infested areas. A certain number of parasites were kept back in order to build up an increased stock before liberation, and in this way 1,535,000 additional parasites were obtained. Systematic collections and observations in the vicinities where these liberations took place, have resulted in the recovery of six of the species concerned in circumstances indicating that they have become established in the United States, and that they are actually preying upon the corn borer. Although strenuous efforts are being made to import, breed, and establish these various parasites in corn borer infested areas, it is too early at present to decide whether they will prove effective aids in controlling the pest. Judging from the experience with similar parasites imported to aid in controlling other foreign pests, several years will elapse before any important effect can be expected. In the meantime, every effort to control the corn borer by other methods needs to be assiduously maintained.

GENETICS OF CHERRIES.—In a study of the genus *Prunus*, including the plums and cherries, Mr. C. D. Darlington (*Jour. of Genetics*, vol. 19, No. 2) finds that 8 is the basal number of chromosomes and that many of the species and varieties are polyploid. The chromosome number runs so high as 48, and some varieties have chromosome numbers which are aneuploid (not an even multiple). Self-sterility is prevalent and hybridisation has occurred between different forms. This has created a swarm of hybrid forms which render impossible any clear demarcation between species with the same number of chromosomes. Homologous series of variations also occur in *Prunus*, which are attributed to crossing and segregation among related types. The sweet cherries (*P. avium*) have some trivalent chromosomes, the total number of chromosomes being $2n = 17-19$. The sour and Duke cherries (*P. cerasus*) are tetraploid

($2n = 32$), and the bivalent chromosomes are often grouped in pairs at meiosis. The sweet cherries are of ancient cultivation, but the Duke varieties, developed largely in the seventeenth century, are regarded as aberrant $4n$ segregates from diploid gametes of sweet cherries, perpetuated by grafting. Tetraploidy also has the effect of removing the bar to self-fertility. It is found that cherries which are diploid, or nearly so, can produce tetraploid seedlings, and vice versa.

MENDELIAN GENES AND DEVELOPMENT.—The Amphipod *Gammarus chevreuxi* has provided useful material for genetic study. Messrs. E. B. Ford and J. S. Huxley (*Brit. Jour. Exptl. Biol.*, vol. 5, No. 2) have made an analysis from a developmental point of view of the factors controlling eye-colour. The normal black-eyed type gives rise to various mutational eye-colours, such as red, which may differ not only in the final adult colour, but also in the rate at which pigment is deposited. Segregation for slow or rapid development of the pigmentation may occur in a simple mono-hybrid ratio, but in certain families an apparent failure to segregate was found to be due to accessory rate-factors. Many of the facet-colour genes therefore influence the time relationships governing the deposition of melanin, all coloured eyes passing from colourless through scarlet; later they may darken to black by the addition of melanin. Graphs for developmental rates of different factors are given, and conditions which may bear a similar interpretation in various other animals are discussed. It is suggested that a multiple allelomorph series may represent the developmental curves of a single substance, differing in rate of formation of the substance, time of beginning deposition, and equilibrium position finally reached.

NEW CARBONIFEROUS PELECYPODA.—An important little paper on certain Carboniferous Pelecypoda, or, as he prefers to call them, lamellibranchs, has just been published by Mr. J. Wilfrid Jackson of the Manchester Museum (*Mem. and Proc. Manchester Lit. and Phil. Soc.*, vol. 71, No. 10: reprinted as *Notes from the Manchester Museum*, No. 31). The genera dealt with are *Pterinopecten*, *Posidonomya*, and *Posidoniella*. The author shows that more than one form has been included in the first-named genus as *P. papyraceus* (Sow.) and distinguishes five species. The differences between them depend on surface ornamentation, and occur on specimens from different horizons, but are not so marked as those exhibited by contemporary Goniatites, nor are the various species of equivalent value to the Goniatites for zonal purposes, mainly owing to the scarcity of well preserved specimens. Two new species of *Posidoniella* are also described. The paper is illustrated by three very good plates.

CRYSTALLINE CARNOTITE.—The usual carnotite deposits of the plateau region of Utah and Colorado are impregnations in sandstone formed when the rocks were first exposed to the percolation of meteoric waters. Geologically this date has been placed in the Eocene, and the lead-ratios indicate a numerical age of at least 42 million years, in good agreement. A discovery of crystalline carnotite has now been made in a situation near the upper end of the Grand Canyon, where the date of formation would be considerably later in the Tertiary. This unique material is thoroughly described by F. L. Hess and W. F. Foshag in the *Proc. U.S. Nat. Mus.*, vol. 72, art. 12, 1927. Lead is present, as shown by spectroscopic tests, but in quantities too small to be determined chemically in the limited samples available. However, the age was estimated from a measurement of the proportional radioactivity. The radium-uranium

ratio was found to be only 68 per cent. of the normal ratio, corresponding to an age of 6.8 million years, which agrees well with the geological indications. With further investigations of this kind it will become possible to date the various stages in the history of the Grand Canyon from the Eocene to the present day.

SURVEY WORK IN THE UNITED STATES.—Among the many accomplishments of the United States coast and geodetic survey for the year ending June 1927, the *Annual Report* directs particular attention to three of importance. The first is the completion of the field work necessary to make a readjustment of the first order triangulation west of the ninety-eighth meridian. The second is the investigation of the first order level net of the United States. The adjustments started from Galveston and were carried to the Pacific and Atlantic coasts. This levelling shows that mean sea-level on the Atlantic coast is more than a foot above mean sea-level on the Pacific coast. The third notable achievement was of a different nature, namely, the construction of a light movable steel tower for use in triangulation in flat regions. The use of this improved tower is expected to reduce the cost of first order triangulation in level lands as much as 25 per cent. A further advance in survey methods is the adoption by all the vessels of the survey of echo-sounding apparatus. After extensive tests and modifications, a satisfactory apparatus has been developed. The *Report* contains key maps of the state of various surveys.

ARE AURORÆ ACCOMPANIED BY NOISES?—Reports of swishing sounds accompanying auroral displays are common, but are still regarded with doubt, because of the difficulty of reconciling the production of such sounds at low levels with the extreme rarity and altitude (about 100 km.) at which auroræ appear. There have, however, occasionally been reports of auroræ being seen at much lower levels; some years ago, in a letter to *NATURE*, Dr. G. C. Simpson discussed various cases of the kind, including some instances in which he was able personally to investigate the report on the spot; his conclusion was that in these cases the effect was an optical illusion. Another report of a low level aurora, by Mr. J. H. Johnson, appeared in the December (1927) issue of the *Publications of the Astronomical Society of the Pacific*. "A singular aurora—an array of dancing streamers having prismatic colours," accompanied by swishing sounds, was seen at Eagle, Alaska, $64^{\circ} 47' N.$, $141^{\circ} 10' W.$ in front of a bluff half a mile away, which rises to a height of 1200 feet above the town. There seems to be no reason to doubt that a remarkable luminous phenomenon occurred not far from the observer, and at less than 1000 feet above ground level; but it must have been of a very different character from that usually called an aurora. Even the top of the streamers did not appear above the summit of the bluff, and no mention is made of the presence, at the same time, of high-level aurora properly so-called.

NEW RESULTS WITH SOFT X-RAYS.—In a recent paper in the *Journal de Physique* (vol. 8, p. 484) J. Thibaud and A. Soltan have directed attention to differences between their measurements of wavelengths between 40 Å. and 80 Å., made with a ruled grating, and those made by Dauvillier with a crystal. The latter, if calculated directly from the Bragg formula, are always too high, apparently because the index of refraction of the material used differs from unity by as much as 0.01 in this region. Their own results include new values for the *K* lines of nitrogen and boron, and for the *N* and *O* rays of several heavy elements, and have enabled them to find the energies

of the *L* level for the lighter elements. The *N* rays examined consist of regular doublets. In a later note in *Comptes rendus*, it is reported that continuous spectra are also present in association with the characteristic soft X-rays, if heavier currents are passed through the generating tubes (*NATURE*, Mar. 3, p. 321).

A NEW SEPARATING FUNNEL.—In the *Chemiker Zeitung* for Jan. 25 is a description of a new form of separating funnel, consisting of a combination of two stoppered pear-shaped bulbs, between which is inserted a 3-way stop-cock. Each of the bulbs carries an elongated hollow stopper of special design. The new funnel, which offers considerable advantages over the older type, is in use in the technological laboratory of the Chemical Institute at Buda-Pesth.

MEASUREMENT OF THE CONCENTRATION OF DILUTE SOLUTIONS.—The accurate determination of concentrations of dilute solutions of organic compounds is a matter of considerable difficulty when the usual methods of analysis are employed. It is possible to utilise the interference refractometer for this purpose to obtain rapid and accurate measurements, and some of the difficulties encountered in the calibration of the Zeiss interferometer are discussed by R. Macy in the *Journal of the American Chemical Society* for December 1927. A greater degree of accuracy is attainable with solutions of aromatic than with solutions of aliphatic compounds, and the reading for two substances in the same solution is very nearly the sum of the separate readings for each.

ADSORPTION OF OXYGEN ON CHARCOAL.—Using four different types of charcoal, A. F. H. Ward and E. K. Rideal have investigated the adsorption and heat of adsorption of oxygen, the rate of autoxidation, the area of methylene blue adsorption, the ash content, the true and apparent bulk densities, and the particle size, and an account of their work is contained in the *Journal of the Chemical Society* for December 1927. In the case of a charcoal with a large ash content, the initial heat of adsorption for oxygen was very high and the carbon surface appeared to be unstable. For the other charcoals, the areas of the active portions were found to be proportional to the rates of autoxidation and were of the same order as when determined from the poisoning of autoxidation by amyl alcohol. The results obtained do not support the supposition of Keyes and Marshall that the high initial heat of adsorption corresponds to the establishment of a unimolecular layer and that the lower subsequent heats are due to the building up of thicker oxygen films.

THE REACTIONS BETWEEN OXYGEN AND COAL.—An investigation of the spontaneous combustion of coal is being carried out by the Safety in Mines Research Board, and some of the results obtained are described by Messrs. W. Francis and R. V. Wheeler in the *Journal of the Chemical Society* for December 1927. The amounts of oxygen fixed by the vitrain portion of newly won coal and by vitrain from the same seam after prolonged atmospheric oxidation at $150^{\circ} C.$ were measured at various temperatures, and the quantities of the products of the reaction determined. The oxidation of coal appears to take place by the formation of unstable oxygenated groupings, which are carboxylic in character and ultimately cause the ulmin portion to become soluble in alkalis. The reaction seems to depend upon the presence of an adsorbed layer of oxygen, which is continually renewed so long as oxygen enters into combination. The oxygenated groupings are decomposed into water and oxides of carbon and the coal 'revivified' by heating in a vacuum.