

Research Items

Neolithic Age in Western Europe. Recent interpretation of archaeological evidence has shown an increasing tendency to reduce the duration of the neolithic age as against the claims of the mesolithic and bronze ages, until, as a period, it has seemed in danger of extinction. In Britain, recent researches, notably the pottery analyses of Mr. Stuart Piggott, have placed the neolithic on a more assured basis; and a similar service is performed for the neolithic and chalcolithic periods of western Europe in *Antiquity of March* by Jacquetta Hawkes. As a starting point is taken an early culture which is identified in south and east France. It passed, presumably up the Rhone Valley, to the western Swiss lakes, where it became established in the first Danubian period. Thence it passes to Britain without touching Brittany. It is not yet possible to determine the exact limits of distribution of this culture. In the next phase, a period of differentiation, one offshoot, coming under Danubian influence, forms the Michelsburg culture, while another branch, spreading westward, joins with an influence from southern France, producing a more sophisticated type of pottery, and is responsible for the Chassey culture. This spreads farther westward and joins with other elements to produce the elaborate chalcolithic culture of Brittany. Cutting across this 'western culture' from Belgium to the Channel Islands is the Seine-Oise-Marne culture, of which the most characteristic feature is the vase with everted rim, well-marked shoulders and splayed foot. The pottery of this last-named culture, it has been suggested, shows a relationship with that of the peoples who in the meanwhile, and after severe flooding, had resettled the western Swiss lakes, their culture showing affinities with that of their predecessors, but developing new features.

Birds' Bones from Prehistoric Eskimo Ruins. On St. Lawrence Island in the Bering Sea, Eskimo habitations dating from more than 2,500 years ago to village sites of half a century back have been excavated during several seasons, and several thousand bones of birds have been found amongst the food refuse. In all, 45 species were represented, ten of them new to the fauna of the island (H. Friedmann, *J. Washington Acad. Sci.*, 24, 83, Feb. 1934). Commonest in all sites of all ages (found in 69 diggings) was Pallas's murre (*Uria lomvia arra*), still the most abundant bird on the island. The other birds generally used for food included the crested and parouquet auklets, the Pacific and king eiders, the latter more common than the former in the older diggings, contrary to their relative abundance to-day, and, curiously enough, the pelagic cormorant (*Phalacrocorax pelagicus*), represented from the most ancient to the most recent site. Other pelagic birds include fulmars, shearwaters and the short-tailed albatross. Considering the difficulty of obtaining such birds, it seems strange that birds so large and so abundant on St. Lawrence Island as geese should be poorly represented, the more so as geese are now much hunted for food by the Eskimos.

Transposed Hinge Structures in Lamellibranchs. Under this title, W. P. Popenhoe and W. A. Findlay describe several cases of valves with the hinge elements reversed, those normally occurring in the right being

found in the left valve, either wholly or partially (*Trans. San Diego Soc. Nat. Hist.*, 7, No. 26; 1933). The relations of the individual teeth to one another, and to the bilaterally symmetrical parts of the shell, are exactly similar to the relationships which are present in the normal individual. The shells in question belong to the genera *Venericardia*, *Astarte*, *Transennella* and *Unio*. Many other genera were examined, chiefly venerids and tellinids, but out of 2,000 no reversed specimens were seen. The dentition in these abnormal forms may be completely or partially transposed, but no complete transposition involving cardinals, anterior and posterior laterals has been found in this study. The tendency is for the cardinals and anterior laterals to transpose together. The posterior laterals, which are formed independently of the others, do not usually transpose. In rare cases the posterior laterals transpose and not the cardinals. This hinge transposition has usually been regarded as a very rare phenomenon, even rarer than the comparable abnormality of inverse coiling in gastropods, but these notes show that it takes place quite as frequently as in some of the helices in which reversal is much easier to see. The authors are of the opinion that the abnormal hinges described represent examples of a systematic abnormality, not pathogenic, except in very rare cases, in which certain of the primary lamellæ from which hinge-teeth are derived have developed in the opposite valve from that in which they are normally found.

Atomic Composition of Plants in Relation to Atomic Number. Summarising the results of large numbers of analyses, Vinogradov (*C.R. Acad. Sci.*, 197, 1673; 1933) claims that the relative number of atoms of any chemical element present in living matter tends to be inversely proportional to the atomic number of that element. The curves showing this relation also tend to show a regular periodicity. Maxima occur, for example, at atomic numbers of 18, 36, 54, 72 and 90, and special significance is claimed for the elements found at these and at other periods. It may be noted that no biological function is at present known for most of these significant elements.

Replacement of a Bud by Roots. Mr. Samuel Sandison writes from the Department of Botany, University College, Dundee, to report a striking case noted during some observations upon the propagation of *Forsythia suspensa* by cuttings. Usually roots arise from buds at the basal end of the cuttings and always from the basal half of the bud. In this case, when the bud scales were stripped off, the bud-apex had disappeared and in its place five roots were seen arising from a common point of origin, somewhere about the original base of the bud.

Pigment of *Aspergillus* Spores. Further results of his investigations on aspergillin, the brownish-black pigment of the spores of *Aspergillus niger*, have been recorded by Dr. Adolfo Quilico in *Rend. R. Ist. Lombardo Sci. Let.*, Parts 11-15, 1933. This pigment exhibits an acid character, which is ascribed to the presence in its molecule, not only of phenolic hydroxyl groups, but also of carboxyl groups. It is, indeed, able to displace carbon dioxide from alkali and alkaline-earth carbonates, and, when heated to

150°–250° C., it liberates appreciable amounts of carbon dioxide and water, at the same time losing its solubility in alkalis. When oxidised by hydrogen peroxide, it yields, together with acid products not yet characterised, mainly mellitic acid, which is also formed, along with a small amount of oxalic acid, on oxidation with nitric acid. Consideration of the chemical behaviour indicates that aspergillin is a typical humic acid, analogous to that extractable from peat, lignite and soil. This is the first known case of the formation of a humus substance in a vegetable organism from a carbohydrate such as sucrose, and is of interest as a contribution to the problem of the genesis of humic matters. Unlike peat, etc., the *Aspergillus* spores yield a particularly pure humic acid, which lends itself well to chemical investigation.

Scot Head Island. A study of the physical processes at work on the north coast of Norfolk has led to some interesting conclusions with regard to this island, which lies to the east of Brancaster. In a lecture to the Royal Geographical Society on March 12, Mr. J. A. Steers discussed the relative effects of tidal and wave action on this coast. The island apparently began by wave action separating the shingle from the sand on an extensive foreshore, a stage that can be seen at other places on that coast. A shingle ridge near high-water mark formed an off-shore bar, became more stable, extended westward by wave action and formed a recurved end. Dunes formed on its surface. Newer ridges were added by wave action to the main ridge and pushed backwards, a process that can still be seen in action. At other times the new ridges were of sufficient size to form permanent additions to the island. The island lies not parallel with but at a slight angle to the coast. Wave action would tend to build at right angles to the coast-line, but this would force the distal end into deep water and so subject it to greater wave action, which necessarily drives it back. The island is about four miles long, with a width that varies with the state of the tide. The dunes show various stages of consolidation, and between them lie salt marshes which increase in height from the younger in the west to the older in the east.

The Constant Pressure Air Thermometer. A number of careful determinations of the volume coefficients of condensable gases have been made by Coppock and Whytlaw-Gray using the Callendar compensated thermometer (*Proc. Roy. Soc., A*, Feb.). The gases used were ethylene, air, carbon dioxide, dimethyl ether, nitric oxide, carbon monoxide and sulphur hexafluoride, under pressures up to 1 metre of mercury. The gases were carefully purified and butyl phthalate was used as a manometer liquid. The values obtained with a glass bulb, when extrapolated to zero pressure, gave values for the coefficient layer, then the 'perfect gas' value, and this was ascribed to adsorbed gases on the walls of the vessel. These are liberated as the temperature rises and give values for the coefficient which are too high. The difference was less marked for a fused silica containing bulb, and the authors suggest that silica is a suitable material to adopt as a standard in determining the volume coefficient for condensable gases.

Positive Electrons from Lead ejected by γ -Rays. In a communication which was unfortunately too long for use in our correspondence columns, but will, we

hope, shortly be published elsewhere, Dr. A. Alichanow, of the Physical-Technical Institute, Leningrad, describes measurements of the velocity distribution of the positive electrons ejected from lead by the γ -rays of radium C'. A semicircular focusing apparatus was used, and the electrons were detected by coincidence counts in two contiguous Geiger-Müller counters. Two pronounced and two subsidiary maxima were found in the distribution curve, which appear to agree well with the known γ -rays of energy greater than 1.78×10^6 volts. Similar measurements were also carried out with a source of radon enclosed in a thin glass tube, and also in this case positive electrons were found with a somewhat similar velocity spectrum. The total number of the positive electrons in the latter case is 0.5–1 per cent of the number of β -rays of the corresponding continuous spectrum. This is in agreement with the measurements of Dr. Skobeltzyn, whose experiments are described in a letter in this issue of NATURE (p. 565), where he points out the problems raised by this result.

Isotopes of Hydrogen. In three preliminary notes in the *Proceedings of the Royal Academy of Sciences of Amsterdam* (36, Nos. 6 and 7, 1933; 37, No. 1, 1934) Zeeman and de Gier reproduce very clear parabolic traces obtained by the use of the J. J. Thomson mass-spectrograph with gases containing hydrogen isotopes and inert gases. Curves were obtained which could be interpreted as belonging to hydrides of the inert gases, since they do not exhibit multiple charges. Various kinds of ions were detected: (H_2^+H^+) , (H^+H_2^+) , (H_3^+) , and others due to traces of impurities in the apparatus. The mass differences between He and H_2^+H^+ , HeH¹ and H_1H_2^+ , HeH²⁺ and H_2^+ were measured with some accuracy. In an experiment with hydrogen obtained by passing water vapour over sodium, a faint parabola with $m/e=4$ was obtained after an exposure of half an hour, and the hydrogen isotope was thus detected without previous concentration.

Structure of some Platinum and Palladium Compounds. Chemical and X-ray experiments by Cox, Saenger and Wardlaw (*J. Chem. Soc.*, 182; 1933) with the dimethyl sulphide derivatives of platinum and palladous chlorides, $[\text{Pt}(\text{Me}_2\text{S})_2\text{Cl}_2]$ and $[\text{Pd}(\text{Me}_2\text{S})_2\text{Cl}_2]$, indicate that the two isomeric forms of the former are planar *cis-trans* compounds. The α -form is the *trans*-compound, not the *cis*-compound as was suspected by Werner, or a tetrahedral configuration as suggested by others. The results with the β -isomer are less definite, but it seems likely that the sulphur atoms are in *cis*-positions and that the compound is ionised in the solid state. In the case of the palladous compound, only one form was obtained, which is isomorphous with the α -platinous compound and is therefore no doubt the plane *trans*-compound. The chemical reactions of the substances differ very considerably, particularly with silver oxide. The β -platinous compound reacts rapidly with silver oxide with production of silver chloride and a basic substance, which forms an alkaline solution in water and reproduces the original compound with acid. The α -form, on the other hand, reacts only slowly, with evolution of dimethyl sulphide and precipitation of platinum, as hydroxide or oxide. A so-called third form of $\text{Pt}(\text{Me}_2\text{S})_2\text{Cl}_2$ had been shown by Tschugaev and co-workers to be really the plato-salt, $[\text{Pt}(\text{Me}_2\text{S})_4][\text{PtCl}_4]$, a result confirmed by the present investigators.