

RESEARCH ITEMS

South African Bored Stones

A. J. H. GOODWIN, of the University of Cape Town, has given an account of the bored stones of South Africa in No. 1 of the new series of Communications from the School of South African Studies published by the University of Cape Town. Bored stones are of various kinds—as described in the article—but, generally, may be visualized as balls of stone so pierced that they can be hafted on to sticks, which are then used for digging or other purposes, the weight of the stone materially assisting the operation. The age of these bored stones varies considerably, some being quite modern and some of unknown antiquity, and culturally speaking they have been used by Bantus, Bushmen and prehistoric peoples. They are figured in some of the so-called Bushmen paintings. The present article analyses a large amount of material and will be very useful for reference purposes to students of South African Stone Age archaeology.

New Palaeolithic Industry from East Anglia

An interesting paper on a new palaeolithic industry from the Norfolk coast appears in the *Geological Magazine* (79, July–August 1942) under the names of D. F. W. Baden-Powell and J. Reid Moir. The problem of the number and relationships of the various glacial deposits in Norfolk has evoked much literature, but this short article may well be preferred to some of the longer treatises. For the first time, the Corton sands at Corton are properly taken into account and correlations made between the deposits there and at Hoxne. A very interesting flint industry found in the “Corton” sands at Runton and hence named *Runtonian* is also described. The artefacts are apparently usually small and include neatly trimmed round scrapers, points, etc. The whole industry might perhaps be assigned to an early Clactonian culture since it certainly belongs to the flake-tool culture group, and plain, unfaceted striking platforms are the rule. It is to be hoped that Baden-Powell and Reid Moir will not rest content with this small article; it should be treated as a synopsis to a more comprehensive work on the prehistory of these parts of East Anglia.

Biology of the Brown Trout

THE results of the research by A. E. J. Went and Winifred E. Frost form the fifth of the series of the survey of the River Liffey begun by the late Rowland Southern and continued after his death in 1935 by Miss Frost (River Liffey Survey, V. Growth of Brown Trout (*Salmo trutta* L.) in Alkaline and Acid Waters. *Proc. Roy. Irish Acad.*, 48, B, No. 4; 1942). Variation in the size of brown trout from different localities has given rise to much discussion. In general, in waters of low pH values the trout were small and slow-growing, whereas in limestone waters they were of the large quick-growing type. The present work is based on sets of scales together with other data relating to length, weight, sex, date of capture, etc., most of which have been collected by Miss Frost from brown trout taken by angling in the River Liffey and its tributaries. The main part of the material was obtained from Straffan (alkaline water, mean pH 7.9) where the trout were of relatively large size, and from Ballysmuttan (acid water, mean pH 5.5) where they are seldom more

than four ounces in weight. It is suggested that the difference in growth-rate in the two localities is mainly due, not, as it is often considered, to the age of sexual maturity, which is found to differ little, but to a longer period of rapid (summer) growth and more active growth during the period of slow (winter) growth at Straffan than at Ballysmuttan.

Subantarctic and Antarctic Algal Communities

C. SKOTTSBERG describes the communities of marine algae in subantarctic and antarctic waters (Kungl. Svenska Vetenskapsakademiens Handlingar. Tredje Serien. 19, No. 4; 1941). The work is based on his personal observations during the Swedish Antarctic Expedition (1901–1903) and the Swedish Magellanic Expedition (1907–1909). The algal communities were practically unknown in the regions visited except that the ‘kelp belt’, the association of *Macrocystis pyrifera*, had attracted attention for centuries. This, the most famous of all southern communities, ranges from the Peruvian coast to Cape Horn and is circumpolar in the antarctic, forming a belt outside the breakers but approaching close to the shore in smooth waters. It was a great misfortune that the major part of the antarctic collection was lost with the ship in the pack-ice of Paulet Island. A large amount of work, however, has still been possible. The four districts concerned—South America from Chiloë to Fuego, the Falkland Islands, South Georgia and West Antarctica (“Graham Land”)—are treated separately and there are distinct differences in the algae of these regions. There are some interesting deep water communities. The red algae dominate in deep water, whereas the littoral species often show a brownish violet tinge. The author believes that, judging from his own material, in the antarctic at least a small number of red algae are able to exist at a depth greater than 40 m., especially as the *Desmarestia* association extends to almost this depth, but that there are no special deep-water species justifying the recognition of a separate littoral algal region, and that records from below 50 m. need corroboration.

Genetics of the Potato

SEVERAL viruses of the potato cause a lethal necrosis of some varieties when these are grafted on to infected stocks. This necrosis only occurs on those varieties which are intolerant of the virus, and which rarely, if ever, carry the infection in the field. C. H. Cadman (*J. Genetics*, 44, 33–52; 1942) has shown that the products of top-necrosis due to virus X after grafting occur in those varieties which carry a dominant gene *Nx*. This gene segregates in an autotetraploid manner; the occurrence of equational exceptions and the statistical examination of the segregation ratios show that *Nx* is situated far from the centromere. It should be possible to raise varieties which are intolerant, that is, practically immune from virus X.

Great Iron Boulder from Ovikaf

H. Löfquist and C. Benedicks give a detailed account of the core from the great iron boulder brought by Nordenskiöld from Ovikaf to Stockholm (“Det Stors Nordenskiöldska Järnblocket från Ovikaf: Mikrostruktur och Bildningssätt.” Kungl. Svenska Vetenskapsakademiens Handlingar. Tredje Serien. 19, No. 3; 1941). This huge mass of 25 tons belongs to the Mineralogical Department of the State Museum of Natural History (Riksmuseet) and was successfully

drilled out in 1938. The core obtained was divided into five specimens and a complete metallographic investigation was made. Chemical analyses of samples taken close to these specimens show that the iron boulder consists of nickel-bearing, sulphur-rich massive iron with a high carbon content, making a natural raw iron. The microstructure, on the whole, agrees well with the analytical results, and minute investigations were made on all the constituents. The general conclusion is that there are strong reasons for the view that the iron boulder has been formed from iron sulphide to which carbon has been added. The genesis of the Ovfak boulder may be explained as the result of the following contact-metamorphosis: "One of the boulders of the nickeliferous pyrrhotite of the neighbourhood has happened to be enclosed in a crack in which molten basalt has risen, after having absorbed carbon from the coal beds broken through. . . . Under the combined action of the high temperature of the magma and its carbon, the sulphides of the pyrrhotite have been dissociated, giving carbon-rich iron, i.e., a natural crude iron containing nickel, being Ovfak iron." This work is in Swedish with an English summary.

Crystal Structure of Phosphorus Pentachloride

THERE is proof from electron diffraction experiments that the molecules of some phosphorus pentahalides have the configuration of a trigonal bipyramid, and the same configuration is found for a number of other molecules of similar formula. The appreciable electrical conductivity of solutions of phosphorus pentachloride and other observations suggest that it may be able to exist in an ionized form. The physical properties of the solid lend support to this idea, and a comparison of the Raman spectra in various states shows that the bipyramidal molecules do not persist in the solid. An examination of the X-ray spectrum by D. Clark, H. M. Powell and (independently) A. F. Wells (*J. Chem. Soc.*, 642; 1942) has now given the very interesting result that in the crystal the substance exists in ionic form. The unit cell is tetragonal and contains tetrahedral PCl_4^+ and octahedral PCl_6^- groups. These are arranged in a structure essentially of the caesium chloride type, but distorted, since the ions are not spherical. The structure bears some resemblance to that of tetramethylammonium iodide but belongs to a lower symmetry class of the tetragonal system. The phosphorus to chlorine distance varies from 2.06 Å. in PCl_6^- to 1.98 Å. in PCl_4^+ and is interpreted as related to change of effective nuclear charge. The P to Cl distance in PCl_4^+ is short by about 0.08 Å. of the length calculated from the sum of the normal tetrahedral covalent radii derived from methyl compounds, with a correction for charge. Similar shortenings have been observed for many halogen compounds.

Estimation of Added Calcium Carbonate in National Flour

At a meeting of the Society of Public Analysts and Other Analytical Chemists held on November 4, E. N. Greer, J. D. Mounfield and W. J. S. Pringle described "The Estimation of Added Calcium Carbonate (Creta Praeparata) in National Flour". Three methods have been studied and are described: (a) The sample is incinerated and calcium is determined in the ash by precipitation as oxalate and titration with permanganate; a blank estimation should be made on a sample of the same flour without added Creta. (b) The sample is treated with excess of standard

hydrochloric acid and the excess titrated back with alkali; with this method also a blank estimation is necessary. (c) The carbon dioxide liberated by excess of hydrochloric acid is absorbed and weighed. If a control sample of the unfortified flour is available, the oxalate method is the most accurate; without a control sample the error may be as much as 20 per cent. Method (b) also requires a control sample and when the amount of Creta is about 7 oz. per sack the method is accurate to 3–4 per cent. Method (c) is accurate to within about 3 per cent even in absence of a control, and this method is therefore the most useful of the three.

Crystal Structure of Graphite

A FURTHER discussion of the faint extra lines found on X-ray powder photographs of well-crystallized graphite by Taylor and Laidler (*NATURE*, 146, 130; 1940) is given by H. Lipson and A. R. Stokes (*Proc. Roy. Soc., A*, 181, 101; 1942). A new structure is proposed having hexagonal layers similar to those of graphite, but arranged in a different sequence. About 14 per cent of the new structure is present in the samples examined, ranging from natural graphite from Ceylon, Bavaria and Travancore to graphite extracted from the 'kish' occurring in the casting of carbon-rich steels as well as in graphite crystallized by arcing.

Obscured Regions in the Greenwich Astrographic Zone

IN a paper on this subject (*Mon. Not. Roy. Astro. Soc.*, 102, 5) E. G. Martin gives the results of the separate counts for the Greenwich region (Dec. $+64^\circ$ to $+87^\circ$, galactic latitude $+4^\circ$ to $+51^\circ$), originally published in vol. 4 of the *Astrographic Catalogue*. A comparison of the average $\log N_m$ at different latitudes and longitudes with the figures by van Rhijn provides some very interesting results. The frequency curve shows that there is a considerable amount of asymmetry, negative residuals being in excess. On the assumption that the scatter is due to accidental error, the probable error in $\log N_m$ of a single count for regions at latitudes exceeding 25° is ± 0.102 , and for those less than latitude 25° it is ± 0.122 . There are twenty-nine regions in which the negative residuals are larger than three times the probable error, the largest residual being eight times the probable error, and it is considered that this is due to a real absorption effect. Nineteen of the outstanding regions are spaced in latitudes 4° to 20° , and only ten lie between latitudes 20° and 50° ; this confirms the hypothesis that absorption increases towards the galactic equator. Among the five strips selected in galactic longitude to derive the separate mean values of $\log N_m$, it was found that there is a tendency for the central strips to contain more outstanding regions than the outer strips, indicating a higher absorption around longitude 90° – 100° and confirming a secondary maximum. It is very difficult to determine how much the absorption for each individual count amounts to in magnitude and also to find at what distance the absorption is effective, owing to the fact that actual counts are available only from magnitudes 10 to 13. An attempt was made to analyse the mean results of the counts for latitude 7° , and, while the result showed a density near the sun similar to that given by van Rhijn up to 1,000 parsecs, at 10,000 parsecs the density rapidly increased to a much larger value than that of van Rhijn.