

## RESEARCH ITEMS

## Prehistoric Village Site, Ontario

THE Lawson prehistoric village site, Middlesex County, Ontario, Canada, had already suffered severely from amateur collectors when it was explored by W. J. Wintemberg during 1921-23, but with the addition of scientifically valuable evidence from private collections it has been possible to reconstruct a picture of the material culture of the inhabitants (*Bull.* 94, *Anthrop. Series*, 25, *Nat. Mus. Canada*; 1940). The territory in which the fort is situated is known to have been inhabited by the Neutral Indians of Iroquoian linguistic stock. Probably it had been inhabited long before traders penetrated the region. The site is surrounded by slopes steep on north and south sides, elsewhere less steep. The village probably lay at the east end. Along the north side flows the Medway, a navigable stream, and on the south, Snake Creek, and there is a spring on the west end of the site. Refuse deposits and pits, in groups, of unknown purpose have been found; and there are eleven fireplaces, some round, others oval. The site is strategically important. The east and west ends alone were vulnerable and had to be protected by earthworks. Post-holes for palisades were found along the north and south sides of the site, in places in four rows. The houses were probably like the bark-covered cabins of the Hurons, 2-40 fathoms long and about 4 fathoms wide, and of the same height. Post-holes of small, nearly round habitations, 8-9 ft. in diameter, were found. In the evidence of foodstuffs, animal remains were more numerous than plant remains, but probably both were used in about equal amounts. About 11,000 animal bones were found, including those of mammals, birds, turtles and amphibians, as well as shells of land and freshwater molluscs. About one hundred fish bones were secured. Certain artefacts, animal bones and vegetable products indicate hunting, fishing and agriculture as modes of subsistence. About 14,000 potsherds were found, none, however, permitting reconstruction. Tools consisted of axes, adzes and chisels of stone, antler and teeth, whetstones, rubbers, scrapers, flaking tools, points and hammerstones.

## Rock Engravings on the Indus

A SERIES of rock-engravings or chippings were observed in 1931 and succeeding years by Cuthbert King in Attock, the most northerly district of the Punjab Province, India (*Man*, May, 1940). The engravings are on groups of large stones lying on the right (North-West Frontier Province) bank of the Indus about three miles below the Attock bridge near the village of Darwaza. At times of flood and generally during the summer months the rocks are wholly or partially submerged. The stones are of black basalt, and the pictures or marks are pecked on a smooth surface, but not artificially prepared. Local tradition is that the three engraved rocks figured were originally one, which was split by lightning. They certainly show signs of violent fracture, while the technique and subject-matter of the engraving on all three appear uniform in every

way. Afterwards, further examples were discovered up-stream, while similar engravings were recorded on rocks near the Haro River about a mile above its junction with the Indus, 1½ miles below the first discovery, and also in the Indus itself above this confluence, but showing slight differences from the Darwaza engravings. Some of the markings show resemblance to Chinese characters, while others resemble stylized figures of Swedish and Spanish rock-engravings. Sir John Marshall, to whom the find was reported, considered them to be of the late historic period, while their similarity to many rock-drawings of the medieval period has been pointed out.

## Precautions against American Foul Brood in Bees

CERTAIN aspects in the treatment of American foul brood among bees are discussed in the *Bee World* of June. As in any disease of bees, it is necessary to prevent the bees from carrying infection into a clean hive and also to realize that all infected hives and apparatus require adequate sterilization. If either of these measures be neglected or inadequately carried out, all effort is wasted. Ignorance of the means of infection by a given disease is a potent source of trouble. Thus, until the discovery that *Bacillus pluton* is carried on the mouth-parts of the adult bees, the failure of the most careful measures for controlling American foul brood remained unexplained. In connexion with disinfecting hives, nearly all competent advisors recommend scorching by means of a painter's blow-lamp. This method has its disadvantages, since it is difficult to burn out the corners and crannies without undue burning of the wood. The application of hot washing soda and water is much easier and cheaper to use, but the question arises as to whether it will kill the spores of the disease organism. Apparently a reliable answer to this question is not available and full inquiry is badly needed.

## Indian Palaeobotany

INDIA has long been known to be very rich in fossil plants, and it is fortunate that there should now be an able Indian palaeobotanist with a vigorous school of fellow workers. In a reprinted lecture by B. Sahni ("Recent Advances in Indian Palaeobotany", *Lucknow University Studies*; 1938-39) we have an excellent survey of a field wide enough to include such matters as mountain uplift and continental drift, and in addition a most encouraging promise of fresh results from many pieces of work now in progress. Two of these pieces of work have now appeared ("Jurassic Plants from Afghan Turkistan", by R. V. Sitholey, *Mem. Geol. Surv. Ind. (Pal. Indica)*, 29, Mem. 1; 1940: "The Fossil Charophyta of the Deccan Inter-trappeans near Rajahmundry (India)", by K. S. Rao and S. R. N. Rao, *ibid.*, Mem. 2); that on the Charophyta provides welcome evidence for the Lower Tertiary rather than Cretaceous age of a very important formation, while Sitholey's work is of value in providing new localities for certain Middle Jurassic

species, and though his flora is small, it will be a useful item of information in building up the complicated story of the history of this vast area.

#### Preservation of Vegetables by Waxing

It has long been known that a thin film of natural or artificial wax on the surface of plant tissue is effective in reducing its rate of water loss, and commercial processes have been developed, particularly in the citrus industry, which take advantage of this fact, more than 75 per cent of the oranges grown in California and Florida now being treated in this way. The possibility of extending the process to include vegetables which have to be stored for some time before sale is now being investigated and useful results are described by H. Platenius (Cornell Univ. Agric. Exp. Station, N. York, *Bull.* 723). The method which appears to be the most promising is the dipping process, which can be carried out by hand or mechanical equipment. The vegetables are first washed, and without drying are dipped momentarily into a cold wax emulsion at room temperature and then dried thoroughly, the average thickness of the resulting dry film varying from one to two microns. The chemical nature of these emulsions is very complex. Essentially they consist of colloidal suspensions of one or several kinds of waxes in water, the minute particles being kept in the disperse phase by means of a soap. One of the waxes used contained bentonite in addition to paraffin and a soap. Proprietary articles were used in these experiments, and their names, together with those of their manufacturers and partial compositions, are given. A large variety of vegetables were tested. The results obtained with topped carrots and cucumbers were outstandingly good, and in general the process can be recommended for all root crops with the exception of parsnip. The waxing of leafy vegetables is not advised, nor for those which are shipped with ice on top of the container. Waxing does not improve the quality of an inferior product, nor does it prevent the progress of disease; but it does reduce shrinking and maintain the fruit or vegetable in a fresh condition for a longer period than would be possible without treatment.

#### Rust Fungi of the Genus *Prospodium*

THE very numerous species of rust fungi form a rather unwieldy taxonomic unit, and it becomes a matter of necessity to sub-divide the Uredinales into convenient sub-groups. One of these, the genus *Prospodium*, proposed by J. C. Arthur in 1907, has recently been studied in detail by George B. Cummins (*Lloydia*, 3, No. 1, 1-78; The Lloyd Library and Museum, Cincinnati, Ohio, U.S.A., March 1940). *Prospodium* is separated from the other Uredinales by the picturesque character of possession of appendages to the spore pedicels. This ornate feature is, however, linked to a more fundamental criterion in the limitation of the host range favoured by the genus to Verbenaceae and Bignoniaceae. The present discussion attains monographic proportions, with accounts of structure, life-history, taxonomy, a key to the fifty species with a detailed description of each, and the necessary bibliography.

#### Pleiotropic Effect of Genes

WHETHER genes in general affect only one or a few characters of the organism or whether all genes of an organism affect most characters is an important question in genetics. J. J. Schwab (*Genetics*, 25,

157-178; 1940) has analysed the effect on the shape of the spermatheca of *Drosophila melanogaster* of eleven single mutant strains chosen for convenience of observation. These stocks were continuously backcrossed to an isogenic wild strain and the spermatheca were measured before, during and after the period of backcrossing. Statistical analysis of forty controlled generations, of which twenty were designed to permit crossing-over, was made. It was found that out of eleven segments studied, nine were able to affect the shape of the spermatheca, a character also selected for experimental convenience. Hence "structures may be affected by a multiplicity of genes".

#### A Fungicidal Fertilizer

S. C. TENG makes the interesting suggestion in *Sinensia* (8, Nos. 5-6; September 1937) that urine be employed as a fungicide, and shows that it is effective against the sclerotinia disease of asparagus lettuce and other maladies. Ammonia is evidently the fungicidal compound, and the liquid is applied during transplantation, at the rate of one litre per square foot of soil. Urine is a common fertilizer in China, and its use as a fungicide in no way diminishes that property.

#### Constituents of the Higher Fungi

ERGOSTEROL has been isolated from some higher fungi, but so far as was known no well-characterized members of the terpene group, such as the triterpene resinols, had been isolated from fungi. L. C. Cross, C. G. Eliot, I. M. Heilbron and E. R. H. Jones (*J. Chem. Soc.*, 632; 1940) have now examined the birch tree fungus, *Polyporus betulinus* Fr., and after saponification of the extracts have isolated three polyporenic acids, all of which are probably triterpenoid. Two of these (*A* and *B*) appear to be isomeric  $C_{30}H_{48}O_4$  acids, and both contain two hydroxyl groups and two ethylenic linkages. The third (*C*) may be identical with gypsogenin,  $C_{30}H_{46}O_4$ , isolated from *Gypsophila* and other species of *Saponaria*.

#### Earthquakes in the Aleutian Islands

THE United States Coast and Geodetic Survey, in co-operation with Science Service and the Jesuit Seismological Association, has determined the epicentres of the earthquakes of April 16 and May 4, 1940. The shock of April 16 happened at 6h. 7.7m. G.C.T., and, using reports from twenty-six seismograph stations, the epicentre was calculated to be near lat. 52.6° N., long. 173.8° E., which is just to the north-east of Near Island at the extreme western end of the Aleutian Islands. The shock of May 4 occurred at 7h. 24.1m. G.C.T., and from instrumental reports obtained from Weston, Honolulu, Hong Kong, Manila, Sitka, State College (Pa.), Chicago, Fordham College (Alaska) and Burlington the epicentre turned out to be very close to the previous one, namely, lat. 53.0° N., long. 173.0° E., or immediately north of the Island of Attu at the extreme western end of the Aleutian Islands group. Increased seismic activity in the Aleutian Islands has been noticeable during recent months.

#### Structure of Sulphur Dioxide

THE structure of the sulphur dioxide molecule has been re-investigated by the electron diffraction method by V. Schomaker and D. P. Stevenson (*J. Amer.*

*Chem. Soc.*, 62, 1270; 1940), who have obtained improved diffraction photographs and find the following results. The S—O distance is  $1.43 \pm 0.01$  Å, and the bond angle O—S—O  $120 \pm 5^\circ$ . The entropy determination of Giauque and Stephenson (*ibid.*, 60, 1389; 1938) gave for the product of the three principal moments of inertia of the SO<sub>2</sub> molecule the value  $(10.58 \pm 0.99) \times 10^{-116}$  gm.cm.<sup>2</sup>, and this value with the above bond distance gives  $121^\circ$  as the bond angle, in excellent agreement with the electron diffraction value.

#### Configurations of Quadricovalent Complexes

As is well known, the configuration of some 4-covalent complex compounds of metals is tetrahedral, and of others it is planar. G. N. Tyson and S. C. Adams (*J. Amer. Chem. Soc.*, 62, 1228; 1940) have measured the magnetic susceptibilities of salicylaldehyde complexes of copper, nickel and cobalt, and the salicylaldimine complexes of copper and nickel. From the results the following configurations have been assigned to the compounds. Cobaltous and nickelous disalicylaldehyde probably have tetrahedral configurations, nickelous disalicylaldimine is planar, and cupric disalicylaldehyde and cupric disalicylaldimine are probably planar. In the case of the nickelous compounds, the formation of the disalicylaldimine from the disalicylaldehyde involves a change from a tetrahedral to a planar configuration, and this is attended by a marked colour change from green to orange.

#### Attainment of Very High Pressures

M. JAMES BASSETT has recently described the attainment of pressures of the order 50–75,000 kilograms per sq. cm. (*J. de Phys. et le Radium*, Ser. 8, 1; April 1940). This has been achieved by the use of a special carbide of tungsten, out of which the component parts have largely been made, though steel forms part of the general framework. A special feature of the apparatus is its maintenance at the temperature of liquid air, thus taking advantage of the increased resistance to compression or tension which all metallic bodies exhibit at low temperatures; special precautions are taken to prevent any access or accumulation of moisture. Three diagrams illustrate the main features of the design, but the scale of operations which could be carried out cannot be stated, as no dimensions are given in the text.

#### Photographic Action of Metals

THE photographic action of certain metals has been fully recognized since the researches of Russell more than forty years ago. J. A. Reboul returns to this subject (*J. de Phys. et le Radium*, Ser. 8, 1; 1940). Further experiments have led him to the view that Russell's working hypothesis is inadequate to account for all of the phenomena which have been observed to date. Russell maintained that the action was due to the presence of hydrogen peroxide. This is allowed by Reboul, who, however, maintains that part of the effect is due to a very 'soft' radiation from the metals themselves; he hazards the view that this radiation is itself excited by cosmic radiation. Such a conclusion is tentative in view of the fact that these phenomena have so far not been examined under conditions which, of themselves, reduce the cosmic radiation to insignificant proportions. The protean character of the phenomena remind the reader of the Volta effect.

#### The *K* Term and the Galactic Rotational Constant

W. M. SMART has criticized the claims of Plaskett and Pearce to have solved the mystery of the *K* term (*Mon. Not. Roy. Astro. Soc.*, 100, 5; March 1940). Some time ago, Smart offered some criticisms of their work (*Mon. Not. Roy. Astro. Soc.*, 96, 568) and Plaskett accepted the validity of the criticism; but in spite of this, he still maintains that in actual practice a theoretically incorrect procedure is justified by the results. In their investigations, Plaskett and Pearce made use of 132 *B*-type stars lying between galactic longitudes  $210^\circ$  and  $330^\circ$ , known as the Southern Stream, which they believed formed a moving cluster. Smart has shown (*Mon. Not. Roy. Astro. Soc.*, 100, 60) that these stars do not form a moving cluster but are merely a normal sample of *B* stars, yielding a solar motion of 19 km./sec. and a *K* term of 5.2 km./sec. The value of  $K = 8.3$ , derived from the stars of this so-called Southern Stream, has very little significance. He now shows that in their earlier paper Plaskett and Pearce gave solutions which were derived from an incomplete equation of condition and are therefore erroneous. The conclusion is that the only information relating to the *K* term of moderate accuracy that survives concerns the normality of the *K* term for the distant stars of Groups 1 and 2. It is impossible to say at present what the value of *K* will be for the nearer stars, included in Groups 3 and 4; this can be obtained when solutions are made for these groups with the corrected equation of condition and without any arbitrary adjustment of the radial velocities. The claim of Plaskett and Pearce to have reduced the *K* term to its gravitational value is not admitted.

#### Masses of the Stars

A MONOGRAPH with this title, by Henry Norris Russell and Charlotte E. Moore, has appeared (Chicago: University of Chicago Press. London: Cambridge University Press. 21s. net). It is the outcome of a lecture delivered by Prof. Russell in connexion with the Harvard tercentenary and contains all the direct evidence available regarding the masses of the stars, that is, that derived by gravitational motions from binary systems. The first chapter deals with visual binaries and contains a large amount of statistical discussions. A new empirical formula connecting mass with luminosity is given at the end of the chapter, and though it is impossible to provide a complete theoretical explanation of the formula, nevertheless it is available over a wide range, and should be adequate for the computation of stellar parallaxes. Spectroscopic and visual binaries are dealt with in the second chapter, and in the next chapter there is a collection of various discussions under the headings, statistical theory for slow-moving pairs, triple systems, mass ratios, astrophysical conclusions. A curve shows the close agreement between the empirical linear formula connecting mass and luminosity and observational data, and where large discordances exist these correspond to small or poorly determined groups, or to uncertainty in the individual values, as in the case of the "Trumpler stars". Chapter iv presents a new treatment of the determination of dynamical parallaxes and introduces a number of refinements. Tables are also given which facilitate the computation of parallaxes from double-star data. In the last chapter there is a general catalogue of the dynamical parallaxes of 2,529 stars which have been calculated by the methods explained in the previous chapter.