

Research Items

Early Cultural Distributions in Louisiana, U.S.A.

MR. WINSLOW M. WALKER, in describing a Caddo burial site at Natchitoches, Louisiana (*Smithsonian Misc. Collect.*, 94, 14), points out the importance for American archaeology in the southern States, more especially in relation to the problem of the mounds of the lower Mississippi Valley, of investigation of sites that can be proved to have been inhabited by known historic tribes. The site now described was laid bare in the summer of 1931, when land was being prepared for a new fish hatchery on Cane River Lake near the town of Natchitoches. This body of water was formerly a bend of the Red River, which has now been cut off. No mounds are known to have existed on the site and it was evidently a burial ground. Bones were discovered here about 1916. Of several burials that were uncovered in 1931 only one was examined untouched. It contained the skeleton of a woman, about two feet below the surface, lying on the back with head to the north-east and arms by the sides. With it were two vessels of plain ware heavily tempered with shell. The head was an example of extreme fronto-occipital deformation. This site is probably that visited by Henri de Tonti in 1690. A number of fragments of pottery were obtained from the burials, of a shell-tempered greyish paste tinted with red. Both decorated and undecorated forms were found, the latter incised and engraved, four elements usually being worked into the pattern of the design, as, for example, four spiral arms radiating from a disc. A few stone axes and points were found by the workmen. It would appear that the pottery is of a type found on sites along the Red River, its most northerly point being in Arkansas. None, except as an intrusion, is reported from mounds. The burials probably belong to the early half of the eighteenth century, and afford a valuable clue to the interpretation of many of the archaeological remains of north-western Louisiana.

Diatoms and Whales

ONE of the more curious plant habitats is that of the diatoms growing on the skins of whales in the Antarctic. These have recently been studied and described by T. J. Hart (*Discovery Rep.*, 10, 247, 1935). The chief diatom is *Cocconeis ceticola*, a form confined to this peculiar habitat and possibly at times saprophytic on the skin. Other diatoms are, however, also present in some cases, and among these is a new species, *C. Wheeleri*. These diatoms prove to be of considerable practical importance, for when abundant they form a yellowish film on the skin which is easily visible at a little distance. Whales carrying such a marked film have been in the Antarctic for some time, and are found to be in much better condition than whales without a film, which are recent arrivals from warmer seas. The diatoms seem to spread themselves by forming microspores at the beginning and the end of the Antarctic summer. Their survival through the winter months seems to be assisted by the fact that some whales remain in the Antarctic through the winter and these alone possess a diatom film in the beginning of the succeeding summer.

Growth of *Mya arenaria* in the Fundy Bay Region

AN interesting paper by Curtis L. Newcombe (*Canad. J. Res.*, 13, Sec. D., No. 6, Dec. 1935) shows that the rings of growth in *Mya arenaria* are of value as age determinants, and that in controlled experiments, conducted under natural conditions by planting specimens in boxes, the standard error of the differences between mean annual increments obtained by 'annual ring' measurements and those based on field growth experiments is insignificant. A relatively rapid growth is depicted for the first four years, after which there is a pronounced decrease. Relatively little variation has been found in the rate of growth characterising the widely separated parts of the Bay studied. The length of the growing season during 1931 was approximately four months—May–August. During 1930, growth continued until December 1. Such a late growth is considered unusual in the Bay of Fundy region. It is shown that variations in seasonal growth rates during the same and different years correspond with abundance of diatoms and not with temperature, diatoms being the chief food of this species. In a letter to NATURE of February 1, the author discusses the validity of concentric rings in *Mya arenaria*, L. for determining age, in which he mentions the statement of Mead and Barnes (34th Rep. Comm. Inland Fish. Rhode Island, 1904) that their specimens from Rhode Island do not possess 'annual rings' suitable for age determination. The explanation apparently lies in the fact that the *Mya arenaria* from some localities do not form rings of sufficient significance for them to be used in age determinations, whilst in others they are well formed. In a study of this species from Chesapeake Bay the author failed to find rings that might be considered annual in character.

Light and Nitrogen Fixation in the Soil

THE current view is that the vicissitudes of the nitrogen cycle in the soil are mainly, if not entirely, to be interpreted in the light of the varying proportions and activities of the living soil population, both plant and animal. Under English conditions this may well be true; none the less, these views would seem to deserve critical reconsideration in view of the evidence produced by Dr. N. R. Dhar of the significance of the action of light on the soil, under Indian conditions. With sterile conditions he has shown, in comparison between soils in light and dark, that the sunlight alone profoundly modifies photochemical oxidation of ammonia to nitrites and nitrates, the amount of production of nitric nitrogen in the air and therefore in the rain water, and the production of ammoniacal nitrogen in sterile soils containing such carbohydrates as cane sugar. Dr. Dhar in his enthusiasm may be swinging to the other extreme, but his experimental evidence is very striking, and the work deserves very full consideration both by biologists and soil chemists. He has given a very full summary of his work in a publication under the aegis of the Society of Biological Chemists, India, issued in 1935 under the title "Influence of Light on some Biochemical Processes" (Bangalore: Indian Institute of Science. 1 rupee).

Plant Virus Problems

AN address on this subject was given by Dr. Kenneth Smith before Section K at the Norwich meeting of the British Association and is published in *Science Progress*, 30, No. 119, January 1936. Dr. Kenneth Smith, referring to the 'breaking' or variegation of self-coloured tulips, which has been shown to be due to an insect propagated virus disease, makes the very interesting suggestion that virus infection may be widespread as a cause of flower variegation. Inoculation from the petals of variegated violas has produced virulent mosaic diseases in healthy tobacco plants; there is obviously an enormous field of work opening here of exceptional interest to the horticulturist, who may yet be found inoculating flower strains to obtain interesting variegated forms. The insect transmission of virus diseases is discussed. Their transmission is often closely linked with the sap-sucking Hemiptera, and the relation of the virus to the insect carrier raises many points of interest. Dr. Storey's observation of the existence of two strains of leafhopper in East Africa, indistinguishable to the eye but one transmitting the streak disease, the other not, is full of interest, and notably his further observation that the inactive strain will transmit the virus after the wall of the gut has been punctured. The mechanism of movement of the virus is discussed and its slow propagation in living parenchyma and comparatively rapid propagation in living phloem emphasised. A comparative diagram of sizes of virus organisms and of protein molecules, based upon ultra-filtration through specially prepared collodion membranes, lends emphasis to the recent claim of Dr. Stanley of the Rockefeller Institute to have crystallised out the virus of tobacco mosaic, which he therefore concludes is an autocatalytic protein. Certainly autocatalytic production of the virus organism would be a natural assumption to explain the extraordinarily interesting production of a special virus in the roots of tobacco plants, which are quite healthy in the seedlings and yet, grown in sterile soil, later develop a virus which remains located in the roots until it develops symptoms in some of the lower leaves.

South Orkney Islands

THESE islands on the edge of the Antarctic are heavily glaciated, and not easy of access on account of the pack-ice and heavy seas. Discovered more than a century ago, they had been rarely visited and were almost unexplored when Dr. W. S. Bruce chose them for the winter quarters of his *Scotia* expedition in 1903. This resulted in a thorough exploration of Laurie Island and the discovery of the strong probability of its relationship to the Andean folding. In January 1933, the R.R.S. *Discovery II* visited the group and surveyed the coasts of Coronation Island. Mr. J. W. S. Marr has now produced a monograph on the group (*Discovery Reports*, 10, 283-382. Cambridge University Press. 15s. net). He surveys the history, adding a little to the meagre details, and goes on to a finely illustrated description of the islands with some account of the seals and the scanty plant life. Further evidence is adduced for the existence of the South Antillean arc, now fitly termed the Scotia arc, encompassing the north, east and south of the Scotia Sea, thus supporting Suess's suggestion of Andean connexion with Antarctica. The soundings of the *Discovery II*, added to those

of the *Scotia* and *Meteor*, confirm the suggestion. There is, however, a possibility of a gap or deep col in the submarine ridge between lat. 33° and 34° W. on the southern arm. The volume contains a reproduction of the charts of the islands, in which unfortunately there are a few misprints in the names of Laurie Island.

Motor Transport in the Arctic

THE use of mechanical transport is a new feature in arctic travel, although unsuccessful attempts in this direction were made a quarter of a century ago in the Antarctic. In the January number of the *Polar Record*, four writers give their experience of various types of mechanical transport in different parts of arctic regions and discuss its usefulness. The German Greenland expedition of 1930-31 used motor sledges on the ice cap where the surface was smooth, but found them useless near the edge of the ice on account of crevasses, steep slopes, slush and hard snowdrifts. Mr. N. Urvantsev, writing on the use of caterpillar tractors in the Soviet Arctic, claims that they bid fair to revolutionise transport in that region and that they move equally well on sea-ice, snow and snow-free stony surfaces. The Hudson's Bay Company reports on the whole the success of tractors, but a difficulty in high cost of operating and danger of mechanical breakdowns. Lastly, tractors have been found very useful in northern Ontario, provided different types of 'tread' are available for different surfaces. None of the writers finds that the mechanical difficulties are now considerable in this form of transport, but carriage of fuel may be a consideration.

Theory of Excitation

VARIOUS attempts have been made to formulate the laws governing the excitation of living tissues by electric currents. Prof. A. V. Hill's new mathematical treatment (*Proc. Roy. Soc.*, B, 119, 305; 1935) takes more of the facts into account than previous theories have done, and agrees closely with the results of numerous experiments of different kinds. Excitation occurs when the 'local potential', V , rises above the 'threshold', U . The passage of current for an infinitesimal time produces an increase in V which is proportional to the current. On the other hand, V has a spontaneous tendency to decay exponentially with time-constant k . Lapique's chronaxie is $k \log_e 2$. The new feature of the theory is that it takes into account the tendency of the threshold to be affected by the passage of currents during finite times. This tendency is 'accommodation'. The rate of change of threshold is given by the following formula:

$$\frac{dU}{dt} = \frac{V - V_0}{\beta} - \frac{U - U_0}{\lambda}$$

where U_0 and V_0 are the initial values and β and λ are constants. The problem is simplified by taking the case (which actually occurs under special conditions) where the original threshold is equal to the threshold after a current has passed for an infinite time. This allows the elimination of β . Several methods of determining λ , the time constant of accommodation, give consistent results. It varies independently of k . Accommodation is accelerated by increasing the concentration of calcium or potassium, or the temperature. It is greatly slowed by decreasing the calcium ion concentration.