

Research Items

Excavations at Tall Chager Bazar, 1935

THE results of the excavations of the British Museum and the British School of Archaeology in Iraq, conducted by Mr. M. E. L. Mallowan at Tall Chager Bazar during 1935, are briefly outlined by Mr. R. D. Barnett in the *British Museum Quarterly*, 10, 3. The plain of the Upper Habur River corresponds in part to the kingdom of Mitanni. After a preliminary reconnaissance in 1934-35, the mound of Tall Chager Bazar, typical of the district about thirty-five kilometres south of Nisibin, and once an important road junction, was selected for excavation. The mound was found to be formed solely by human occupation and to consist of fifteen layers. It was abandoned about 1500 B.C. It has not yet been identified with any historical site known by name in the records. The topmost and latest level, dating from 2000 B.C. to 1600 B.C., contained solidly built houses of Babylonian type. In one room, possibly a kiln, were clay models of horses, which recall the fondness of the Mitannians for horse-breeding. The pottery, highly polished black and a coarse painted ware, is rare but known elsewhere as Hurrian. Levels II-IV contain well-built houses with a surprising number of child burials under the floors. Level V, 3000 B.C.-2500 B.C., contained houses much destroyed, but below them were rich graves containing bronze daggers, silver beads, etc., which show direct connexion of trade with southern Mesopotamia and resemble objects from the Royal Tombs of Ur. Previous to this the hill had been continuously deserted from the close of the rich prehistoric civilisation, characterised by the 'Tel Halaf' were recently investigated at Arpachiyah. It is here developed through six habitation levels, in which the first use of metals was achieved. Here was found the earliest known cylinder seal. On virgin soil was the highly polished black pottery ornamented with white-filled incised markings hitherto known only from Sakje-Gözü, north-east of Aleppo and Ras Shamra and resembling that from Knossos. It belongs to the end of the stone age.

Sinkyone Festivals

THE Sinkyone (Kaikomas) are an Athabascan tribe living in southern Humboldt and north-western Mendocino counties, California, to whom two visits were paid in 1928 and 1929 by Miss Gladys Ayer Nomland (*Univ. California Pub. Amer. Archaeol. Ethnol.*, 36, 2). Their territory extends from the Pacific Ocean eastward to the Nongatl, Lassik and Wailaki western boundaries, while the southern boundary adjoins Kato and coast Yuki and the northern boundaries adjoin Mattole. Their culture is closely allied to that of the surrounding Athabascans and to the general non-Athabascan type of culture of northern California. One of the most interesting features here recorded is that of the first-salmon rites. During the salmon run, usually lasting about two months, the tribe camped on the banks of the streams. In fishing, unlike hunting, there were no restrictions against women taking part or on sex-relations. Any one might catch the first salmon; but after its capture, the shaman began the ceremony. The first-

salmon rite is a characteristic north-western trait, the southern extension of which meets the Californian culture in Sinkyone territory. This is probably the farthest southerly occurrence of the rite. The prayer with which the shaman begins the ceremony is clearly the same as that of the characteristic first-acorn ceremony, the older acorn formula having been transferred to the newer introduced salmon ceremony. After the first prayer, the shaman danced around a small fire for a short time and then ceremonially scaled and cleaned the salmon with a special obsidian knife, split it open, and roasted it on hot coals at the side of the stream, where it was brought out of the water. The shaman tasted the first morsel, then each person present must taste a bit of the flesh to ensure the increase of salmon for the next year, as well as personal and tribal safety.

Fauna of the Marquesas

THE human population of the Marquesas has fallen from more than 50,000 to about 2,000 owing almost entirely to introduced diseases, especially tuberculosis, and yet a surprisingly small number of the protozoan diseases of the tropics has occurred there. In a survey of the non-marine invertebrate fauna of the islands (excluding the insects), A. M. Adamson shows that large numbers of endemic species are known amongst the Arthropods and Mollusca (*Bernice P. Bishop Museum Occasional Papers*, 10, No. 10; 1935). But while the degree of endemism of land snails in many central Pacific Islands is almost 100 per cent, relatively fewer species of this group would appear to have evolved on the Marquesas, where out of 92 species of land and fresh-water snails 72 (about 78 per cent) are endemic. On the whole, it is apparent that there is a general affinity between the Marquesan fauna and that of the islands to the south-west, Cook and Society Islands and in lesser degree Austral Islands, and thence with the Indo-Malayan fauna. The non-marine invertebrates, however, do not show any direct relationship with those of Hawaii, except as regards one genus of spiders and some of the mites. There is also little evidence of American influence in this island fauna.

Nematodes of the Belgian Coast

DR. J. H. SCHUURMANS STEKHOVEN, jun., in his "Additional Notes to my Monographs on the Free-living Marine Nemas of the Belgian Coasts. I and II written in collaboration with W. Adam and L. A. de Coninck, with some Remarks on the Ecology of Belgian Nemas" adds several new species and new records to his former lists (*Mémoires du Musée Royal d'Histoire Naturelle de Belgique*, Mémoire No. 72, 1935). The study of many mud and sand samples afforded the opportunity for important ecological studies in which several localities are compared. It is found by the author, that, generally speaking, the richness in quantity of the nemec population depends on the amount of mud and detritus present in the habitat. There is a great deal of shifting due to tides, which apparently explains the comparative richness of the nematode fauna often found in shell sand, for the worms swept by waves find a hold between the

sand particles; but the food is scarce here, and most of the species do not reproduce but move to the more fertile and muddy places for feeding and breeding. A survey of each sample studied shows the number of nematodes present and the composition of the soil, with mention of the more important animal or plant life occurring there. The largest number of individuals, consisting of twelve species, occurred in a sample from Zeebrugge "in yellow-brown sulfur-ion containing mud with an enormous number of *Cyanophyceae*".

A Simple Test for Seed Viability

DR. KOZO HASEGAWA, of the Forest Experimental Station, Imperial Household, Asakawa near Tôkyô, claims to have had very reliable results in seed testing, with a colour reaction with a one per cent solution of sodium tellurate (*Japanese J. Bot.*, 8, No. 1; 1936). A darkening of the living embryonic tissues takes place within forty-eight hours (at 16° C.) and this colour change then remains constant. It is claimed that the depth and extent of the colour change can be correlated with the vitality of the embryo. The author further states that no damage is done to the vitality of the embryo by this treatment. This simple method of testing viability will undoubtedly be given a trial in many laboratories where seed viability is a problem of first importance.

Light Intensity and Sporulation of Fungi

MANY species of fungi which produce spores liberally in the open air are poor spore-formers in artificial culture. Mr. W. A. R. Dillon Weston has shown that in the fungi *Helminthosporium avenae* and *Alternaria solani*, paucity of sporulation is due to lack of sufficient light intensity (*Trans. Brit. Mycol. Soc.*, 20, Pt. 2, January 1936). The account follows a previous announcement in these columns (NATURE, 131, 435; 1933) that sporulation was induced by irradiation with a quartz mercury vapour lamp. Further experiments have shown that it was the relatively high intensity of the visible part of the spectrum which produced the effect, and that light below a wave-length of about 400 m μ actually did not induce sporulation. Cultures of *H. avenae* exposed to high light intensity spored about eighteen hours after irradiation, and continuation of such exposure increased the pigmentation of the fungus.

Decay of Timber

THE *Transactions of the Botanical Society of Edinburgh*, 31, Part 4, 1935, contains an interesting discussion of the main fungus agencies associated with the decay of timber in buildings, especially under Scottish conditions. It is pointed out that the ravages of different species have been lumped together frequently as due to 'dry rot', *Merulius lacrymans*. In connexion with this organism it is apparently necessary to distinguish between *M. domesticus*, only known on sawn timber, and *M. silvester*, which occurs in the forest. There have been no records of the latter in Scotland until it was found recently on Corsican pine in East Lothian. *Contiophora cerebella* has frequently been confused with dry rot, but the fructifications are different and this fungus only attacks house timber under very damp conditions, when, however, there is some evidence it may pave the way for a subsequent attack of true dry rot. Species of *Lenzites*, *Lentinus* and *Trametes* are also described as occasionally found in building

timbers. *Trametes serialis* needs higher temperatures probably than usually prevail in Scotland, but was found in joists around hot-water pipes in an unventilated space.

Wetting Agents in Insecticides and Fungicides

THE full effective action of insecticidal and fungicidal spray solutions is only obtained when the solution thoroughly wets the insect or fungal surface, and this is frequently secured by the addition of wetting agents or 'spreaders', a procedure which may involve difficulties where combined direct and protective washes are used. Evans and Martin (*J. Pom. and Hort. Sci.*, 13, 4, 261) have made a survey of various wetting agents, the amount of spray retention on several standard surfaces being determined by the use of an apparatus designed to apply known amounts of spray solutions. Wetting properties are defined by the ability of the liquid to form a persistent liquid-solid interface when excess of liquid is drained from the surface, and the various physical properties examined, namely, spray retention, area of spread, contact angles and surface tension, all arrange the materials tested in the same general order of wetting activity. A classification is made of wetting agents on a structural basis, and it is suggested that the behaviour of materials of similar molecular structure may possibly be predicted by certain properties determined in the laboratory.

The Peru Coastal Current

THE Peru coastal current which sometimes bears Humboldt's name has been the subject of much speculation and investigation since Humboldt in 1802 attributed it to cold water from Antarctic latitudes. In a lecture to the Royal Geographical Society on March 9, Mr. E. R. Gunther discussed recent investigations in this current made by the R.R.S. *William Scoresby*. Humboldt's suggestion was queried by Bougainville in 1837 and replaced in 1844 by de Tesson's theory of the upwelling of lower layers. Of this there is no doubt. Maury in 1844 applied the law of deviation due to the rotation of the earth, and Witte in 1880 showed how a northerly current must lag to the west as it reaches latitudes of higher rotation, and thereby induce lower layers of water to well up and take its place. These processes Mr. Gunther admits, but he combats the conception that the surface layers are derived from the coast by offshore winds. This idea was contemporaneous with that of the trade wind belt girdling the earth, which is now known to be untrue; the prevalent winds between lat. 5° and lat. 40° S. blow more or less parallel with the coast. However, the effect is produced by aspiration, that is, by surface drift away from the coast owing to the south-east winds in the open ocean. Mr. Gunther also discusses the small inshore counter currents in the nature of cyclonic eddies. As regards nomenclature, he prefers the name Peru, and argues that Humboldt's name should be dropped since it was associated with an abandoned theory.

Pre-Cambrian Rocks of North America

DETAILED knowledge of the geology of the Lake Superior region has been greatly augmented since the official monograph on the area was issued by the United States Geological Survey in 1911. In Professional Paper 184 of this Survey, C. K. Leith, R. J. Lund and A. Leith have assembled the new

information and presented a revised map, with cross-sections, based on the details of some 150 local maps. The result is a most welcome review of the Pre-Cambrian rocks of one of the world's standard areas. The most noteworthy of the new correlations suggested are (a) the correlation of the major iron-formations of the Mesabi, Gogebic, Marquette and Menominee ranges as of Middle Huronian age; and (b) the correlation of the iron-formations of the Cuyuna, Iron River, Florence and Crystal Falls districts as of Upper Huronian age. While the Knife Lake series is regarded as probably pre-Lower Huronian, the possibility of its being Lower Huronian is not overlooked. Three great periods of granite intrusion are recognised—Laurentian, Algoman and Killarney. The last of these is defined as cutting the Keweenaw series (550 million years), but there is also a post-Huronian granite of much greater age (800 million years) than the Keweenaw which is probably the equivalent of the type Killarney granites of Killarney. This difficulty is clearly brought out by recent lead- and helium-ratios. If the post-Keweenaw granites could be given some other name than Killarney much confusion would be avoided.

The Trent River Bore

AN account by the late H. H. Champion and R. H. Cockran of the bore or 'eagre' which forms in the River Trent has recently appeared (*Proc. Roy. Soc., A*, March, 1936). Observations were made of the water-level throughout the tidal cycle, at several stations on the river, and a detailed examination was made of the rapid rise of level which constitutes the bore. The tide in the Humber estuary was available from Admiralty tide tables. The observations allowed the authors to draw profiles of the water surface at short intervals, showing the formation of the steep-fronted eagre at a point a few miles from the mouth of the Trent, and its subsequent progress upstream at a speed of about 10 m.p.h. The amplitude of the front increases during the next twenty miles of the progress, and then falls off. The data provide material which could be used for a theoretical analysis of the phenomenon.

Effects of γ -Radiation on the Chick Embryo

In a paper contributed to *Acta Radiologica* (16, 719; 1935) Mr. C. W. Wilson, of the Strangeways Laboratory, Cambridge, discusses some effects of γ -radiation upon the developing chick embryo. Previous investigations had dealt with the action of radiations on chick tissues grown *in vitro*; in the present communication the work is extended to the more complex conditions of growth in the presence of a circulation. Earlier work had indicated that the sensitivity of the chick embryo, as measured by the lethal dose, was dependent upon the age of the embryo at the time of exposure. In the present experiments embryos of 1-6 days' incubation were submitted *in ovo* to uniform γ -radiation from 145 mgm. radium element. The results obtained with exposure for 3 hours suggest that this exposure is somewhere near the border line which permits the complete recovery of an irradiated embryo, with subsequent hatching. Exposures of longer than 3 hours were invariably fatal; shorter exposures, such as 2 hours, permitted a practically normal development in a large number of cases. It was found that radiosensitivity decreased regularly for the first 3 days of incubation, decreased more rapidly from 3 to 5 days and then

remained fairly stationary. There appears to be a maximum dose of radiation from which embryos may recover and hatch, and it is suggested that this dose probably produces some irreversible changes through the blood circulation.

Artificial Radioactivity of Thulium

THE rare earths have been repeatedly tested for induced radioactivity, with the sole exception of thulium. Elisabeth Neuninger and Elisabeth Rona (*Wien. Anz.*, 72, 275 (1935). *Mitt. Inst. Radiumforsch.*, 375a.) have examined a thulium preparation which contained, according to spectroscopic analysis, 7.5 gm. Tm_2O_3 , 2.3 gm. Y_2O_3 , a minute quantity of cassiopeium and traces of erbium. The induced activity of thulium caused by bombardment with neutrons, retarded in paraffin, has a half-period of several months or more and is very intense. The half-value thickness for the electrons is 0.15 mm. in aluminium. The other rare earths contained in the preparation were tested separately for artificial radioactivity, the results showing that besides values already known, ytterbium has a faint activity with a half-period of about 40 hours.

Strength of Synthetic Resin Materials

RAPIDLY growing experience in the preparation and manufacture of the materials grouped under the designation 'plastics' has led to their use in increasingly important applications, a notable example being that of the material for air screws. The advantages from the manufacturing point of view which enable these materials to be made up into intricate forms with a good finish are offset by their low ultimate strength, limit of proportionality and Young's modulus, and as a result they are generally more favoured for ornamental purposes than for parts upon which serious stress is imposed. In the case of air screws, cotton fabric is impregnated with phenol formaldehyde resin, and it is not a little surprising that two such dissimilar materials—one pliable and extensible, the other extremely brittle—should combine to produce one having an ultimate tensile strength of 14,000 lb. per sq. in. with a proportionality limit of 2,000 lb. per sq. in. Owing to the rapid disintegration of the material after this last figure has been reached, Messrs. Aero Research, Ltd., of Duxford, Cambridge, have undertaken an investigation into the possibility of raising its value. In this interesting commercial research it was established that the properties of the combination depended upon the proportion of fabric present and upon the degree to which the fabric is initially in tension and the resin in compression. A tensile load can be applied with safety up to the point at which the initial compression in the resin is eliminated, after which Hooke's law ceases to apply and creep, due to failure of resin and fabric to hold together, begins. Experiments showed that the stress at which departure from Hooke's law occurs is that at which the resin was hardened, and therefore as most commercially obtainable materials are treated at a pressure of one ton per square inch they begin to show creep at about 2,000 lb. per sq. in. Working from this basis, improved methods of manufacture have been devised, and by suitable proportions of fabric and resin, combined under the right conditions, a material having a proportionality limit of 6,500 lb. per sq. in. has been obtained, at, of course, the expense of reduced ultimate strength.