Research Items

Anthropology of Carpathian Ruthenia.—A study of the racial characters of the Ruthenian inhabitants of the upland valleys of the Carpathians has been made by Prof. V. Suk, of which a preliminary report has been published (No. 150, *Pub. Fac. Sci. Univ. Masaryk*). The native Sclavonic population lives in long narrow villages which often extend for several miles along the deep valleys of the mountains. They fall into two groups, between which there are considerable cultural differences. They speak the same language but with dialectical variation. The Huculs, the eastern group, have dark hair, eyes, and skin, and are of tall stature, averaging five feet eight to nine inches, many men reaching six feet. The head is brachycephalic (av. index 84). Dinaric faces are not rare; but these have green-blue or dark blue eyes. Other members of this population have features approaching the Alpine; but the average complexion is darker than is usual in 'alpine' countries. On the whole, they are healthy. Tuberculosis is rare; but goitre is common. The western group, known by different names locally, is much poorer and of lower status. The skin is lighter than in the east and at times shows a yellowish tinge. The eyes are brown, green-brown, and blue, the latter usually with brown hair of the lighter shades. The stature is lower and the Dinaric face is absent, but faces of Laplander type are common. There is also a number of indeterminate types, some of which approach the 'alpine' type, though with lighter complexions. The people are much less healthy than the Huculs. Tuberculosis is common, in some villages rising so high as forty per cent among the children. Adults without goitre are rarely seen.

Ancient Jewelry from Yasin. — Sir Aurel Stein figures and describes in the *Indian Antiquary* for June a collection of ancient jewelry from the once cultivated tract of the Dasht-i-Tana in the Hindu Kush valley of Yasin in the Gilgit Agency. The find was made by villagers while digging up a small mound, and no particulars of the circumstances are available. As most of the objects were of gold, it is probable that 'specimens' only were given up. Comparison with objects cleared from burial deposits in 1913 suggests a similar provenance. Of the Yasin objects, two provide more definite chronological evidence than those found elsewhere. Of these two objects, one is a small bronze figure of a Bhodisattva $3\frac{3}{4}$ inches high and $2\frac{1}{2}$ inches broad at the base. The figure is seated and the right hand is held, palm outwards, at the level of the knee, while the left holds some indistinguishable object. The metal is too corroded to allow details of features or dress to be made out; but around the neck is an ornamental band or chain and the folds of the drapery are disposed in the Græco-Buddhist style of Gandhāra. The lotus seat is of a style which persists in Buddhist sculpture from the early centuries of our era down to a late period. This little figure may be an import from outside, as is certainly the second object, an intaglio set in the bezel of a fine gold ring. It is cut in an onyx-like stone, much crackled by exposure to great heat. It represents a helmeted male head which is of a late Hellenistic or Roman style of workmanship. Similar intaglios from Khotan and other parts of Chinese Turkestan have been dated at second-third century A.D. The number of such seal stones found in Central Asia and north-west India suggests that they were a frequent article of import from the west.

Birds of Guatemala.—The bird-life of this limited area, lying between two distinct zoogeographical regions, the nearctic and the neotropical, is wonderfully rich in racial forms. The American Museum of Natural History possesses collections of birds made there by Austin Paul Smith and A. W. Anthony, excelled only by the Salvin-Godman collection in the British Museum, and these collections have been reported upon by Ludlow Griscom in a monograph of 439 pages (*Bull. Amer. Mus. Nat. Hist.*, vol. 64, 1932). The wealth of the bird-life of the area is traceable to a number of factors, of which the chief are the antiquity of the country and its position between the two zoogeographical regions of the New World. To the first is due the survival of some elements of a once rich pre-glacial avifauna; to the second the influx of fresh contingents of birds from the north during the Pleistocene period, and of southern tropical elements during post-glacial time. These various elements in the bird-life have been so modified by time, in association with diverse topography, much local isolation, and half a dozen different climates, as to produce the 736 species and subspecies recorded in this monograph. The author, refusing to commit himself, leaves the reader to decide whether the compelling factors in this evolution were the latent potencies in the germ plasm or the stresses of time and change of environment, but he reminds us that the outcome of systematic and zoogeographical studies has been to show that, granted variation is limited by the latent potencies in the germ plasm, such potencies are of no value with the great majority of birds unless subjected to environmental stresses. Where environmental stresses are many and diverse, there is extraordinary diversity in the bird fauna, as in Guatemala or in Colombia or Ecuador; where environmental stresses are few or too severe, there is a relatively uniform and poverty-stricken bird fauna, as in New England, which is just recovering from the glacial epoch.

Free-living Nematodes of the Belgian Coast.—This, the first account of the free-living nematodes of the Belgian coast, is based on the collections in the Natural History Museum in Brussels and on material collected by dredge or net from twelve stations. The authors (J. H. S. Stekhoven, jr., and W. Adam, in *Mém. Mus Roy. d'Hist. Nat. de Belgique*, No. 49; 1931) direct particular attention to the material from the surface of *Alcyonium* and from oyster beds. The colonies of *Alcyonium* dredged at two of the stations were covered with a rather thick layer of fibrous substance (probably the mucus coagulated on fixation), on the inner surface of which nematodes were present in large numbers and in almost identical proportions in both cases. Oyster beds are favourable for those nematodes which are detritus feeders, and a ship's hull with its rich fauna of hydroids afforded excellent conditions for an opulent nematode fauna. Twenty-six genera, including twenty-seven species, eight of which are new, are recorded. The geographical distribution of each species is stated, and notes on the characters, including the Cobb formula, are given for most of them. While these nematodes are essentially marine, some of the species are capable of penetrating into waters of lower salinity.

Mosaic Disease of the Bean.—"Investigations in the Mosaic Disease of Bean (*Phaseolus vulgaris* L)", by Ray Nelson (*Michigan State College Tech. Bull.*, No. 118; 1932), gives the results of very extensive studies

into the behaviour of the virus diseases of the runner bean. The malady known as mosaic has a world-wide distribution, and is one of the few viruses which are transmitted through the seed. Many aspects of the problem have been studied, but great efforts were directed towards cultivating the virus or finding a causal parasite. A coccoid body was isolated from diseased tissue and appeared to have a close association with mosaic, but would not reproduce this disease when inoculated on to healthy plants. Rugose mosaic, a virus disease distinct from ordinary mosaic, has also been studied.

Geology of South-Eastern Manitoba.—*Memoir* 169 of the Geological Survey of Canada, by J. F. Wright (1932, pp. 150 and map), is devoted to the geology and mineral deposits of the area between the south end of Lake Winnipeg and the Lake of the Woods, just east of the junction of the Canadian Shield with the Great Plains. Apart from Quaternary deposits and the nearly horizontal early Palæozoic strata which overlap the crystalline complex of the Shield, the rocks are of ancient Pre-Cambrian age, and consist (*a*) of an assemblage of sedimentary and volcanic strata and their metamorphic equivalents intruded upon by (*b*) a widespread series of igneous rocks ranging from peridotite to granite. The supercrustal assemblage is known as the Rice Lake Series, and is divisible into the Manigotagan phase of sedimentation (fine-grained arenaceous and argillaceous deposits); the Beresford Lake phase of volcanic conditions (basalt, andesite, dacite, and rhyolite, now largely altered to green-schists, with greywackes, chert, and iron-bearing formations); and the Wanipigow phase of renewed sedimentation (greywacke, arkose, quartzite, and slate). The series is typical of geosynclinal conditions and is lithologically similar to the Couchiching and Keewatin. The deep-seated intrusives include peridotite and gabbro, associated with nickel-copper sulphides, and both are known to be earlier than the granodiorites and granites. The end phases of granite invasion are represented by microcline- and albite-pegmatites. Tin and lithium deposits occur with the latter, and one of the albite-pegmatites contains uraninite, which H. V. Ellsworth finds to have a lead-ratio of 0·260 to 0·265 (*Amer. Min.*, 1931, p. 569). This is the oldest mineral yet known, and it is of interest that the conglomerates of the Rice Lake Series contain pebbles of a still older granite.

Cavities in the New Jersey Traps.—The crysta cavities in the Triassic trap rocks of the New Jersey zeolite region have long excited the interest of mineralogists. A detailed study of the phenomena has been made by W. T. Schaller (*Bull.* 832, U.S. Geological Survey, 1932, pp. 90). The cavities occur in an altered basalt that as lava flowed into pre-existing lakes occupying depressed areas in which glauberite and other saline minerals had accumulated. Where the lava poured over dry Triassic shale it contains no cavities. The mineral history is as follows: (1) Solidification of basalt; (2) formation of anhydrite and glauberite derived from the lake waters; (3) formation of quartz, albite, etc., replacing the lava; (4) solution of glauberite leaving *rhombic cavities*, precipitation of prehnite, datolite, pectolite, etc., and solution of anhydrite leaving *rectangular cavities*; (5) zeolite formation from lime and soda supplied by the solution of the saline minerals; (6) deposition of calcite and changing of remaining anhydrite to gypsum and thaumasite. In addition to the two main types of cavities mentioned above, there are also lamellar types representing anhydrite and possibly calcite and babingtonite, and a miscellaneous series after apophyllite, quartz, calcite, natrolite, pectolite, and other minerals. Although no glauberite now remains in the region, the rhombic cavities sometimes contain pseudomorphs in quartz the measured forms of which prove to be identical with those of glauberite.

Rainfall of Sumatra.—Dr. J. Boerema has published detailed monthly and annual maps of the rainfall of Java and Madura (*K. Mag. Met. Obs. Batavia*, Verhand. 14, vol. 2). Similar information is now available for Sumatra (Verhand. 24, vol. 2). The figures relating to rainfall are derived from observations extending over at least five of the fifty years 1879–1928. In a few instances they refer to the whole fifty years. Anyone making use of these statistics should bear in mind the great difficulty of securing accurate and comparable figures from a large number of voluntary observers, and should also note that figures based on periods of varying length are not strictly intercomparable, even if free from error, owing to differences in the general character of the weather in the different periods—the 'errors of sampling' of mathematical statistics. In spite of these difficulties, the material is obviously of great economic importance, besides being a big contribution to climatology. Sumatra is famous for its luxuriant vegetation. Except on the higher mountains, the mean temperature of every month is high, and bearing this fact in mind, an inspection of the rainfall statistics provides a sufficient explanation of this luxuriance. It is significant that on the map of annual rainfall no tint is provided to represent a rainfall anywhere near so low as London's 600 odd millimetres. On a part of the mountain chain that lies not far from Padang, on the west coast, the annual total is shown as more than 7000 mm. (23 ft.), and there is an almost equally wet region towards the north end of the island. If more detailed information is required, the reader must refer to Verhand. No. 24, vol. 1, which contains tables of rainfall relating to 3293 stations in the Netherlands Indies, for the period 1879–1928 or a portion of that period. This volume includes the data for Sumatra.

Thermal Expansion of Bismuth.—An investigation of the thermal expansion of a bismuth single crystal has been made by A. Goetz and R. C. Hergenrother (*Phys. Rev.*, June 1), which is of importance in bringing out the difference between the macroscopic and microscopic properties of solids. The expansion was measured by two methods. The first, which has been carried out several times for this substance, was similar to the standard macroscopic work of Roberts. The second consisted in examining the temperature shift of an X-ray beam, when reflected from the (111) plane in a modified Siegbahn apparatus, and tells how the crystal lattice changes in size with change in temperature. The results of the latter determinations show that an empirical relation, due to Grüneisen, which states that expansion coefficient and specific heat bear a constant ratio to one another, was accurately satisfied up to almost the melting point, whereas a departure from this, outside the range of experimental error, occurs if the macroscopic expansion coefficients are used. The interpretation of the discrepancy, based on the assumption that there is an amorphous component in the crystal as well as the component with a regular lattice, is that the relative amount of the former increases with increase in temperature, but little, if any, obvious advance has even now been made towards the outstanding problem of why a pure substance melts sharply.

Stellar Structure.—A review of the recent work of the constitution of the stars was given by Prof. E. A.

Milne in a lecture on "Some Aspects of Stellar Structure", delivered before a joint meeting of the University of Durham Philosophical Society and the Newcastle-upon-Tyne Astronomical Society on March 4, an abstract of which has just been published (*Proc. Univ. Durham Phil. Soc.*, vol. 9, pt. 1). The lecture gives a descriptive account of the properties of the 'two phase' stellar model and the conclusions to be drawn from them. This model consists of a degenerate spherical core, approximately isothermal, surrounded by a gaseous envelope of constant opacity. The essential variables taken are L/M, the ratio of the luminosity of the configuration to its mass, and r_1/r_2, the ratio of the core radius to that of the whole configuration. The relations between these two variables, as worked out mathematically, are exhibited as a series of curves connecting L/M with r_1/r_2 for each constant M. The curves show that for certain values of L/M and constant M there are two distinct configurations possible, corresponding generally with the phenomenon of the rearranged 'Russell diagram'. Certain of the curves of high mass show a position where dL/dr_1 is infinite. This is the limiting position giving a maximum L for that particular mass. It is shown that at this point the core radius is indefinite and pulsations are likely to occur, suggesting an explanation of the cepheid variables, which thus appear only in certain classes of configurations. The curves also exhibit the possibility of discontinuous changes. During one of these the core radius increases cataclysmically and the external radius decreases cataclysmically, with the consequent evolution of energy. The phenomena resemble those of a nova outburst. The curves of low mass and certain portions of those of high mass yield an approximately linear relation between L/M and M for corresponding configurations. They also throw light upon the giantism of some stars, the dense characters of the nuclei of planetary nebulæ, and the general relationship of dense stars to non-dense stars. The complete mathematical investigation has since appeared in *Mon. Not. R.A.S.*, vol. 92, No. 7.

Oxidations with Selenium Dioxide.—Riley, Morley, and Friend (*J. Chem. Soc.*, June) show that selenium dioxide is capable of oxidising acetone to methylglyoxal and acetophenone to phenylglyoxal on heating, the selenium dioxide being reduced to selenium. Similar reactions giving other derivatives of glyoxal were carried out. A methylene group adjacent to the carbonyl group of an aldehyde is readily oxidised to carbonyl by selenium dioxide and the preparation of glyoxal from acetaldehyde according to the reaction

$$CH_3CHO + SeO_2 = (CHO)_2 + H_2O + Se$$

may be caused to proceed almost quantitatively. In some cases the reaction may be carried out by passing the vapour of the substance over selenium dioxide in a heated tube. The reactions show that selenium dioxide has a specific oxidising action on aldehydes and ketones of various types, whereby 1 : 2 diketones and aldoketones are conveniently obtained in quantity, compounds which contain a methylene group activated by proximity to a negative group being specifically oxidised at reasonably low temperatures.

Astronomical Topics

A New Algol-Variable in Andromeda.—*Astr. Nach.* 5877 contains a paper on this star by its discoverer, Herr K. Lassovszky. He found it on a plate that he took at Neubabelsberg on April 27, 1931; its position for the equinox of 1855 is $23^h\ 42^m\ 18^s$, N. Decl. 44° 58·4′, and its designation 381, 1931 Andromeda. He took a series of plates on fifteen nights between July 23 and Aug. 21, 1931, to study the light curve; the period is $0{\cdot}79365^d$ or about 19 hours. The magnitude is 11·26 at maximum, and falls to 11·87 at minimum; the duration of eclipse is $0{\cdot}160^d$; the light-curve appears pointed at minimum, showing that the eclipses are not annular, as in that case the curve is flat at minimum. The observations do not show any trace of a secondary minimum, such as occurs in Algol; it may be concluded that the eclipsing star is much fainter than the other. The star is less than 2° distant from "Selected Area No. 43"; Herr Lassovszky utilised this fact to obtain the magnitudes of his comparison stars by comparing them with stars in that well-surveyed region. It reflects credit on a single observer to have both discovered the star's variability and deduced an accurate light-curve in the course of a year.

Astronomical Notes for August.—Mercury is well placed as a morning star at the end of the month, being in elongation on Sept. 3. Venus is conspicuous as a morning star, being at its greatest brilliance on Aug. 5. Jupiter and Neptune are both near the sun; the former is in conjunction on Aug. 26; it will be about 5° from the eclipsed sun on Aug. 31. Neptune will be less than a degree from the eclipsed sun, and may be recorded on some of the coronal plates. A small partial eclipse at sunset will be visible from parts of Galway and Mayo and the islands of Skye and Lewis. Prof. S. Chapman has pointed out that the British Isles are within the region in which effects of the eclipse on wireless transmission may be looked for. Saturn passed opposition on July 24, and is therefore visible for most of the night; but its south declination of 20° makes observation difficult. Uranus is approaching opposition, and may be observed after midnight.

There will be an occultation of the Pleiades on the morning of Aug. 24; disappearances of three stars at the bright limb occur at $1^h\ 20^m$, $1^h\ 41^m$, $1^h\ 50^m$; the times and angles of reappearance of five stars at the dark limb are $2^h\ 6^m$, 198°; $2^h\ 25^m$, 242°; $2^h\ 44^m$, 272°; $3^h\ 1^m$, 227°; $3^h\ 10^m$, 276°. The angles are reckoned from north through east and south.

The Perseid meteors should be looked for about Aug. 10, especially after midnight, as Perseus is then higher; the moon sets at $10^h\ 30^m$ p.m. on Aug. 10.

Newman's comet may be observed with moderate telescopes; the following ephemeris for 0^h is from *Harvard Card* 229:

	R.A.	N. Decl.
Aug. 1	$14^h\ 51^m\ 42^s$	26° 5′
5	14 51 7	27 2
9	14 51 6	27 54
13	14 51 38	28 42
17	14 52 41	29 28
21	14 54 14	30 11
25	14 56 16	30 53
29	14 58 46	31 34

The comet has been observed to throw off nebulous objects; its neighbourhood should therefore be examined.

A minimum of Algol occurs at $0^h\ 5^m$ on Aug. 7.

Add one hour to all times to reduce to Summer Time.