Research Items

Burial of a Bari Rain-maker. The burial of a rain-chief in the Bari country, Mongalla Province, Sudan, is described by Mr. A. C. Barton in *Sudan Notes and Records*, vol. 15, pt. 1. The rain-maker's last illness took place during a drought, and, as was ascertained by the performance of a special rite, had been caused by a more powerful rain-maker, who attributed to him the failure of his own efforts to bring rain. The grave was of a special type reserved for rain-makers, chiefs and influential freemen. It lay from east to west, and from the west, descent to the bottom of the excavation was by two steps cut in the earth. The interment chamber proper was cut laterally and frontally into the north and east sides of the excavation. The funeral ceremonies began with secret rites, to which only the close kin were admitted, in the house, which was closed immediately after death. These rites included the shaving and anointing of the corpse, the hair being placed in a calabash to be disposed of later in the bush. At the graveside, women who had not been present inside the house again anointed the body over its clothes, and the sons after anointing the back of the corpse down to the waist, again over its clothes, with ground and burnt semen returned to the house, observing a grass taboo, in walking, where they remained until earth had been thrown into the grave. A small son of a serf had been chosen as a serf of the dead, and when the corpse had been laid to rest in the chamber as on a bed, this boy remained by the corpse until it opened in final decay, when he came out of the grave and proclaimed the chief really dead. Large slabs of stone, sacking, etc., blocked the entrance of the cavity, so that no earth could fall on the chief, and above the grave were placed carved grave stakes, of which one had two prongs, a 'male' and a 'female', while the smaller is the 'sentinel'. These were brought from the father's grave and will remain on the chief's grave until required for his son's burial. A mourning feast and dance follow the burial.

The Malabar House. In commenting on a ballad of Kerala in the *Indian Antiquary* for November, Dr. M. D. Raghavan appends some notes on the Malabar house, which is highly conventionalised in plan and clearly has retained its main features unchanged for a very long period of time. The most characteristic dwelling-house of Kerala is called *nâlu-pura*, literally 'four-houses', being built round the four sides of a courtyard which is open to the sky, each room being named relatively to its situation with regard to the courtyard, that is, southern room, northern room or the three western rooms. Every house, however small, is regarded conventionally as a *nâlu-pura*, and hence a house of the smaller type, though facing east, is called *paḍiññârra pura*, that being the western block consisting of three rooms with a verandah in front. Usually behind the central room of the western block there is a small room called the 'lean-to'; and beside the inner verandah is an outer verandah with a long ridged roof on a beam supported by high pillars. The central of the three western rooms is the principal room of the house, containing the valuables and sacred to all household ceremonies. The main entrance is through a portico which serves the purpose of a drawing-room. Each house stands in a compound of its own, which is thickly planted with trees, and is enclosed by a massive bank of earth. A broad smooth walk, well rammed and plastered with cowdung, leads to the courtyard, of which the surface has been treated in the same way. The courtyard is used for drying paddy, pepper, etc., in the sun. It serves as a threshing floor, as the recreation-ground of younger members of the family, as an exercise ground in the use of arms, and as a place for ceremonial and social functions.

Facial Growth in Children. "Facial Growth in Children", by Corisande Smyth and Matthew Young (Medical Research Council. Special Report Series, No. 171), gives the results of a study of twenty characters of the face in 1,400 London children. The primary object of the investigation was to establish standards of normality. Measurements were made of some 1,200 selected children aged 8–14 years in the London County Council schools, 100 boys aged 9–10 years taken at random from a group of boys of the same age, and 100 children aged 2–5 years attending a welfare clinic. No measurements were made of children aged 5–8 years. This study confirms the findings of John Hunter, Tomes and Bolk that the dental arch does not increase in length after complete eruption of the milk teeth, but Smyth and Young find there is a definite increase in breadth of the dental arches after four years of age. As regards inter-relationships of the facial measurements, the most interesting result is the high association between the zygomatic breadth and breadth of the dental arches, an association denied by Korkhaus and other observers. There appears to be some tendency for a narrow face to be associated with a high palate but not necessarily with a narrow dental arch. Although all the results are based on selected children, that is, on those in whom normal occlusion has occurred, Smyth and Young consider they may be taken as fairly representative of London school children because of the close agreement found in the results for two groups of boys aged 9–10 years, one group selected because of normal occlusion, the other taken at random from the London schools.

Influence of Living-Space upon Growth. In the course of two years, experiments, fifteen in number, have been carried out by Dr. Jan Podhradsky with the object of deciding whether the size and shape of the living-space influenced in any way the growth and development of tadpoles of *Rana fusca* (*Bull. de l'Instit. Nat. Agron. Brno*, CSR., Sign. C. 20, 1931). It was found that size of living-space had a bearing on growth and development so that they followed their normal course only within certain limits of space, above and below which growth was depressed. In a small living-space the adverse factor appeared to be mutual disturbance amongst the tadpoles; in a large living-space the isolation of individuals seemed to be largely responsible. Shape of living-space also had a measurable influence: narrow and high vessels depressed growth because they enforced and exaggerated vertical movements on the part of the tadpoles and caused greater reciprocal disturbance, as well as allowing only a low absorption of oxygen at the surface. These effects were intensified

with the growth of the tadpoles. It was found also that abnormally low water depressed growth and development, and this relation was thought to be due to the unusual accumulation of excretory products and the fouling of food.

Age and Growth of Limpets. N. Abe (*Science Reports*, Tôhuku Imp. Univ., vol. 7, No. 3, 1932) has shown that colonies of *Acmæa dorsuosa* formed in spring and summer break up in autumn and winter but the individuals do not migrate more than 5–6 metres and hence are subject to the same environmental conditions every year. He has measured the individuals of such colonies and also other examples in which the shell clearly shows the annual rings. In limpets which live in wet places the growth-rate is greater, the thickening of the shell is slower and the height of the shell is relatively less than in those from a drier locality. The ratio of breadth to length of the shell is practically constant in individuals more than three years old. The weight of the shell is greater than that of the body (soft parts) in the proportion of 1 : 0·8. The frequency distribution of age in the colonies is asymmetrical; individuals of four years of age are most numerous. Specimens older than twelve years are few and it would appear that the maximum age of this limpet is about seventeen years.

Style-Sac of Gastropods. R. V. Seshaiya (*Rec. Indian Mus.*, vol. 34, pt. 2, 1932) notes that a crystalline style and style-sac have been recorded in ten families of prosobranch gastropods, and he now records them in two more families—Cerithiidæ and Assimineidæ. He refers to Randles' description (1902) of the posterior chamber of the stomach of *Turritella* in which the presence of a single fleshy fold and a crescentic groove is recorded, the groove being considered to be a vestigial cæcum and a very primitive feature. The author's examination of the stomachs of *Turritella* and of several other style-bearing gastropods does not support this view. The groove and the adjoining ridges or folds are functional structures and serve to accommodate the gastric shield and to direct the gastric contents towards the style.

Nutritive Value of Pastures. The fact that pastures which appear very similar may differ widely in nutritive value (stock-carrying and fattening capacity) has long remained without a satisfactory explanation, and an investigation of the problem has been made by E. J. Sheehy (*Sci. Proc. Roy. Dub. Soc.*, vol. 20). So far as the chemical composition of the dry matter of the organic portion of the herbage is concerned, no consistent difference was observed between good, mediocre and poor pastures in the same neighbourhood, and although a slight inferiority in the phosphate content of the inorganic portion did occur in the poorer herbage, the disparity was not large enough to account for its reduced feeding value. Further, the chemical composition of the dry matter of fiorin grass and plantain grown on soils carrying pastures of very different value, remained unaffected. The digestibility of such different types of pasture plants as perennial rye grass, Yorkshire fog and plantain were also found to be very much alike, so that differences in nutritive value could not be explained on this score either. The factor which proved to indicate the value of the pasture, however, was the percentage of dry matter, and in consequence the density of the sward is an important feature. The latter is largely determined by the botanical personnel, the narrow-leaved grasses yielding a higher dry weight per unit area than broad leaved plants such as weeds. Clovers occupy an intermediate position. Fattening capacity is, therefore, definitely related to the dry matter content and density of the herbage, but stock-carrying capacity is also affected by the rate of growth, as upon this property the provision of abundant feed depends.

Identification of Indian Sleeper Woods. In *Forest Bulletin* No. 77 (Economy Series, of the Forest Research Institute, Dehra Dun, 1932) Mr. K. A. Chowdhury, wood technologist, has produced a most useful little guide to enable forest officers, railway passing officers and others to identify on the spot some of the more common Indian sleeper woods. This bulletin is the first of its kind. Capt. Trotter in a preface says that it is hoped to publish similar bulletins from time to time dealing with timbers of individual provinces, that is to deal with timbers according to localities rather than uses. In the present case that method of treatment would not have been so useful, as the map appended to the bulletin well illustrates. This map "shows the various species of sleeper woods that grow in the areas in which different railway groups are concerned". These groups are five in number, namely, Northern, Central and Terai, Eastern, Southern and Burma. The map serves two purposes—the first and most obvious, the species which can be obtained from a given locality, and the second and the more striking, it can help in identification, as a species may easily be eliminated which does not occur in a particular locality. A few simple details on wood structure and so forth lead up to the key for the identification of more than fifty species of important Indian sleeper woods. This key is drawn up in the simplest fashion and appears to be easily workable, but as the author states, "quick and accurate identification of timbers can only be achieved after much practice". A sharp knife and a hand lens magnifying 10–12 times are all that are required to assist the key. Incidentally, the bulletin serves once again to show the importance to India as a whole of the research work being carried out at Dehra Dun in connexion with the enormously valuable Indian forest estate.

Spectroscopic Detection of Small Quantities of Elements. The *Wiener Berichte* IIb 141 contains a paper by W. Späth on the detection of very small quantities of elements by the spectroscope. Droplets of solutions were evaporated on silver or copper electrodes and the spectra were excited by condensed spark or by a break-contact arc, according to whether spark or arc lines are the more persistent in a particular case. The preparation of very pure silver electrodes was a long and troublesome matter, and the methods finally adopted are described in considerable detail. 10^{-10} gm. of cadmium was the smallest quantity which could be detected, using the arc line 2288 A. and the spark line 2265 A. In experiments with other metals, 10^{-10} gm. manganese, 10^{-7} gm. arsenic, 10^{-7} gm. tellurium, 10^{-9} gm. lithium and 10^{-11} gm. strontium could be detected. The limit is apparently set by the presence of a continuous background in the spectra which masks very faint lines, and it is suggested that a spectrograph with higher dispersion combined with high light gathering power would enable yet smaller masses to be detected.

Low Temperature Carbonisation of Coal. In accordance with the policy adopted by the Government some years ago, the Department of Scientific and Industrial Research has examined the Turner plant for the low temperature carbonisation of coal installed at the Comac Oil Co. Ltd., Coalburn, Lanarkshire. The report on the test issued by the Department (H.M. Stationery Office, 9*d*. net) shows that the retort is of the continuous vertical type, internally heated by superheated steam. A peculiarity is the use of a fluctuating pressure claimed to facilitate transfer of heat from the steam to the coke. From 1 ton of coal were obtained 13·4 cwt. of coke, found to be a good domestic fuel, 21·3 gallons of tar and spirit, 2,170 cub. ft. of gas of total heating value 18·7 therms, and 334 gallons of liquor of no value, although as an effluent it must be regarded as a distinct liability. The alternations of pressure are regarded as a necessary feature of this process, but tests made with the plant adjusted to give steady and fluctuating steam pressures to the retort gave substantially the same results.

Dewaxing and Acid Refining Mineral Oils. At a Congress of Polish Petroleum Technologists two years ago, the De Laval *S–N* method of dewaxing was for the first time made public. The data then were based principally on tests with Polish oils from Schodnica and Urycz. Tests were being carried out on a small plant, but since that time a larger centrifugal separator has been employed successfully, and it has been possible to treat pipe-still distillates in addition to those produced by other methods. An account of this process was given by Dr. Nils Olof Backlund on December 13 at the Institution of Petroleum Technologists. Among interesting points made was the substitution of trichlorethylene as a more suitable solvent for separating the wax from the oil than the time-honoured benzene. Rate and degree of cooling of the oil-solvent mixture are of the utmost importance to the process. The advantages of the De Laval *S–N* trichlorethylene method compared with the benzene method include a smaller quantity of solvent used, a shorter period of cooling and the possibility of working at higher temperatures. Particulars were also given regarding acid treatment of petroleum products, and it was concluded that this process had not reached an entirely satisfactory stage. Fundamentally, acid treatment still remains a 'discontinuous process', and suffers from the disadvantages thereof when compared with efficiency of distillation, dewaxing and cracking in continuous plants. The author pointed out directions in which modernisation of acid-refining is desirable and gave an account of the De Laval *S–N* acid sludge separator, which represents a definite advance on anything so far designed. The main importance of this process, however, would seem to be in the field of lubricating oil refining, where it is destined to effect considerable economy in production costs.

Astronomical Topics

Astronomical Notes for January. Mercury can be observed as a morning star early in the month; Venus is also a morning star, but far from the earth, and approaching superior conjunction; its disc is almost fully illuminated. Mars is approaching opposition, and is visible for most of the night; this is an aphelion opposition; the diameter on March 3 will be just under 14″. Jupiter also reaches opposition in March, and will be near Mars for some months. Saturn is in conjunction with the sun in January; Uranus is still observable in the evening. Neptune is well placed for observation in the middle of Leo.

A star of mag. 5·6 is occulted by the moon on Jan. 9, disappearing at 8.28 P.M. κ Geminorum (mag. 3·6) disappears at 10.50 P.M. on Jan. 11, reappearing at 11.24, angle 221°; the moon is full on that day.

The following are the positions of Comet Dodwell-Forbes at the beginning of Jan. 14 and 24, according to the Whipple-Cunningham orbit:

Jan. 14 R.A. $0^h38^m34^s$ S.Decl. 4° 52′; Jan. 24 R.A. $1^h15^m4^s$ N.Decl. 4° 43′.

Comets Faye and Geddes may also be seen with moderate telescopes; there are ephemerides in the B.A.A. Handbook for 1933.

There are minima of Algol at convenient times for observation on Jan. 8 at 7.54 P.M. and on Jan. 28 at 9.42 P.M.; a full table is given in B.A.A. Handbook.

Mass of Eros. Soon after the announcement by W. H. van den Bos and W. S. Finsen that Eros appeared like a figure-of-eight in the 26½ in. Johannesburg refractor in January 1931, Prof. W. H. Pickering derived the mass of Eros on certain assumptions as to its figure. Dr. Knut Lundmark has made a further investigation based on the same material (*Lund. Obs. Circ.*, No. 7). The diameter of Eros was taken as 23·4 km., and it was supposed to consist of two spheres in contact, each having a radius of 5·85 km.; the reciprocal of the mass in terms of the earth is 259,900,000. This gives a density only a quarter of that of the earth. If the distance of centres is increased to 18·6 km., the density becomes equal to that of the earth.

Comets of A.D. 868 and 1366. It was established by Dr. Hind that the second of these comets is in all probability identical with Tempel's Comet, 1866 I, associated with the Leonid meteors; Hind thought that the comet of 868 might also be identical with it. The *Japanese Astronomical Herald* for October, 1932, contains a re-investigation of the orbits of these two comets, by Dr. S. Kanda, based on the original observations; for the first comet he used observations made in Japan, Europe, and Korea; for the second he does not appear to have found any further observations than hose used by Dr. Hind, and the new orbit is quite close to that of Hind.

T	868 March 4	1366 Oct. 18·54 U.T.
ω	277°	164·8°
Ω	305	218·5
i	65	149·8
q	0·42	0·9749
e	1·00	0·9059
Period	—	33·35 years (assumed)
Equinox	868·0	1366·0

It may be concluded that the first comet is not identical with Tempel, but that the second probably is identical. This identity had been assumed by the Computing Section of the British Astronomical Association in investigating the perturbations of the comet from 1366 until 1932. Search ephemerides are given in the B.A.A. Handbooks for 1932 and 1933.