

## Research Items.

PSYCHO-ANALYSIS AND MOTHER-RIGHT.—In *Psyche* for January, Dr. B. Malinowski concludes his examination of the applicability of the Freudian theory of the Œdipus complex to a society organised on a matrilineal basis. In his previous contribution to this subject (*Psyche*, April 1924) it was shown that whereas under the *patria potestas* the conflict is concerned with father and mother, in the matrilineal family of the Trobrianders, it affects the sister and the mother's brother. Turning now to the question of disease and perversion, it appears that among the Trobrianders, where sexual desires are allowed a natural outlet at an early age, perversions and neurotic affections are comparatively rare, while in the Amphletts, where sexual license is repressed, they occur with frequency. The evidence of dreams, distinguishing "free dreams" from "official dreams" of a divinatory or magical character, points to repressed desire in the direction of the sister. This form of incest is regarded with such horror that at first sight it might appear never to occur, but careful investigation has revealed that it does exist. Both obscenity and myth bear this out. Abuse by attribution of mother and sister incest, though both actions are abhorrent to the Trobriand mind, in the degree of resentment it arouses indicates that there is a real temptation to break the strong taboo against the sister. In the same way, throughout the myths of the Trobrianders there runs a strong matrilineal complex; in the tales of origin, no father appears, and when a male member of the family is mentioned in such a manner as to indicate a conflict of some kind, it is the maternal uncle.

THE PROBLEM OF ARISTOTLE.—Prof. Burnet's British Academy "Master-mind" Lecture ("Aristotle," Oxford University Press, 1s.) is of more than usual interest, not only to classical and philosophical students but also to men of science. Aristotle's real greatness, Prof. Burnet tells us, was as a biologist. The most important formative period of his life was the middle period, the years when he was lecturing at Assos and afterwards when he removed to Mytilene in Lesbos, where he made his careful observations and studies of marine forms of life. Prof. Burnet refers to the recent important work of Prof. Werner Jaeger of Berlin ("Aristoteles, Grundlegung einer Geschichte seiner Entwicklung"). The conclusions of this book are in accord with Prof. Burnet's own independent studies of the problem, though he differs from the author on some points of minor importance. The curious problem about Aristotle is that scarcely any of the works we possess, and none of the important ones, were published in his lifetime or intended for publication, or in a form in which he would have acknowledged them or consented to their publication. Yet it seems certain that they represent his mature views in a way which his published works did not. They are his written lecture notes, and they have been preserved by a strange accident, while his own published works, by which alone he was known in the first two centuries after his death, are lost. What Prof. Burnet brings out with exceptional clearness is that the contrast between Plato and Aristotle and the latter's criticism of the former's doctrine of forms is explained by the fact that, while Plato was exclusively interested in mathematics, Aristotle's attention was directed towards biology.

TERTIARY MAN IN ENGLAND.—A review of the evidence bearing upon the question of tertiary man in Britain by Mr. J. Reid Moir, appears in vol. xxiv., No. 6 of *Natural History* (American Museum of Natural History). The vast geological age of the

Kentian eoliths finds support in East Anglia. There the White Coralline Crag, which is definitely earlier than the Red Crag, was laid down in a warm period, the deposition of the Red Crag beginning with the irruption of arctic waters. The Red Crag detritus contains material of different periods due to denudation, including eoliths of Kentian type, much rolled and abraded, and later forms of which the rostracinate is the outstanding implement. The Red, and Norwich Crag, and their underlying detritus bed, represent the first glacial deposit in East Anglia. The Foxhall implements belong to the Crag itself and are clearly later than the detritus bed implements, as is shown in the variation in patination when, as in several cases, the former has been made out of the latter; but implements of the same kind as are found at Foxhall occur at Thorington Hall *beneath* the Crag, where man evidently lived on a surface of London clay instead of Crag. The Cromer implements are to be regarded as Early Chellean, a classification supported by the fauna. In an appended note in the same publication, Sir E. Ray Lankester questions the use of the term "quaternary" to describe the strata later than pliocene, on the ground that they are adequately described as tertiary, as there is no separation of later deposit from pliocene as there is of tertiary from secondary and secondary from primary. The term pliocene should be applied to the White Coralline Crag on the ground of its Molluscan fauna in many respects identical with that of deposits distinguished by the marine "Pliocene"; while the Red Crag should be assigned to the Pleistocene, it being recognised that the shells, bones, and teeth of cetaceans and terrestrial mammals in the Suffolk Bone Bed, which were assigned by Lyell and his followers to the Red Crag, and its sea are derived from earlier strata and are not contemporary with the Red Crag.

THE PLEISTOCENE VERTEBRATE FAUNA OF NORTH AMERICA.—The Carnegie Institution of Washington has published (October 1924) an account, by Dr. O. P. Hay, of the pleistocene vertebrate palæontology of the region west of the Mississippi, a continuation of a previous account which dealt with the regions east and north of the river. The volume deals with the discovery of various groups of mammals, each group being taken separately, and the places where species of the group have been found are detailed in order for each province. More than a quarter of the account concerns the places where Proboscidea have been found, mastodons and, in particular, *Elephas boreas*, *E. columbi*, and *E. imperator*. Other groups detailed are the Xenarthra, horses, tapirs, peccaries, camels, deer, bison, and beavers. Twenty-nine maps illustrate the positions where material has been found, and an index, which is very complete, gives reference both to the animals and their localities. The work will be very useful for reference by any one studying the Pleistocene of North America as well as for purposes of comparison with the corresponding faunas of the Old World in questions of migration and distribution.

CARBONIFEROUS ROCKS IN CENTRAL JAPAN.—A recent issue of the Scientific Reports of the Tôhoku Imperial University at Sendai (vol. viii., No. 1) contains an important paper by Ichirô Haysaka "On the fauna of the Anthracolithic Limestone of Ômimura in the western part of Echigo." The paper has had a chequered career; originally written in 1920, the MS. was destroyed in the Tokyo fire that followed the earthquake of September 1, 1923, and

the whole work has been courageously rewritten since. The locality considered lies on the northern side of the Central Island, almost due north-west of Tokyo. The formations represented by the thick mass of almost vertical limestone, about 2 km. in thickness, there developed probably include the Permian down to the Tournaisian. The fossil fauna comprises Foraminifera (including, of course, the well-known Fusulina), corals, Brachiopoda, Bryozoa, a crinoid, and a very few mollusca. Altogether, 41 species are recorded, but only four are regarded as new, while several are indeterminate. Representative specimens receive illustration on six plates of that standard of excellence which we have come to associate with Japanese productions, whilst there is, further, a map of the district giving the geological details. The author points out that the Lower Carboniferous formation of marine origin is almost absent from continental Eastern Asia—China, Korea and Manchuria—although it seems to be recognised in the province of Yun-nan, and has been reported from Central Asia. What was the relation between the Lower Carboniferous waters of Central Asia and of the eastern border land is, as he remarks, a very interesting question.

CHROMOSOMES OF WHEAT HYBRIDS.—Mr. A. E. Watkins (*Journ. of Genetics*, vol. 14, No. 2) has made an important investigation of the chromosome behaviour in certain hybrid wheats. From earlier work of Sakamura, Kihara, Sax and others, the wheats are known to fall into three groups having chromosome numbers which are different multiples of 7. An intensive study was made of the chromosome distribution in the pollen mother cells of  $F_2$  and  $F_3$  plants derived from crossing Rivet wheat (*Triticum turgidum* var.  $2n=28$ ) with varieties of *T. vulgare* ( $2n=42$ ). The  $F_1$  plants have 35 chromosomes, and two plants from later generations were especially studied, one having 31 chromosomes ( $14 \times 2 + 3$ ) and the other 38 ( $=17 \times 2 + 4$ ). The history of the unpaired chromosomes is followed and the mathematical probability of the various types of pollen grains which will be formed, based on random distribution, is worked out. From these observations and those of Kihara, it is found that plants with less than 35 chromosomes never have more than 14 bivalents, and in plants with more than 35 chromosomes the sum of the number of bivalents and univalents is always 21. One tentative explanation offered is that in these hybrid plants only pollen grains with 14 or 21 chromosomes function. There is evidence from other plants that the unpaired chromosomes are frequently or usually lost.

THE CARBON BLACK INDUSTRY.—A few years ago the carbon black industry of the United States was one of the minor "side-lines" of natural gas production, and some peculiar state legislation very nearly killed it altogether, especially in Louisiana. A new demand for this commodity, however, has arisen and has influenced operations to such an extent that the output for 1923 (during which year 138,262,648 pounds were produced) represented an increase of 104 per cent. over that obtained in the previous year. The cause of this remarkable spurt is the demand by the rubber companies manufacturing pneumatic tyres for motor vehicles; carbon black is thus employed with considerable advantage both to manufacturer and to user. Mr. G. B. Richardson, in *Mineral Resources of the United States, 1923*, part 2, gives figures to show that the average yield per thousand cubic feet of gas is 1.3 pounds of carbon black, and the estimated quantity of gas used for the purpose in 1923 was 109,096,000 thousand cubic

feet. Louisiana, the most important producer in America, was responsible for practically 75 per cent. of the total amount, West Virginia and Kentucky yielding the next largest outputs. It is interesting to note, however, that during the latter part of 1923 a state of over-production of this substance was reached, and as this corresponds with a period of great activity in the pneumatic tyre industry, we may gauge to some extent the possible economic limit to the manufacture of carbon black for this purpose and to the expansion of the industry. The price of carbon black at the plant averages about 8.5 cents per pound.

PHYSICAL CONSTANTS OF ICE.—The specific heats and latent heats of fusion of ice have recently been determined by O. Maass and L. J. Waldbauer (*J. Amer. Chem. Soc.*, Jan. 1925). The method used enabled measurements to be carried out at low temperatures. The specific heat of ice, determined at ten-degree intervals from  $-180^\circ$  to  $0^\circ$ , was found to be accurately represented by the equation:  $c = 0.485 + 0.000914t - 0.00000546t^2$ ; the latent heat of fusion is 79.42 cal. per gram. The specific and latent heats of some organic liquids were also determined; the results indicate that atomic heat is a highly constitutive property when the specific heat of a compound varies greatly with the temperature.

THE SUN AND ATMOSPHERIC ELECTRICITY.—In the March and December 1924 issues of *Terrestrial Magnetism and Atmospheric Electricity*, Dr. Louis A. Bauer has collected together and discussed the observations on atmospheric electricity made on undisturbed days during the past seven sunspot periods. He concludes that the atmospheric potential gradient and its daily and seasonal variations, and the air-earth electric current, are influenced by sunspots. As a rule the gradient and the ranges of its daily and seasonal variations are increased about 30 per cent. by the change from minimum to maximum sunspot frequency, but there have been periods in which they have decreased, and in these periods terrestrial magnetic activity has also decreased. The gradient and the ranges of its variation are greatest near the equinoxes and least near the solstices.

GUN WIRE.—The system of wire-winding of guns first proposed in 1855 was introduced about 1890 with the object of effecting a distribution of the firing stresses in a more uniform way than could be attained by shrinkage alone. The steels employed usually contained from 0.6 to 0.7 per cent. of carbon, and British gun wire is in the form of a tape or ribbon 0.25 in. wide by 0.06-0.04 in. thick with rounded edges. The steel is severely cold-worked, and exhibits a comparatively low elastic limit in spite of its high tensile strength, but it has long been recognised that this condition of imperfect elasticity in the wire under tension can be removed by a low temperature heat treatment. We have received from the Research Department, Woolwich, R.D. Report No. 60 entitled "Gun Wire. The Effect of Low Temperature Heat Treatment on the Properties of Cold-Strained Steel and Its Behaviour under Stress at Raised Temperatures." The work described was undertaken with the object of providing a material which would maintain a condition of constant stress with constant strain at a given temperature whatever the variation (within certain limits) of strain and temperature to which it was subjected in use. The author, Dr. Greaves, as a result of his investigations, concludes that if it is required to ensure a constant tension in the wire at atmospheric temperature, in

spite of considerable variation in the temperatures to which it may be subjected in use, the wire must be heat-treated at a temperature not below  $200^{\circ}$  C. The lower limit of the temperature of preliminary treatment (in excess of  $200^{\circ}$  C.) is fixed by the fact that it must be above any temperature to which the wire is likely to be subjected in use. On the other hand, the upper limit of temperature of treatment is governed by the tension which is to be maintained. The higher the tension the less must the temperature of the treatment exceed  $200^{\circ}$  C. The report contains data from which the relation between stress, temperature, and preliminary treatment of the wire can be determined.

**A VECTOR-TROLLEY APPARATUS.**—Anything that makes the principles of mechanics more obvious to the student is sure of a hearty welcome from all teachers of the subject in schools and at universities. Considerable interest, therefore, attaches to the "Vector-trolley" apparatus designed by Mr. E. J. Atkinson, of the Harrow County School, and exhibited recently at the annual meeting of the Mathematical Association, and at the Royal Institution. The method is based upon the principle of the well-known problem in mechanics, where two masses, one

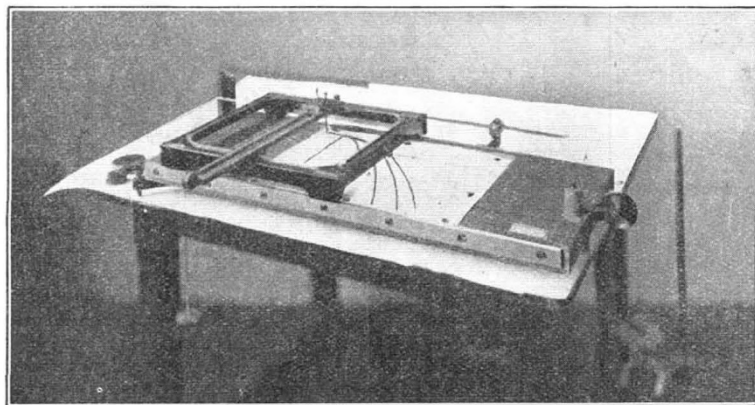


FIG. 1.—The Atkinson vector-trolley.

moving on a horizontal table and the other falling vertically, are joined by a string passing over a fixed pulley. The motion is one of uniform acceleration, even if friction and the mass of the pulley are taken into account. If in this way motion is given to the mass on the table, and the hanging mass is disconnected from it, then, assuming smooth running, the mass on the table can be taken to move with constant speed for some considerable time. The application of this principle by Mr. Atkinson is made clear by means of the accompanying illustration (Fig. 1), from which it is seen that two such accelerated or uniform motions in different directions are communicated to a registering instrument simultaneously. The angle between the two motions can be adjusted at will. Propositions like the parallelogram of velocities and of accelerations, the relationship  $P = mf$ , parabolic motion of the projectile, the theory of relative motion, can all be illustrated simply and convincingly. Mr. Atkinson's method is very straightforward. The mechanism is easily understood, and both the teacher and the student should find the use of such a mechanism of considerable value. The apparatus is being manufactured by Messrs. Cussons, Ltd., of Manchester.

**FORGING TEMPERATURE OF STEELS.**—It is well known that, in the case of steel, forging is most effective at a certain favourable temperature which

is neither too high nor too low. This is called the forging temperature. As yet no method has been discovered for measuring the forgeability of a metal. Prof. Kotaro Honda has addressed himself to this problem, and in the eighty-first report from the Research Institute for Iron and Steel and other Metals, Sendai, entitled "On the Forging Temperatures of Steels," he concludes that forgeability can be adequately measured by the elongation obtained in a testing machine. He gives reasons for considering that the mechanism of the elongation due to longitudinal tension and lateral compression must be the same, and finds that, in the case of carbon steels, the elongation temperature curve has generally two maxima and two minima. The temperatures of the maxima are at  $760^{\circ}$  and  $1200^{\circ}$  C., this latter being the temperature most favourable for forging. The temperatures of the minima are at about  $900^{\circ}$  and  $300^{\circ}$ . Hence in the process of forging low carbon steels, every precaution must be taken against a fall of temperature to  $900^{\circ}$ , where the elongation is at a minimum. In the case of medium carbon steels this minimum is inconspicuous, so that the cooling of the specimen is not so critical. The investigation of a high speed tool steel containing 18 per cent. of tungsten showed that the elongation temperature curve has maxima at  $800^{\circ}$  and  $1100^{\circ}$  and a minimum at  $950^{\circ}$ . The maximum at  $1100^{\circ}$  is very sharp, and hence in high speed tool steels the temperature range favourable to forging is very limited.

**ACTIVITY NUMBERS OF HYDROCHLORIC ACID.**—The activity coefficients and transport numbers of hydrochloric acid solutions in ethyl alcohol are described in two papers by H. S. Harned and M. E. Fleysner, published in the Journal of the American Chemical Society for January 1925. The activity coefficient and activity of the acid are about one hundred times greater in alcoholic than in aqueous solutions. The cation transport number, determined by measuring the E.M.F. of the concentration cell  $\text{Ag}/\text{AgCl}/\text{HCl}(c_1)/\text{HCl}(c_2)/\text{AgCl}/\text{Ag}$ , was found to be 0.654 for 0.1N, and 0.610 for N solutions. These figures are in agreement with the results of Lapworth and Partington (1911). Measurements were also carried out in aqueous alcoholic solutions of the acid.

**MICROSCOPE LAMPS.**—Several novel and useful types of microscope lamps and illuminating apparatus, suitable for routine work, for micro-projection, and for dark ground and critical illumination, are described in a catalogue recently issued by Messrs. Ogilvy and Co. from their new address at 20 Mortimer Street, London, W.1. Included amongst these is the Hartridge-Williams axial illuminator. This consists of an electric lamp of suitable design enclosed in a ventilated chamber, which can be fitted to any pattern of microscope. The illuminator when fitted forms an integral part of the microscope, occupying the usual place of the mirror. By its use, errors due to polarisation or double reflection from a mirror are avoided and a light source, invariable in position, shape and character, is obtained. No external lamp or bull's eye is required, and adjustments once made are not affected by inclining the microscope or moving it about. The illuminator is fitted with an iris diaphragm which limits the area of light on the specimen to the field of the eyepiece.