

Research Items

Chastity in Bechuanaland. Changes in the attitude of the Southern Bantu to premarital chastity and pregnancy and their cause are discussed by Dr. I. Shapera in *Africa*, vol. 6, No. 1, in the light of investigations among the BaKxatla of the Sotho-Tswana cluster in Bechuanaland Protectorate. As among other tribes of the group, the essential element in marriage is the transfer of cattle from the family of the bridegroom to that of the bride, known under the name of *boxadi*. According to traditional practice, strict chastity used to be required of both sexes before they entered the initiation classes, and any boy who was known to have transgressed was liable to be killed while under instruction and in any event was regarded as having disgraced his family and tribe; while a girl who became pregnant had to submit to a variety of humiliations, as well as mockery from other girls, this last being the most serious deterrent of all. The child was either aborted or killed at birth. On completion of initiation, the girl was usually married at once, while the boys were drafted into regiments, and as they were permitted to marry only girls from an age-class junior to their own, marriage was postponed for some years, during which period they had access to the younger wives of other members of their family—usually of the father's younger brother. The changed attitude of the present day, characterised by looseness of morals and a much milder attitude towards the unmarried mother, is due to a variety of causes, among which are mentioned the abolition of the initiation classes at the instance of the Church, freer intercourse between the sexes before and after adolescence, the greater license of the youths awaiting admission to the regiments, the freedom in sexual matters acquired by the men while away in European employment and the preponderance in the number of women owing to the fact that many males do not return to the tribe when they once leave.

Census of Nigeria. The reports and detailed figures of the 1931 census of Nigeria have now been published in six volumes ("Census of Nigeria 1931." 1932-33. London: Crown Agents for the Colonies.) In spite of severe curtailments in field work on the score of economy, the census reveals much of interest in problems of race distribution and changes in Nigeria. In vol. I the results as a whole are discussed by Mr. S. M. Jacob. In the Northern Provinces, intensive counts were made in many villages throughout the area. For the rest, the figures were obtained by compilation from village lists, but on the whole are considered to have an error of not more than five per cent, and so low as one per cent in the intensive data. In the Southern Provinces, outside Lagos, there was no actual count and the figures are based on a computation derived from the number of taxable males. The margin of error is thought to be ten to twenty per cent. In Lagos, where a count was made, the error may be so high as ten per cent. The total figures for Nigeria, 19,928,000, show a seven per cent increase on those for 1921 but the 1921 figures cannot be regarded as accurate. Certain tribes appear to be increasing in number, Kanuri, Fulani, and Tuareg in the north, and Yoruba in the south, but Nupe in the north and several of the forest tribes of the Cameroons are infertile and tending to disappear. An extensive census of the

southern provinces seems to be a desirable measure. A noteworthy feature is the remarkable drop in the death rate of Lagos for both native and European.

Census of Wapiti Deer in Wyoming. A co-operative count of wapiti, universally known as 'elk' in North America, was shared during the winter of 1931-32 by the U.S. Biological Survey, the Forest Service, and the Wyoming State Game Commission. Ground work was supplemented by use of an aeroplane, and the count is regarded as the most thorough yet made. It revealed the presence of 7,921 individuals on the four feeding grounds maintained by the Biological Survey, 679 on two State feeding grounds, and 11,255 spread out over the adjacent region, including national forest areas, and easily counted from the air because of a background of snow (Report of the Bureau of Biological Survey for year ended June 30, 1932). The total of 19,855 in the herd compares with 19,238 counted five years before, so that the herd appears to be maintained in almost stationary numbers.

Rodents of the Semipalatinsk District of Kazakstan. A paper on these rodents by B. A. Kuznetsov (*Bull. Soc. Nat. Moscou*, 41, Nos. 1-2) results from an expedition to investigate the fur trade of this part of Siberia and to study the mammalian fauna of the area, the latter only being discussed here. The distribution of the species of wild animals is shown for the various districts, some of which have mountains under perpetual snow, while others are mostly steppe. The zonality of vegetation is not necessarily accompanied by one in the distribution of local species, high mountain and steppe forms of animals often being found together. The bulk of the work is devoted to interesting systematic and biological notes on the rodents of the area. The author asserts that some forms, such as the alpine hare (*Lepus timidus*, L.) and the squirrel (*Sciurus vulgaris*, L.) are decreasing in numbers through man's activity, while others such as *Cricetus cricetus*, L. are increasing as a result of cultivation following forest clearing.

Antennal Secretion in Insecta. Although in a few exceptional cases the antennae of adult insects are modified for special uses such as grasping the female, they have hitherto been regarded as entirely sensory in function. In this connexion a number of antennal receptor organs have been described which are believed to respond to various external stimuli and are accordingly said to be either tactile, olfactory or auditory (Johnston's organ). It is therefore of some interest to note the recent discovery by Mr. S. Maulik (*Proc. Zool. Soc. London*, pp. 943-956; 1932) of a new and complicated type of antennal organ which he considers to be secretory in function. The organ occurs in the enlarged eighth antennal segment of the males of certain chrysomelid beetles of the genus *Agetocera*. It consists of an internal chitinised tube which opens by a well-marked external orifice on to a specialised surface. Two types of organ have been distinguished, a long, tapering tube giving off into the surrounding tissue innumerable minute unbranched tubules of identical diameter, and a larger more or less dichotomously branched tube the ramifications of which

penetrate the surrounding tissue in tubules of continually decreasing diameter. The ninth segment is also modified in sympathy with the eighth but the connexion between them is unknown. The probable function of this organ is the dispersal of certain products of secretion in relation to some aspect of sex activity at present unknown.

Daffodils, Narcissi and their Hybrids. The classification of garden plants presents many difficulties which do not beset the systematics of wild flowers. The care and selection given by gardeners is responsible for new forms which become very numerous as years go by. Travellers also bring new species or varieties which add greatly to the confusion of classification whilst enriching the beauty of the garden. "A Monograph of *Narcissus*, subgenus *Ajax*", recently published by Mr. H. W. Pugsley (*J. Roy. Hort. Soc.*, 58, pt. 1, 17-93, Feb. 1933) clears up many difficulties connected with the identity of several different types of daffodils. The history of the sub-genus *Ajax* is traced from the sixteenth century, when many varieties were already in cultivation. Two main sections of the sub-genus are now recognised—*Cyclaminopsis* and *Pseudo-narcissus*, and the latter is subdivided into six series:—*Minores*, *Lutei*, *Vulgares*, *Nobiles*, *Albiflori* and *Bicolores*. Twenty-seven species are described with such detail as to be useful to the botanist, the gardener, or the geneticist.

Inheritance of Grain Colour in Oats. Various investigators, beginning with Nilsson-Ehle, have found two factors present for black grain colour in oats. In crosses carried on at the Scottish Plant Breeding Station, Mr. William Robb (*J. Genetics*, vol. 26, No. 2) finds that the varieties Bell, Black Mogul, Black Tartarian and Sir Douglas Haig are homozygous for a single black factor, giving 3:1 ratios in crosses with white varieties. In the varieties Myrtle and Black Mesdag, however, two factors, *B* (black) and *G* (grey), are present, their formula being *B B G G*. *B* is epistatic to *G* and in crosses with white varieties an almost continuous series of grain colours is obtained, indicating a cumulative action of factors similar to that found in wheat. The variety Orion is found to be homozygous also for a third factor *B*, its colour formula being *B B B' B' G G*. The eleven white-grained varieties of oats tested were found to be homozygous recessives with the formula *b b b' b' g g*.

Cyclone Season in the South Indian Ocean. The cyclone season of 1929-30 is discussed by R. A. Watson and N. R. McCurdy in *Miscellaneous Publications of the Royal Alfred Observatory*, No. 12. This is the third publication in this series dealing specially with the cyclones of the western part of the South Indian Ocean, Nos. 7 and 10 covering the periods 1927-28 and 1928-29. The season under review appears to have been a remarkable one in many ways. In December the rainfall in Mauritius was nearly twice the previous highest, several places having the huge total of more than 60 in.—nearly three times the normal fall in London in a whole year. The synoptic weather charts showed numerous depressions which, although of considerable depth, were yet without the vigour of typical tropical cyclones; even among those classified as genuine cyclones, none was notably intense. The storm of September 23-27, 1929, near Chagos Archipelago, was exceptional, first in that it originated less than 5° from the equator, and secondly,

in its being only the second recorded in Mauritius so early as September during the past 119 years. The most intense cyclone gave a wind force of 10 on the Beaufort scale, corresponding with an average speed of about sixty miles an hour, at Reunion on February 2, 1930, and the lowest pressure recorded on the charts (994.6 millibars) occurred on the same day at Reunion. Such a wind speed is not uncommon in deep depressions in the neighbourhood of the British Isles; the pressure scarcely merits the description 'low'; and the event well illustrates the moderate and anomalous character of this cyclone season.

Momentum and Energy in the Special Theory of Relativity. In *Current Science* (1, No. 8, Feb. 1933) Prof. A. C. Banerji, of the University of Allahabad, considers some of the difficulties which arise when an attempt is made to combine the special theory of relativity with the ordinary ideas of momentum and energy. If the invariant masses of two particles are respectively m_1 at *A* and m_2 at *B*, and their relative velocity is v , an observer at *A* will estimate the total momentum of the two particles as $m_2 v (1 - v^2/c^2)^{-\frac{1}{2}}$, whereas the estimate of an observer at *B* will be $-m_1 v (1 - v^2/c^2)^{-\frac{1}{2}}$. Similar discrepancies arise in the estimate of the energy. The attempt to define the position of the centre of mass is subject to a similar difficulty, arising from the variation of the masses with their velocities, but also an additional difficulty arises from the ambiguity in the estimation of the relative distance.

Internal Conversion of γ -Rays. An account of the work of Mott, Taylor and Hulme on the internal conversion of γ -rays has recently appeared in these notes (*NATURE*, 131, 99, Jan. 21, 1933). According to their results, the values of the conversion coefficient plotted against the frequency lie on one or other of two smooth curves according to whether the nuclear radiation is of dipole or quadripole type. The internal conversion data may thus be used for classifying nuclear transitions into two groups. In a paper by Ellis and Mott (*Proc. Roy. Soc.*, Feb.) the transitions of the thorium B and C bodies are studied from this point of view. According to a theory proposed by Gamow and largely verified by Ellis, the loss of an α -particle may leave the nucleus in an excited state which collapses, giving rise to a γ -ray. The number of γ -ray transitions from the excited levels is connected with the number of α -particles in the corresponding emission groups, which have been studied by Rosenblum. Knowing, then, the number of β -rays produced by internal conversion, the internal conversion coefficient may be estimated. The coefficients obtained mostly fit satisfactorily on the two curves. It is found that many of the transitions are of quadripole type and quantum numbers analogous to the azimuthal quantum number l are suggested for the levels.

Polarity of Hydrocarbon Vapours. McAlpine and Smyth (*J. Amer. Chem. Soc.*, Feb.) describe measurements of the dielectric constants of benzene, toluene, propane and propylene, all in the gaseous state. An important result is the absence of any change of polarisation with temperature in the cases of benzene and propane, which indicates that the increase previously observed with rising temperature in the case of liquids is due to decreasing intermolecular action. The zero moment found for the benzene

molecule agrees with its symmetrical structure, and the zero moment for propane is consistent with the absence of moment in the higher members of the series and shows that any polarity in the C-C bonds, electrical dissymmetry caused by repulsion in the molecule or difference in electronegative character between the hydrogens on the primary and secondary carbons, is too small to measure. The small moments found for toluene and propylene are of the same magnitude as those which might arise from inductive effects in the molecules.

Efficiency of Power Stations. In a paper on "Power Station Efficiency" read to the Institution of Electrical Engineers on March 23, Mr. W. S. Burge discussed the processes involved in the generation of electricity from coal and examined the effects produced by 'releasing' the heat at various temperatures. The main factors connected with the efficiency are four. The first shows how it varies with the steam pressure and the vacuum conditions. The second shows whether the maximum efficiencies of the various components forming the plant all occur at the same time or not, and the last two the effects of regenerative feed heating and superheating. The

influence of the present physical limitations of the properties of metals, owing to the high temperatures used in practice, has also to be considered. The advances in the design of turbo-alternators in recent years have been so rapid that machines are now made which run at 3,000 revolutions per minute and have a capacity greater than 100,000 horse power. In the United States, it has been proved that when powdered coal is used, automatic control is more desirable than employing workmen. In one very large installation there, it is the habit of the 'watch' engineer to visit his boiler house only twice during an eight hour shift, although there is no one else in the boiler house. Mr. Burge considers that with no extension of steam conditions beyond about 650 lb. pressure per sq. in. and a temperature of 850° F., there is still wide scope for progress by making the plant item efficiencies have their values more nearly at the same time and thus improving the operating conditions. In his opinion, there is little scope for efficiency gain by using higher steam pressures and temperatures. Concentrated effort based on pressures of about 650 lb. pressure per square inch will produce the quickest and the best returns on the capital expended.

Astronomical Topics

Canals on Mars. An article by H. Boyd Brydon on this subject has recently appeared (*J. Roy. Ast. Soc. Canada*, Feb. 1933). It is in the main a discussion of E. M. Antoniadi's recent volume on Mars, and gives reasons for differing from his conclusion that all the narrow straight markings on the planet are an illusion.

The article quotes the following sentence from G. W. Ritchey describing certain observing sites (including Flagstaff): "The conditions of atmospheric definition and transparency are at least as much superior to those at Mt. Wilson as the latter are to the average conditions at the important observatories of northern Europe and the United States. The overwhelming impressiveness, the incredible tranquillity of the night sky seen at these very high semi-desert sites are beyond all description and imagination."

It is noted that the equivalent focus of the camera used at Flagstaff for Martian photography is 180 ft. Statements are quoted from Dr. Slipher that the photographs confirm the drawings as to the existence of a network of dark linear markings, sensibly uniform and continuous along their length; the photographs include a few double canals, but these are exceedingly difficult objects.

It is pointed out that M. Antoniadi lays undue stress on the fact that some drawings of the canals do not conform strictly to the laws of perspective.

Origin of the Solar System. A note in the *Astronomical Topics* in *NATURE* of November 5, 1932, gave some account of articles by A. C. Gifford on the above subject that appeared in *Scientia* last year. The note suggested that in giving the views of Sir James Jeans as to the age of the planetary system, thousands of millions of years should be substituted for the value millions of millions, stated in his articles. Mr. Gifford now quotes a passage from Sir James Jeans's earlier writings which certainly does suggest

that he then assigned a more remote epoch for the stellar appulse than a few thousands of millions of years ago. Since that passage was written, much work has been done by cosmogonists in endeavouring to determine the age of the earth and the other planets. Their work is based on both astronomical and geological considerations, notably on a study of uranium and the products of its disintegration. The results are summarised by Dr. Harold Jeffreys in his book "The Earth"; the maximum estimate is about twelve thousand million years, the minimum one about a tenth of this. It is evident that Sir James Jeans now accepts these estimates; his article on Cosmogony in the "Encyclopædia Britannica", 14th edition (1929), vol. 6, p. 492, concludes as follows: "Our sun is a member of a colony of some thousands of millions of stars, the galactic stellar system. We do not know much about the number or arrangement of stars in the outlying parts of this system, but only in the dense central regions are stars at all likely to pass close enough to one another to produce planets. And here calculation shows that under present conditions planetary systems are only likely to be produced at the rate of about one in 6,000 million years. Thus our solar system with its age of only a few thousand million years is very possibly the youngest planetary system in the whole colony. Our terrestrial civilization, with only some 6,000 years of existence behind it, is almost certainly the youngest civilization."

Annuaire of the Observatory of the University of Belgrade for 1933. This *Annuaire* is a useful volume for all observatories engaged in meridian work. It gives apparent positions, at ten-day intervals throughout the year, of 240 fundamental stars for which ephemerides are not given in any other publication. There are also tables giving true sidereal time and the reduction from true to mean; the short period terms in the nutation are given for every day. There is also a list of new minor planets.