

Research Items.

An Archaic Egyptian Figurine.—M. G. Loukianoff describes and figures in *Ancient Egypt* for June 1930 a rare type of small figurine of ivory, purchased in Cairo in 1927. The figure is one and a half inches high, almost entirely black and remarkably heavy for its size, weighing 12.6 grains. It represents a seated infant with legs doubled back, and, as may be inferred from the inclination of the right arm, which is broken, and a mark on the lips, sucking its finger. The lips are a little twisted, as owing to the position of the finger in front of the mouth, the artist was unable to fashion them with an unbroken stroke. The left hand lies extended along the knee. The head is crowned by a little cap fitting close to the cranium. From the artistic point of view the minute accuracy of the work is to be remarked; while equally characteristic is the cast of the features, which is not Egyptian, the nose being large and the cheek-bones prominent. The attitude of the figure is that which was traditional for the infant Horus from the early dynasties to the decline of Egyptian civilisation. It is the same as that of the lapis lazuli figurines recently found in the tomb of Tutankamen, in which the Pharaoh is represented as the infant Horus. The motive of the present example is so exactly repeated in the alabaster figurine of Pepy II., found last year at Saqqara, that it would suggest an identity of date, if it were not that there is a still closer resemblance to the ivory statuettes of pre-dynastic date discovered by Petrie at Abydos and Ballas. The type is, indeed, very different from that of the early dynasties—a fact which immediately suggested its attribution to the archaic epoch of Egyptian art. It has been examined by Dr. Reisner, who pronounces it authentic and assigns it to Dynasties 0-2.

A Sea-lion Census.—In 1930 a census of the sea-lions off the coast of California was made, in view of the possibility that recommendations to the legislature might be desirable. It was made at the height of the breeding season, from mid-June to mid-July, and although no census was made in 1929, the figures made an interesting comparison with the censuses of the two previous years (Paul Bonnet, *California Fish and Game*, vol. 17, p. 150; 1931). Of Steller's sea-lion, with twelve rookeries the largest containing 2500 individuals, the grand total in 1930 was 6360, against 4593 in 1928 and 5781 in 1927. The California sea-lion, with eleven rookeries of which the largest had 340 individuals, numbered 968 in 1930, 1338 in 1928, and 892 in 1927. The presence of more Stellers in 1930 than in 1928 is attributed to migrations from the north, where the animals are still hunted under a bounty system; while the decreasing population of the California sea-lion is due to the unrestricted collecting and hunting of the previous two years. The casual shooting by fishermen of sea-lions in the neighbourhood of fishing operations does not seem to lower the population to any great extent, but the slaughter due to professional trimming hunters and to collectors who capture living specimens for zoos and circuses is a serious menace, and has brought about the material reduction and even the abandonment of several of the larger rookeries.

Blepharoceridae of Japan.—This small family of dipterous insects has a very wide distribution, and is remarkable on account of the peculiar morphological characters exhibited in the different post-embryonic stages. The larvæ and pupæ are particularly interesting in that they are aquatic and confined to rapid mountain streams. Until recently, only four species

of the family were known from Japan, but neither their larvæ nor pupæ had been discovered. In *Memoirs of the College of Science*, Kyoto Imperial University (Series B, vol. 6, 1931), Mr. Shirô Kitakami describes the results of his researches on this family. His discoveries have led to the recognition of five genera and eighteen species in Japan. Of these, one genus, *Parablepharocera*, and fourteen species are described as being new, the largest number of species belonging to the genus *Philorus*. In the new genus *Parablepharocera*, the adult is distinguished from *Blepharocera* by the much longer vein Rs, and its larva bears a pair of finger-like processes on each side of the first six abdominal segments, together with a pair of caudal appendages. In *Blepharocera*, it may be added, neither type of organ is evident. In the pupal stage the two genera are scarcely separable from each other. The paper is well illustrated with ten plates of carefully drawn figures portraying structural characters of the different stages of the species described.

Chromosome Homologies in Wheat, Rye, and Aegilops.—In a paper on chromosome homologies in wheat, rye, and *Aegilops*, Prof. W. P. Thompson (*Canadian Jour. Research*, vol. 4, p. 624) summarises in a series of tables the results of crosses among members of these three related genera, as regards chromosome pairing in the hybrids. A number of workers have drawn various conclusions regarding the relationships of species from the way in which the chromosomes pair in their F_1 hybrids. In this way it has been concluded that the einkorn (diploid) wheats have an A set of seven chromosomes, the emmer (tetraploid) $A+B$ and the vulgares $A+B+C$; similarly that *Aegilops cylindrica* has $C+D$ sets and *A. ovata* $D+E$ sets. There are, however, difficulties and inconsistencies in the application of these conceptions of chromosome homology, for the cytological results (pairing) do not always agree with the genetical ones. Thus, rye chromosomes are D as judged by their mating in hybrids with *A. triuncialis*, but the genetic characters are not those associated with D . Again, the morphological differences found within the chromosomes do not correspond with their mating peculiarities. Thus, several of the chromosome types in *T. dicoccum* and *T. polonicum* are not found in *T. vulgare*, although every chromosome in these two species finds a mate in crosses with *vulgare*. It is believed that with further work these anomalies will be cleared up, and that the cytological behaviour will throw further light on evolutionary divergence in these forms.

Gyromagnetic Effect for Salts of the Iron Group.—The small spin which a body acquires when it is magnetised is connected closely with the behaviour of the electrons in the atoms in the magnetic field, and it is theoretically possible to decide in certain cases between theories of the action of the field from the gyromagnetic effect. This has been done for certain ions of chromium, cobalt, and iron by W. Sucksmith, in an investigation of extreme delicacy which is described in the issue of the *Proceedings of the Royal Society* for September. The salts used have an even smaller susceptibility than dysprosium oxide, the only non-ferromagnetic body which had been studied hitherto, and the angular momenta generated were correspondingly more difficult to measure. The method employed was again that in which a resonant angular movement was set up in an alternating field. The results show that of the various theories which

have been advanced, that which supposes the angular momenta of the effective electrons due to their intrinsic spins and their orbital motions to be separately quantised relative to the field axis is the most nearly correct, and further, that the orbital moments may be wholly or partially suppressed by the fields of neighbouring ions. Measurements were also made upon manganese ions, but in this case the conflicting theories all predicted the same result, which was actually obtained.

Reflection of X-Rays.—Some results of much interest in connexion with long X-rays are contained in three papers from Prof. T. H. Laby's laboratory, which appear in the September number of the *Proceedings of the Royal Society*. The first of these, by R. T. W. Bingham, contains a description of the construction and use of a compact vacuum spectrometer; this is of the Seeman single slit type, and was specially designed to give a high intensity of radiation at the photographic plate, together with accurate angular measurements. In the second paper, Mr. Bingham and Prof. Laby describe some investigations on the reflection and diffraction of soft X-rays. They find that these are reflected from surfaces of glass, quartz, and stainless steel at angles very much greater than the critical angle that would be expected theoretically. This fact increases considerably the range of angles for which gratings can be used with this radiation, and has been employed in some new determinations of relative wavelengths. It also permits of focusing of long radiation by a spherical mirror at large angles of incidence. The last paper, by Mr. Mohr, deals with certain details of the total reflection of long X-rays. Within the limits of experimental error, agreement was found between the observed and calculated values of the critical angle, and for the rate of fall of intensity near the

critical angle, for the light substances quartz, calcite, and glass, but not for the denser bodies steel, silver, and gold, it being found that increasingly large discrepancies occur with increasing density of the reflector.

Inertia of Loud-Speaker Vibrating Diaphragm.—In addition to the theoretical difficulties of treating the many variable factors involved in loud-speaker design, there are also numerous experimental difficulties concerned in the laboratory measurement of the quantities. Following a treatment (*Phil. Mag.*, 11, 1-54) of the theory and performance of certain types of modern acoustic apparatus for reproducing speech and music, Dr. N. W. McLachlan has now given an account (*Phil. Mag.*, 11, 1137-1152) of five methods, each necessitating the measurement of the inductance of a coil situated in a magnetic field, of measuring the accession to inertia of a vibrating diaphragm driven by the reaction between the magnetic field and that of the alternating current in the coil. Three measurements of the inductance are made respectively with the coil fixed, free to move in air of known density and free to move *in vacuo*. In the free condition the value of the inductance depends on the effective mass of the moving system. When vacuum equipment is not available, the necessary conditions for the third measurement can be simulated by removing the diaphragm from the moving coil. Experimental arrangements and precautions necessary to attain accuracy are discussed in detail, and the importance of ensuring that the diaphragm move as a whole is emphasised. The results obtained for a conical diaphragm are in good agreement with those computed from Rayleigh's formula for a rigid disc. It is shown that with a limited size of baffle the accession to inertia decreases with frequency.

Astronomical Topics.

An Interesting New Minor Planet.—On the average three new minor planets are discovered every week, so such announcements are received with equanimity. But when the new object has an unusual rate of motion the case is a little different, for it implies either proximity to the earth or that the body lies on the outer fringe of the asteroid region. *Circular No. 465* of the Berlin Rechen-Institut announces that a new planet designated 1931 RA was found by Herr Reinmuth at Königstuhl, which had the remarkably slow motion of -20^{sec} per day in R.A., and $1'$ south in declination; this is slower than the usual rate of the Trojan planets when near opposition, as the new planet was. The motion was verified by another observation two days later. The slow motion may arise either from great distance or from the linear velocity of the planet being nearly the same as that of the earth. In either case the body is deserving of careful observation, so the positions are given as a guide to observers:

	U.T.	R.A.	N. Decl.	Mag.
1931. Sept. 74	23 ^h 49 ^m 1 ^s	23 ^h 38 ^m 9 ^s	6° 34'	13.7
9	21 59.5	23 38.2	6 32	

The second observation was a visual one, made by M. Müндler. The observation of minor planets is one of the principal lines of work at Königstuhl; the earliest image of Pluto that has yet been identified was found on a plate exposed there on Jan. 23, 1914.

Van Gent's Short Period Variable.—Reference has been made in this column to the variable discovered by Mr. H. van Gent in R.A. $8^{\text{h}} 10^{\text{m}} 6^{\text{s}}$, S. Decl. $18^{\circ} 45'$, with a period of 100 minutes. It was noted that

photographic study of the light changes was difficult, owing to the considerable variation during the time of exposure. Mr. Harold L. Alden contributes a paper on the star to *Astr. Jour.* No. 958: the star can be photographed at maximum with 2 minutes' exposure with the Yale 26-inch refractor at Johannesburg. Fifteen plates were taken on 11 nights, giving 56 exposures of the variable. The light range is from 14.05 to 15.12. The light-curve shows an extremely rapid fall after maximum (about 1 magnitude in 7 minutes). The curve is then nearly horizontal for about 40 minutes; the increase of light is fairly uniform for the remaining 53 minutes. In Cepheid variables the increase of light is usually more rapid than the decrease, so that this star differs notably from them.

A New Cluster of Faint Nebulae.—Quite a number of clusters of faint spiral nebulae have been detected in recent years. *Astr. Nach.* No. 5815 contains an account by Dr. W. Baade of a new one that he detected on plates taken with the large reflector at Bergedorf Observatory, Hamburg. Its position for the equinox of 1925.0 is R.A. $10^{\text{h}} 54^{\text{m}} 7^{\text{s}}$, N. Decl. $57^{\circ} 11'$, about half a degree from the star Beta Ursae Majoris. It extends over a region some $24'$ by $17'$; the southern part of the region is filled by a densely packed cluster of very faint nebulae (probably fainter than mag. 17). They are on the limit of visibility, and no structure can be detected. Dr Baade concludes that the nebulae are considerably more distant than those of the other cluster, also in Ursa Major, that he announced a few years ago.