Research Items.

THE STATUE OF SOPHOCLES IN THE LATERAN MUSEUM.—The chief glory of the Lateran Museum is the great statue usually supposed to be that of the poet Sophocles. This identification is disputed by Mr. Theodore Reinach (Journal of the Hellenic Society, vol. xlii. Part 1), who, after a full discussion of the evidence, identifies it with the famous statue of Solon of Salamis, dating about 391 B.C., the work of the artist Kephisodotus, whose son and pupil seems to have been Praxiteles. This new work by a great master thus stands out as the herald of a new dawn of art, the real link between the divine Phidias and the divine Praxiteles.

EXCAVATIONS AT THE SITE OF BETHSHEAN.—The town of Bethshean, afterwards, for some unexplained reason, known as Scythopolis, lay between the Little Hermon and Gilboa ranges, on a plain about three miles west of the Jordan. Permission to excavate the site by the University Museum, Philadelphia, having been granted by the Archæological Department of Palestine, the work was started in 1921 under the superintendence of Mr. C. S. Fisher. Fortunately no Mahomedan tombs or other buildings on the mound interfere with the work of excavation. The stratification shows a continuous occupation of the site from Arab, Byzantine, and Classical times down to the early Semitic period. The results of the excavations, so far as they have proceeded, are described in the March issue of the *Museum Journal*. The most important discovery made is that of a large basalt stele with an Egyptian inscription of Sety I. (1313–1292 B.C.). When the lowest stratum is reached it is hoped that much light will be thrown on early Semitic life and religion.

BANTU THROWING-STONES AND BRASS.—In the Report of the South African Museum for 1921, Dr. Péringuey discusses some large rounded stones, perforated in the manner of the Bush *Kwe*, and weighing about 18 lb. He does not think that they could have been used to weight digging-sticks or as rolling mill-stones. With them were some stones, also perforated, but rather flat, with a sharp edge. These, it is said, were carried on a stick by the Bantu, and used for throwing at the legs of bucks. This explains the use of some heavy brass rings found in Swaziland, and the question arises whether the brass was made in that country or was imported. The Chief Regent of Swaziland says that the former was the case, and adds: "The process of separating was by melting the minerals and certain chemicals known to our ancient blacksmiths and founders. In the making of brass and other metals, copper, lead, and zinc were used for the manufacture of bangles, etc., which were worn only by Royalties. The bangle in this form is known as Itusi; it is the form in which brass is kept, instead of making it into bars as the Europeans do." Specimens in the museum show that the Bantu had also a bronze industry, but the rarity of such objects is rather remarkable, and Dr. Péringuey suggests as the reason the very early supersession of bronze by iron in South Africa.

PHYSICAL NATURE OF VERSE.—A recent number of the *Wiener Medizinische Wochenschrift* reports a lecture at the University of Vienna by Prof. E. W. Scripture, of London and Hamburg, on recent researches in experimental phonetics. Speech is registered by physical means on a recording drum, and the resulting curves are analysed and measured under a microscope. One of the latest problems is that of the physical nature of verse. Verse is shown to be a continuous vocal gesture. There are no syllables, no feet, no measures, no possibility of such notions as iambus or trochee. The entire system of metre as taught in modern prosody is held to be a fantastic construction that has not the slightest relation to verse as actually spoken. Any attempt to fit it to verse or fit verse to it results in such monstrosities as some of the present corrections to the text of Shakespeare, with apologies for the bad verse he is supposed to have written. Verse, from a physical point of view, is shown to be a flow of speech energy with regularly recurring regions of greater density. The total of this energy can be treated as if condensed at certain points—centroids or centres of gravity. These centroids recur at regular intervals and give the effect of beats. This regular recurrence of centroids constitutes the whole of the system of verse. Another topic presented was the recent work on registering speech in nervous diseases. Three diseases—epilepsy, disseminated sclerosis, and general paralysis—show specific peculiarities in the records. A diagnosis thus becomes an automatic thing; the speech is registered, the curves are analysed and measured, and the result appears of itself.

THE SITE AND GROWTH OF LONDON.—The relation of topography and underlying structure to the growth of London are traced in some detail by Mr. C. E. M. Bromehead in a paper in the *Geographical Journal* for August. After describing the extent of alluvial and river gravels and the course of the Thames tributaries in the area now covered by London, Mr. Bromehead points out that the narrowness of the river and the approach by gravel banks from either side marked the present site of London Bridge as the lowest ford. Around this, especially on the better situated northern bank, the original London grew. The essentials of the site, in addition to the ford, were twin hills capped by water-bearing gravels separated by the valley of the Wall Brook, bounded on the west by the Fleet and on the east by the low ground of the Thames marshes. To the north was the forest area of the London clay, but the river gravels were comparatively bare. The early Roman camp, which was the earliest historic London, was on the east hill; on the west hill the brick earth was worked until the city grew over it. Mr. Bromehead traces the growth of London through Saxon times and up to the Great Fire in 1666. After that event London rapidly expanded. The limit of the gravels for a long time set a limit to building operations. Wells sunk through the gravel, seldom more than 25 ft. in thickness, were sure to tap water, but it was not realised till recent times that better supplies could be obtained beneath the clay at depths of 150 ft. and more. It was for this reason that the areas of bare London clay remained unoccupied until the advent of steam pumping and iron water mains. Once these difficulties of water supply were overcome, the clay areas were rapidly built over and outlying hamlets became linked up with London.

MEDIAN PROLIFICATION OF FLOWERS OF HEMEROCALLIS.—We learn from Dr. J. C. Costerus, of Hilversum, Holland, that he has observed numerous central floral prolifications in *Hemerocallis fulva* in gardens at Hilversum, in the botanic gardens at Amsterdam and Utrecht, and also at Twickenham in this country, during the past summer. Apparently the prolification resembled closely a "doubled" flower. Median prolification of flowers of Hemerocallis, although apparently rare, has been noted on several occasions and is referred to in "Vegetable Teratology," by the late Dr. Maxwell T. Masters. While it is difficult to suggest a reason for the phenomenon with any degree of certainty, it is probable that the condition may have been more prevalent than usual this year owing to the prolonged drought of 1921 and the early months of 1922, placing a check upon normal development, followed by a rush of vigorous growth brought about by the wet summer months. A check to growth followed by a sudden change to first-rate growing conditions often brings about fasciation, and the median prolification of flowers of Hemerocallis may be regarded in a rather similar light to fasciation.

LIFE-HISTORY OF THE NEUROPTEROUS INSECT ITHONE.—In the Bulletin of Entomological Research, vol. xiii. pt. 2, August 1922, Dr. R. J. Tillyard gives a very detailed account of the biology of *Ithone fusca*, an Australian moth-lacewing. It appears that the complete life-history occupies two years, and the eggs are laid in soft or sandy ground, each being rolled separately in the sand, which adheres to its sticky surface, forming a protective covering. The larvæ are very different from those of other Neuroptera Plannipennia, being curved and more or less scarabæiform in their general features. There appear to be at least five instars instead of the usual three or four present in other members of the sub-order. The cocoon is spun from the anal end of the body, and the pupa is armed with large jaws for cutting a way out for the emergence of the imago. The larval food appears to be mainly scarabæid grubs, and Dr. Tillyard is so impressed with the value of Ithone in reducing the numbers of these organisms, that he has decided to test its capabilities as an aid to agriculture in New Zealand. Some 7000 fertile eggs of *Ithone fusca* have been introduced, and it remains to be seen whether the larvæ will succeed in establishing themselves under the new conditions, and serve as a help towards controlling the "grass-grubs." The latter are serious pests with but few natural enemies in New Zealand.

THE MAGNIFICENT SPIDER (*Dicrostichus magnificus*, Rainbow).—In the Proceedings of the Royal Society of Queensland (vol. xxxiii. 1921, pp. 91-98, pls. 7 and 8) Mr. H. A. Longman gives an interesting account of this very large and handsome spider. It appears that the creature constructs egg-cocoons of a more or less elongate-fusiform shape, each being suspended by a pedicel attached to a bush. Their total length measures from three to four inches with a maximum diameter of about one inch. The cocoon is double, one cocoon lying within the other, and between them is a loose packing of delicate silk. Within the inner cocoon are the eggs, which number more than 600, and, taking five cocoons as an average, each spider lays about 3000 eggs. After hatching, the young spiders climb up the surrounding leaves and spin fine threads. On the latter they are floated, or ballooned, through the air to start life on their own account. The author gives a detailed account of how this remarkable cocoon is spun by the parent, which, although skilful in this art, had neither the capacity nor inclination to mend a rent in it when it was torn by a cricket-like insect. The spider constructs no web for ensnaring prey, but shortly after sunset it hangs suspended from a horizontal line near its cocoons. From this slender bridge it spins a short filament which hangs downwards and terminates in a globule of viscid matter a little larger than the head of an ordinary pin. The filament is held out by one of the front legs, and, on the approach of an insect, the spider whirls it with surprising speed; this is undoubtedly the way in which it secures its prey. Mr. Longman has repeatedly found the spider sucking a common species of Noctuid moth which it captures in this manner.

IMPROVED RIVER DISCHARGE MEASUREMENTS.—In the measurement of river discharge special difficulties are encountered in the case of sluggish streams such as the Blue Nile at Soba during low water. In a report on "Investigations into the Improvement of River Discharge Measurement," Pt. II. (Government Press, Cairo), Mr. E. B. H. Wade gives the result of his experiments with an improved current meter for streams of this type. It is a helical current meter in which the helix is driven not by the stream but by an independent constant power. The effect of the stream is merely to increase or diminish the rate of the helix by an amount which serves as a measure of the stream's velocity. An instrument on these lines is being constructed by Messrs. Kent and Co. The distinctive feature of the model is that gear is dispensed with, and instead of a weight with one or two kilogrammes falling about thirty centimetres, a weight of 25 to 50 grammes falls a distance of one metre. The good results of this model are said to be due, in large measure, to the directness of its action and the avoidance of dissipation of energy in gear work. Experiments made with instruments of this type gave satisfactory results. The probable error for a single determination was found to be $\pm 0\cdot 03$ second, but Mr. Wade believes that this will be reduced in the perfected instrument.

TURBULENCE ON A LARGE SCALE.—To say that a gas has viscosity, is a device to compensate in the bulk for the motions which are ignored in detail. Thus if the ignored motions are those within only a cubic tenth of a millimetre the viscosity, for air, is roughly $0\cdot 0002$ cm.$^{-1}$ grm. sec.$^{-1}$. If, however, we ignore the gusts in a wind, then we must attribute to the smoothed wind a much greater viscosity, ranging, in the same unit, from 1 to 100. In this way the increase and veer of the mean wind in the first kilometre above ground have been explained by Åkerblom, Taylor, Hesselberg, Sverdrup, Schmidt, etc. Recently Albert Defant of Innsbruck has gone a stage further by asking what the viscosity must be if we ignore even the cyclones and anticyclones, so that we are left with a smooth general circulation of the atmosphere proceeding along the paths commonly shown in maps of the globe. A review of Defant's first paper on this subject appeared in NATURE of April 15 last, p. 469. In a second paper, "Die Bestimmung der Turbulenzgrössen der atmosphärischen Zirkulation aussertropischer Breiten" (Wien, *Akad. Wiss.*, 1921), he re-examines, by other methods, the viscosity to be attributed to this general circulation, and finds, as before, values round about 10^8 cm.$^{-1}$ grm. sec.$^{-1}$, that is to say, a billion times as great as that arising by ignoring molecular agitation only. This large value, 10^8, applies to friction across vertical planes, but apparently the friction across horizontal surfaces is an affair of gusts, not of cyclones. When the viscosity is known the conductivity for heat and for water vapour can be found by the theories of G. I. Taylor and W. Schmidt. The methods whereby Defant obtains this viscosity include a computation of "eddy-stresses" in accordance with Osborne Reynolds' theory from the hourly values of the wind at various heights. The direct eddy-stresses are in some cases as big as $0\cdot 3$ millibar. Defant also makes a determination by way of the scattering of air to north and south of the mean-current after a passage of 3 days, using a formula due to L. F. Richardson.