been in our possession for three years, we can still obtain successful cultures in gelatine; the various forms, which we have previously described, have been observed as before.

Our object in sending this note is to call attention to the extraordinary vitality of this organism under such untoward circumstances, owing doubtless to its carefully entrenched position.

V. H. VELEY,
Oxford, March 10. LILIAN J. VELEY.

Drunkenness and the Weather.

ON reading the letter of Prof. Dexter on "Assaults and Dunkenness" (p. 365), I notice that there is one great fallacy in the argument.

When a man is intoxicated and commits an assault, the result is entered in police reports as "assault," the more serious offence overshadowing the less. So that, in all probability, many of the cases of assault referred to in the statement were also cases of drunkenness, but were not tabulated as such.

The temperature is an important element; for its variations are probably the cause of the change of character of the offences recorded. The same quantity of alcohol will, as has often been noticed, have very different effects in the summer and in the winter. In hot weather alcohol has a stimulating influence; this is much less marked in the winter, and during this season the sedative effect is certainly more noticeable.

Studying Prof. Dexter's curves in this light, and assuming the absence of any other fallacies, we may reasonably conclude that the number of those arrested for drunkenness or its results varies but little throughout the year. Probably the same people supply the cases of drunkenness in winter and of assaults in summer.

R. C. T. EVANS.
9 Heathcote Street, Gray's Inn Road, W.C., March 3.

Mechanical Methods of Calculating Logarithms.

THE following mechanical method of finding logarithms seems to be as simple as any that have been proposed, and has the advantage that it gives the logarithms of all numbers without interpolation, and at the same time affords a proof of the fundamental property of the function.

Let a flat ruler AB be provided at one end, A, with a hatchet edge (like that of the hatchet planimeter), so arranged that when the ruler is held horizontally, and the hatchet allowed to touch the paper, it touches at a point vertically below the edge of the ruler. The hatchet must lie in a vertical plane inclined at a convenient angle (say 45°) to the ruler. Let the ruler be held thus, with its edge touching a pin. On moving the ruler so that the hatchet does not slip sideways, the latter will trace a spiral curve on the paper. From its mode of generation the spiral clearly cuts all radii vectores at the same angle, and thus is the well-known equiangular spiral. Let OA be a radius vector of unit length, and OP one of length r. Let $AOP=\theta$ where θ may be expressed in terms of any convenient unit, then we may define the logarithm by the equation $\theta=\log r$. Of course, θ depends on the angle of the spiral and on the unit of angle adopted as well as on r, and so is not yet completely defined. We can, however, immediately prove the fundamental property of the logarithmic function.

Imagine a copy O'A'P' of the diagram to be made on some extensible material, and to be extended equally in all directions in the ratio R : 1. All angles remain unaltered, and the new curve is an equiangular spiral with the same angle as before. If, now, O' be placed on O, and the new diagram turned till A' lies on the old spiral, the two spirals, having the same angle, must coincide, and hence P' lies on the old spiral. Now $OA'=R$, $OP'=rR$, $AOP'=AOA'+A'OP'=AOA'+AOP$, which gives $\log rR=\log r+\log R$, the fundamental property. If we further chose our unit angle so that $\log 10=1$, the spiral will give Briggian logarithms. It would, perhaps, be more convenient practically to adjust the angle of inclination of the hatchet so that log 10 is represented by 100°, or perhaps by 360° if we divide the circle centesimally. It may seem that the logarithm, as defined above, still depends on the angle of the spiral, but this idea can be readily disproved by means of the equation $\log rR=\log r+\log R$. The logarithm, having been defined without reference to indices, may now be used to define the quantity x^n, where n is negative or fractional, and to give the index laws in a manner rather less artificial than that usually adopted (the fact that no indication is given of the many-valued character of a fractional power is, however, a drawback).

The hatchet planimeter may be used to obtain logarithms, but in a less simple manner. If the planimeter be placed with its point on a given straight line, and its length perpendicular to the line, and the point be moved through a distance x along this line, the inclination θ of the planimeter to the line is given by $x=a \log \cot \theta/2$, where a is the length of the planimeter. This gives an obvious mechanical construction for a logarithm.

Leeds, March 5. H. C. POCKLINGTON.

THE CENTENARY OF THE BERLIN ACADEMY OF SCIENCES.[1]

IT is with feelings of pleasure that we call the attention of our readers to the fact that rather more than one month ago the Academy of Sciences at Berlin, at its meeting on the 25th of January, commemorated with great rejoicing and some very pardonable pride the work which its members have done in the world during the last hundred years. The subjects which have been investigated by this distinguished body include almost every branch of human knowledge, and although at this date we are too near in point of time to be able to judge definitely and finally as to the value of the work which the German scholars and men of science, whose names are written on its books, have done, there is no room for doubting that they have enlarged the bounds of human knowledge in every direction, and have brought us many degrees nearer to the goal sought by all honest investigators.

The Berlin Academy has kept in mind what the true functions of an Academy of Sciences should be, for it has not sought to limit the number of subjects which its members desired to investigate, and it has not attempted to patronise or to foster the growth of one class of sciences, or of one branch of learning, to the exclusion of all others. It has encouraged knowledge of every kind, and has supported by its influence and money the workers in the most recondite branches of human learning, and its influence for good has been so far-reaching that it would need a volume if we attempted to describe the work which has been well and efficiently performed under its auspices. And the Academy of Sciences at Berlin has not only helped the world positively, as it may be termed, that is to say, by enabling its members to formulate and build up sciences, but negatively, by making it impossible for the faddist, and crank, and charlatan to press his views upon the non-expert, but well-educated, section of the German public. In this last capacity it has performed, very quietly and unobtrusively, but effectively, a most important duty, and it has succeeded in obtaining and holding a position of *authority* which cannot be gainsaid. It has proved to all the world that when it sets its seal of approval on a man's methods or works, those methods and works have permanent value. We may almost say that the work of German scholars and thinkers is so good because they possess in their country a high authority for the approval of which they are content to toil long and arduously, knowing well that its stamp is a hall-mark which the intellectual world will honour, and the full value of which will be duly credited to it. Of the universality of learning the Academy at Berlin has been a consistent and powerful patron, and the long list of great names which Herr Waldeyer, one of the secretaries of the Physical Section, brought to the notice of the members at its festival meeting is a splendid proof of this statement. Among historical investigators and jurists may be mentioned Fichte, Schleiermacher, Schelling and Trendellenburg; among students of linguistics and archæologists, Boeckh, Bekker, Bopp, Curtius,

[1] *Sitzungsberichte der Königlich Preussischen Akademie der Wissenschaften zu Berlin. 25 Januar. Öffentliche Sitzung zur Feier des Geburtsfestes Sr. Majestät des Kaisers und Königs und des Jahrestages König Friedrich's II.* In Commission bei Georg Reimer, Berlin.

Haupt, Dillmann, Müllenhoff and Lepsius; among mathematicians and physicists, Dirichlet, Kronecker, Erman, Dove, Kirchhoff, Kundt and Helmholtz; among chemists, Mitscherlich and Hofmann; among astronomers, Bode, Ideler, Encke; among geographers and cartographers, Ritter and Kiepert; and among biologists, Link, Braun, Lichtenstein, Ehrenberg, Müller and du Bois-Raymond. The above names represent only a selection, but these eminent members by their works have permanently influenced, and have stamped their individualities upon, the various sciences to the investigation of which they devoted their best powers and their lives. The Berlin Academy, and the very few institutions which resemble it, are the only places where men of such diverse qualifications and acquirements as Schleiermacher, Ranke, Lepsius, Dillmann, Seebeck, Kirchhoff, Helmholtz, Hofmann and Encke could be found sitting together as members and discussing the best methods for furthering the universality of knowledge. In Berlin, Vienna and St. Petersburg the past and present members of the Academies have carried out the intentions of their founders, and every branch of human knowledge has been considered worthy of recognition and encouragement at their hands.

The Academy at Paris was originally founded for the preservation of the French language, but the French savants soon found that it was necessary to establish other bodies which should represent the arts, and sciences, and archæology. Hence the Académie des Inscriptions, the Académie des Sciences, and the Académie des Beaux Arts came into being; in 1795 these Royal Academies were combined under the general title of Institut National. Thus together they represent all natural knowledge, and the various Academies really form sections of one great controlling and directing intellectual power in France. The operations of this power are so extensive that even a writer like M. Zola thinks himself entitled to enrolment among the members of one of its great sections.

When Herr Waldeyer had read his festival address he proceeded to report to the meeting what works the Academy had in hand, and to describe the progress which had been achieved in them. These included a *Corpus* of Greek inscriptions under the direction of Kirchhoff, a *Corpus* of Latin inscriptions under the direction of HH. Mommsen and Hirschfeld, the publication of the Commentaries on Aristotle, of the political correspondence of Frederick the Great, of the *Acta Berussica*, of the Latin Thesaurus by Diels, of an edition of the works of Weierstrass, of the work of Kant, of the Arabic history of Ibn Saad, of an Egyptian Dictionary, &c.; to give a list of all the works upon which the Academy is engaged would exhaust our space, and the curious reader will find them all mentioned on p. 45 ff. of the *Sitzungsberichte*.

The writing of these remarks causes many disquieting facts to cross the mind; foremost among them is that which tells us that there is no equivalent in England of the Academy of Sciences at Berlin. In its earlier years the Royal Society in a measure occupied in England the position now held by the Academy at Berlin in Germany, but such is no longer the case. The founders of the Royal Society apparently intended its members to be recruited from the ranks of scientific men of every kind, and the first seventy volumes of the *Philosophical Transactions* bear testimony to the truth of this assertion. The pages of that work were open to every scholar and man of science, provided that he had something to say and knew how to say it, and as a result the earlier volumes of the *Philosophical Transactions* are wider in their scope than the later ones.

Thus if the reader will take the trouble to turn over their pages, he will find papers on Latin, Greek, French, Irish, Phœnician, Etruscan and Runic inscriptions; accounts of pigs of lead, a tesselated pavement, a leaden coffin, Irish urns, &c.; an extract from a letter comparing the Egyptian and Chinese languages, and even a paper "On judging of the age of learned authors by style." Mr. P. H. Maty's Index of the first seventy volumes of the *Philosophical Transactions*, published in 1787, will supply many other examples of the extreme comprehensiveness of the scope and view of the Royal Society in its earlier years.

Slowly but surely the view of the Society has narrowed itself, and almost the only welcome guests are the mathematician, and physicist, and biologist; in like manner the *Philosophical Transactions* and *Proceedings* have become the home of "papers" in which letterpress and figures and algebraic signs appear in almost equal proportions. Papers on philology and archæology are extremely few, whilst those on physics and physiology greatly preponderate. Is it too late for the Royal Society to come back to the original field of its investigations? And although everything "made in Germany" is not necessarily good, it would probably gain more power and increase its influence if it imitated the excellent example afforded by the Academy of Sciences at Berlin in its efforts to further the universality of knowledge.

THE POTENCY AND PREPOTENCY OF POLLEN.

IN his book on "Cross and Self-fertilisation of Plants" (pp. 393-401), Charles Darwin called special attention to the subject of pollen-prepotency, and showed that numerous cases occur where the ovary of a given flower is more effectually pollinated by means of pollen-grains from some other flower, or from particular anthers, than by grains from its own anthers. If the two kinds of grains be present together on the stigma, the prepotent pollen is able to drive its tubes down the stigma more rapidly than the other, and so the ovules are reached first, and the egg-cells fertilised by the contents of the favoured or successful tubes—a point of great significance in crossing. Numerous examples were also given by Darwin, which indicate far-reaching effects of pollen on various parts of the flower and ripening fruit; these may be termed pollen-potency. Since Darwin's time we have learnt much more of the processes which go on in pollination and fertilisation, and, among other things, that the pollen tube of, for instance, a lily, carries down in its end, floating in its protoplasm, two active nuclei (generative nuclei) which bear in themselves the hereditable properties of the parent plant of the pollen, as well as remains of another nucleus (vegetative nucleus) of no use in fertilisation.

No fact in the domain of plant histology is better established than that fertilisation consists in the union of one of these generative nuclei with the nucleus of the egg-cell in the embryo-sac, and the researches of Strasburger, Guignard, Farmer and others have rendered the whole process of this nuclear fusion and its consequences so clear, that even minute details can be correlated with what occurs in organisms other than the flowering plants. In this connection I need only recall the demonstration by Ikeno and Irase,[1] and by Webber,[2] that the generative nucleus in the pollen tube is a spermatozoid, and in *Gingko* and some other gymnosperms is even ciliated and motile, and escapes as a true spermatozoid. This important discovery has lately been extended by Nawaschin,[3] who found that the two generative nuclei in the pollen tube of *Fritillaria* and *Lilium* are elongated, and are emptied into the embryo-sac as writhing worm-like bodies, and the same has been demonstrated by Guignard[4] for *Lilium Martagon*. The main point was also demonstrated by Miss Sargent at the last meeting of the British Association at Dover (September 1899).[5]

[1] Hirase, *Bot. Cent.* 1897, p. 34. [3] *Bot. Centralb.* 1899, B. 77, p. 62.
[2] Webber, *Bot. Gaz.* 1897, p. 16. [4] *Rev. Gén. de Bot.* 1899, vol. ii. p. 129.
[5] *Proc. R. S.* vol. lxv. 1899, p. 163.