

specially called attention, accounts for the diffusion of some poisons through the body and for that rapid action of certain poisonous substances which so many experimenters have endeavoured, but not successfully, to explain; further, he suggests that in some instances poisonous products of decomposition generated within the body itself, in disease, may be diffused through the nervous ether, and that the sudden collapse of nervous function, which is often seen in acute disease, may be due to this cause. Finally, there may be conditions of disease in which there is unnatural tension of the nervous atmosphere, followed by disturbance of muscular motion, convulsion, or cerebral pressure, leading to apoplectic insensibility.

We have sketched out thus briefly the leading points of this theory of a nervous atmosphere or ether produced, during life, within and by the living organism, as a theory calculated to give rise to much discussion and device of new experiment.

#### ASTRONOMICAL OBSERVATION

THE statistics of modern astronomical observation would, we suspect, be very curious, if it were possible to get at them. A report showing the gradual increase in the number of telescopes manufactured during the last fifty years would be very interesting; and so would be a table comprising at once the advance in their dimensions and the diminution in their cost. The result would, we believe, be such as at first sight to cause great surprise among those unacquainted with the subject, or those whose recollection does not go back to days when five inches was as extraordinary an aperture for an object-glass, as double that size is now. But the value of these, as of other tabular statistics, would suffer material abatement, if they were applied to establish any other conclusions than those to which they directly lead. For instance they would probably be fallacious; if considered as inferring a proportionate increase in the number of important observations. In order to bring out such a result, we require, so to speak, another factor, and a very essential one—a corresponding increase in the number of competent observers. This, we fear, may not have been commensurate with the advance of optical means: at least, except upon the supposition of some such deficiency, it is difficult to understand what becomes of the multitude of really good object-glasses which are annually produced, not only in England, but in Germany and America. A large proportion of these, we are led to think, must be purchased to be looked at, and not looked through: or handled as mere toys for the amusement of people who do not know what to do with themselves in an idle evening. This was not so much the case in the early days of telescope-manufacture. The greatest master of figuring specula in his own time was also the greatest proficient in using them: it is needless to add the name of Sir William Herschel. And so the finest reflectors in Germany were placed at the same period in the hands of the leader of all accurate selenographical investigation, J. H. Schröter. These were "the right men in the right place." Even then, it may be said, many noble reflectors went, no one knows where, the greater part of them long before this time useless from tarnish, or, still more mortifying to think upon, ruined by unskillful repolishing. Still, admitting this, the disappearance of powerful instruments does not seem to have been so remarkable in those days as it is now, and the quantity of really valuable observations appears to have been greater in the end of the last and the early part of the present century, in proportion to the means of observing.

This is not a very encouraging view of the present state of this branch of astronomy. But, if well founded, as we

believe it to be, we might expect that there would be some assignable reasons for it; and, in fact, several are sufficiently obvious. One certainly is, that the process of discovery is not, generally speaking, renewable. What has been once detected is usually placed on record, in bar of all future claims. So it has been in the science of music; a man might arise among us with the fervid genius of Handel, but he could not write the Hallelujah Chorus over again; and doubtless the spirit of Mendelssohn must have been cramped by the impossibility of employing many of the noblest and most impressive subjects which had been anticipated by his predecessors. And so it has been in the researches of geography. The enterprising explorer has now to go much farther in pursuit of "fresh woods and pastures new," and every Alpine season is so rapidly narrowing the number of summits untrodden by the foot of man, that the excitement of a first ascent will soon have to be sought in remoter regions. Thus in astronomy, though it cannot be said that there are no worlds left to conquer, yet all the larger and more conspicuous features of the heavenly bodies have been long ago so fully noted and recorded, that what remains for exploration is chiefly of that delicate character which, without being the less interesting from its minuteness, is less accessible, for that reason, to the possessors of ordinary instruments. And on this account many a student who might well have risen from the ranks in the earlier days of scientific campaigning, is now compelled to remain in comparative obscurity—a mere spectator, when he might well have taken his place among the discoverers of fifty years ago.

Another reason why tools have multiplied without a corresponding increase of good work, may be this, that looking upon the observer and his instrument as a complex apparatus, the improvement of the intelligent has not kept pace with that of the material part. In fact, it is impossible that it should. The eye is but what it was when David learned humility from considering God's heavens, the work of His fingers, the moon and the stars which He hath ordained; the intellect, though more developed and cultivated, is not more strong and piercing than it was in the days of Hipparchus; man does much more with his brain, but he has no more brain to do it with, than his uncivilised ancestors; and observers may, and will be, collectively multiplied without being individually improved. Every man that has eyes does not know how to use them; or, not failing in this respect, he may lack other requisites: he may not know what to look for, or where to find it; or he may be deficient in his handling of the faithful pencil or the expressive pen. And so it comes to pass that the capacities of instruments may be much in advance of the abilities of those who use them.

Besides all this, there is a physical obstacle of an entirely different character, which must not be forgotten; the unimprovable constitution of our own atmosphere. This will ever be a sore subject for the zealous observer, especially among ourselves. If even Secchi finds fault with the glorious Roman heavens, what have we not to regret in our own murky, and fuzzy, and restless skies? Who that has read the most graphic as well as instructive writings of Sir J. Herschel is likely to forget his complaints of "twitching, twirling, wrinkling, and horrible moulding?" and who that has had much actual experience of observatory work will not endorse all this with a very lively fellow-feeling? The nights may easily be numbered, during a long season, in which the defects of the atmosphere do not overlie those of the instrument, and when the observer has not rather to wish that he could see all that his telescope could show him, than to long for greater power or light, to be expended in making atmospheric disturbances yet more conspicuous and prejudicial. The only way to obviate this grievous hindrance is to get above it; and no man has yet done this except Professor Piazzi Smyth in

his most successful "Experiment"; it was said, indeed, that the French observers were about to follow his example, and to plant their instruments on the Pic du Midi de Bigorre; but we have never heard whether the idea has been carried into execution. And, however striking may be the advantage of such a plan, it must ever be confined to a favoured few.

We have dwelt at some length on a view of the present state of astronomical observation, which, though rather unfavourable, we believe to be substantially true. But it is not to be inferred that this is its sole aspect. There are, as usual, two sides to the shield; and much is to be said that is of an opposite tendency. If, for instance, we have asserted that for some time past observers have not multiplied in proportion to the means of observation, this is but a relative statement; the absolute fact is that at no former period has there been so numerous, or so zealous, or on the whole so competent a band of astronomical students. And of this we have a very pleasing evidence in the recent formation of an astronomical society expressly devoted to physical observation, to which we cordially wish success. If again it is probable that not many of the great discoveries are left within the reach of ordinary instruments, it should not be forgotten that many telescopes of very superior character are now housed in private observatories; and that for them investigations are still reserved, whose delicacy is no bar to their importance, and which may be undertaken with a hope of success no longer chargeable with extravagance. Great cabinets may be unlocked by little keys. Minute researches may give the clue to discoveries of the broadest extent and deepest interest. The changes of the lunar surface, the internal motion of stary clusters; the parallax and fixity of nebulae; the planetary attendants on the brighter stars, these are mere specimens of the magnificent arcana, whose solution may not be denied to human energy and perseverance. We may remember, too, that if the telescope and the micrometer should be found unequal to the task, we have yet a new and most powerful method of investigation, the results of which are equally important and surprising—spectrum-analysis. The revelations of this beautiful invention may be said to be only beginning, and no man can foresee their end. What has already been done would have appeared as improbable as the reveries of Kepler, had it been predicted fifty years ago; and who shall say what may be the result of fifty years more of patient and energetic application? And what might not Kepler have said and done, had such an instrument of research been placed in his hands? We may suppose how his fervid imagination would have exulted in the prospects, and with what confident joy he would have repeated the memorable words which characterise one of his lofty aspirations, "Plus ultra est."

### NOTES

It is stated that the Astronomer Royal is to have the honour of a K. C. B. conferred upon him in recognition of his services in respect to the International Exhibition. We trust this rumour is not strictly correct; for unless it is to be generally understood that services are to be rewarded in the inverse ratio of their value, it is simply grotesque and unbecoming of the Government to ignore all the Astronomer Royal's services to Science, and all his unpaid services to the State in connection with subjects more important to the nation than all the exhibitions which ever have been or ever will be.

In a Congregation to be held at Oxford on Tuesday, May 23, three forms of statute will be promulgated on the subject of the Second or Final Examination. It is proposed to have one Pass School of a mixed character and six Honour Schools. In the Pass School the examination is to be divided into three groups, as follows:

—Group A.—1. One Latin and one Greek author, one at least of which shall be a philosopher or an historian. 2. The outline of Greek and Roman history, with a special period of one or the other, and English composition. Group B.—1. Either English History and a period or subject of English Literature, or a period of Modern European History with Political and Descriptive Geography, together (in each case) with English composition. 2. A Modern Language, either French or German, including composition in the language and a period of its literature. 3. The Elements of Political Economy. 4. A branch of Legal study. Group C.—1. The Elements of Geometry, including Geometrical Trigonometry. 2. The Elements of Mechanics, solid and fluid, treated mathematically. 3. The Elements of Chymistry, with an elementary practical examination. 4. The Elements of Physics, not necessarily treated mathematically. Every candidate is to select two subjects from one of these groups, and one of another of them, and must pass in all three; but may present himself for each of the three subjects in separate Terms. The six Honour Schools are to be:—1, Literæ Humaniores; 2, Mathematics; 3, Natural Science; 4, Jurisprudence; 5, Modern History; and 6, Theology. The examination in the Honour School of Literæ Humaniores is to include Philology, Ancient History, and Philosophy:—1, In Philology, the Greek and Latin languages; 2, in Ancient History, the histories of ancient Greece and Rome; 3, in Philosophy, Logic, the History of Philosophy, and the outlines of Moral and Political Philosophy, each candidate being required to offer at the least two treatises by ancient authors. Candidates shall be permitted to offer in addition, as special subjects, one or more authors or portions of authors, or departments, or periods falling within or usually studied in connection with any of the stated subjects of this school. For the purpose of this provision philology shall be taken to include textual criticism, the minute critical study of authors or portions of authors, the history of ancient literature, and comparative philology as illustrating the Greek and Latin languages, and ancient history shall be taken to include classical archaeology and art, and the law of Greece and Rome.

It is with very great pleasure that we print the following intelligence of the safety of Dr. Livingstone:—Despatches were received last week at the Foreign Office from Dr. Kirk, the Acting British Consul at Zanzibar, containing information of the safety of Dr. Livingstone in October last. The doctor was then at Manakoso, helpless, without means, and with few followers. Dr. Kirk had sent him supplies to meet his immediate necessities, which, it was hoped, would shortly reach him.

At the annual meeting of Convocation of the University of London, held on Tuesday last, Dr. E. A. Parkes was chosen by a very large majority at the head of the list of three graduates, to be submitted to Her Majesty for selection therefrom of a member of the Senate in the place of the late Dr. W. A. Miller. At the same meeting a resolution proposed by Dr. Francis T. Bond, that it is expedient to retain Greek in the Matriculation Examination only as an optional subject, was rejected by a small majority.

THE example set by Clifton College in the formation of a botanic garden in connection with the Natural History Society is, we understand, about to be followed at Marlborough, a plot of ground having been granted by the authorities for that purpose. Such a garden will be a valuable adjunct to the herbarium, if such plants are selected as are typical of the principal natural orders, especially of those which are sparingly represented in the British flora.

THE following appointments have been made in consequence of the death of Prof. Miquel:—Dr. N. W. P. Rauwenhoff to be Professor of Botany and Director of the Botanic Garden at Utrecht. Dr. W. F. R. Suringar to be Professor of Botany and Director of the Botanic Garden at Leyden.