

of the new ships both in total weight as well as in weight of projectiles fired from the broadside, and right ahead and astern, is much superior to the older two.

Mr. Scott Russell's paper dealt with the true principle of the resistance of armour to shot. Like everything that comes from his pen, it is written clearly and forcibly. It advances for the first time a rational explanation of the great resistance of steel-faced armour-plates as compared with the old-fashioned armour.

In addition to the above many other papers were read, some of them being of great interest and originality. For instance, Mr. MacFarlane Grey's paper "On the Simplification of the Thermodynamics of Steam," which however much we may object to the word *simplification* in the title, is nevertheless a singularly bold and original attempt to account for many of the phenomena of steam and other effects of heat when applied to matter. Want of space however prevents our reviewing this paper in the way it deserves. The same remark applies to Mr. Merrifield's description of Prof. Amsler Laffon's new instrument for calculating simultaneously the area, the statical moment, and the moment of inertia of any closed figure.

Upon the whole the Institution of Naval Architects must be congratulated upon the very valuable and interesting nature of its transactions. It is only to be regretted, that on account of the large number of papers and the limited time for the meetings, so little time is often left over for discussion.

THE LOCAL ENDOWMENT OF RESEARCH

BIRMINGHAM enterprise and Birmingham manufactures are known all the world over. One of the present remarkable features of this hard-working provincial town is a gradual infusion of the apparatus of scientific culture, not before its time. Thus we have now a potential, college, to say nothing of an increase in the number of its educational institutions and scientific societies. One of the most recently founded of these institutions is the Birmingham Philosophical Society—a title which one is apt to associate with respectable dullness—a circulating library, and a well-stocked reading-room. But the Birmingham institution, founded only in 1876, is something very different, and bids fair to rival her well-known Manchester sister. Already has the Society published a third thick part of its *Proceedings*, containing a number of original papers that would do credit to a London society.

But Birmingham is nothing if not innovating; her politicians founded a new school of politics, and now her men of science have initiated a new departure in the conduct of scientific societies. This will be plain from the following circular, a copy of which has been sent us:—

"The Council, having taken into consideration the advisability of establishing an Endowment of Research Fund, will submit the following scheme for the consideration of the Society:—

"*Scheme for Establishing and Administering a Fund for the Endowment of Research in Birmingham*

"The Council are of opinion that this Society would be omitting a principal means of the advancement of science—the end for which all such associations exist—if it neglected the question of the endowment of research. To maintain a successful investigator in his labours, even

though no results of immediate or obvious utility can be shown to spring out of them, is of interest to the community at large. Indeed it is just because the practical usefulness of such work is not immediate or obvious that it becomes necessary to give special support; for, otherwise, it would have its own market value, and endowment would be superfluous. But the proper and effectual administration of an endowment fund is perceived to be so beset with difficulty as often to deter even those who recognise the principle, from advocating it in practice. Most of the dangers usually foreseen would, however, as a rule, be avoided, simply by the distribution of such funds from local centres, under such a scheme as is now proposed.

"The Council are therefore anxious to establish a fund, in connection at once with the Society and the town, for the direct endowment of scientific research. And they are further of opinion that the eminent merits of Dr. George Gore, F.R.S., as an investigator of exceptional originality and success in the domain of chemistry and physics, clearly point him out as fittest to be the first recipient of endowment from the fund. In accordance with these views the Council propose the following regulations for the fund:—

"1. That the fund be entitled, 'The Birmingham Endowment of Research Fund.' 2. That contributions be invited, payable either at once, or in instalments distributed over a term of years, as individual subscribers may desire. 3. That the money collected be deposited with the Birmingham Banking Company, in the name of the Council of the Birmingham Philosophical Society; and that all cheques on this fund be signed by the president, the treasurer, and one of the secretaries for the time being. 4. That the management of the fund shall be in the hands of the Council of the Birmingham Philosophical Society, who shall have the power of allotting such sums and under such conditions as they may deem fit to any one or more persons engaged in scientific research, for the purpose of assisting them in carrying on their investigations. 5. The Council shall present a report of their proceedings in connection with the fund at the annual meetings of the Society.

"Subject to the approval by the Society of these General Regulations, the Council have resolved—1. That Dr. George Gore, F.R.S., be elected as the first recipient of an endowment from the fund. 2. That in order that Dr. Gore may have greater facilities for continuing in Birmingham his original researches, if the sum collected permit, the amount of 150*l.* per annum for three years be allotted to him. 3. That the first cheque on the sum subscribed be payable on the 1st of July of the current year."

These resolutions were carried unanimously at a full meeting of the Society on the 11th inst. It is not necessary for us to say a word in praise of the important initiative which has thus been taken by one of the youngest of our provincial societies. The lessons to be derived from this action seem plain. Nothing, we think, could conduce more to the encouragement of scientific research in this country than the establishment in the great centres of wealth or industry of funds similar to that with which the Birmingham Philosophical Society have resolved to endow Dr. Gore. To so enormously wealthy a town as Birmingham what is 150*l.* or even 1,500*l.* a year? And need we remind practical Birmingham manufacturers that in their own special lines the most lucrative results have been obtained from investigations that originally had no practical ends in view? Need we also remind them of what during the past few years their balance-sheets have given evidence over and over again,

that this country is fast losing its old industrial supremacy through sheer lack of the scientific knowledge which other countries are turning to such practical account? But it is not on these grounds we would urge the leading scientific societies in our great provincial towns to follow the admirable example set by Birmingham. Scientific research, for its own sake, is a worthy and ennobling pursuit, blessing those that give as well as those that receive the funds for carrying it on, when these are given in a generous spirit and with a discriminating hand. We feel quite sure the Birmingham Philosophical Society would have not only little difficulty in raising the modest sum with which they have ventured to start, but that the wealthy Birmingham manufacturers, and probably even the Birmingham Corporation, will see it to be to their best interests to make the fund a permanent one, and so increase it as to produce wide and substantial results. The example, it is to be hoped, will be followed by other provincial towns, as Manchester, Liverpool, Newcastle, and Glasgow, all of which have reputable philosophic or other similar societies, plenty of money to spare, and everything to gain and nothing to lose by such a wise and noble use of it.

May we not also hope that the example set by this provincial Society will strengthen the weakness of knee which, in the opinion of many, the Royal Society has displayed in its administration of the fund which Government has committed to its care for the endowment of research? At Birmingham the endowment becomes an honour, and not an alms to be sued for on the "proper form," and it is not frittered away so as to miss the real object of the creation of the fund. That some such fund is necessary seems to us clearly proved, if further proof were needed, by the action of the Birmingham Society; and the Royal Society will show itself scarcely worthy of its position as the leading Society of the kingdom and the only Society which demands original research as a condition of admission, if through feebleness or any false sense of dignity it should allow the modest sum it now administers to lapse from its hands. It need not fear that in administering this fund, and in taking all the trouble that must be taken to do so wisely and honestly, it sustains any loss of prestige. There are certain things with which to meddle would certainly be undignified on its part; but in doing work of this kind it seems to us it is performing a proper function.

Perhaps nothing would sooner convince our ignorant and one-sided politicians of the reality of science, and of the necessity for its national recognition than efforts similar to that begun at Birmingham, carried out in all our great industrial centres. In the somewhat humiliating agitation now being carried on all over the country we hear much from both sides of the country's highest welfare; and yet not a single statesman of them all ever gives a hint that he knows what science really means, far less what important national issues depend upon the results of its cultivation. Let our great municipalities take the matter up as Birmingham has done, and we are confident that while much will thus be done for the promotion of scientific research throughout the country, their action will not be without its effect upon the Government. For while such action in the provinces is in the highest degree desirable and laudable, it is no more a substitute

for the national recognition of science than municipal government is a substitute for a central administration.

Meantime the Birmingham Philosophical Society, whatever may be the final result of its enterprise, will be entitled to hold an honourable place in the annals of English science.

ECLIPSE OBSERVATIONS

Observations made during Total Solar Eclipses. Collated by A. C. Ranyard, M.A., Sec. R.A.S. *Memoirs of the Royal Astronomical Society*, vol. xli., 1879.

THE idea of collecting different accounts of the same eclipse, and breaking them up, so that all descriptions of one and the same phenomenon should be found side by side, first originated with the Astronomer-Royal, who began to collect all accounts he could procure of the eclipse of 1860. As pressure of work prevented him from carrying out his idea, Mr. Cowper Ranyard took it up at his suggestion and gradually extended the plan, so as to include all the more important physical observations which have ever been recorded during total solar eclipses. This enormous work has now been published in a volume of nearly 800 pages, and there cannot be two opinions as to its usefulness and value. It must, however, be borne in mind that this is a mere work of compilation, and the reader who expects to find a general and correct account of the conclusions to be drawn from the observed phenomena and the results which have actually been arrived at, will be bewildered rather than instructed by the perusal of the book. The volume is simply intended to classify the observations which have been made, and not to discuss them. A good discussion is very much wanted, but it could hardly have been made by a single man, and certainly not without consulting the chief authorities on the subject. It is of course impossible to avoid altogether reference to theories which have been proposed, and their comparison with observations for which they are supposed to account, but Mr. Ranyard has acted in this respect with commendable self-restraint, and whenever he departs from his general rule, he only makes us feel how grateful we ought to be to him, that he has not more often indulged in such vague, confused, and unsatisfactory discussions as here and there disfigure the book. As it is, it will not be difficult to draw a pen through all statements involving debateable matters, and we shall then have a volume which will do credit to its author and to the Society which has published it.

In order to gain an idea of the great variety of observations which are dealt with in the volume, we have only to look over the table of contents.

The first chapters contain accounts of phenomena of minor importance, yet of considerable interest. Most of these can also be observed in partial eclipses, such as the occultation of sun-spots by the moon, the darkness of the moon compared to sun-spots, the fringe round the moon's limb, &c.

Chapter IX. contains an account of the remarkable moving shadow-bands which have been observed just before and after totality. There can be no doubt that these shadows originate in our own atmosphere; but whether the currents which give rise to them are produced by the chilling effect of the eclipse, or whether