

to insure positive results, only those classes of facts should be admitted which were capable of being expressed by numbers, and which promised, when sufficiently multiplied, to indicate general laws. If, then, the main object of science—and I beg to be understood henceforth as speaking only of that section which the Association has under its especial care, viz, inductive science,—if, I say, the object of science is the discovery of the laws which govern natural phenomena, the primary condition for its success is accurate observation and collection of facts in such comprehensiveness and completeness as to furnish the philosopher with the necessary material from which to draw safe conclusions. Science is not of yesterday. We stand on the shoulders of past ages, and facts ascertained have been transmitted to us, and carefully preserved in the various store-houses of science. Other crops have been reaped, but still lie scattered on the field. Many a rich harvest is ripe for cutting, but waits for the reaper. Economy of labour is the essence of good husbandry, and no less so in the field of science. Our Association has felt the importance of this truth, and may well claim as one of its principal merits the constant endeavour to secure that economy. One of the latest undertakings of the Association has been, in conjunction with the Royal Society, to attempt the compilation of a classified catalogue of scientific memoirs, which, by combining under one head the titles of all memoirs written on a certain subject, will, when completed, enable the student who wishes to gain information on that subject to do so with the greatest ease. It gives him, as it were, the plan of the house and the key to the different apartments in which the treasures relating to his subject are stored, saving him at once a painful and laborious search, and affording him at the same time an assurance that what is here offered contains the whole of the treasures yet acquired. While this has been one of its latest attempts, the Association has, from its very beginning, kept in view that its main sphere of usefulness lay in that concentrated attention to all scientific operations which a general gives to the movements of his army, watching and regulating the progress of his impetuous soldiers in the different directions to which their ardour may have led them, carefully noting the gaps which may arise from their independent and eccentric action, and attentively observing what impediments may have stopped or may threaten to stop the progress of certain columns. Thus it attempts to fix and record the position and progress of the different labours by its reports on the state of science published annually in its Transactions; thus it directs the attention of the labourers to those gaps which require to be filled up, if the progress is to be a safe and steady one; thus it comes forward with a helping hand in striving to remove those impediments which the unaided efforts of the individual labourer have been or may be unable to overcome. Let us follow the activity of the Association in these different directions. The reports on the state of science originate in the conviction of the necessity for fixing at given intervals with accuracy and completeness the position at which it has arrived. For this object the General Committee of the Association entrusts to distinguished individuals in the different branches of science the charge of becoming as it were the biographers of the period. There are special points in different sciences in which it sometimes appears desirable to the different sections to have special reports elaborated; in such cases the General Committee, in its capacity of representative assembly of all the sciences, reserves to itself the right of judging what may be of sufficient importance to be recorded. The

special subjects which the Association points out for investigation, in order to supply the gaps which, it may be observed, are either such as the philosopher alone can successfully investigate, because they require the close attention of a practised observer, and a thorough knowledge of the particular subject, or they are such as require the greatest possible number of facts to be obtained. Here science often stands in need of the assistance of the general public, and gratefully accepts any contributions offered, provided the facts be accurately observed. In either case the Association points out what is to be observed, and how it is to be observed. The first is the result of the same careful sifting process which the Association employs in directing the issue of special reports. The investigations are intrusted to specially appointed committees or selected individuals. They are in most cases not unattended with considerable expense; and the Association, not content with merely suggesting and directing, furnishes by special grants the pecuniary means for defraying the outlay caused by the nature and extent of the inquiry. If we consider that the income of the Association is solely derived from the contributions of its members, the fact that no less a sum than £17,000 has since its commencement been thus granted for scientific purposes is certainly most gratifying. The question how to observe resolves itself into two—that of the scientific method which is to be employed in approaching a problem, or in making an observation, and that of the philosophical instruments used in the observation or experiment. The Association brings to bear the combined knowledge and experience of scientific men, not only of this but of other countries, on the discovery of that method which, while it economises time and labour, promises the most accurate results. The method to which after careful examination the palm has been awarded is then placed at the free disposal and use of all scientific investigators. The Association also issues, where practicable, printed forms, merely requiring to be filled up, which by their uniformity become an important means for assisting the subsequent reduction of the observations for the abstraction of the laws which they may indicate. At the same time most searching tests and inquiries are constantly carried on in the Observatory at Kew, given to the Association by her Majesty—(loud cheers) the object of which is practically to test the relative value of different methods and instruments, and to guide the constantly progressive improvements in the construction of the latter. The establishment at Kew has undertaken the further important service of verifying and correcting to a fixed standard the instruments of any maker, to enable observations made with them to be reduced to the same numerical expression. I need hardly remind the inhabitants of Aberdeen that the Association in one of the first years of its existence undertook the comparative measurement of the Aberdeen standard scale with that of the Greenwich,—a research ably carried out by the late Mr. Baily. The impediments to the general progress of science—the removal of which I have indicated as one of the tasks which the Association has set for itself—are of various kinds. If they were only such as direction, advice and encouragement would enable the individual or even combined efforts of philosophers to overcome, the exertions of the Association to which I have just alluded might be sufficient for the purpose, but they are often such as can only be successfully dealt with by the powerful arm of the State or the long purse of the nation. These impediments may be caused either by the social condition of the country itself, by restrictions arising out of

peculiar laws, by the peculiar separation of different countries, or by the magnitude of the undertakings being out of all proportion to the means and power of single individuals of the Association, or even the voluntary efforts of the public. In these cases the Association, together with its sister society, the Royal Society, becomes the spokesman of science with the Crown, the Government, or Parliament—sometimes even through the Home Government with foreign Governments. Thus it obtained the establishment by the British Government of magnetic and meteorological observations in 6 different parts of the Globe, the beginning of a network of stations, which, we must hope, will be so far extended as to compass by their geographical distribution the whole of the phenomena which throw light on this important point in our tellurian and even cosmical existence. The Institute of France, at the recommendation of M. Arago, whose loss the scientific world must long deplore, cheerfully co-operated with our Council on this occasion. It was our Association, which, in conjunction with the Royal Society, suggested the Antarctic Expedition, with a view to further the discovery of the laws of terrestrial magnetism, and thus led to the discovery of the Southern Polar Continent. It urged on the Admiralty the prosecution of the tidal observations which that department has since fully carried out. It recommended the establishment in the British Museum of the conchological collection, exhibiting present and extinct species, which has now become an object of the greatest interest. I will not weary you by further examples, with which most of you are better acquainted than I am myself; but merely express my satisfaction that there should exist bodies of men who will bring the well considered and understood wants of science before the public and the Government, who will even hand round the begging-box and expose themselves to refusals and rebuffs, to which all beggars are liable, with the certainty besides of being considered great bores. (Laughter, and applause.) Please to recollect that this species of bore is a most useful animal, well adapted for the ends for which Nature intended him. He alone, by constantly returning to the charge and repeating the same truths and the same requests, succeeds in awakening attention to the cause which he advocates, and obtains that hearing which is granted him at last for self-protection, as the minor evil compared to his impotency, but which is requisite to make his cause understood. This is more particularly the case in a free, active, enterprising and self-determining people like ours, where every interest works for itself, considers itself the all-important one, and makes its way in the world by its own efforts. Is it then to be wondered at that the interests of science—abstract as science appears, and not immediately showing a return in pounds, shillings and pence—should be postponed at least to others which promise immediate tangible results? Is it to be wondered at that even our public men require an effort to wean themselves from other subjects, in order to give their attention to science and men of science, when it is remembered that science, with the exception of mathematics, was until of late almost systematically excluded from our school and university education—that the traditions of early life are those which make and leave the strongest impression on the human mind, and that the subjects with which we become acquainted, and to which our energies are devoted in youth, are those for which we retain the liveliest interest in after years, and that for these reasons the effort required must be both a mental and a moral one? A deep debt of gratitude is, therefore, due to bodies like this Association, which not only urges the wants of science on the Gov-