TRANSACTIONS.

ADDRESS
TO THE MEMBERS OF THE HISTORIC SOCIETY OF LANCASHIRE AND CHESHIRE.

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(Read 18th October, 1870.)

Another year has passed, and we are on the threshold of another Session. It seems idle to speak of the flight of one year, when the twenty-two years and upwards, since the founding of the Society, have passed so rapidly. In what respect has the past taught us any new lesson?

In a Provincial Society,—where it is impossible, and would be absurd, to try to keep up the rule of recording nothing which has been known before,—original discoveries are rare, but a new use of old materials is frequent. If we cannot add new truths to the stock of human knowledge, we may yet serve a most important purpose, by making them known. With the exception that there are several teachers and subjects instead of only one of each, a Learned Society is in some respects like a Professor's class in one of our Universities. It is hardly expected that either he or they will kindle any new light, or discover any additional Law of Nature;

but it is expected that they will not lag behind the period, or fail to keep abreast with the acquirements of the day.

Our Report, just read and adopted, is comparatively a trifling affair. It gives the result of a single Session,—though even that is not without its importance. But when we look at our twenty-two volumes, corresponding with the same number of Sessions,—with numerous papers, and hundreds of illustrations in the shape of plates, maps, plans, and woodcuts,—the result is far from unimportant. There is a storehouse of valuable facts for the future historian of the district, in which he will find materials ready to his hand, on almost every subject within his range.

There are some who imagine that though we read, "many "shall run to and fro, and knowledge shall be increased," yet its progress is comparatively slow; and that any particular age is not very far in advance of the immediately preceding one. Such persons usually derive their information from the daily newspapers; and they forget that the most important facts in Science are rarely alluded to in them. These are contained in the Transactions of Learned Societies, and in Journals specially addressed to distinct classes of inquirers; but they are available to all, especially to those who can make the best use of them. And it is only by comparing the information of different periods, as a traveller reckons the milestones passed, that we can see the progress made.

In like manner, year by year glides away, leaving few traces on an individual; indeed, sometimes he appears to belie the parish register, and actually to grow younger. Yet age creeps on with silent steps, all the while, and makes its presence felt at least every decade.—Also, to a momentary observer, the sun appears stationary, and the shadow on the dial can not be noticed to progress. Yet day by day brings us the reckoning of the silent hours, and year by year the beautiful

succession of all the seasons.—Or, a person passing through a forest may scarcely notice that the brown leaves are falling around him; but a few weeks, and often a shorter period, exchange the abundant foliage of Spring and Summer for naked branches and leafless twigs.

It is thus that Scientific knowledge, and indeed knowledge of all kinds increases;—slowly, it may be, at times, but with absolute certainty;—and mankind receive, somewhat ungratefully, the treasures accumulated by numerous explorers, in different paths of inquiry.

There is an interesting Atlas, known in our best schools, which traces the progress of Geographical discovery from the earliest recorded times. It exhibits first the earth as known at the time of the Deluge, surrounded by thick darkness; but as time clears away the clouds, Egypt, Greece, Rome, the pillars of Hercules and Britain gradually come into view;—and again the West Indies, the American continent, Australia, the Isles of the Pacific, and the North West Passage. There is still much to be known of the interior details of countries which are laid down on our maps; but the facts serve to illustrate the gradual lifting of the clouds, which originally hung over different departments of human knowledge.

In the history of Geology, a great fact was brought to light, when it was discovered that the strata of the earth lie from bottom to top in a certain order. The whole was suitably compared to a great "stone book," the leaves of which lie, like those in an ordinary printed volume, in regular succession. And, though certain strata are absent at particular places, they are found elsewhere: so that the series is known, as an entire volume is completed by the collation of several copies, each perhaps imperfect, but in different degrees and at different places.

A further step in advance was made, when it was found

that fragments of some were imbedded in others, the older formations in the new: and again when it was seen that each had treasured in its bosom its own set of organic remains, differing in character from other sets above and below.

A further step still was taken, when it was found that the works of man lie beneath certain of the upper beds;—and this simple fact forms a new subject of inquiry of great interest. How low are they found, and to what distance in time do they carry back the history of the human race?

Again, it is but a few years since certain reddish projections were noticed round the surface of the moon, during a total eclipse of the sun. Various were the speculations concerning them, as is usual on the discovery of a new fact; but by bringing the advanced knowledge of optics to bear upon Astronomy, the riddle has been already read. It was found that the prismatic colours which Newton had described, were modified when certain kinds of light were employed; and that the burning of different materials gave each its own set of phenomena, in the form of certain dark lines upon the colours. By the application of this discovery to the sun, certain old theories, like that of the luminous envelope, were at once disproved. It was found to be a vast burning mass, the materials consumed being the same as those known to ourselves; and even the distant stars have been obliged to yield up their secrets to persevering investigators. I might go still further, and tell you that calculations have been made, which are no doubt approximately true, showing the explosive force necessary to cause certain luminous projections, which our telescopes bring to view.

Thus, one lesson which we are taught is that no portion of knowledge should be despised, though its utility may not at present be seen. In fact, all knowledge is money invested at compound interest,—since every fact enables us to know others which without it would have remained unknown; and

as scientific inquirers are now greatly multiplied and their means for research improved, the interest is high and the capital is rapidly doubled.

Before several modern branches of science were known, an interesting article was written entitled "Thirty Years Ago;" the object of which was to show what vast progress mankind had made in useful inventions and discoveries, during a comparatively short period. But, it would be easy to show that since that time, no term of even half the extent has passed, without raising the platform of knowledge higher, to an equal extent and sometimes to a greater.

As an example of what may be accomplished in a single year,—the very last completed one, 1869,—I shall avail myself of the enumeration of Judge Day, made before the American Geographical and Statistical Society, at its anniversary held during the present year.

1. The connexion of the North Atlantic with the Pacific, by railway, has been completed.—2. The canal through the Isthmus of Suez has been opened for the commerce of the nations.—3. Exploration and important discoveries have taken place, in North Eastern and East Equatorial Africa.—4. Additional and conclusive evidence has been obtained, of a climate in the Arctic regions, during past ages, resembling that of modern countries lying a short distance from the Equator.—5. Marvellous results have been obtained, by the deep-sea dredging of Professor Thompson and Dr. Carpenter, proving the existence of animal life at enormous depths of the ocean, where it was previously thought the existence of life was impossible.—6. Earthquake disturbance has been very general,—and the phenomena have been distributed so widely as to include places hitherto undisturbed, at least within the memory of man.—7. New facts have been discovered respecting the attractive power of mountains;—as shown in the pendulum experiments, at certain stations in the Himalayas.—8. By means of the spectroscope, a method has been discovered of determining the proper motions of the stars;—and the fact that the physical and chemical construction of the

whole stellar universe is identical.—9. A self-registering compass has been invented, and used with success; by which every motion of a vessel can be recorded and preserved, from the beginning to the end of her voyage.—10. Trees of enormous height and magnitude have been discovered in Australia, one of which was found to be 69 feet in circumference.—11. Great deposits of coal have been discovered in New Zealand, and also on the borders of the Caspian Sea;—in the latter case verifying a prediction of Humboldt's.—12. Researches respecting man, in Europe, Asia and Africa, reveal the structure, mode of life, and customs, of several ancient pre-historic races.

There can be no moral doubt, that when the discoveries of 1870 come to be reckoned up, the roll will be equally surprising, if not more so.

It has been said, however, by persons pretending to be judges, that the British Association has accomplished nothing of importance, by its visit to Liverpool. It is true that no new comet appeared on the occasion; nor were animals or minerals previously unknown, paraded before the eyes of the curious; nor did "a young earthquake," to adopt Byron's expression, opportunely occur, to show us the mode and the power of the earth's interior working. Yet we may fairly say that each of the seven, or rather nine, great subjects was pushed forward a stage; that difficulties were cleared away; and that some misconceptions of long standing were swept out of the path. A few brilliant but stale experiments would have come within the range of these surface skimmers, and have satisfied them; who fled from section to section in search of excitement, or frightened by technical terms, and who thought the glories of the week were concentrated in the evening Receptions. But those who can best appreciate such investigations, know that there is often most heat where there is least flame; and they are satisfied with the results. Let us take a single fact, the experiment of Professor Rankine, by which he showed, almost prophetically, the fate of the ill-starred

Captain. It spoke more eloquently to the understanding and the heart, than a thousand frothy orations.

To a superficial observer, the great work of the Association takes place in the Section-rooms; but the published Reports show the comparative value in which the papers are held. Some very brief ones, as well as the Addresses of Presidents of Sections, are printed entire; the majority appear either by abstract or extract; and not a few are condensed down to their titles. The more popular memoirs appear in the newspapers; and the more important ones are printed at large in the Scientific periodicals.

It is rather in the Reports, of which little is known to the public in general, that the real work of the Association is shown. These are prepared with great care, by committees selected for the purpose; grants of money are made to defray the costs of inquiry; and the results are printed at large in the annual volume, constituting its principal bulk.

But it cannot be said that the meeting was unimportant. It had an interest peculiarly its own; and it is from Liverpool in 1870 that will date the prominent discussion of the important question respecting the origin of life. Can living and organized beings exist without predecessors? And can they propagate their kind, those which themselves had no parentage being at the top of a chain of similar links, descending, perhaps, in perpetuity? Or, is the popular opinion erroneous, which has for ages affirmed the existence of spontaneous generation? Did it originate in our ignorance of causes, and does it require only an adequate *experimentum crucis*, to show that Abiogenesis is a delusion? The evidence certainly tends in this latter direction; for thus far, almost in proportion as we isolate the materials employed from external influence, are the supporters of spontaneous generation driven back. And, in the absence of definite information, it is certainly more philosophical to conclude that the exercise of still greater caution, and more

care and skill in the experiments, will eliminate other grounds of error, till the theory of Abiogenesis becomes attenuated to a fine and a still finer thread, and at length snaps in twain. But, on such a subject it would be unbecoming to dogmatise; We must suspend our judgment and wait in patience.

It should be borne in mind, that mere motion in minute bodies is not conclusive of the existence of life; as it often arises from causes of a mere mechanical kind, which are definitely assignable. And it is clear that similar questions suggest themselves respecting vegetable life,—which being of a lower type might be supposed to be producible with still greater facility. Yet I am not aware that a claim has ever been put forward to the production of the humblest lichen;—and especially that any theory of development would ever account for its producing the oak or the cedar.

There is one important event by which the present year has been marked,—the passing of the Elementary Education Act. It is true that in 1833, Education received from our government a tardy recognition; and that in 1839, the Committee of the Privy Council was formed for promoting education throughout the country. Yet it required the lapse of thirty-one years more,—practically a generation,—before another great step in advance was made.

Now, for the first time, is provision made for the education of all;—in other words, a thorough *National* system has been established. Now, for the first time, in the dark places of our large towns and rural districts, where education is most required but least appreciated, can we "compel them to come "in." When, in after years, the history of the year 1870 shall be written, the story of Mr. Forster's Act will constitute one of its brightest pages.

It is somewhat curious that previous to 1833, we had, in England, religion established and education voluntary;

whereas in the United States of America they had education established and religion voluntary. Probably the golden mean lies between the two contradictory courses; at all events, England is approximating to America, and America to England.

The two great evils of our present educational condition are,—first that the grade of acquirements is too low, nine-tenths of those who leave school knowing only how to read, write, and cipher imperfectly;—and second that it is too limited in range, not touching that class of the community who are "in the lowest deep a lower deep." The Act contains provisions for remedying the latter; but the former may also be remedied in practice, by enlarging the boundaries of Education, through a better class of school books, and improved modes of teaching. Attention to the subject has been awakened all over the country; and mankind have recently learned that even the common soldier is not a mere machine,—the cultivation of his intellect giving him increased personal resources, as well as enlarged power for conquest.

This leads us to contemplate a higher grade of Education; viz., that which is intermediate between the requirements of the National School pupil, and those of the College student. This class at least, and even those of a lower grade, should know something of the laws of matter and of the human constitution. The engineer may be careful as to the quality, and may understand the effects of the coke and water which he gives to his engine, and yet may remain careless and ignorant respecting his own food and drink, or the air which he breathes. Mankind in general should understand something of the laws of health, and of the dangers which arise from deficient drainage or the decay of organic matter; or as some one says of "the enemy which is under their feet." The powerful agents by which we are surrounded in daily life

should be understood, that danger may be reduced to a minimum; as the nature of steam pressure, and the character of the terrible gases which endanger human life in mines. In short, besides learning to read, which is only giving us the tools for research, we should know something of the varied material laws, the numerous facts of which lie so close to us from day to day.

We do not despair of having all this accomplished in time; indeed a better day is dawning. Science herself takes a double flight, not only ascending upwards and outwards to the ascertaining of new and valuable truths, but stooping also to popularise and simplify these great results for the use of mankind. Thus the lark, singing soars into a higher and purer atmosphere, yet descends to make her home upon the ground.

But there is a higher grade of Education still, that of the professional student. As I referred to this subject at our last anniversary, I require to touch it but slightly now. Events move, however, with a rapid pace; for since that time, indeed since the close of the meeting of the Association, the foundation stone of new buildings for the Owens College has been laid,—which, it is said, is designed to be the Great Scientific University of the North. It commences a new era with most flattering prospects; and two local Learned Societies have made characteristic contributions to it, presenting the whole of their illustrative collections.

When we remember the small beginnings of our Free Public Library and Museum in 1851, which were contemptible in comparison with the rich gifts cast into the treasury at Manchester, and consider the dimensions which these Institutions have already attained, we do not despair. The Library was closed during the recent great meeting, but

the Museum was open ; and from those who were best qualified to judge, there was a unanimous expression of delight and astonishment, that such extended progress had been made.

Few towns possess like this one, facilities for education of the highest class. For example, we have two large collections of Natural History, and in those departments where either is weak it could easily be strengthened.—Commercial products in their various stages, from the raw material to the highest condition of manufacture, are here ; and other specimens could be procured with great readiness. In the departments of Ethnology and Antiquity, our collections are in some respects unrivalled ; and the permanent Gallery, connected with the Royal Institution, is noted for its rare collection of mediæval Art. There are lecture rooms and collections at both the Royal Institution and the Library and Museum ; so that endowments only are wanting. In the early days of the Owens College only six Professorships were founded, three more important on a scale double that of the three less important. In the same way, by avoiding a minute distribution of subjects, a limited staff of instructors might suffice in the day of small things. For some reason, the highest kind of education is viewed with considerable apathy in this town ; and it is therefore important to keep the subject before the minds of the people, " whether they will hear or " whether they will forbear."

It is a curious fact, that while knowledge is subdivided into smaller portions, for special cultivation by kindred spirits, and while departmental Magazines, if I may so call them, are on the increase, there is a movement in the metropolis towards partial union. It is thought, for example, that all the Societies might meet under one roof,—say at Burlington House,—using to some extent the same apartments, the same attendants, the same apparatus for illustration, and perhaps eventually

the same libraries. Thus, while distinct in their specific objects and operations, they are united in general purpose; and it is interesting to find that the same thought is entertained both in London and the provinces, though it has nowhere been welcomed yet as it deserves to be.

There are other subjects to which I might direct your attention, but I fear to trespass. Believing as I do, that a knowledge of God's laws is not antagonistic to a knowledge of his written word, but on the contrary auxiliary to it, it has always been the delight of my leisure hours, and even of times when I had no leisure, to promote useful knowledge of every kind and degree. This sentiment, I know that you share with me, and I trust that the result of the coming session will show intelligence, energy, and system; and also that in this and every good work, we may be found though faint still pursuing.