

serious work in the Antarctic, or to equip an adequate British expedition to co-operate with them by conducting simultaneous observations on the other side of the unknown area. An expedition a few years hence would be much less serviceable, because the value of consecutive work is at most additive, while that of simultaneous work is as the square, or some higher power, of the numbers engaged.

For the first time a south-polar map on a good scale is now available, thanks to the enterprise of Herr von Haardt of Vienna, and his publisher Hölzel. It is on a polar projection, and the scale of 1 : 10000000, approximately 160 miles to one inch. A special feature is made of ice-conditions and ocean currents, and the tracks of all the important southern voyages are laid down. But the most impressive feature is the vast central blank wherein lie hitherto untouched gold-fields of scientific data.

HUGH ROBERT MILL.

THE HEIGHT OF LUMINOUS CLOUDS.

IN the *Astronomischen Nachrichten* (No. 3347), Dr. O. Jesse gives a short condensed account of some of the main results that have been obtained from a discussion of all the observations made during the years 1889-91. The full discussion, entitled "Die leuchtenden Nachwolken," will, however, soon appear in the Publications of the König. Sternwarte in Berlin.

Perhaps the most interesting part of this work is that which is based, for the most part, on a series of photographs taken simultaneously at Steglitz, at the Urania Observatory, at Nanen, and at Rathenow, which brings out prominently the fact that the height of these clouds since the beginning of the phenomenon in 1885 has remained for the most part constant. The first table given by Dr. Jesse shows to a remarkable degree this almost constant value obtained for the mean height of the clouds, the actual total mean value being 82.08 kilometres  $\pm 0.009$ . The apparent constancy in the value thus obtained for the height of these luminous masses is even more surprising when it is remembered that the observations were not made exactly simultaneously, a task by no means easy, so that the fast movements of the clouds were liable to influence the results to some marked extent.

An examination of the facts, however, seems to indicate that if the observations had been made strictly simultaneously, then the zone in which these nocturnal masses move might be considered narrower than the observations have as yet indicated.

As the observations used in this discussion were made for the most part after midnight, the computed value of the height to which they extend can only be said to hold for those clouds observed at this time. As a matter of fact, however, the few observations made before midnight indicate also roughly the same elevation as above obtained, but the paucity of the observations renders impossible any degree of certainty being attached to the result obtained.

Another part of the investigation related to the question as to whether the apparent height of the clouds had always been the same as that deduced from the observations extending over the years 1889-91. To answer this, an examination of all the observations since 1885 was made to see whether the zenith distances for the same depression of the sun below the horizon had always been the same; which would necessarily be the case if the distance of the clouds from the earth's surface be assumed to be nearly always constant.

The observations employed were those made by Backhouse, of Sunderland, in Kissingen, and by Dr. Jesse himself in Steglitz. A condensed form of the table given by the latter is as follows:—

Number of observations.	Depression of sun below horizon.	Zenith distance of the clouds.	Probable error of observation.
6	9.9	69.9	2.5
9	11.2	77.8	1.4
8	11.8	80.3	0.8
5	12.5	81.7	0.6
7	13.8	85.0	0.5

In the year 1889 the phenomenon of luminous clouds occurred on July 2, and was, fortunately, unusually bright, rendering it possible to make numerous accurate measures; these Dr. Jesse gives in the following table, and compares the results with those given above. The numbers are as follows:—

The Difference of the Zenith Differences on July 2, 1889, from those found in earlier Years.

Depression of sun below horizon.	Zenith distance of the highest point of the clouds.	Difference.	Variation in height for 1" error in measured Z.D.
1889, July 2.		From table.	km.
11.4	77.5	78.6	+1.1
11.7	79.1	79.9	+0.8
12.6	82.7	82.0	-0.7
12.9	83.1	82.7	-0.4

After allowing for the numerous sources of error which might account for some part of the large differences in the fourth column, Dr. Jesse adds that the magnitudes of these are such as to lead him to assume another source of explanation, namely, in the arrangement of the particles composing the clouds themselves. It is probable that the clouds vary very considerably in thickness vertically, which would also affect the differences to some extent; thus with decreasing zenith distances a largely increased impression on the measured zenith distance of the clouds would result.

Setting aside, however, the question of the origin of these small differences, the important main result of the investigations still remains intact, namely, that from the years 1885-91 the luminous clouds have always had nearly the same mean height, namely 82 kilometres, or about 51 miles.

W. J. S. L.

THE BISHOP OF RIPON ON HUXLEY AND SCIENCE.

AT a meeting convened by the Leeds Philosophical and Literary Society, held a few days ago, a resolution was unanimously adopted appointing a Committee, consisting of the Mayor, the members of the Council of the Philosophical and Literary Society, and all others who volunteered to join, for the purpose of raising subscriptions in aid of the Huxley Memorial Fund. We rejoice at the formation of the Leeds Committee, but another cause of gladness is the address delivered by the Bishop of Ripon in support of the object for which the meeting was held. In no uncertain voice, Dr. Boyd Carpenter declared himself a supporter of the principles which guided Huxley's noble life, and proclaimed the righteousness of scientific truth. It is not often that dignitaries of the Church speak so boldly for science as Dr. Carpenter did at the Leeds meeting; and on this account, and also because many of our readers will be glad to see this public recognition of Huxley's integrity of thought and purpose, we gladly print a report, though an abridged one, of the address.

It would not be surprising to discover there are many in this meeting who would be prepared to point out one or two special and specific objections or difficulties they have felt in regard to Prof. Huxley's teaching. I think, however, you will agree with me that if we demand complete harmony of opinion, that stupid unanimity which betrays either ignorance or thoughtlessness, before we dare to speak in honour of any one whose

name has become great, we shall be in the position of those who have nobody to honour and no names to commemorate. I feel, therefore, though all may differ in some points from Prof. Huxley, there is not one of you who cannot with the most simple honesty of purpose take part in this meeting. I am here to do honour, as an English citizen, to the name of a great Englishman. We who belong to the English race are, I suppose, sometimes slightly jealous for its greatness in certain departments. We feel we are outstripped by our Teutonic neighbours in the pathways of investigation. We feel we are outstripped sometimes by our American neighbours in the process of invention. So that whenever we have a great man we might as well cherish him, and make the most of him. Nations are great from a variety of causes. Their geographical position contributes to their greatness; their fertility and wealth of soil, and their racial qualities play a large part in the conspicuous or obscure place they are able to fill on the platform of the world. But the element which constitutes the happiest source of national greatness is the possession of great men. Great men are in the nation what the highest peaks are in the geography of the land—they mark the high level to which the people are capable of attaining; they are fertilising water-sheds pouring out their rich stores on the great plains below them. A nation ought, therefore, to reverence its great men, for they are not merely the expression of national greatness, but high ideals producing a reaction, an enthusiasm, an ambition in the hearts of those who come after them. I think you will agree with me that Huxley was entitled to the epithet "great." He was a strong man among strong men. But it was not simply that he attained immense eminence in the walk of life to which he dedicated his powers, he possessed also an unique power of being able to look with a sympathetic and appreciative eye on other walks and realms of science than those which were peculiarly his own. And, therefore, he was able to take a larger outlook than many a man who, shut up in his laboratory, or working in the fields, or observing through his telescope, remained limited to one particular sphere of scientific work. And because Huxley possessed that power, he became what he himself humorously described, "a maid of all work, a gladiator-general for science." That position was a worthy and a useful one. He also possessed a marvellous gift of lucid exposition. He was able to make clear to the minds of those who were not scientific, thoughts and ideas which were eminently scientific. For these reasons we have a right to claim him as great—great in English life, great by virtue of his devotion to science, great by virtue of that wide appreciativeness he brought to bear upon it, and great in the power of being able to expound to others. I am here as a friend of knowledge, to do honour to one who enlarged its borders. I know there are many—though they are a diminishing quantity—who are disposed to look somewhat askance at the progress of science. In the history of the world it has been only too obvious that men through timidity have been afraid of the advance of knowledge, and it is not surprising to find that in the nineteenth century, with all its vaunted enlightenment, that spirit of timidity should have found expression. What men own and feel to be dear to them they cherish, and God forbid they should be hindered from cherishing it. Many a man looks on science very much in the same way as a woman who hugs her infant to her breast looks on the doctor who draws near, and in regard to whom she entertains some very unreal but still natural suspicion. When men hug to their bosom the faith which is dear to them, and which they feel to be bound up with their dearest hopes, one can quite understand their clinging more closely and looking apprehensively at the progress and advance of science. But men are beginning to understand that it cannot be in the nature of things that facts and truths will contradict those things which are nearest and dearest and most essential to men. And because we are men we claim it to be our privilege and our responsibility—I may almost say we claim it to be part and parcel of our probation in this world—to follow truth wherever it leads us. It is not, therefore, our duty to encourage a timidity which, if it were encouraged, can only lead to a fatal obscurantism. The progress of knowledge can only deepen and intensify our attachment to the things which are true, and things which are true cannot be out of harmony with the things round about us. The child, cherished and reluctantly parted with, is restored to us by his doctor healed and saved. Religious truth, in one sense, must always wait on scientific truth, and religious truth must often change its form at the bidding and on the information

given it by scientific truth. I am not aware that in the history of scientific progress religion has ever lost; the precious jewels have always been restored to her in richer and nobler settings. Because I believe that the advancement of knowledge must be for the benefit of mankind, and could not in the long run be hostile to any of the things most precious to us, I stand here to-day to do honour to one who laboured in the cause of the advancement of knowledge, and did so much to make it the heritage of all people. And, lastly, I am here to do honour to one, for whose truthfulness of character I have the profoundest admiration. Prof. Huxley had what might almost be called an exaggerated tenacity for the thing which he believed to be true, and a reluctance to surrender the truthfulness of his spirit at the bidding of any man or any authority. "But," some may say, "he was antagonistic." This is not the place nor the occasion to speak of Prof. Huxley's attitude towards Christianity, or even towards faith; but it should be remembered that the antagonism of his spirit was far more called out by the unfortunate attitude adopted by some who professed and called themselves Christians than by anything in its (Christianity) own nature. The moral and lesson of it is perfectly clear. A man may show himself the antagonist of other men's errors and of other men's methods without in the least degree being hostile to those precious things on which the hearts of men were wont to repose. Prof. Huxley was not one to knock from under any cripple's arm the crutch that enabled him to walk. While he spoke the language which seemed to him to be justified against those whose methods he could not approve, his language at other times was of that childlike simplicity, that entire modesty, and that natural humility which belonged to all thinking, educated, and reasonable men. Because he seemed to be setting before the world, even when we did not agree with him, an example of simplicity and truthfulness of disposition, I am here to say I honour him. We all desire to honour one who, great in his powers, sought to extend the borders of knowledge, and thus to add to the comforts, the joys, and the assurances of life, and who showed a character so simple, steadfast and truthful.

#### NOTES.

PROF. VICTOR MEYER has been elected a corresponding member of the class of mathematics and physics of the Berlin Academy of Sciences.

MAJOR P. A. MACMAHON has been appointed to represent the London Mathematical Society at Lord Kelvin's jubilee commemoration in Glasgow.

THE Bavarian Academy of Sciences at Munich has awarded the Liebig Gold Medal to Prof. F. Stohmann, Professor of Agricultural Chemistry in Leipzig University, and silver medals to Prof. B. Tollens, Professor of Agricultural Chemistry in Göttingen University, and Prof. P. Sorauer, of Berlin.

MR. FREDERIC DUCANE GODMAN, F.R.S., has been elected a Trustee of the British Museum.

THE annual visitation of the Royal Observatory, Greenwich, will take place on Saturday, June 6.

MR. G. GRIFFITH left Liverpool for Toronto on Saturday, to make arrangements for the meeting of the British Association in 1897.

THE exhibition galleries of the British Museum, Bloomsbury, and of the British Museum (Natural History), Cromwell Road, will be opened to the public on Sunday next from 2.30 to 7 p.m.; and will be opened on subsequent Sunday afternoons until further notice.

A SPECIAL general meeting of the Geological Society will be held on Wednesday, May 20, in order to submit to the decision of the Fellows certain resolutions of the Council regarding a proposed transference of a portion of the Society's collections to the Trustees of the British Museum.