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"The Thirteenth Annual Meeting of the American Association for the Advancement of Science."
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FROM OUR SPECIAL REPORTER.

The Thirteenth Annual Meeting of the American Association for the Advancement of Science.

SPRINGFIELD, August 8, 1859.

FIFTH DAY--MONDAY.

The Association met this morning at 10 o'clock in the City Hall, about the usual number being present. The general business commenced by the reading and approval of the records.

President Alexander announced that the Standing Committee had recommended that the rule of the Association, as adopted at Montreal, in relation to the publication of papers offered at the meeting of the Association in the report of the same, be not changed, a motion for such a change having been made by Prof. Coffin of Penn., on Thursday last, and referred to them.

This gave rise to considerable discussion, in which several members took part, and this became somewhat warm in its character, Prof. Pierce of Cambridge evidently supposing those who took part in the discussion intended to cast reflection on the manner in which the Standing Committee accepted and rejected papers offered to them, and he defended the action of that committee in an able manner.

On being put to the vote the amendment was lost by a very decided vote.

The following resolutions, reported by the Standing Committee, were read and unanimously adopted:

Resolved, That the American Association for the Advancement of Science regard with great interest the efforts making by the British Association for the Advancement of Science to induce the re-establishment of the Colonial magnetic observations for a new series of magnetic and meteorological observations.

Resolved, That the officers of the Association be requested to communicate this resolution to the officers of the British Association.

It was then announced that the Standing Committee recommended that the final general meeting of the Association for the present year be held in Hampden Hall, on Tuesday evening at 7½ o'clock, and this recommendation was unanimously adopted.

The Permanent Secretary announced the report of the Standing Committee, recommending the election of six new members, and they were all elected.

Mr. Wm. R. Prince, of Flushing, L. I., said he had a preamble

and resolution to offer, and he would read it to the meeting. He said learned societies had been assailed as composed of Atheists and Infidels, and he desired to give the Association an opportunity to set this calumny at rest. Furthermore, he desired that the Association should give to the world a proof that its object is to elucidate and not to suppress investigation. The subject I shall introduce, said Mr. Prince, is Mental Power or Spiritualism. He stated that he did not consider that the Association has any thing to do with the isolated fact that spirits do communicate with man, but the Society is certainly bound to recognise Mentalism and Spiritualism, so far as they form a medium for the communication of knowledge to the human race.

You may refuse Spiritualism a hearing, said Mr. Prince, but if this spiritual science courts investigation and you evade it, the world will form its own opinion, and my purpose will be answered.

When Mr. Prince had got thus far the President called him to order, and requested him to confine himself to the reading of his resolution.

Mr. Prince said he had a preamble to offer with the resolution and he wished to explain it. He then recommenced his remarks where he had left the subject, but was stopped amid cries of "Order" from all parts of the hall.

The President then told him that he must confine himself to the reading of his resolution, without the preamble, when Mr. Prince said his object in offering the resolution was to have it referred to a committee with instructions to examine the subject thoroughly and report at the next annual meeting, and he wished to read the preamble in order to give his ideas on the work before such committee.

The meeting showing unmistakable signs of objection to hearing the preamble. Mr. Prince read the resolution as follows:

Resolved, That a committee composed of six members be now appointed to take into consideration the claims of Spiritual communications to be ranked among the Sciences—the most exact of sciences, too, and that said committee report at the next annual session of this Association.

After some delay, a gentleman seconded the resolution, when it was moved to lay the resolution on the table, and this was carried by a large vote, thus laying Spiritualism at rest for this year at least.

There being no other general business the meeting adjourned to Tuesday forenoon at 10 o'clock.

SECTION A--FIRST DIVISION--MATHEMATICS, PHYSICS AND CHEMISTRY.

In this sub-division Prof. Smith of Annapolis was appointed chairman.

The first paper read was by Prof. Pierce of Cambridge, on the personal peculiarities of Astronomical observers. This was a continuation of a paper by the same gentleman, read before the Association at its meeting at Cleveland, Ohio. He said he found there was a tendency among observers, especially those longest in practice, to record some numbers more frequently than others, and to

show this he exhibited the recorded observations of some of the most eminent observers. Mr. Safford and Dr. Gould of Cambridge, took part in a conversational discussion on the subject of the means used to take observations, but without any remedy being suggested for the evil complained of, the subject was dropped.

The next paper read was by Prof. Alexander, on "Harmonies and the Ancient History of the Solar System." This was illustrated so copiously by figures as to render it impossible to give any idea of the views of the author in a sketch.

This closed the forenoon proceedings and the meeting adjourned.

AFTERNOON SESSION.

Mr. T. H. Safford, of Cambridge, read a paper on the determination of a comet's tail.

The paper was mainly filled with mathematical matter, and it was necessary to freely use the black-board to enable the meeting to comprehend the subject as treated by the author. He treated his subject thoroughly. The method he used was slightly different from that published in Olber's work. He said that when a comet has been observed some time Olber's method of computing the ratio of two curtate distances ceases to be accurate, and it is necessary to use an orbit deduced in this way as a first approximation only. He showed by his calculations a series of equations which served to correct the elements of the orbit.

Dr. Gould of Cambridge read an abstract of a paper on "The alleged lunar origin of Ærolites," contending that the common theory that they are not of such origin was incorrect. He said that not more than one in two millions of aerolites touched the earth, and that if they came from the moon it must, as a matter of course, sensibly diminish in size, while it was clearly demonstrated that it did not. He also said there were meteoric masses of iron in South America and Africa which would weigh 30,000 lbs. each.

Rev. Thomas Hill then illustrated the classification of curves by diagrams, on which he showed that six curves, hitherto unconnected, enjoy fundamental geometric properties in common.

The next paper was by Prof. W. D. Whitney of Yale College, on "Hindoo Astronomy." He said that the Hindoos were the only ones of the Ancients who had any astronomical system, and with this, rude as it was, they could make calculations of eclipses with tolerable precision. He said that this system was clearly proved to have come from Greece, before Ptolemy, but it was changed to adapt it to the Eastern mind.

Dr. Gould warmly complimented Prof. Whitney on his labors, and expressed a desire that he would continue them for the benefit of science.

After this paper had been read the meeting adjourned to Tuesday morning.

SECOND DIVISION.

Prof. Mallet of Tuscaloosa, Ala., was appointed chairman, and Prof. Frank E. Storer of Boston, secretary for the day.

The first paper read was "A note on the discharge of atmospheric electricity through gas mains," by Prof. B. Silliman, Jr.

The Professor commenced by saying, "during the past year two cases have fallen under my observation of the discharge of atmospheric electricity through the iron gas mains of New Haven, with effects which so far as I know have not been previously noticed.

On the last Sunday of June 1858, about 4 P. M., a violent thunderbolt fell on the spire of the Wooster Place Baptist Church in New Haven, and was conveyed, without injury to the spire, (227 ft. high) to a point less than 20 ft. from the earth. At this point, owing, as was afterwards ascertained, to an imperfect ground termination of the conductor, the electric tension was sufficient to produce a disruptive discharge through a brick wall, nearly 20 inches in thickness, to meet a gas-pipe on the side of the wall directly opposite to the lightning conductor. By the new channel thus forcibly gained, the electric discharge was conducted to the main pipes of distribution and no farther immediate effects were seen.

Soon afterwards, however, the escape of gas on the street in front of the church was noticed, as well by the odor, as by the death or the sickly condition of the shade trees lining the street. Upon opening the ground it was found to be saturated with gas, and every joint in the whole length of the street, some forty in number, was discovered to be leaking profusely.

The inference seemed unavoidable that the leakage was occasioned by the electrical discharge.

During the last week of July, 1859, another very energetic discharge fell upon a house in George street, which was supplied with gas, and which did but little hurt to the dwelling and none at all to the inhabitants,--the gas mains in the street, to the number of over 60 joints, were entirely loosened.

In June of this year the same church spire struck in 1858 was again the subject of a second accident of this sort; the wall of brick was again perforated near the same place as before and in the same manner, with the additional circumstance that the gas-pipe in the church was fused or burnt off at the point of contact of the discharge, and the gas being thus set on fire, in its turn set fire to the wall casing behind which it ran. But either because the volume of the discharge was less than last year, or because a portion of it found a lateral escape, there was no effect produced in the disturbing the joints of the street mains.

The effect is plainly due to the sudden and explosive expansion of the gas in the mains, at the point of electric discharge, notwithstanding the enormous extent of the metallic circuit, over 20 miles of pipes of 3112 inches diameter, all buried in moist earth, the restoration of electrical equilibrium cannot be accomplished without this hitherto unobserved effect of expansion on the gas in the mains.

At the conclusion of the reading of the paper, Prof. Henry gave the results of his own observations of these subjects. He said the thunder-cloud is usually positively electrified, and consequently all conducting bodies at or beneath the surface of the earth are by induction electrified negatively. There is, therefore, an attraction between the bodies, and the discharge from the

cloud to the earth is the result of this attraction, and not that of the rod itself. The discharge is then between the cloud and the conducting matter, such as the plexus of gas and water pipes, which extends for miles under a city, but in its passage the discharge follows the line of "least resistance." On this account it sometimes leaves the rod and passes through several feet of air or even of brick-work; hence it is important that the rod should be connected with the water mains or gas-pipes of the city.

Rev. George Jones of the U. S. Navy, then read an interesting account of observations on "The occasional luminousness of the atmosphere on the summits of the Andes."

Baron Humboldt, in Cosmos, he said, speaks of a luminousness in the atmosphere in Germany, about the year 1833, so great that people could see to read fine print. This, said the Rev. gentleman, is only to be found mentioned in Humboldt's book, and he had not been able to find mention of it elsewhere.

In 1856-7, while in Quito, Mr. Jones said he had observed a similar luminousness, not constant, but occasional, and he made records of the phenomenon. He was told by Col. Lanegan, an Irish gentleman, that this light had been often observed by him while there during the night, and it had the appearance of day breaking, so much so as to induce him to commence his journey. Occasionally, during the time of so travelling, it would become dark, so that he could not see at all.

This, said Mr. Jones, induced me to make enquiries from others at Quito, and I found that it was a circumstance often occurring, particularly on the mountains. Mr. Jones said he could not account for this phenomenon, unless it was that all space was filled with nebulous matter--that nebulous matter is self-luminous, and that it is sometimes swept by us in dense waves. Mr. Jones acknowledged that his theory was far-fetched, and he introduced the subject for information.

Prof. Elias Loomis, of New York city, then read a paper on the European storm of December 25, 1836.

He said that about Dec. 25, 1836, a very violent storm of rain and snow was experienced over a large portion of Europe, and in England it was particularly severe, and the Professor read the following extract from the London Times on the subject:--'Never before within our recollection was the London mail stopped for a whole night within a few miles from London, and never before have we seen the intercourse between the Southern shires of England and the metropolis interrupted for two whole days.' The rain and snow, continued the Professor, formed nearly a circle of 1500 miles in diameter. North of Switzerland the moisture was precipitated in the form of snow and in the South in rain; in Florence the rain exceeded three inches.

Over almost the whole area of the storm the barometer was below its mean height; at the centre it was depressed one inch <u>below</u> its mean height, while at Iceland it stood more than an inch <u>above</u>. The point of greatest geometric depression was near Switzerland, or about the centre of the storm.

Throughout the entire area of the rain and snow, the winds, for several days, exhibited a tendency to crowd spirally inward towards the centre of the storm, circulating round the centre in

the direction contrary to the motion of the hands of a watch, and this was particularly noticeable from the 24th to the 28th of December.

From a comparison of this storm with the American storms of Dec. 20th, 1836, and of Feb. 4th and 16th, 1842, the Professor has been led to certain generalizations, some of which were substantially the same as those given by Mr. Espy in his fourth Meteorological Report, but he said that Mr. Espy's conclusions are only true when applied to American storms.

Prof. Loomis then gave his generalization, which was quite thorough and necessarily lengthy, but unless a full report were given, it would only mar the object of the author.

This closed the business of the forenoon.

AFTERNOON SESSION.

Prof. J. H. Coffin read a paper "upon the winds of the Southern Hemisphere." The resultant of all the winds is calculated: that is, it is found where, if a balloon is sent up from any place, it will come down, in what direction, and the ratio of its final distance from its starting point to the whole distance gone over. The results embody the result of observations every day for 600 winters and 300 summers. The observations of the high latitudes are very unsatisfactory, still it is very clear that there are three zones of winds, the torrid S. E. winds, the temperate N.W. winds, and the arctic winds. The theory was that the air in each zone circulated by itself. Upon the divi- /torn original.../ the zones there is and should be, by /torn original.../ precipitation of rain.

/Torn original.../ -ified to the originality and research /torn original.../ -estigations.

/Torn original.../ "Upon the causes of Variation /torn original.../ Seasons," by Prof. G. W. Burnap.

This was a finely written resume of a theory of the weather. Some original suggestions were made, but space does not permit a detailed account. No remarks are made upon the paper.

The afternoon proceedings closed with a paper on the atomic weight of Lithium by J. W. Mallet.

It was noticed that the new atomic weight of Lithium, which was brought forward by the author at the meeting of the American Association in 1856, had since that time been confirmed by Dumas and controverted by Troost. It was shown that the objections of the latter to the method employed had in the author's famous paper been fully considered, and modes of obviating them given. Sources of error in Troost's own method were pointed out, and the author's former determination of the equivalent of Lithium was confirmed by new experiments upon the sulphate. The number 7 on the hydrogen scale, or 87.5 on the oxygen, may be taken as the true equivalent.

The meeting then adjourned.

SECTION M--NATURAL HISTORY AND GEOLOGY

In the meeting of this Section, Prof. A. H. Worthen, State Geologist of Illinois, was called to the chair, Prof. E. Hitchcock being absent.

Mr. W. P. Blake gave a recapitulation of his paper read on Saturday, on the Geology of the Rocky Mountains, preparatory to a discussion on the same. He said he took it for granted that it was generally admitted that the coal measures gradually thinned out from the Appalachians westward, and he wished to show that there was a point where this thinning ceased.

Prof. Leslie doubted the thinning out alluded to by Blake, as he thought the paucity of the coal measures in Arkansas, Missouri and Iowa was not due to the decline of the sediment per se, but rather to the effect of erosion dowwards, towards the basis of the measures.

Prof. Hall, State Geologist of New York, agreed with Mr. Blake, as he had found that the sediments thinned out towards the west. The discussion was taken part in by Sir W. E. Logan of Montreal, Prof. T. Sterry Hunt of Montreal, and Prof. Dewey of Rochester, and was continued until the hour of adjournment.

AFTERNOON SESSION.

Mr. E. Hitchcock, Jr., exhibited the Beluga Vermontana or Fossil Whale, to the meeting. It was found in Charlotte, Vt., in August, 1849, during some excavations made in that place for the Rutland and Burlington railroad. The bones were put in the hands of the lamented Prof. Thompson, who preserved them in their present condition (except the mounting.)

The skeleton, said Mr. Hitchcock, is sadly defective, since the Irish laborers supposed the bones, at first, to be merely those of a horse, heedlessly breaking them up and dumping many of them off the sides of the railroad embankment. The head was so badly broken that it was found impossible to attach it to the vertebral column. Enough, however, was left to show the two spiracles characteristic of the cetaceans. Nine conical teeth were also found, which were considerably worn, showing that it was not a young animal. Of the 50, or perhaps 52 vertebrae which belong to the genus Beluga, but 41 were found; the remaining 9, with the exception of the first, I have endeavored, said Mr. Hitchcock, to represent by rude carving from wood, the deficiency in teeth. The caudal vertebrae, particularly the last ones, are flattened horizontally, giving another indication of the whale family. The total length of the vertebral column, including the inter-vertebral cartiliges, must have been 137 inches, and this with the head and caudal, five, must have made the animal about 14 feet in length.

Of the five chenon bones which belong to the Beluga, only one is missing, and two of them are perfect. The ribs are very badly broken, though at least four are perfect. Their whole number was 26. Several of the stern costal bones are also missing. Of the anterior extremities many of the bones are wanting.

The most remarkable bones of this animal were the hyoides and sternum. The former measures eight inches across at its bifurcated points, and the latter is 15 inches long and from 3 to 7 inches wide; and, unlike the sternum in most animals, it is of very great firmness and consistency, evidently containing a large portion of earthy matter.

Prof. Thompson, who discovered the remains, found a very close

resemblance to the white northern whale, except in the dental formula in which there is a manifest discrepancy, and there are other differences in the width of the maxiliary and inter-maxiliary bones, as well as in the outlines of the head, which led Prof. Thompson to call this a new species, and give it the name "Vermontana," in commemoration of the place of finding it.

Dr. Hitchcock said he had brought the skeleton to the meeting, hoping to obtain information in regard to it, so as to enable him to prepare a correct description of it prior to its location in the State Cabinet of Vermont, and that Prof. Agassiz had examined the bones and said that while he could not say that it was that of a whale, yet it was very like one.

Sir W. E. Logan of Montreal, said that a similar skeleton, or rather 19 of the caudal bones of a similar kind, had been found in Canada some time since, 15 feet below the surface and 100 feet above the ocean's level in a clay pit. With these bones were found five varieties of marine shells, woods and plants, as also the bones of a seal. He had no doubt the bones were those of a whale, and that it was similar to those in the Gulf of St. Lawrence.

Prof. L. H. Morgan of Rochester, N. Y. then read a very interesting paper on the Indian mode of bestowing and changing names, which, as was the case in his previous paper, showed a thorough acquaintance with the Red man and his customs, and a determination on the part of the gentleman to prove his theory, that the American Indians all sprung from one ancient tribe.

Sir William E. Logan of Montreal, read the next paper. His subject was the "Contribution to the History of the Laurentian Limestones."

This was a continuation of a previous paper read by the gentleman, and for its interest was principally dependant on the former one.

The next paper read was "On the origin and formation of Silicious rocks," by Prof. T. S. Hunt of Montreal. It was a purely scientific production.

He was followed by Dr. Joseph Le Conte of Columbia, S. C., who read a paper "On the formation of Continents and Oceans," occupying upwards of half an hour, when the Section adjourned to Tuesday morning at 9 o'clock.