

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 maxillary and inter-maxillary 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.

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

1859 Boston Daily Evening Traveler, 10 August, p. 2, c. 4-5.
Fisch, First Supplement.

FROM OUR SPECIAL REPORTER.

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

SPRINGFIELD, August 9, 1859.

SIXTH DAY--TUESDAY.

The general meeting was held at 10 o'clock, and notwithstanding many of the members had left town, there was a good attendance.

The Standing Committee recommended Newport, R. I., as the place for holding the next annual meeting. This was accepted, and Newport decided on, the time to be hereafter fixed.

The same Committee reported the following list of officers for the next annual meeting:

President--Prof. Isaac Lee of Philadelphia.

Vice President--Dr. B. A. Gould, Jr., of Cambridge.

Secretary--Prof. Joseph Le Conte of Columbia, S.C.

Treasurer--Dr. A. L. Elwyn of Philadelphia.

The list, as reported by the Committee, was elected unanimously.

An earnest recommendation from the same Committee was announced to the effect that the Standing Committee consider the expediency of making arrangements for a winter session at some one of the Southern cities next year, viz.: the winter of 1860-61. This was endorsed by the unanimous vote of the meeting.

The same committee recommended a vote of thanks to Prof. Caswell, for his able valedictory address, and that 250 extra copies of the same be printed by the Association and granted to Prof. Caswell for his use. This recommendation was also unanimously passed.

An abstract of a communication from Lieut. Gillis, of the U. S. Coast Survey, was given by the Secretary, in which he referred to the late Chilian scientific expedition, and as hopes are held out of success in another expedition, he, Lieut. Gillis, desired the further assistance from the astronomers of the North, and the co-operation of the Association. The Secretary said the utmost exertions of scientific men would be necessary on the approaching transit of Venus, and he hoped the Association would do all in its power to assist Lieut. Gillis in ascertaining the solar parallax of Mars and Venus. He said the communication was too long to detain the Association by reading in full, and he merely

gave the substance, as instructed by the Standing Committee.

He closed by offering a couple of resolutions--one commending the enterprise of Lieut. Gillis, and the other that a committee of seven be appointed by the President to confer with Lieut. Gillis on the subject.

Both these resolutions were unanimously adopted.

On motion of Prof. Caswell it was voted that the communication of Lieut. Gillis be received and printed in the proceedings of the meeting.

The various sub-committees were called on for reports, but none being made, the committees were all continued.

The question of amendments to the constitution then came up, the motion being to adopt the amendments as proposed at the Montreal meeting.

The first amendment proposed to divide the Association into two classes--the first to be composed of those members devoting themselves to scientific pursuits, and the second of those interested in science, the latter to be called associate members.

The second amendment was that none but members of the first class should be eligible for officers of the Association, or to become members of the Standing Committee, nor should they be allowed to vote at such elections.

A warm debate took place on this question, which was participated in by Prof. Dewey of Rochester, Mr. Hyatt and Dr. Frank Tuthill of New York, in opposition to the amendments, the latter gentleman finally giving them their quietus, and Professors Bache of Washington, Chauvenet of Annapolis, and Caswell of Providence, and Dr. Gibbon of North Carolina, in favor of the passage.

Dr. Tuthill moved, in a strong speech, to lay the whole matter on the table, and on the vote being taken, the proposition was carried by a vote of 36 to 26.

The President then announced that the Standing Committee recommended that Prof. Joseph Henry be invited to deliver a lecture before the Association at its next annual meeting, on Meteorology; also that Prof. A. D. Bache be invited to deliver an address on the Gulf Stream on the same occasion; also that Dr. Joseph Leidy of Philadelphia be invited to address the Association on Mamalia and Reptilia, on the same occasion.

It was also recommended that Prof. Joseph Henry be requested to prepare a memoir, to be read before the Association, of the scientific services and contributions of the late Dr. Robert Hare. All the above recommendations were adopted by the meeting.

The Standing Committee recommended that no action be taken in regard to the election of lady members of the Association, as they were now eligible.

The meeting then adjourned to 7½ o'clock in the evening to meet at Hampden Hall.

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

This section met at 11 o'clock A. M. Prof. Stearns was appointed chairman for the day. A paper was read by Prof. Joseph Le Conte, of Columbia, S. C., on the "Correlation of Physical and Chemical Forces." This was an application of the principle of the

conservation of forces to the animal and the plant. Upon this principle he explained the double respiration of plants, the growth of animals and plants, with many other minor phenomena, without introducing two opposing forces, as is done by Liebig and most other physiologists.

Prof. Henry remarked that the communication was not a mere barren speculation, but was fruitful in results and formed a formula upon which to base many experiments. He said that he had arrived at some of the same results as Prof. Le Conte by a somewhat different way.

The next paper was on "The Disappearance of Ice in Northern Lakes," by Gen. J. G. Totten; read by Prof. Bache.

The ice was found to consist of right prisms, the limits of which are determined by the bubbles of air forced out radially when the freezing takes place, and which interrupt the crystallization. He said the natural action seems to be that the early rains of spring throw upon the surface and by the triturations pour under the fields of ice frequent supplies of water, at a temperature melting even at first, and rapidly rising with the progress of the year. This warm underlying water, acting chiefly upon the porous spaces between the prisms dissolves them out of the full depth to which the ice is immersed, and perhaps still further by capillary action. At the same time, the spongy ice formed upon the upper surface by melted and re-frozen snow, affords warm water, by melting and percolation, to affect similarly the porous spaces between the tops of the prisms.

Profs. Henry B. Silliman, Jr., E. Loomis, and Caswell offered remarks on this paper.

The Section then took the dinner recess.

AFTERNOON SESSION.

The section met at 4½ P. M. The first paper was entitled-- "Vital observations and statistics," by Prof. E. B. Eliot. This was an account of the principal vitality tables.

The next paper, read by Prof. Hilgard of the National Coast Survey, was a "Description of a self-recording instrument for taking the sun's altitude without an artificial or natural horizon," by John Oakes.

This was a method of taking the altitude of the sun when the horizon is obscured. The interior of a silver hemisphere was coated with the iodide, as in the Daguerreotype plates, and the sun's rays strike through a pin-hole at the centre. In this way the sun records its own place in the form of a line, owing to the motion of the ship, the mean point being its true place. The instrument can be used by any one who can use a quadrant.

The next paper was "On magnetizing Locomotive Wheels," by Prof. E. W. Serrell.

By magnetizing wheels, an additional adhesion of over 75 per cent was obtained. No difference in the effect was caused by the motion of the wheel.

This being all the business before the Section an adjournment, sine die, was carried.

AFTERNOON SESSION--SECOND DIVISION.

This division assembled at 4 o'clock, Prof. Peirce commencing the afternoon session by reading a paper on "the causes of changes in the earth's temperature." The Professor showed by a long array of figures that the changes could not occur from the interior heat of the earth nor yet from the celestial spaces, or stars, and he could only account for these changes by attributing them to the change in temperature of the Sun itself, although he considered it "was an unscientific recourse to be driven to, and one to be avoided, yet he thought it was the only one open."

Prof. Loomis thought that the cause that Prof. Peirce regretted being driven to, was very plausible, and was in accordance with the hypothesis with regard to the solar system under the development of the laws.

Suggestions were made by Prof. Joseph Le Conte, and Messrs. J. Hyatt and E. C. Coffin, the latter of whom suggested the electric light as probably tending to solve the problem.

Mr. James Hyatt then read a paper "on the cause of steam-boiler explosions." He commenced by saying that he had been a close observer of the number of explosions of boilers that occurred in this country, that the number averaged one in each fortnight, and he considered that every explosion was the result of a too high pressure of steam. He said that water heated to 212 deg. would give a pressure of 15 lbs., and this would, by the same table, with the water at 868 deg., give a pressure of 7680 lbs., which was "red heat," when the iron would begin to become soft. He remarked that steam increased very quickly, and the inattention of the person in charge of a boiler for a very few minutes might result in a rapid generation of steam, and thus an explosion take place.

He then suggested that, in a steamboat, if the flues were exposed, and thus heated, and the small quantity of water in the boiler being suddenly, by a lurch, thrown on these flues, would account for many of the explosions reported. He spoke of the law in relation to the inspection of the boilers of steamboats, requiring the testing of them by hydraulic pressure, and the licensing them to run a year at three-fourths of the testing pressure. This he considered too high, as a boiler necessarily wears much in that length of time, and he thought half the test pressure was all they should be allowed to use.

As an illustration of the immense power of steam, he said that 50 barrels of water heated to a pressure of 1,100 pounds to the inch, would be sufficient to lift 2,000 heavy freight trains of 30 cars each, with engine and tender.

He said he was desirous of bringing the subject before the Association in order to have the opinions of members on it, and that his opinion, as previously expressed, was that all explosions occurred from over pressure.

Prof. Henry spoke of the latent heat and the sensible heat being the same, a simple heat of 212 deg. added to a latent heat of 972 deg. being equal to 1184 deg., and further that a simple change of condition would double the steam in the boiler. He said he had been consulted on the subject of electricity causing the explosion of boilers, but he was satisfied there was no cause to

suppose so. He further stated that if a boiler be placed on glass pedestals, while it contained water generating steam, it would exhibit strong signs of electricity, mainly on account of the water, while if nothing but dry steam were there there would be no such signs.

Prof. B. Silliman, Jr., considered the theory of Prof. Henry a very valuable one, and thought it would lead to the solving of a difficult problem.

There being no other business, the division adjourned sine die.

SECTION B.--NATURAL HISTORY AND GEOLOGY.

This section met at 9 o'clock, when Prof. J. D. Whitney was called to the chair.

The first paper read was by Prof. Whittlesey, on "the origin of the Azoic rocks of Michigan and Wisconsin." In the absence of Prof. Whittlesey, Prof. Whitney read the paper. In it the author gave it, as his opinion, that the argillaceous rocks of the region spoken of did not contain any alkalis.

Prof. T. S. Hunt thought he must be mistaken, as his own investigations in Canada led him to the belief that alkalis would be found in all this class of rocks.

Prof. J. H. McChesney, read the next paper on "the relations of the upper carboniferous rocks of Illinois, to the older members of the Palaeozoic System."

The Professor exhibited the want of conformity between the upper carboniferous strata and the lower salurian, as mentioned in the writings of Prof. Hall. The author said there were numerous indications of denudation in the upper salurian and devonian rocks, but he had only found one instance in the limestone formation.

He illustrated a peculiar characteristic of these rocks, which was the sudden change in the fossil flora and fauna in the basin from the mountain limestone to the lower carboniferous, which indicated that a long period must have elapsed between the formations of the two periods.

Prof. A. H. Worthen said the want of conformity mentioned was remarkable in the Illinois coal measures, and there was also a remarkable fact that there was a want of continuity in the Illinois coal seams, and the fact had recently been brought to light that what has heretofore been considered the centre of the great Illinois coal basin was comparatively destitute of coal.

Prof. A. H. Worthen, State Geologist of Illinois, delivered some remarks on the discovery of a terrestrial Flora in the mountain limestone of Illinois. He said the most interesting portion of his address was the assertion of the fact, that the discoveries alluded to afforded evidence of land plants in a position in which they were not found in the rocks of other sections, none but marine organizations having been found in the Devonian beds of New York and Nova Scotia. These were the usual fossils of the mountain limestone, not belonging to the coal measures proper.

A short discussion followed, when the section adjourned to attend the general meeting.

On re-assembling, the first paper read was by Prof. J. D. Whitney, "on the stratigraphical position of the sandstone of the Connecticut River valley." This forms two basins, a small one in Massachusetts, and a large or lower one, extending through the whole State of Connecticut, to the mouth of the river. The lower basin, said Prof. Whitney, dips to the East 12 to 15 degrees, and he accounted for the formation of the strata by expressing an opinion that it was from the westerly currents, more or less violent, crossing the basins, the whole width of the lower basin, being from 25 to 30 miles.

Mr. Charles H. Hitchcock dissented from the cause assigned by Prof. Whitney for the formation, as he considered, from surveys he had personally made, that the granite found among this sandstone did not exist to the west of the basins, but such did exist in considerable quantity in the north.

Prof. Whitney contended that it would be impossible that the strata could have been deposited in a horizontal direction, as it was clearly demonstrated that the sandstone at Turner's Falls had been upheaved by the trap, thus showing the manner of formation fully.

Prof. T. Stern Hunt, of Montreal, then read a lengthy but well prepared paper "on the formation of Gypsum and Magnesian rocks." It was purely scientific and not of general interest, but was warmly applauded on his resuming his seat, Prof. Leslie remarking, on the Chairman calling for discussion, that he did not consider the Section competent to discuss it.

Prof. W. P. Blake then gave an account of a remarkable vein of gold in the bed of the Chestatee river, Georgia. He exhibited specimens of the gold-bearing quartz found there, very rich in the precious metal.

The last paper of the morning was read before this Section by Mr. C. H. Hitchcock of Amherst. His subject was "The so-called Talcose Schist of Vermont." He said he could not trace the difference between Talcose schist and Gneissoid rock, and as there was a doubt about their being the same, he recommended the retention of the first mentioned name for the present at least.

The Section then adjourned to 3½ o'clock.

AFTERNOON SESSION.

The first paper read at the afternoon session of this Section was by Mr. Clinton Roosevelt. His subject was "On the paradox of the co-existence of Excessive Production and Excessive Population." This was a peculiar paper, and the ideas advanced were of a singular character.

The next paper read was by Mr. E. B. Andrews on "the vertical planes in bituminous and other coals." He said these planes had been supposed by some to be the effect of uplifting of the earth, but he thought the supposition incorrect from the appearance of the specimens he had obtained. In Southern Ohio these veins run nearly east and west, as is shown at the Pomeroy mines, and the author said he understood it was the same in Illinois. He said his object was to have the matter discussed so as to ascertain whether these planes were uniform over the country, and then to

determine whether the cause of this was electricity or magnetism. He hoped to lead the Association to investigate the subject, so that at the next meeting some correct conclusion could be arrived at.

Prof. Leslie said that from all he had observed, all coals presented the appearance shown in the specimens exhibited by Mr. Andrews, but he could not account for it, as he had never investigated the matter, and he wanted light on so dark a subject.

Dr. J. H. Gibbon then read a very interesting paper entitled "The obsolete Alphabetic letters discovered among the monuments on the American Continent."

He said the characters or letters he should refer to were found in Central America, in the valley of the Oronoko, in Western Virginia and in Wisconsin. The art of alphabetic writing, said he, was known in the East in the earliest periods, but the Indians never knew it. It was supposed by learned men that the Ten Commandments were written in alphabetic character, from the fact that they were described as being written plainly, thus showing that it was not written by pictures. The first record of inscriptions shows that they were made on rocks, and it is a curious fact that the bevelled rocks found in Phœnicia, in Judea, are only found on our Continent, in Central America and Peru.

Dr. Gibbon said these rocks appeared to him to be a representation of the sacred letter which is an upright representing exactly a pair of scales on a cross. He spoke of the discoveries of Layard, Stevens, Schoolcraft, and others and said that there were mounds representing fishes, beasts and birds, in Central America, which he supposed to be the signs of the different tribes. There were also arms unlike those ever used by our aborigines, but swords, knives and daggers similar to those used by the Asiatics. The Doctor supposed from these discoveries that the strangers who came to this Continent had two alphabets, and further that Indians overcame the Eastern strangers and compelled them to represent themselves as conquered on their tablets as represented in "Stevens' Travels."

If, said the Doctor, the hieroglyphics are read aright by us, it appears certain that the four great races that compose the human family existed, at a period long distant on this continent. He concluded his paper by speaking of the resemblance between these characters and those found on the monuments described by Mr. Lapham, and found in Wisconsin.

Prof. Andrews said that a small image had recently been discovered in Marietta, which was evidently of Asiatic origin.

Mr. W. P. Blake then read an interesting paper "on the Minerals and Ancient Mines of the Cherokee Valley River in North Carolina." He said it was supposed from the traditions among the Indians as to the appearance of the men who worked these ancient mines, that they were De Soto's party. He said that from an examination of them the shafts were better sunk than in the mines of our own day, but their antiquity is placed beyond a doubt from the heavy growth of timber which covers them up.

The Section then adjourned sine die.

EVENING MEETING.

In the evening the Association met in general session at Hampden Hall, after which the Association adjourned to meet at Newport on the First of August, 1860.