knowledge are to individual success. When regarded in their relation to society, those decencies, which have been aptly denominated "the minor morals," rise at once to importance, and demand the utmost care at the hands of those to whom the training of the youth of a country is intrusted.—*Burrowes.*

II. MEETING OF THE AMERICAN ASSOCIATION FOR THE PROMOTION OF SCIENCE.

This body held its annual meeting at springfield, Mass., under the presidency of Dr. Alexander, last August. There was a good attendance, and many interesting papers were read; the whole number registered being 108. Dr. Isaac Lea of Philadelphia was chosen president, and Dr. B. A. Gould, jr., of Boston Vice-president for the next year. The association to meet at Newport, Rhode Island, on the 1st of August, 1860.

From the reports of the meeting we extract the following abstracts of several papers, which may prove interesting to our readers:

1. PROGRESS OF METEOROLOGY IN EUROPE AND AMERICA.

Professor Henry of the Smithsonian Institute, said that extensive operations had been made in Europe and this country, by the British admiralty, the French government, the States of New York and Pennsylvania, and by the Smithsonian Institute. The Institute had purchased many hundred instruments which had been distributed over the country, but only a series of observations extending over many years could be of value. There are 350 observers in the United States who make observations three times a day. He proceeded to give some general views of meteorology. The general idea of the motion of the atmosphere was from Hadley. The moving power in meteoric changes was the sun. It was originally supposed that the currents of air flowed from the equater to the poles, but that could not be true; on account of the convergence of the meridians, there was no room for the air at the poles. There were middle systems, of intermediate currents of air. But these points were not fully established. There were exceptions in the general action which could be determined in their general bearings only by long observation. One cause of the fitful disturbances of the atmosphere was the conversion of water into vapor. During a single shower an amount of water fell upon the Smithsonian Institute building equal to 20,000 horse-power an hour; that is to say the heat necessary to evaporate it would be equal to that required for working an engine of twenty thousand horse power an hour. Another cause of disturbance was the motion of the earth itself upon its axis. In illustration, diagrams were given showing that the currents of air moved in circles,—that the same quantity of air that moved north must come from the north, of course not in the same track. Observations made tended to show a series of currents completely around the earth, north and south of the equator, also in the temperate latitudes, and in the Arctic circles. The calms at the equator, it was shown, were caused by the upward currents of the air,—currents coming from the north and south and rising over the equator, under the influence of heat.

In regard to the meteorology of our own continent, it was shewn that there were four circles,—two in the Atlantic, one of which, the Gulf Stream, completes its circle once in three years, one in the Southern Atlantic, one in the Northern Pacific, and one in the Southern Pacific. These are sub-divided into minor currents. It is found that the cold Arctic current setting south from the coast of Labrador, passes through the Gulf of St. Lawrence, while the ice which comes down sets eastward towards Europe. Between these there is produced the disposition of vapor or fog on the banks of Newfoundland. He had been assured by Mr. Wise, the æronaut, that out of 200 ascensions, he had always been enabled to move east on reaching an upper stratum of air. He (Prof. H.) therefore did not think it impossible that an ærial voyage could be made to Europe. Success would greatly depend upon the ability to make the balloon air-tight. If kept in the upper strata, it might succeed, although it was not certain there was not a reverse current in mid-ocean. In the lower strata there were irregularities which must be avoided. The balloon he considered as an important means of meteorological observation; by it, electrical phenomena and the formation of clouds could be observed. The reason why the English meteorologists had failed to make any satisfactory observations was because they lived on the western side of a great continent, with no opportunity to make observations west of them, while we lived on the eastern side of a great continent, with telegraph lines extending inland thousands of miles. He gave an account of the method of observation pursued each day at the Smithsonian Institute. They have a map of the United States hung upon a board, with pins stuck through it at the points where the observers of the Institute are stationed. The Institute has daily reports by telegraph from many of these points. Each morning an assistant hangs a cord on the pins to indicate the state of the weather—black if raining, green if snowing, brown if cloudy, and white if fair. All storms travel east, and thus they are enabled to predict with great certainty the condition of the weather twelve hours in advance. Meteorology as connected with agriculture, was then considered. It was shown that the fertility of the soil of the United States was owing to the currents from the Mexican Gulf and the Pacific; and it was shown that the climate of the 100th meridian must forever be unfruitful, unless trees should be planted, which might modify it somewhat.

2. FORMATION OF OCEANS AND CONTINENTS.

Prof. Joseph Le Conte, of South Carolina, endeavoured to prove the truth of the theory of Prof. Airy as to the laws governing bodies floating upon fluids, which he considered as explaining the phenomena of continents, oceans, and volcanoes, upon the supposition that the inside of the earth is fluid and enclosed by a crust. Prof. Le Conte gave an elaborate explanation illustrated by diagrams of different bodies floating upon water, proving that the under surface of such bodies may be judged of as to their configuration by a simple inspection of their upper surface. If there is a general rising or depression of the upper surface from the margin towards the middle we may be absolutely sure there is a general projection or hollowing of the under surface corresponding; in a word, the general outline of the two surfaces is similar. If the surface of the earth is raised by continents, a corresponding thickness or elevation must be found inside, a swelling inward of the crust; and if the outer surface is depressed as in ocean bottoms, there the inner surface is hollowed out, making the middle of the bottom much thinner than the edges. The speaker from the evidence adduced to prove these general ideas, assumed that the centre of the earth was fluid, that the crust floats upon its surface and is subject to the laws of floating bodies. The laws and conditions under which this crust cooled and its state when solidified were then scientifically explained at length, as tending to confirm the generally accepted theories as to the fluidity of the central mass. This theory, the speaker remarked, would satisfactorily account for the distribution of volcanoes, if not for the phenomena. He admitted that volcanoes were the most difficult of explanation of all the igneous phenomena in nature, and although gases and vapours are probably one cause of the eruptions, yet he thought few physical geologists would admit the local pressure of gas as the only or even the chief cause. The great general cause, he thought, might be the reaction of the crust upon the interior fluid, and gave his reasons therefor. At any rate the disruption of the crust should take place in the thinnest part as the bottom of the sea, and the next place should be the next weakest part or the margins of the sea, and these are exactly the places where the volcanoes occur. Of 225 active volcanoes mentioned by Humboldt, 155 are situated upon islands in the ocean, and of the remaining 70 almost the whole are situated near the sea-shore, while but very few are found in the interior of continents.

3. GYPSUM AND MAGNESIAN ROCKS.

Mr. T. Sterry Hunt, of Montreal, showed that besides those gypsums formed by the alteration of beds of limestone, another class, by far the more important, comprehends those gypsums which have been deposited directly from water. Such may be produced during the evaporation of sea-water; but Mr. H. has recently shown that sulphate of magnesia is decomposed by solution of bicarbonate of lime, giving rise to gypsum, which is first deposited, and a more soluble bicarbonate of magnesia, which by further evaporation is separated as hydrous carbonate, either alone or mingled with carbonate of lime. When these magnesian precipitates are gently heated under pressure they are changed into magnesite or dolomite. Thus are explained the magnesian rocks associated with gypsums and with rock salt. The action of solutions of bicarbonate of soda may in like manner separate the lime from sea-water and give rise to solution of bicarbonate of magnesia; in this way are formed the megnesian limestones which are not associated with gypsum. The intervention in this process of the waters of alkaline metalliferous springs will explain the metalliferous character of many magnesian rocks. The source of the bicarbonate of soda has been the decomposition of feldspathic rocks to form clays and clay slates. The action of this alkaline carbonate upon the lime and magnesian salts of the primitive sea has been the source of limestone and dolomites, as well as of the sea salt which we find in the ocean, at the same time that the intervention of the carbonic acid of the atmosphere which has been through the medium of the soda, fixed in the form of carbonate of lime, has served to purify the air and fit it for the support of higher orders of plants and animals. In this relation between the atmosphere, the argillaceous rocks, the limestones and the salt of the sea, we have a remarkable illustration of the balance of chemical forces in inorganic nature.