ing the adoption of the report, some of the older members of the board of education seemingly regarding the proposed innovation as a reflection on the character of the education now given, and therefore opposing it.

Unfortunately the special committee was defeated in its request for immediate action; and, as the report was referred to the standing committee on the course of study, it is hardly possible that, even if it is finally adopted, any thing can be accomplished under it for another year. But the report itself, the favorable reception it has met with in the press and among all intelligent citizens, and much of the discussion concerning it in the board of education itself, clearly indicate that this proposed advance in the common-school system of the metropolis will soon become an accomplished fact. It is only a question of time now, and we trust of a short time.

ANNUAL MEETING OF THE NEW ENGLAND METEOROLOGICAL SOCIETY.

THE third annual meeting of the New England meteorological society was held at the Institute of technology, Boston, Oct. 19. Prof. J. D. Whitney read a paper on 'Rainfall statistics in the United States,' considering especially the statements that have been made concerning the increase of rainfall on the western plains as a result of cultivation of the ground. These statements are considered altogether untrustworthy. In dry regions the amount of precipitation is generally variable. The records kept in the west are seldom of long enough period, of sufficient accuracy, or of sufficient uniformity, to decide so large a question. Moreover, in the eastern part of the country, where long records have been kept, no definite variation in the precipitation is found.

Mr. S. A. Eliot read an essay on the 'Relations of forests to rainfall and water-supply.' The common opinion that forests increase and clearings decrease the rainfall was traced to the authority of eminent writers, based, not on well-kept observations of rainfall under these contrasted conditions, but chiefly on the well-known diminution of stream-flow in cleared districts. This, however, may be due to increased evaporation rather than to decreased rainfall. Forests undoubtedly retard evaporation of fallen water, but it is very problematic if they increase the amount that falls. Mr. Fitzgerald commented on this by referring to a statement, apparently on the authority of DeLesseps, that the rainfall along the Suez canal had increased since trees were planted there. On writing directly to DeLesseps, answer was received that he had made no such statement, and that there were no facts to support it. Mr. Davis added, that, if the causes controlling rainfall be separated into those dependent on and independent of forests, we find that the latter are now powerless to produce forests in forestless countries, such as those around the eastern Mediterranean, and therefore could not have originated the forests once there, unless formerly of different value from now; but, if it be admitted that these non-forest causes vary, the deforesting may be due to natural changes, not to the hand of man.

Several seismoscopes and a series of photographs illustrating the effects of the Charleston earthquake, lent by the U. S. geological survey, were exhibited and explained at the meeting.

In the absence of the director, Professor Upton, an informal report on the work of the year was presented by the secretary. Members now number 110, against 95 last year, and include well-known meteorologists outside of New England. The monthly bulletin has been regularly issued, and recent numbers include reports from 140 to 151 observers, against 123 last year. More attention has been devoted to improving the character of the observations than to increasing the number of stations. Free tests of instruments belonging to observers reporting to the society have been begun by Prof. S. W. Holman. Three valued observers have been lost by death, — Hon. Hosea Doton, Woodstock, Vt.; Dr. B. F. Harrison, Wallingford, Conn.; and Mr. R. H. Gardiner, Gardiner, Me. The records of the last two will be continued. Special investigations, supported by grants from scientific funds, have been undertaken: a report on thunderstorms in New England in 1885, by the secretary, is thus already distributed to members; and a report on the distribution of rain in cyclonic storms, by the director, is now in press. While such special studies are generously supported, the society still needs to increase its membership for the support of its regular work.

PARIS LETTER.

M. CH. ZENGER recently made known, at a meeting of the Academy of sciences, some interesting facts concerning the singular property that different substances have of giving luminous rays in darkness after having been exposed to solar or even diffused light. M. Zenger remarked that Mont Blanc emits, till about half-past ten in the evening, a peculiar blue-green light, very similar to that given by Lake Leman; and he believed that this light originates in the ice of the glaciers as well as in the lime of the rocks. Thinking it might be possible to take a photograph of

the mountain by night, he spread on a plate of glass a thin layer of phosphor of Balmain, and put it in the camera, exactly as if it were a sensitive plate. After a few seconds, the plate was taken out of the camera, and left in the dark, in contact with an ordinary sensitive plate. An hour after, this last plate presented a good photograph of the view which had been focused upon the phosphorized plate. Believing that carbonate of lime can, by exposure to the rays of the sun, absorb some light and give it off in darkness, although these rays may not be perceptible to the eye, M. Zenger allowed a phosphorized plate to remain at the focus of a camera for a quarter of an hour, at midnight, on the terrace of the astronomical observatory of Prague. This plate was then left for some hours in contact with an ordinary photographic plate; and the result was very satisfactory, since the monuments and towers whose invisible image had been concentrated on the first plate in the camera, came out very well on the second. Another experiment was the following: a piece of white paper, with a picture or some words written or printed on it, was left in the sunlight for an hour and then put in the dark, in contact with ordinary sensitive paper. The experiment succeeded well, and M. Zenger has since used this system to copy bills and notes. Of course, black parts come out white, and white ones, black. The general result of M. Zenger's researches is, that many substances absorb luminous rays during the day, and at night emit these rays in such a manner as to be able to impress sensitive plates, although they do not impress the retina.

The smallest country in Europe is not the state of Monaco, nor the republics of San Marino or of Andorre, as many think: it is a yet smaller territory, whose name is hardly known outside of its narrow limits, and compared to which the above-mentioned states assume a gigantic appearance. The territory of Moresnet is about halfway between Verviers and Aachen, between Belgium and Germany. It comprises six square kilometres and two thousand inhabitants, and is situated in a very pretty valley. It is completely independent. Its wealth consists mainly in tin ore. In 1815, after the Napoleonic wars, a committee was appointed to establish the frontier between Germany and Belgium. All went right till Moresnet was approached. Here the delegates disagreed. Each wanted Moresnet for his country on account of the riches under ground. As no understanding could be arrived at, it was agreed that this strip of land should remain independent, and belong to neither country. At that time Moresnet was a beggarly collection of some fifty huts: at present, although still a very young state, it is in a prosperous condition, and comprises more than eight hundred houses. Agricultural and industrial pursuits are carried on to a considerable extent. It is governed by a mayor, or burgomaster, chosen by two delegates, — one German, and one Belgian. This imposing official — a prosperous and hearty farmer — has a second, an old doctor, and presides over an assembly of ten, chosen by himself. This assembly does all the business under his supervision. Nobody votes in Moresnet. There is no military service, and only six francs taxes. The revenue amounts to about twelve thousand francs, and is quite enough to pay for the roads, schools, and the military force, which comprises one man of undefined grade. It would seem that the mayor ought to be satisfied with the state of things. Not so, however: this ambitious man wants to find mineral waters in his territory. But none are to be found yet, so he consoles himself by manufacturing soda-water. Another of his ambitions is that Moresnet should stamp its own stamps, and have his effigy on them. But the delegates from Germany and Belgium do not see the use of the thing.

Unfortunately, fish-culture amounts to nothing in France. Nobody seems to take any interest in it, nor to realize how very useful and profitable it might be to all if the rivers and streams were cared for, and fishes reared, and protected while young. The French fisheries are very poor indeed, and it would require an intelligent and energetic man to call the attention of competent authorities to the fact, and try to secure their good-will. River and pond fisheries amount almost to nothing, but as yet the marine fisheries have been very prosperous. This year, however, sardines are very scarce. This fact is a very serious one, since some sixty thousand persons are occupied in the sardine-fisheries. It seems that this fish is prevented from following its natural course alongside the French coast, from Biarritz up to Brittany, by the Portuguese fishermen, who, it is said, as soon as the fish arrive from the south, spread large nets, many kilometres long, in their course, and so prevent them from going any farther. So they all turn back for a while, but some time after, they try to pass. This gives the Portuguese a second fishing-season. The fact is, that in Portugal the fisheries are very prosperous, and that sardines are sold this year at the rate of a franc and a half or two francs per thousand. In France they are so scarce that they range between six and eight francs (the small ones): fine sardines are sold at from thirty-five to forty-five francs per thousand.

A new balloon has been recently tested in Paris. It was built by an engineer whose name is not

yet made known. M. H. considers that it causes great loss of force to put the motor power in the basket, and that, if it were applied on the sides of the balloon, a great deal less would be required to give much more satisfactory results, as the power would act at the point where the resistance is greatest. So he has given his balloon a cigar-like shape, and, instead of a propeller underneath it, he has used a pair of wings on the sides of the balloon: they are put in motion by electricity, which is generated in the basket, and conducted by two wires to the wings. With this contrivance, M. H. believes he can obtain the same results as MM. Renard and Krebs, with less power. A public experiment, some days ago, gave, it seems, very satisfactory results, and the balloon was worked very well. Another balloon is being prepared, and M. H. is confident that it will be quite a success.

M. d'Arsouval, an able physiologist, and assistant to Dr. Brown-Sequard, published some time ago some interesting facts concerning the production of heat in muscular tissue. The fact that heat is developed when a muscle contracts, is well known. Many physiologists have made the experiment, which consists in a repeated and violent stimulation of the motor nerve, inducing tetanic spasms and a rise of temperature in the muscles. M. d'Arsouval has shown that it is not necessary to stimulate the nerve in such a manner as to induce tetanic spasms: weak stimulations, that do not bring on any contraction whatever, being too weak to do so, are accompanied by a thermic rise. Of course, the rise is not a high one, but it is measurable. M. d'Arsouval does not believe that the development of heat in organic bodies is a primary fact: on the contrary, he thinks that electricity is the first agency, and that heat results from the transformation. However, new experiments are necessary to ascertain this point.

M. L. Grandeau, the director of the agricultural station of Nancy, has recently published two interesting papers concerning a trip he made in Switzerland, during which he gave much attention to the agricultural productions of that country. There are in Switzerland some 30,000 square kilometres devoted to agricultural pursuits, 21,600 to pasture-land, 7,700 to forests, and 300 to vineyards. The greater part of the 21,600 is merely pasture-land (70 per cent): the remainder (30 per cent) is used to grow wheat. The pasture-land is used only for cattle-raising. Horses would not do well in Switzerland, on account of the climate. In Europe the increase of population has been much greater than that of meat-production. There is less meat to be had to-day per individual than there was fifty or sixty years ago. Cattle-raising is a profitable business, but it cannot yet become important enough in Switzerland to allow of exportation. If some cattle are exported, many more are imported: the excess of importation over exportation is fifty per cent, and more. As most Swiss peasants have only one or two cows (38,000 have only one, and 52,000 have three or four), an association system has been organized in many parts of Switzerland, after an old custom of Franche-Comte. It works as follows: some twenty or thirty peasants put their cows together in a herd, sending only as many as the lands they dispose of in the mountains can feed. A man is in charge of the herd, who every day milks the cows and cares for them, and makes the cheese during the summer season. When the cold sets in, the herd is brought down to the valley, and the cheeses are sold. The profits are distributed among the proprietors of the cows, according to the quantity of milk given by each of them. This quantity is carefully noted every day by the milkman. The result is, that, as cheese sells much better than milk, the benefits for each proprietor are nearly double what they would have been had the milk been sold as such. The whey is generally used to feed pigs, but of late it has been proposed to make milk-sugar from it. One litre of the whey contains some four or five grams of this sugar, which sells at one hundred or one hundred and ten francs per hundred kilograms. In Switzerland as well as elsewhere, the association system among small proprietors or producers proves very profitable and useful. M. Grandeau gave an interesting account of his visit to the Swiss works of the Anglo-Swiss condensed-milk company, built in the village of Cham by your countrymen MM. Page. The idea of condensing Swiss milk originated in 1866, and was put forth by M. G. Page, at that time American consul in Zurich. He imported the instruments in use in the states, and began immediately. In 1867 the milk was furnished by 263 cows, and the works prepared 137,000 cans of milk. In 1886, twenty years after the first start, the works of Cham condense the milk of 8,000 cows (60,000 litres per diem), and sell some 15,000,000 or 17,000,000 cans.

We hear from Bologna that a committee has just been appointed to celebrate the centennial of the discovery of animal electricity by Galvani. It is a pity that frogs cannot speak, for the speech their delegate would deliver on that occasion would be worth while hearing. From the day Galvani noticed the movements which put him on the scent of his discovery, to the present minute, how many of these unfortunate creatures have died cruel and lingering deaths! The balcony is yet shown in Bologna on which Galvani suspended his

frogs, and where he noticed for the first time the facts that led him to his fertile discovery.

M. Brown-Sequard delivered a communication on *rigor mortis* at the last meeting of the Academy of sciences. It is known that this phenomenon is generally ascribed to an hypothetical coagulation of myosin after death. Dr. Brown-Sequard shows, that, if blood is injected in rigid limbs, rigor disappears immediately, and appears again if the blood introduction ceases. This fact has been noticed by him, even twenty-eight days after death. If, during the first eight hours after death, a limb is maintained in a state of constant agitation by means of some mechanical contrivance, no rigidity appears. It is to be noted, also, that cadaverous rigidity does not affect nervous excitability. Dr. Brown-Sequard does not believe in the theory of myosin-coagulation, and thinks that muscular tissue retains, after death, a particular sort of vitality.

M. Succi, concerning whose fasting experiment I gave you some particulars in my last letter, has victoriously achieved his feat, and is getting on quite well. He intends to renew the experiment in Paris. However, he is not considered as much more than a humbug; and to persons of a scientific turn of mind his experiment does not seem to have been conducted in a serious manner. As E. de Cyon remarks in a short but 'telling' paper on the subject, there is no proof whatever that M. Succi has not been able to feed himself secretly.

Among new books I must say a word of the memoirs published during the competition for fellowships in the medical school. Some subjects are interesting; for instance, 'On progress of teratology since Geoffroy Saint Hilaire' (by Princeteau), 'Muscular work and heat' (by Tapie), 'The origin of heat and power in living organisms' (by Lambling), 'Alkaloids of animal origin' (by Hugounenq), 'Pigments and coloring-matters of animal economy' (by Villejean), 'Air' (by Morelle), 'Calorimetry and thermometry' (by Malosse). Generally speaking, these memoirs are good and substantial, and they give a good idea of the present state of science concerning the questions to which they refer.

The professors of the different schools are coming back to Paris, and preparing their winter work. In the medical school some considerable material changes are being made. The new laboratories are ready, in the new building in front of the medical school, and the professors entitled to occupy them are going to move their instruments and books. Professor Vulpian visited his laboratory the other day, and was happy to see that he was to benefit by the change. The fact is, that the old rooms he has occupied in some old houses close to the school these many years are quite inappropriate for laboratory work, space and light being very scarce. In the new building, although he will have nothing very extraordinary, he will be much better off. But our best French laboratories are small and inconvenient when compared to German ones. Nevertheless, France can boast of many great physiologists, such as Magendie, A. Bernard, Vulpian. Fine laboratories do not create genius, but they help a good deal in making work easier and more accurate. V.

Paris, Oct. 15.

NOTES AND NEWS.

THE *Quarterly journal of economics*, announced by President Eliot of Harvard at the last commencement as having its origin in a fund of fifteen thousand dollars given to Harvard for the purpose by John E. Thayer, Esq., has appeared. While primarily an economic periodical, its prospectus does not exclude from treatment current topics in other branches of political and social science. In outward appearance the new *Quarterly* is very attractive, and the contents of this first issue are of excellent character and quality. Professor Dunbar, the editor, writes the opening article on 'The reaction in political economy.' To him "this movement appears to be no revolution, but a natural reaction, probably salutary, and destined to promote ultimately a rapid but still orderly development of the science, upon the lines laid down by the great masters of what is called the deductive school." In view of its historical and ethical aspect and its directing the attention of the economic world to new problems, Professor Dunbar thinks that the importance of this movement can hardly be overrated; but nevertheless it is not an absolute break, as is sometimes supposed, in the continuity of economic thought. The second article, by Mr. Arthur T. Hadley of Yale college, treats of 'Private monopolies and public rights.' It deals principally with the railroad problem. Mr. S. Dana Horton, whose reputation is international, writes learnedly and clearly on 'Silver before congress in 1886.' It is a strong argument for immediate action by congress in order to put an end to the 'present amorphous and anomalous state of affairs.' Following the leading articles come valuable notes and memoranda, and an interesting letter on economics in France by Arthur Mangin. The bibliography for the quarter is appended, carefully classified, and in an appendix is included a partial translation of Wagner's review of Cohn's 'System der national-ökonomie,' from a late number of the *Jahrbücher für national-ökonomie u. statistik*. The first number is in every way commendable, and we can