SCIENCE

FRIDAY, AUGUST 19, 1887.

THE MEETING JUST CLOSED in New York, of the American Association, has been generally voted a success. The attendance was not so large as had been hoped, but the character of the papers was satisfactory. Against the ordinarily large attendance at the meetings held in Eastern cities, there were this year registered not many over seven hundred. This may have been due partly to the late announcement of the place of meeting, and to a slight change from the usual date, — two circumstances which may have rendered it impossible for many to change their summer plans so as to allow of a week's visit to New York. The fear of hot weather in New York City has not been fulfilled. The next meeting of the association will be held at Cleveland, O. An invitation from Toronto unfortunately came just too late to allow of its being accepted. A list of the officers for the next meeting will be found in another column. In the general meeting of the association a few important resolutions were passed. The association expressed its opinion that the efficiency of the United States Geodetic Survey would be greatly increased if a superintendent were appointed who was thoroughly trained in the methods of geodesy; and it was resolved to ask the President of the United States to appoint a scientist to this position, instead of the present superintendent, who was only temporarily appointed. The second resolution which was passed by the association refers to the establishment of a bureau of standards, in which standard measures of electricity, heat, weight, length, etc., may be obtained. A motion of Prof. Cleveland Abbe was passed, requesting Congress to have an index of the publications of the Signal Service published. Scientists would be gratified if Congress should make a reduction in the tariff on scientific books and instruments.

THE SUBJECT OF MEDICAL LEGISLATION is attracting the attention of both the medical and legal profession throughout the country; and while it is generally conceded that the laws have in the past, either by reason of innate defects or their non-enforcement, permitted the practice of medicine by quacks and charlatans of the most pronounced type, still there is a sentiment, which is growing, that the State can go too far in its restrictions and exactions. This sentiment forms the basis of an address, entitled 'State Control of Medicine,' which was read before the Monroe County Medical Society by its president, Dr. Louis A. Weigel, the full text of which is published in the July number of the *Medical Press of Western New York*. In his opening remarks, Dr. Weigel says that it is usually considered absolutely necessary that there should be medical legislation to protect the public against quackery and imposture; that the lives of the people are directly endangered by incompetent and ignorant charlatans; and that it is the duty of the State to exercise a paternal control over its subjects, and dictate to them whom they shall employ when sickness invades their homes. He proposes in this address to investigate the practical results obtained by State interference in medical practice, and endeavors to show that no law has yet been passed which has had the slightest effect in suppressing quackery or protecting the community against imposture. The report of Drs. Dunglison and Marcy, a committee of the American Academy of Medicine appointed to ascertain the practical working of laws regulating the practice of medicine in the United States, is referred to at length by Dr. Weigel. The facts presented by this committee were obtained by correspondence with physicians in the various States and Territories. In New York the law has been inefficacious. From Michigan the answer came that the entire good of the law has been to give lots of quacks a legal standing. In Tennessee any and all may set up for physicians, and starve or make money, as the people decree. After referring to other States, the president says, "If any further proof of the inefficiency of legal enactment to suppress charlatanism is needed, I am at a loss to know what additional evidence I could present that would be more conclusive." He firmly believes, that, if no attempt at medical legislation had ever been made, the profession to-day would be held in higher estimation by the people, and occupy a still loftier position than now obtains. It is somewhat singular that the remedy for all this, in accordance with the view of Dr. Weigel, should be more legislation; and yet that is practically the outcome of what he proposes. He says that every year the multitude of medical colleges throughout the land send forth a large contingent of half-educated stupidity, endowed with the coveted half-yard of parchment, which a confiding public accepts as a guaranty of competency. It certainly has no standard to go by. The remedy for this suggests itself. The teaching and licensing bodies must be separated. The suggestion here made by the doctor is not a new one in this State, and is practically in operation in other States. It is more than probable that the next New York Legislature will be called upon to enact some such law as this. While theoretically it seems to be what is needed, we have never been able to see how it can be practically accomplished in this State without the danger of making it a political measure.

PROCEEDINGS OF THE AMERICAN ASSOCIATION.

Section A.

THE Mathematical Section was without a vice-president through the absence of Professor Ferrel of Washington, who had been elected to that office, but at the opening meeting of the association the vacancy was most satisfactorily filled by the election of Prof. J. R. Eastman of the Naval Observatory. A further consequence of this change of officers was that there was no vice-presidential address in Section A, which therefore held no meeting on Wednesday afternoon. On Thursday morning, however, the section convened with a fair attendance, including at times a number of ladies, who apparently did not find the abstruse subjects discussed at all beyond their comprehension or interest. Several papers were upon what is known as 'personal equation.' One by Professor Eastman called forth remarks by Professors Hough, Harkness, and others, from which it appeared that there is still considerable uncertainty in the matter; it being by no means sure that the results derived from the personal-equation machine are comparable with the personal error of actual observations, nor that the error is the same for light and dark illumination. Professor Eastman concluded that many of the Washington observations on record can only be made valuable after a further discussion of the personal equations involved. Mr. Farquhar criticised Mr. S. C. Chandler's conclusions in regard to the dependence of personal equation upon the stars' velocity. Mr. H. B. Fine gave a general proof that the singular solutions of differential equations of the second order have always a tangency of the second order with the consecutive curves in the system to which they belong.

Professor Harkness's interesting paper on the visibility of objects seen with a telescope was an account of the result of some experiments on the distance at which objects become invisible when viewed through small holes of different sizes. It incidentally brought out the fact, that, when the image of the object fills the pupil of the eye, further magnification is of no value, and led to the

speaker's giving a method by which any one can measure the size of the pupil of his own eye, all the apparatus needed being easily constructed from a half-sheet of writing-paper. Mr. Brashear exhibited a new form of comet-seeker, very conveniently arranged, consisting of a Newtonian reflector of six and one-half inches clear aperture, mounted with an altazimuth motion, the eye-piece being placed in the horizontal axis, so that the observer has no need to change his position while sweeping the sky. He also showed a modification of the Merz-Young polarizing helioscope, less liable to breakage than the old form; and in a third paper he advocated the adoption of standard sizes for screws and draw-tubes for astronomical instruments, so that the parts may be interchangeable, — an improvement whose utility seems self-evident, especially if combined with the adoption of metric units for the standards.

Professor Boss presented a list of over twelve hundred stars with large proper motions, whose data, collected from various sources, will, however, need to be verified before detailed publication.

The last paper of the day had been postponed from the first place on the list, and was by Prof. F. N. Willson. He presented a systematized nomenclature for the roulettes, or trochoidal curves, in which he recognizes the fact that the same curve may be generated in two ways by varying the relative size of the circles and the position of the tracing-point.

On Friday morning only seven papers were assigned to Section A, and two of these failed to appear. Mr. Woodward's paper on a method of computing the secular contraction of the earth, and Professor Stone's on the perturbations of the orbit of Hyperion, were of a technical character, consisting of a discussion of the differential equations involved in the problems. The interest of the morning, however, centred about the papers of Professors Mendenhall and Webb. The former was upon the eccentricities of guessing. The circumstances which gave rise to it were these: a number of persons having recorded their guess of the number of nails contained in a glass carboy, the nails being of various sizes, large and small, these guesses were given over to the professor for discussion. The results were plotted with amount of guess and number of guessers as abscissa and ordinate, and were found to agree pretty well with the probability curve; but the maximum of the curve did not coincide with the actual number of nails, showing that the average guess was considerably below the truth in this case, reasons for which were easily suggested. Mr. Farquhar suggested that the use of the logarithm of the number guessed for abscissa would bring the two curves into closer agreement. The author rather objected to his own title, and thought this was not really a case of guessing (which should be entirely without the bias of any reason), but rather a series of estimates. It is no doubt true, that, while some of the numbers were careful estimates, others were the most random guesses, made without ever seeing the carboy. The guesses numbered over seven thousand, and varied from forty-three to over three million, both extremes being seriously given. The true number was 2,551, as ascertained later by actual count. Professor Webb advocated the introduction of the idea of mass into the definition and formula for the moment of inertia, defining it as the summation of the mass into the square of the distance from the axis, or the mass which at unit's distance will have the same energy at the same speed of rotation. The discussion which followed, participated in by a number of those present, brought to light the fact that a good many persons object to the use of the term 'inertia' at all, some preferring 'moment of mass,' while others were content to retain the term because used in so many valuable memoirs already in print.

There was no session of Section A on Friday afternoon nor on Saturday; and on Monday, no papers being assigned to the section except the two which failed through absence on Friday, and their author still being absent, the section adjourned finally, so far as reading of papers is concerned.

Section B.

THE address of Vice-Pres. W. A. Anthony before the Physical Section, at its opening on Wednesday, was on the importance to the advancement of physical science of the teaching of physics in the public schools. Professor Anthony took the ground, that, since there is a strong re-action by which the applications of science stimulated the development of the science itself by awaking more general interest and by bringing out phenomena that call for explanation, the cause of pure science will be advanced by giving inventors and all concerned with the application of physics a more thorough training in the principles of that science.

This training must be given by the public schools, and should begin early, and be prolonged over several years of the course, so that such a principle as the conservation of energy shall not be to the student something which he learned in cramming, during one year or a part of a year, a very difficult subject called physics, but it shall be as familiar and well understood a fact as that water will not flow up hill. When this is the case, the labors of inventors may be expected to be more fruitful, because more intelligently directed, and science itself will be advanced.

The most important paper of the session was presented by Professors Michaelson and Morley, and was on a method of making the wave-length of sodium light the actual and practical standard of length. The methods that have heretofore been advanced for this purpose all depend on the use of the diffraction grating, and do not afford a sufficient degree of accuracy in the comparison; for, as was remarked by Professor Rogers, before the wave-length of sodium light can be taken as the standard of length, it must be possible to lay off a distance on a scale which shall represent a given number of wave-lengths, at least as accurately as it is possible to compare two standard scales. Messrs. Michaelson and Morley allow sodium light to fall on a piece of plane parallel glass, where it is divided into two beams at right angles to each other, which are reflected back by two mirrors, and again brought together into one beam, which falls upon the observing telescope. Interference bands are seen, which depend on the difference between the distances which the two beams traverse. One of the two mirrors is provided with a screw motion, by which it can be moved back or forth in the direction of the beam of light which falls upon it. If, now, it is moved, the observer at the telescope, by counting the number of interference bands which cross the field of view, can determine the exact number of wave-lengths of sodium light corresponding to that distance. By this arrangement a distance of one decimetre can be directly determined; and by successively measuring off ten decimetres, and by having the marking diamond rigidly attached to the mirror which is moved, Professors Michaelson and Morley believe that they will be able to lay off a length of one metre, in terms of a given number of wave-lengths of sodium light, with an accuracy of about one part in a million, which is at least twice as accurately as two metres can be compared; but, in finding the number of wave-lengths that correspond to a metre, they will of course be limited by the accuracy with which the microscope can be set on the graduations of the standard.

A second paper of great interest was by these same investigators, and was an account of some experiments by which it was sought to measure the velocity of the luminiferous ether relative to the earth, by the interference between two beams of light, which were reflected back and forth a number of times, one being in the direction in which the ether was supposed to be moving, and the other at right angles to that direction. No effect was found, so that it was concluded that the ether must be very nearly at rest with respect to the earth; but this result leads to serious difficulty in explaining aberration, and should be carefully scrutinized.

Prof. William A. Rogers, to whose enthusiasm and skill in a very arduous field of research American investigators are so greatly indebted, presented a number of papers to the association, in one of which points of great importance in the exact measurement of lengths were brought out; in particular, that, in comparing standard scales, a time when the temperature is slowly changing is the worst possible, and that such comparisons should be made either with constant temperature, or at a certain critical time in the day when the temperature is changing quite rapidly, the time depending on the relative masses of the bars and on other circumstances. In the case cited this critical time was about 6 A.M., and measurements a half-hour before that time showed errors about equal in amount and opposite in direction to those made a half-hour after it.

Prof. W. F. Magie, in a study of capillarity, showed reasons for believing that the contact angle of water and glass is not zero.