tures, and reading; and practice, in which the members of the class taking the scientific course teach the elements of this subject for a term of weeks in the school of practice. The philosophy of methods rather than a definite course of practice mainly engages attention, and yet that most difficult special problem in modern pedagogy, how to teach the elements of the sciences in a real way to pupils below the high school, is attacked with vigor, and a possible course is marked out and illustrated in detail. Much time is also given to practical work in the smaller high schools. The course of reading in this class is quite extended, and its members become somewhat familiar with the best European and American methods of teaching secondary physics.

5, 6. Chemistry and advanced chemistry. In these subjects the members of the scientific course complete Remsen's "General Chemistry," Jones's "Junior Course in Qualitative Analysis," and have ten weeks' quantitative work. The work is arranged with special reference to teachers. The students have much practice in demonstration before the class, in the preparation of apparatus and reagents, in gas analysis, in blowpiping, and the attempt is made to interest each one in some sort of practical work which he will be able to continue, and in some chemical periodical which he will desire to read as a teacher.

7. Physical Technics. The subject of this course is the laboratory method, which is here viewed from its practical side as it is from its theoretical side in the course in training. Robins's "Technical School and College Building" is made the authority in most matters of construction. The members of the class make detailed plans and specifications for fitting up an ordinary schoolroom as a laboratory for physics or chemistry or both, and with various degrees of elaboration; prepare lists of apparatus of varying cost from $50 to $1000; and report in full, with drawings and price-lists, upon some high-school or college laboratory which is visited for this purpose. All do much practical work in making and especially in repairing apparatus; construct some important piece; have much practice in testing balances, galvanometers, etc.; report monographically upon some assigned topic, as, for example, the best form and material for fine weights, the spiral-spring balance as an instrument of precision, comparison of photometers, conditions determining the size of drops, etc.; and have much careful and continued practice with at least two instruments of precision, which were in general used with less completeness in the regular laboratory course, as the spectroscope, the saccharimeter, the sextant, the astronomical transit, etc.

8. Astronomy. The essence of this work consists in the actual observation of the heavens with the unarmed eye, an opera glass, and a small telescope during one school-year. Great familiarity with the constellations is secured, and a full set of drawings showing the observed motion among the stars, and the telescopic appearance, at frequent intervals, of the moon and the planets visible under favorable circumstances during the year. A good high-school text-book is incidentally gone through with.

9. Advanced Physics. The objective point here is a mathematical view of physical science and the ability to read the stronger scientific books and periodicals with ease and profit. Those who enter the class have had work in trigonometry, higher algebra, and the calculus, and are able to master an advanced text-book. Much practical work is also done with the purpose of leading the members of the class toward some course of study or investigation to relieve and vivify their subsequent teaching. The post-graduate work will not be described as it has not yet become important.

It may be asked whether this preparation is sufficient to make a well-furnished teacher of science. For myself I would frankly answer, no. The highest attainable preparation is not sufficient, it is only hopeful — in the way to become sufficient. Our candidate for success as a teacher has been all along taught that the first condition of success is intimate and exact knowledge of his subject. He already has some knowledge and has been put in the way of getting more, and surely this is a hopeful condition. If it were further queried whether this man would not have done more wisely to attend a technical school or college for four years as a preparation for teaching science rather than give a large part of his time to English, history, mathematics, and German, to the study of children, to practice-teaching, and to the history and philosophy of education, I would reply that it depends upon who the man is. A native talent for teaching or exceptional knowledge and love of young people may render the intending teacher independent of formal professional instruction; but it is my own observation continued for many years as principal of a large high school and superintendent of a system of schools, that the normal graduate will be the more painstaking and studious man, and that he will, in the long run and with important exceptions, do finer, sounder, and more rapid teaching than the technical student. At any rate he has fairly emerged upon the field of advanced secondary instruction and deserves recognition and interested and sympathetic criticism.

Ypsilanti, Mich., Sept. 17.

NOTES AND NEWS.

A PARISIAN Inventors' Academy is distributing letters to inventors in this country, informing them that "after examination of your last invention the Academy has conferred upon you the title of Honorary Member (*Membre d'honneur*) with award of the first-class Diploma and the Great Gold Medal (gilded)," on receipt of ten dollars to defray the cost of the gilded medal, etc. We advise our readers, if so addressed, to consider the value and probable standing of that institution very carefully before sending on their ten dollars. A note to our consul in Paris might assist them in securing such testimony as they may require on this point.

— Recently a communication from the Lick Observatory recorded a phenomenon which was thought to be as unique as it was beautiful. Fog filled a valley, and upon its level surface the mountain peaks were mirrored as if from a placid lake. Strangely, in the *Yorkshire Herald* of Sept. 7, "An Early Riser" records a precisely similar phenomenon at 6 A.M. on Sept. 5; It was seen from Leyburn, which overlooks Wensleydale. This lovely Yorkshire valley was half filled with fog, which looked like a mighty flood or lake. Upon it the opposite slopes, lit up by the bright sunshine, were reflected with "extraordinary distinctness."

— G. P. Putnam's Sons have in active preparation an edition of the "Works of Thomas Paine," which will be edited by Moncure D. Conway, author of "The Life of Thomas Paine" which they have just issued. The set will be in two or three volumes, the first division being devoted to the political and sociological writings, and the second to the religious and literary papers, of which the most important is "The Age of Reason." The volumes will be uniform with Mr. Conway's biography, and will include essays of importance not in any previous collection

— In "A Chapter in Meteorological Discovery," in the October *Popular Science Monthly*, Mr. John Coleman Adams presents Benjamin Franklin as the father of American meteorology, and shows the part which Redfield, Espy, Dr. Hare, Professor Loomis, Blodgett, Mitchell, Coffin, and Dr. Joseph Henry have severally had in building up the science. A philosophical discussion, of much value and interest to thoughtful people, of the best methods of really learning foreign languages is given by Dr. Howell T. Pershing, in an article on "Language and Brain Disease." A curious and liberally illustrated article on the "Evolution of Dancing," by Lee J. Vance, shows how the custom has been largely derived from the religious, mystic, or festive exercises of the human races in the earlier stages of their civilization, and illustrates the various forms which dances assume among different peoples. Pertinently to the present vogue of the "Keeley Cure," Dr. T. D. Crothers discusses the merits of the various specifics for the cure of inebriety that have claimed attention at different times. An important article will appear on the disadvantages which the conditions of modern city-life throw in the way of the best physiological development of children, by Dr. Henry Ling Taylor. The subject is fully reviewed in a philosophical manner, and the attempt is made to measure the influence for good or ill which each of the factors in which city conditions differ from those of the country exerts upon the child's bodily and mental faculties.