A Text-Book on Roofs and Bridges. Part I. Stresses in Simple Trusses. By MANSFIELD MERRIMAN. New York, Wiley. 8°. $2.50.

THIS work of Professor Merriman exhibits in a remarkable degree the clear, logical arrangement and concise style which characterize his writings on engineering and mathematical subjects.

The preparation of suitable text-books of applied science, and especially text-books on engineering subjects, for students of technical schools, at the present day, is an art that demands something more than a critical knowledge of the subjects discussed. It involves also, in the highest degree, a true conception of the art of teaching; and it may almost be laid down as a rule that the most successful teacher is best fitted to prepare a text-book on the subject which he teaches.

Admirable works there may be on particular branches of engineering: for example, works in which abundance of detail and illustration, the presentation and solution of intricate and unusual problems, and the introduction of whatever may elucidate the subject, furnish to the investigator or professional engineer most valuable and instructive information, but which may be quite unsuitable for the daily use and instruction of the undergraduate student.

During the period of the life of a student when his habits of thought and investigation are forming, it is of the utmost importance that he should become thoroughly imbued with the rational principles and processes of thought which will make him an independent thinker and investigator.

In this work the plan adopted for the computation of stresses in the members or parts of roofs and bridges, is, to use Professor Merriman's own words, "The principles and methods are first established, and then numerous examples are fully worked out to illustrate them and their application to different forms of trusses, while a number of problems are stated for the exercises of students."

This plan is faithfully carried out, the mathematical treatment of the principles and methods being clear and concise, and free from complications.

Professor Merriman's work on the 'Mechanics of Materials,' in the same style, and with similar arrangements, was unsatisfactory only in this, that it seemed to end in the middle of the subject, trussed or braced structures being left out; but the addition of the present work supplies the deficiency, and the two together will now constitute a complete work, admirably adapted to use in the higher technical schools.

Report of the Commissioner of Education for 1885–86. Washington, Government. 8°.

THIS report is the first issued by the new commissioner, Mr. Dawson, and is nearly, if not quite, as far behindhand in its appearance as its predecessors. We believe that the blame for this is to be laid at the door of the Government Printing-Office, at present the most inefficient department of the public service. In arrangement it is far superior to the bulky and confused reports issued by Mr. Eaton. The classification of the statistics, and their mode of treatment, mark a decided advance on what we have been accustomed to. The summary of State school laws is a valuable feature, as are the particularly useful statistics in Appendix X., dealing with education in foreign countries. This report, though good and useful, shows by its failures how essential some revision of the method of classifying educational statistics is. It is the task of a lifetime to extract from them, as at present presented, any answers to a score of pressing and important questions. The commissioner of education should have the power to inaugurate and carry through this much-needed reform.

Elizabeth Gilbert and her Work for the Blind. By FRANCES MARTIN. New York, Macmillan. 12°.

THE subject of this biography was the daughter of the principal of Brasenose College, Oxford, afterwards Bishop of Chichester. She was born in 1826, and was made blind at the age of three by an attack of scarlet-fever; but she was a girl of more than usual intelligence and energy, and, under careful instruction, became a well-educated woman, knowing French, German, and Italian, as well as vocal and instrumental music. She learned also to write a very legible hand; but written arithmetic was difficult for her, though she reckoned easily and accurately in her head.

During her childhood and youth she was always treated, both in her studies and in her plays, as nearly as possible like her sisters; but when she became a woman, and her sisters one by one married and left home, she began to feel her loneliness, and especially to feel that there was no field of usefulness open to her. But having received a legacy from a lady friend, which made her pecuniarily independent, she soon discovered work to do. She saw and keenly felt the difficulties that blind persons have in getting employment, even if they have learned a trade; and she undertook to furnish such employment, so far as her resources would permit. She first opened a store for the sale of goods made by the blind, employing a blind man as manager, she herself assuming the pecuniary responsibility, and meeting all deficiencies at first out of her private purse. To the store a factory was soon added, and the whole placed in charge of an association, which ultimately developed into The British Association for promoting the General Welfare of the Blind. Miss Gilbert was also active in serving the cause of the blind in other ways, so far as she had opportunity to do so; but we must refer our readers to the biography itself for the details of her work. She died in 1885. This story of her life is well and simply told, and we commend it to those who are interested in philanthropic work.

The Orbis Pictus of John Ames Comenius. Syracuse, Bardeen. 8°.

IT gives us a startling conception of the antiquity of Harvard College to recall that this educational classic, which so many persons associate with the middle ages, was written by a man who was solicited to accept the presidency of that institution. Mr. Bardeen deserves the hearty thanks of all educators for reproducing the famous work, and issuing it at a reasonable price. The paper, the binding, the type, are all appropriate. The cuts are unusually clear, and are taken from the copperplates of the edition of 1658; the Latin text is taken from the same edition. The text for the English translation is taken from the English edition of 1727, in which for the first time the English words were so arranged as to stand opposite their Latin equivalents. The cuts are here reproduced by the photographic process, and are not retouched or altered in any particular. We trust the *Vestibulum* and the *Janua* may be similarly reproduced at an early day.

Modern Theories of Chemistry. By LOTHAR MEYER. Tr. by P. Phillips Bedson and W. Carleton Williams. London, Longmans, Green, & Co. 8°.

WHILE editions of 'Die Modernen Theorien der Chemie' have succeeded one another in the original to the number of five, the English-speaking public has waited more than a score of years the opportunity to read in the vernacular a work which, perhaps more than any other of the period, has been influential in broadening and harmonizing the ideas of chemists as to the meaning and connection of the throng of facts which busy workers have amassed. The first edition of this work was projected and issued a quarter of a century ago with the purpose of bringing about just valuations of the theories and hypotheses then in vogue but variously estimated, and of showing the suggestive importance of working hypotheses to investigators. The reception of the edition was such (though the author was so modestly diffident of success, previous to publication, as to abandon a personal dedication which had been determined upon) that two more were published in the same form; and a fourth, revised and rewritten to meet the requirements of the time, was issued, only to be succeeded immediately by the fifth edition, upon which the translation now before us was based. In its present form, the book has assumed more of the character of a handbook or book of reference, and on that account the absence of an index is the more to be regretted. Of works merely elementary, and devoted to the representation of accepted theories without very much balancing of the evidence which has led to their establishment, we have in English several very good examples; but with a single exception (Muir's 'Principles of Chemistry'), and that of comparatively recent production, there has been no work on theoretical chemistry, accessible to the student whose only language is English, of any thing like the breadth of this. Its plan embraces

not only the account of the latest development of chemical theories, but also the more important empirical data upon which the theoretical conclusions are based. Of the three parts into which it is divided, the first discusses the atomic and molecular hypotheses, including such topics as the law of Avogadro, Dulong and Petit, and Mitscherlich; the limitations of these laws, and the causes of observed deviations therefrom; and the periodicity, atomic weights, and properties. The second part, treating of the statics of the atoms, or "the doctrine of the equilibrium of the atoms in their combinations with one another," deals with the forms of combination, the law of atomic linking, and valency, or capacity for saturation. The third part is concerned with the dynamics of the atoms, or "the doctrine of chemical change;" and under this head is put an account of the connection of mechanical disturbance, heat, light, and electricity, with chemical change, and a discussion of the influence of mass action and of the stability of compounds as dependent upon atomic composition and interaction. Careful and cautious weighing of evidence is obvious thoroughout the work; and while the value of hypotheses, regarded simply as approximations to truth as well as aids to work, is insisted upon, stress is laid upon the need of proceeding with judgment, and of keeping separate, so far as may be, those theoretical considerations which are the abstract expressions of observed facts, from hypothetical assumptions which show an appearance of probability which may or may not be lasting. To the chemist who wishes to keep up with the tide, a knowledge of the German language, to the point of being able to follow the current of chemical events in Germany, is a matter of necessity, and most chemists are doubtless familiar with the original of the volume before us; but, for the student just entering the real work of chemistry, this book seems to us the most important which has appeared in English in many years.

The Art of Projection. By A. E. DOLBEAR. Boston, Lee & Shepard. 12°.

THIS is a new edition of a well-known book, first issued about ten years ago. It has been revised, and contains some important additions, especially a series of experiments on vortex-rings. Projection has come to be so extensively employed, not only as a means of illustration, but often as an aid to research, that many books would be required to describe the uses to which it may be put. Professor Dolbear's book will always be useful as a guide to the *technique* of port-lumières, lanterns, sources of light, etc., and it contains a well-selected series of experiments suitable for presentation by this method.

The Art of Investing. By a New York broker. New York, Appleton. 16°.

THIS is the sort of book that will find many readers; for although few people, relatively speaking, can invest, yet many more hope to be able to some day, and every one likes to know how it is done. To many its perusal will be like a glimpse through the curtain at a nobleman's ball to a street gamin. It is cleverly written, and puts in a plain, practical sort of way a great many statements that all who invest believe, but few follow. The truth is, that speculation is more or less a disease, and, when it seizes one, it is apt to run its course, cautions and antidotes to the contrary notwithstanding. For this reason a book of this sort is of little value. Many persons who read it will think that they know better than the author what securities are safe, and what are not. Only personal experience and personal loss will convince them.

Under the head of investing, the author discusses the various investment securities in order, beginning with government bonds. The story of State and municipal repudiation is a sad and disgraceful one, and in consequence the confidence in a majority of the securities issued by State and municipal authority has long since been shaken. Many readers will be interested in what is said about farm loans, and will applaud the writer's conservative yet fair judgment concerning them. Under the head of speculating, the New York Stock Exchange receives a severe castigation, but one which is thoroughly deserved. It is beyond question that that far-famed institution has done more harm to the legitimate business interests of the country than any other single influence. If people can only be induced to keep away from it a little longer, it will die of inanition. Gambling is not very profitable unless some rich outsiders participate in the game. The book will unquestionably be widely read: it is almost too much to expect that it will be widely followed.

NOTES AND NEWS.

DR. BILLINGS of the Army Medical Museum will signalize the removal to the new building near the National Museum by the preparation of an illustrated catalogue. It will contain drawings of all the crude and wet specimens of tumors, cancers, gangrenes, etc., and other objects on exhibition in the museum, besides microphotographs of morbid tissues prepared by Dr. W. M. Gray, the microscopist of the surgeon-general's office. Each picture will be accompanied by a short description of the object illustrated, but there will be no discussion of theories. The work, when completed, will constitute a complete pathology, and will be a most valuable text-book for students and physicians.

— Prof. C. H. Hitchcock of Dartmouth College has just returned from the Indian River region of Florida, where he has been studying the tracks of animals on the sand of the seashore in the hope that they might assist in the interpretation of the fossil foot-marks found in the sandstone of the Connecticut valley in Massachusetts. It may be remembered that the late Prof. Edward Hitchcock of Amherst College devoted a great deal of study to these fossil foot-marks, and published in 1858 a report in which he described, and illustrated by plates, a hundred and nineteen species of insects, worms, mollusca, crustaceans, etc., supposed to have been represented by them. Prof. C. H. Hitchcock is pursuing the same line of study in which his father worked so long, and the result of his recent visit to Florida is that he leans more and more to the opinion that the fossil tracks are chiefly those of crustaceans.

— The February number of the *Journal of the Royal Geographical Society* contains an interesting report of William John Steains's journey to the Rio Dôce in Brazil, and its northern tributaries. The traveller, who first went out to South America in connection with a commercial undertaking and the formation of railways, after having accomplished his duties in that direction, undertook the exploration of this river, only the lower part of which was known, although the territory is so near Rio Janeiro. It is principally the difficulty of navigation of the river, which breaks through the coast range in wild rapids and cataracts, and the hostility of the Botocudo, who inhabit this part of the coast, which prevent its being colonized. The country is covered with primeval forest of wonderful beauty and density, and only a few settlements exist on or near the banks of the Rio Dôce. Steains's paper is accompanied by a valuable map giving the results of his traverse surveys. A comparison with other maps of the river shows their great inaccuracy. Steains's geographical explorations, which lasted for eight months, were comparatively thorough. He not only explored the main river, but ascended several of its northern tributaries, particularly the Rio Sao José, which joins the Rio Dôce at Linhares, and several others. By these trips our knowledge of this region is materially increased. On the Rio Pancas he fell in with a sept of the Botocudo, with whom he lived for a month. His observations on this tribe do not contain any new information, and are not so thorough by far as Ehrenreich's study of these tribes, which were mentioned in No. 239 of *Science*. The exploration of the tributaries of the Rio Dôce, as well as that of the main river, was made very difficult by the numerous cataracts which had to be passed by long portages. From Steains's paper it would appear as though a considerable amount of private and government surveying was going on in Brazil; but very little definite information reaches us so far, and our maps of the greater part of Brazil are still very defective, being founded on very old observations and indefinite reports. From Steains's paper it does not appear whether his map is based upon astronomical observations, or a compass survey.

— Thomas Gray of the University, Glasgow, Scotland, has accepted the chair of dynamic engineering in the Rose Polytechnic Institute, Terre Haute, Ind., and will begin his work next September. Professor Gray is well known in this country for his researches in electricity, seismology, etc., and his work for several years with Sir William Thomson on instruments of precision for electrical measurement.