refrigerating purposes it is already in successful use in Paris, and to a modified degree it may well serve to reduce the temperature of houses in hot climates. The production of intense heat for metallurgical purposes, and the aërification of water, are also two other practical uses of which the ultimate list will probably be a long one.

HEALTH MATTERS.

The Mortality in the City of New York for 1888.

A PRELIMINARY report in relation to the mortality of the city for the year 1888 has just been presented to the board of health by Dr. Roger S. Tracy, the assistant sanitary superintendent; and the deductions made in it, as we find them summed up in the *Boston Medical and Surgical Journal*, are somewhat remarkable. The sanitary police took a census of the tenement-house population during the year, which includes all the houses that are more or less constantly under the supervision of the board of health, but not the better class of apartment-houses. The entire population included in this census was 1,093,701 persons, among whom there were 24,842 deaths, while the total number of deaths in the city was 40,175. The highest death-rate, 26.60 per thousand of the population, is in the district south of 14th Street and west of Broadway; the next highest, 23.52, is in the district west of Fifth Avenue and between 14th and 59th Streets, in which are situated a large proportion of the residences of the wealthiest citizens; and the third highest in the district east of Broadway and south of 14th Street, the most densely populated part of the city, and containing almost exclusively a tenement-house population.

The general tenement death-rate was 22.71, while the general death-rate of the city in 1888 was 26.33; and this fact would seem to indicate that the population of the city has been underestimated, and the quoted death-rate too high, or that all the deaths belonging in tenement-houses had not been credited to them, or else that the death-rate is actually lower for the tenement-house population than for the rest of the city, which would certainly seem most extraordinary. It might be that deaths that should have been credited to the tenement-houses have not been so credited; but of the total number of deaths in institutions, 7,774, the former place of residence of the individuals was ascertained in 3,444, and these deaths have all been credited to the houses in which they had lived. In all the districts the death-rate of persons five years of age and over, as a rule, decreases as the number of tenants increases; while the death-rate of children under five years of age increases up to a certain point, diminishing when there are more than eighty tenants to a house. The general death-rate is highest in houses containing from sixty to eighty tenants; and this is caused by the higher death-rate among the children, which reaches in these houses 114.04 per 1,000 living.

The results of the investigations are summed up by Dr. Tracy as follows: "The death-rate in tenement-houses is less than the general death-rate of the city. The death-rate in the large tenement-houses is less than in the smaller ones. While diarrhœal diseases and diphtheria show a greater death-rate in the larger houses, phthisis and pneumonia show comparatively little difference; that difference, however, being in favor of the larger houses. The greatest general death-rate among persons over five years of age, the next to the highest death-rate from diarrhœal diseases and pneumonia, and markedly the highest from phthisis, are in the district south of 14th Street and west of Broadway. The excessive mortality in this part of the city is probably connected with the great number of old houses and the dampness of the soil. These results are much at variance with what was expected. It seems to be sufficiently established that people do not live under such extremely bad sanitary conditions in the tenements as they have been supposed to."

Contagious Consumption.

The following report on consumption as a contagious disease was approved July 9 by the Health Department of New York City: —

"Pulmonary tuberculosis (consumption) is directly communicated from one person to another. The germ of the disease exists in the expectoration of persons afflicted with it. The following extract from the report of the pathologists of the Health Department explains the means by which the disease may be transmitted: —

"'Tuberculosis is commonly produced in the lungs (which are the organs most frequently affected) by breathing air in which living germs are suspended as dust. The material which is coughed up, sometimes in large quantities, by persons suffering from consumption, contains these germs often in enormous numbers. . . . This material when expectorated frequently lodges in places where it dries, as on the street, floors, carpets, handkerchiefs, etc. After drying in one way or another, it is very apt to become pulverized, and float in the air as dust.'

"By observing the following rules, the danger of catching the disease will be reduced to a minimum: —

"1. Do not permit persons suspected to have consumption to spit on the floor or on cloths, unless the latter be immediately burned. The spittle of persons suspected to have consumption should be caught in earthen or glass dishes containing the following solution: corrosive sublimate, one part; water, one thousand parts.

"2. Do not sleep in a room occupied by a person suspected of having consumption. The living rooms of a consumptive patient should have as little furniture as practicable. Hangings should be especially avoided. The use of carpets, rugs, etc., ought always to be avoided.

"3. Do not fail to wash thoroughly the eating utensils of a person suspected of having consumption as soon after eating as possible, using boiling water for the purpose.

"4. Do not mingle the unwashed clothing of consumptive patients with similar clothing of other persons.

"5. Do not fail to catch the bowel discharges of consumptive patients with diarrhœa in a vessel containing, corrosive sublimate, one part; water, one thousand parts.

"6. Do not fail to consult the family physician regarding the social relations of persons suffering from suspected consumption.

"7. Do not permit mothers suspected of having consumption to nurse their offspring.

"8. Household pets (animals or birds) are quite susceptible to tuberculosis: therefore do not expose them to persons afflicted with consumption; also do not keep, but destroy at once, all household pets suspected of having consumption, otherwise they may give it to human beings.

"9. Do not fail to thoroughly cleanse the floors, walls, and ceilings of the living and sleeping rooms of persons suffering from consumption at least once in two weeks."

Ten thousand copies of the report were ordered to be printed for distribution.

PREVENTING TUBERCULOSIS BY MILITARY ORDERS. — The German war minister has decided, says *The Medical Record*, that the chest of every soldier shall be examined once a month. If the chest does not reach a certain breadth, and does not develop with drill and athletic exercises, the soldier will be disqualified, and regarded as being predisposed to phthisis, and, moreover, likely to infect his comrades.

PASTEUR'S METHOD. — In his brief report for the year ending May 1, 1889, the director of the Pasteur Institute, Paris, announces the treatment of 1,673 subjects, of whom 6 were seized with rabies during, and 4 within a fortnight after, the process. But 3 only succumbed after the treatment had been completely carried out, making 1 death in 554, or, including all the cases, 1 in 128.

PROFESSORSHIPS OF HYGIENE. — The University of Kiel, as we learn from *The Medical News*, has inaugurated a professorship of hygiene, and Dr. Bernard Fischer has been appointed to the chair. There now remain only two Prussian universities — those of Bonn and Königsburg — without such chairs. Dr. Fischer was one of Professor Robert Koch's pupils, and accompanied him on that memorable journey into Egypt and India which resulted in the discovery by Koch of the bacillus of Asiatic cholera. Another companion on that voyage was Dr. Gaffky, now professor of hygiene at Giessen. Other pupils of Koch occupy the same department of instruction in other universities, as Dr. Gärtner in Jena, Dr. Löffler in Greifswald, Dr. Hüppe in Wiesbaden, Dr.

Becker in Leipzig, Dr. Fränkel in Berlin, and Dr. Frank in Naples. These are all members of the younger generation of instructors, and are adepts in the laboratory methods of Koch. Dr. Fischer's original work has been exerted in two directions chiefly, — one in the application of bromine to disinfection, another in the study of the phosphorescence of the sea.

ELECTRICAL NEWS.

NEW FORM OF GAS-BATTERY. — This battery, invented by Mr. Ludwig Mond and Dr. Carl Langer, is an improvement on the gas-battery invented by Grove fifty years ago, which produces electricity from hydrogen and oxygen gas by the intervention of platinum. The distinguishing feature of the new battery, which has been designed to obtain large currents of electricity by means of these gases, is, according to *Nature*, that the electrolyte is not employed as a mobile liquid, but in a quasi-solid form, and it is therefore named "dry gas battery." Each element of the battery consists of a porous diaphragm of a non-conducting material,— for instance, plaster-of-Paris, — which is impregnated with dilute sulphuric acid. Both sides of this diaphragm are covered with very fine platinum-leaf, perforated with very numerous small holes, and over this with a thin film of platinum black. Both these coatings are in contact with frameworks of lead and antimony, insulated one from the other, which conduct the electricity to the poles of each element. A number of these elements are placed side by side, or one above the other, with non-conducting frames intervening, so as to form chambers through which hydrogen-gas is passed along one side of the element, and air along the other. One element, with a total effective surface of 774 square centimetres (120 square inches), which is covered by 1 gram of platinum black and .35 of a gram of platinum-leaf, shows an electro-motive force of very nearly 1 volt when open, and produces a current of 2 ampères and .7 of a volt, or 1.4 watts, when the outer resistance is properly adjusted. This current is equal to nearly 50 per cent of the total energy obtainable from the hydrogen absorbed in the battery. The electro-motive force decreases, however, slowly, in consequence of the transport of the sulphuric acid from one side of the diaphragm to the other. In order to counteract this disturbing influence, the gases are from time to time interchanged. The battery works equally well with gases containing 30 to 40 per cent of hydrogen, such as can be obtained by the action of steam, or steam and air, on coal or coke, if the gases have been sufficiently purified from carbonic oxide and hydrocarbons. The water produced in the battery by the combination of hydrogen and oxygen is carried off by the unconsumed nitrogen, and an excess of air carried through it for this purpose.

BOOK-REVIEWS.

Education in the United States: its History from the Earliest Settlements. (International Education Series.) By RICHARD G. BOONE. New York, Appleton. 12°. $1.50.

THIS book belongs to a class that are becoming rather common in this country, books presenting a large amount of useful information in an unattractive style. The time has been when a good literary style was considered indispensable in an historical work; but in our time, and especially in this country, we are treated to volume after volume on historical themes in which style is utterly lacking. That this should be so is somewhat surprising; for a work that has no charm of style is certain to have a much smaller circle of readers than one that has that attraction, and writers usually desire as many readers as possible. In Mr. Boone's book we are sorry to find this literary defect; for the work has a good deal of merit of other kinds, conveying as it does a large amount of information for the most part well arranged. It has evidently been prepared by careful and conscientious study of the original authorities, and will be useful at least to all educators and as a work of reference to all intelligent readers. It opens with an account of the steps taken by the early colonists to establish schools and colleges, and shows how, at the very outset of our national history, the sentiments of North and South differed on this subject of education. Massachusetts and Connecticut led the way in founding schools for the whole people, and it was not until comparatively recent times that their ideas and practice became generally prevalent. How the public-school system grew up and overspread the country, Mr. Boone relates at considerable length; and he does not fail to show how much the schools have been improved by the increase of State control. Then follows a chapter on recent progress in the colleges, showing the changes in the curriculum, the introduction of the elective system, and other matters of interest. Professional and technological schools are also treated of, and there is a chapter on the education of the deaf and dumb and other unfortunates, and of criminals. The author does not confine himself, however, to the schools alone, but gives the history of other educational agencies, such as libraries, museums, and learned societies. The founding of the Smithsonian Institution, the grants of land for educational purposes, and other acts of the general government bearing on education, are related; and the book closes with an interesting chapter on the advance that has been made in the education of women. Thus it contains a valuable mass of information, which, so far as we know, was not accessible before in a convenient form.

A Theoretical and Practical Treatise on the Strength of Beams and Girders. By ROBERT H. COUSINS. New York, Spon. 12°. $5.

SINCE the time of Galileo, the subject of which this volume treats has received much attention at the hands of the ablest mathematicians of all countries. Many attempts have been made during the present century to solve experimentally the problems involved, only to result in the adoption, by many experimenters, of empirical rules for the strength of beams and girders, rather than scientifically deduced formulas; the reason for this, as given by one authority, being that "no theory of the rupture of a simple beam has yet been proposed which fully satisfies the critical experimenter." The theory advanced in this treatise, and the formulas resulting from that theory, deduce the strength of beams and girders from the direct crushing and tensile strength of the material composing them, leaving out of the problem altogether the co-efficient known as the modulus of rupture. The theory and the formulas deduced from it are in accord with correct mechanical and mathematical principles, and the author believes that they will fully satisfy the results obtained by the experimenter. Works of this character derive special importance from the constantly increasing use of iron and steel for building and engineering purposes.

The Beginners' Book in German. By SOPHIE DORIOT. Boston, Ginn. 12°. 90 cents.

THIS little book is the result of the need felt by the author and others, in teaching German, of suitable books to put into the hands of beginners. It consists of two parts. Part I. is a series of lessons, each of which is introduced with a picture, followed by corresponding verses from the child-literature of Germany. These pictures, which illustrate the text following, were all drawn expressly for the purpose, and are brimming with the spirit of fun and humor which they have so faithfully caught from the child-lore. A conversation upon the subject, with the study of words and phrases, completes each lesson. In this way advantage is taken of the children's tastes and inclinations, and even of the mischief-loving element which enters so largely into the child-nature. The second part contains graded selections for reading.

The typography and make-up are in every way excellent. The book, as a whole, forms a very attractive volume, and we have no doubt that it will prove, as the author has intended, a great relief to teachers and a source of pleasure to pupils.

The A B C of Electricity. By WILLIAM H. MEADOWCROFT. New York, F. W. Lovell. 12°. 50 cents.

CONDENSATION of matter and simplicity of language are the points most noticeable in this little volume. A brief general outline of the rudiments of electrical science, or at least of those departments of it which have now become almost a part of every-day life, is given in language devoid of those technicalities which are