in Paris, regarded as sufficiently clean, there was found, in the spring of 1882, 3,830, and, in the winter of 1882, 6,500; giving a mean of 5,260 to the cubic metre. A comparison with the air of a room used for a study in the observatory at Montsouris showed, for the spring of 1882, 270, and, for the winter of 1882, 380; giving a mean of 325 to the cubic metre. From this it at once appears that the air of the house in Paris was sixteen times as impure as that at Montsouris. The decrease in the number of germs from winter to spring is the reverse of what is observed out of doors, and is to be attributed to the more thorough ventilation during the warm months.

The same relation was found in the air from hospitals, except that the numbers were very much higher; varying from 4,500 in summer, to 24,000 in winter, per cubic metre. The micrococci were found to be most abundant here; every hundred germs furnishing, on an average, ninety-one against five bacteria and four bacilli. The inoculation of these, however, was without result.

The air and water from the sewers gave interesting results. A cubic metre of the former furnished from 800 to 900 microbes, while a litre of water taken at the point where it was discharged gave 80,000,000. In this relation it was found that a litre of water condensed from the atmosphere held about 900, a litre of rain-water 64,000, a litre of the Seine at Bercy 4,800,000, while, after the river had traversed Paris, a litre was found to contain 12,800,000. From this it can be understood how easily stagnant water of a sewer can putrefy, and how essential it is that there should always be a current flowing to prevent this. In the air of sewers it is the bacteria proper which abound, but they were without effect when inoculated in animals.

In the ordinary dust of houses it was estimated, after careful weighing and cultivation, that each gram contains about 750,000 spores. A sufficient number of analyses of the soil have not been made as yet, but those made give an average of from 800,000 to 1,000,000 for each gram of earth. In the deeper layers the bacilli preponderate over all other forms, while on the surface the micrococci are most abundant.

Antiseptic substances are last considered; and these are regarded as acting in two ways, —first by destroying the bacteria already in activity, and, secondly, by preventing the germination of spores.

Of such substances, oxygenated water (H_2O_2) was found to be the most powerful, then solution of corrosive sublimate and nitrate of silver. After these come a long list of less efficacious ones. The only compounds which were capable of destroying germs in their dry state by means of the vapor given off were bromine, chlorine, hydrochloric and hyponitric acids.

Such is a brief summary of the principal points touched upon in this book. It is not quite so clearly and concisely written as might be wished; but it is a valuable contribution to science, and must serve as a model for any one who undertakes work in this direction. A careful perusal of the book itself is certainly to be recommended to all interested in the subject.

MINOR BOOK NOTICES.

Outlines of chemistry for agricultural colleges, public and private schools, and individual learners. By N. B. WEBSTER. New York, *Clark & Maynard*, 1883. (Practical science series.) 8+144 p. 24°.

THIS book seems somewhat out of place in a practical series, inasmuch as it consists chiefly of a collection of definitions and brief statements of common facts.

The experimental side of the subject is almost wholly neglected, or, at best, is passed over with brief allusions. To the student who is receiving instruction by lectures, the work might be of some service as a partial relief in taking notes, or as a book of reference, though it is too limited in detail to be of general use in this direction; but, as a text-book in a systematic course of instruction in elementary chemistry, it must fall short of the author's intention.

The electric light in our homes. By ROBERT HAMMOND. New York, *Worthington*, 1884. 12 + 188 p., illustr. 8°.

THIS is a special pleading for the incandescent electric light, delivered by Mr. Hammond in the towns of England as he travelled, in the hope of awakening the English people to the fearful condition of their homes at present, on account of the harmful effects of the products of gas consumption. In the opening, Mr. Hammond is very careful to first heat his audience over the gas-burners, then drench them with the condensed steam, and finally sprinkle them here and there with little specks of soot. After bringing his hearers into this unpleasant condition, a bright, clean, and cool incandescent electric light is held before their eyes till they fully appreciate its beauties. A short return is made to the drenching and warming process to make sure of any laggards, and the conditions of success of an electric-light system are explained. The story is well told

throughout, if one does not object to the fact, evident on every page, that the author has something to sell.

Patents on inventions: a quarterly patent-law review. H. CONNETT and A. C. FRAZER, editors. Vol. i. New York, *Burke, Frazer, & Connett*, 1884. 12+214+12 p. 12°.

THIS is a collection of short essays on points of interest to inventors. These essays are principally written by the members of the firm of Burke, Frazer, & Connett, patent solicitors, in the intervals which their practice allowed. The articles are generally well written; but to some extent the smack of the advertisement clings to them, although none close with the advice to call on Messrs. Burke, Frazer, & Co., for a solution of the difficulties discussed. Throughout, the beauties of patents are upheld, and the *ignis fatuus* of a valuable patent is made as alluring as possible.

INTELLIGENCE FROM AMERICAN SCIENTIFIC STATIONS.

GOVERNMENT ORGANIZATIONS.

Geological survey.

Field-work in the division of the Pacific. — In addition to the office-work of this division, carried on during the winter at San Francisco, field-work has also been prosecuted, especially since the 1st of January. During February, Mr. George F. Becker, geologist in charge, studied the surface-geology of the area lying between Mount St. Helena and Knoxville, in Napa and Lake counties, Cal., — a region that had previously been mapped by Mr. Hoffmann, topographer, and in which Mr. Turner spent some time, especially in January of this year. The mines of this district have been made the especial subject of study by Mr. Becker; and they prove to be of very considerable interest, lying, as they do, between a highly metamorphic area and one of unaltered sedimentary rocks, which is also marked by limited basaltic eruptions. The structure of Mount St. Helena has also been partially examined. During January, also, Mr. Hoffmann's field-work for the map of the New Idria district was completed for the illustration of Mr. Becker's monograph on the quicksilver deposits.

Map of Mount Shasta. — Mr. Gilbert Thompson has just completed a sketch-map, on a large scale, of Mount Shasta. It includes about seventeen square miles, and shows beautifully the glaciers and moraines of the mountain. As already noted in *Science*, Mr. Thompson has recognized some seven glaciers on the upper slopes of Shasta. On this map five of them are named as follows: the 'Whitney' glacier is on the north-west side, lying to the eastward of the volcanic crater (Shastina) that forms so prominent a feature of the north-west spur as seen from the valley below. It extends two or three miles from the summit toward the north-west, with a width in most places of less than a quarter of a mile. This is the glacier seen and explored in 1870 by Mr. Clarence King. The next glacier, as one proceeds eastward, is the 'Bulam' (or great) glacier, which extends to the northward or north-westward about a mile and a half. It is nearly a half-mile in width, and at its head appears to be connected with the 'Hotlum' (or steep rock) glacier, which lies next to it on the north-east slope of the mountain. The latter is broad, being almost a mile across, and reaching only about a mile and a half from the summit. On the eastern side of the peak is the Win-tún glacier (so named from the tribal designation of the Indians of the vicinity). It is nearly two miles long, with an average width of about half a mile. On the south-east slope is the Kon-wa-ki-ton (or Mud Creek) glacier, which, until Mr. Thompson described it, was unknown, although many of those who have climbed the peak since 1854 must have passed close by it. It is smaller than the others, having a length of only a half-mile. Its width is about a quarter of a mile. Mr. Thompson has furnished very full notes of these glaciers to Mr. I. C. Russell, by whom they will be published in the reports of the survey.

On another map being prepared by Mr. Thompson, Mount Shasta and the surrounding country are shown on a smaller scale than in the above-mentioned map; and the isolation of Mount Shasta is well shown. It forms no part of any mountain range; and the highest land within a radius of forty-five miles from its summit is Mount Eddy, which is fifteen miles distant, and is at least six thousand feet lower.

Ice-banners. — In Tyndall's 'Forms of water' is an illustration representing what he terms 'cloud-banners,' which are formed by a current of warm air, charged with moisture, passing a high and sharp mountain point, when, meeting with a colder atmosphere, it is condensed, and forms a visible cloud, the appearance of which has some resemblance to a banner. On Oct. 18, 1882, Mr. Gilbert Thompson ascended Lassen's 'Butte' (or Peak), in California, which has an altitude of 10,500 feet above sea-level; and on Oct. 12, 1883, he made the ascent of Mount Shasta, which rises to the altitude of 14,511 feet, some seventy miles farther to the north-west. On the summits of these peaks, and on both occasions just after a storm, Mr. Thompson observed what he terms 'ice-banners.' The iron signal-post on Mount Shasta, which rises sixteen feet above the summit, had the appearance often seen in trees, posts, etc., after severe snow-storms, when the flying snow is impacted against them by the wind, except that in this case the projection was just reversed, and lay from the wind. On the signal-post the 'banner' projected