

Scientific American.

ESTABLISHED 1845.

MUNN & CO., Editors and Proprietors.

PUBLISHED WEEKLY AT

No. 261 BROADWAY, NEW YORK.

O. D. MUNN.

A. E. BEACH.

TERMS FOR THE SCIENTIFIC AMERICAN.

One copy, one year postage included. \$3 20
One copy, six months postage included. 1 60

Clubs.—One extra copy of THE SCIENTIFIC AMERICAN will be supplied gratis for every club of five subscribers at \$3.20 each; additional copies at same proportionate rate. Postage prepaid. Remit by postal order. Address

MUNN & CO., 261 Broadway, corner of Warren street, New York.

The Scientific American Supplement

is a distinct paper from the SCIENTIFIC AMERICAN. THE SUPPLEMENT is issued weekly. Every number contains 16 octavo pages, uniform in size with SCIENTIFIC AMERICAN. Terms of subscription for SUPPLEMENT, \$5.00 a year, postage paid, to subscribers. Single copies, 10 cents. Sold by all news dealers throughout the country

Combined Rates.—The SCIENTIFIC AMERICAN and SUPPLEMENT will be sent for one year postage free, on receipt of seven dollars. Both papers to one address or different addresses as desired.

The safest way to remit is by draft, postal order, or registered letter. Address MUNN & CO., 261 Broadway, corner of Warren street, New York.

Scientific American Export Edition.

The SCIENTIFIC AMERICAN Export Edition is a large and splendid periodical, issued once a month. Each number contains about one hundred large quarto pages, profusely illustrated, embracing: (1.) Most of the plates and pages of the four preceding weekly issues of the SCIENTIFIC AMERICAN, with its splendid engravings and valuable information; (2.) Commercial, trade, and manufacturing announcements of leading houses. Terms for Export Edition, \$5.00 a year, sent prepaid to any part of the world. Single copies 50 cents. Manufacturers and others who desire to secure foreign trade may have large, and handsomely displayed announcements published in this edition at a very moderate cost.

The SCIENTIFIC AMERICAN Export Edition has a large guaranteed circulation in all commercial places throughout the world. Address MUNN & CO., 261 Broadway, corner of Warren street, New York.

NEW YORK, SATURDAY, JANUARY 6, 1883.

Contents.

(Illustrated articles are marked with an asterisk.)

Table listing various articles such as Agricultural inventions, Atzee remains in Colorado, Brazilian coffee plantation, Button fastening, Dairy industry in France, Dangerous funeral appliances, Deepest coal mine, Direct fermentation of starch, Drainage and ventilation, Duck with three legs, Dynamo elec. machine, Elephant, instantaneous photo., Engineering inventions, Exhaust injector, Feeding blast furnaces, Formulating photo. emulsion, Furniture manufacture, Galvanic battery, Gordon's dynamo elec. machine, Gunpowder engine, Hammer, improved, Hand corn planter, Height of ocean waves, House plumbing and drainage, Ice machine, Windhausen's, Inventors and patents, Isovaniline, Machinery and labor, Mechanical inventions, Protection of railway ties, Nat lock, improved, Orbit of comet of 1882, Parkhurst's galvanic battery, Petroleum emul. as insecticide, Photog. of elephant, instant, Pipe casting, rotary mould, Preservation of railway ties, Raid on telephones in Paris, Railway ties, preservation, Railway transportation, Rotary mould for casting pipes, Roth's saw file guide, Sewer gas trap, Sheet iron gas mains, Starch, direct fermentation, Telephonic experiments, Tides on the Bay of Fundy, Tin discoveries in Alabama, Traction engine, new, Wheel tire, improved, Windhausen's ice machine, Wires, underground, Woehler, death and burial.

TABLE OF CONTENTS OF

THE SCIENTIFIC AMERICAN SUPPLEMENT

No. 366,

For the Week ending January 6, 1882.

Price 10 cents. For sale by all newsdealers.

Table listing sections: I. ENGINEERING AND MECHANICS, II. TECHNOLOGY AND CHEMISTRY, III. ELECTRICITY, MAGNETISM, ETC., IV. HORTICULTURE, ETC., V. GEOGRAPHY AND GEOLOGY, VI. HYGIENE, MEDICINE, ETC., VII. ARCHITECTURE, ART, ETC.

THE DEATH AND BURIAL OF WOELER.

We have already briefly referred to the death of the veteran scientist whose name is familiar to every chemist in America and Europe. On the 23d of September, after a brief indisposition of four or five days' duration, the light of his life, which had been flickering in its socket, went out while he was in full possession of his intellectual faculties. The machine which had kept soul and body together ceased working, and life became extinct. When the final hour came, surrounded by all the members of his family, his spirit took its flight so quietly that those present were scarcely able to tell when he ceased to breathe. It was a most gratifying ending to a long life—no pain, no wearing sickness, no anxiety—as peaceful and gentle as his life had been, so was his death.

Up to the Tuesday preceding his death, which took place on Saturday, he continued his literary activity. When he laid down his pen his table was covered with scientific papers, and the correspondence which, as Secretary of the Academy of Sciences, he conducted to the last, having carried his work forward to the very portal of the tomb. Yet death did not find him unprepared. It had long been expected, and in his will he gave full directions about his funeral, and indicated the inscription to be put on his tomb. His funeral was to be of the simplest character; no music, no speeches, no special ceremonies, no procession of students in uniforms, but everything quiet and unobtrusive, just as his own life had been. And thus it was. We are indebted to Prof. C. A. Joy, who was present at the funeral, for many of the above facts, and the following description of the burial ceremonies:

At 10 o'clock on Tuesday morning, September 26, a few of the most prominent professors of the University gathered at the house of the deceased. The coffin stood in the center of the largest room, covered with wreaths and palm leaves, and on each side there was a row of six burning candles. The Chaplain of the University, Pastor Schultz, read the usual selection from the Scriptures, and in his prayer referred to the character of the deceased, but made no remarks. The widow was present during the exercises, surrounded by all her children and grandchildren, with a few other near relatives.

Among those present at these services were Professor Wm. Weber, now more than eighty years old, Professor Listing, already far in the seventies, and other old and bent colleagues of the deceased. There were but few persons present from a distance, as it was vacation at the University, and no notice of the funeral had been published. But there was one old friend there that could not stay away—Professor Hermann Kopp, who came up from Heidelberg to follow in the mournful procession to the grave.

After the short exercises at the house the body was placed in a hearse, and the procession slowly and silently moved to the cemetery. The streets were lined with people who felt that they had lost a friend. There were several hundred men in the group, many of them world renowned celebrities.

At the grave there were no speeches. I threw in several handfuls of earth, according to the German custom, and in behalf of the many American pupils of the illustrious dead. The grave was rapidly filled up, and after the benediction the mourners dispersed.

RAILWAY TRANSPORTATION.

Mr. William P. Shinn, C.E., lately read before the American Society of Civil Engineers a paper on the "Increased Efficiency of Railways for the Transportation of Freight."

The first portion of this paper gave, from carefully gathered statistics, a valuable amount of information in regard to the actual increase of traffic upon American railways. In 1860, the tonnage mileage of the New York Central and Hudson River Railroad, the Erie Railway, and the Pennsylvania Railroad was about equal, and amounted in the aggregate to a little over three-fourths of that of the New York State canals; and in 1870 each of these railroads averaged about the tonnage of the canals, and in 1880 they averaged each nearly double that of canals.

The aggregate tonnage mileage of the other railroads was, in 1881, 1,217 per cent more than 1860. Statistics were also given showing the increase of population, of railroad mileage, of the production and export of grain and other leading exports. The means by which this rapid increase of freight transportation had been developed was considered under two general heads, namely, improvements in the physical conditions of the railroads, and improvements in the administration. The improvements in the physical condition were treated on under these heads:

- 1. Improved track or "permanent way," including bridge structure.
2. Additional sidings, and second, third, and fourth tracks.
3. Increased capacity and strict classification of locomotives.
4. Increased capacity of freight cars.
5. Additions to terminal facilities.
6. Improved methods of signaling.
7. Running locomotives "first in, first out," and running freight trains at higher rates of speed.
8. Consolidation of connecting lines under one management by purchase, lease, amalgamation, or otherwise.
9. Running freight cars through from point of production to tide water without transshipment.

10. Issuing through bills of lading (or freight contracts) from Western points of shipment to Atlantic and European ports.

The general introduction of steel rails was stated to be the very corner stone of increased efficiency. The improvements in all the directions referred to were treated of, and described at considerable length.

The second portion of the paper presented the views of the writer as to the means whereby still greater efficiency could be most economically obtained. The constant demand is for more transportation facilities—for more cars. In the opinion of the writer, what is needed is not so much more cars, as more movement of cars. Freight blockades will be prevented, not by having more tracks to stand cars upon, but by having fewer standing cars. It was shown that upon one railway there had been a decrease in the miles run by the cars of 21 per cent between 1868 and 1881, and that the Union Line cars between 1879 and 1882 were increased 49 per cent in number, while the mileage run by them decreased 16 per cent in the same period. The remedies suggested by Mr. Shinn, were more main tracks, more locomotives, more trains, the improvement of the making up of trains at the points where cars are loaded. The detention of cars at stations and private sidings, and the absence of cars on foreign railroads were considered as among the greatest causes of loss, and the writer suggests that the remedy will be to charge a per diem charge for cars when on foreign roads, and that this charge should be based upon the average economic value of the cars in use to their owners.

It was voted that this paper should be discussed at the annual meeting. Members of the society and others interested in this subject are requested to contribute to this discussion. The annual meeting of the society will occur January 17 and 18, at the Society house in New York. The first session of the meeting will be at 10 A.M., January 17, 1883.

DANGEROUS FUNERAL APPLIANCES.

The possible agency of the undertaker in disseminating infectious diseases is not sufficiently regarded by health authorities. In many places public funerals are prohibited in cases of infectious disease, yet they are the rule rather than the exception the country over.

Where the funeral services are held in private houses, it is a common thing for the undertaker to provide chairs or camp-stools for the multitude. These are carried from house to house, and are liable to become carriers of infection. Some careful undertakers may take the trouble to disinfect such appliances in all cases of possible infection; but we doubt its being done very generally.

The ice boxes, in which the dead are laid until the time of burial comes, are still more liable to carry the germs of disease. The ice boxes are costly, are seldom renewed, and are scarcely more frequently disinfected. That they are a source of public peril is gradually becoming recognized by physicians and boards of health; and not a few have taken an interest in the devising of means for their displacement. The most promising substitute is the injection of preserving fluids into the circulatory system. Quite a number of prominent undertakers in this city and Brooklyn are reported as having adopted the new plan, under the instructions of Dr. Lukens and Professor Clark, of the Cincinnati School of Embalming. Demonstrations of the process of injecting preservative fluids have been made in the dead house of Bellevue Hospital. No mutilation of the body is required further than the opening of an artery for the injection of the fluid. There are several fluids which answer for the purpose, and the cost of embalming is said to be little if any greater than the charge for the use of an ice box.

A careless embalmer may still be a carrier of infection, but it would seem to be easier to enforce precautionary measures in the case of a man than with the bulky and variously exposed ice box, which may hold in succession the victims of every sort of disease.

MACHINERY AND LABOR.

Mr. Edward Atkinson says that it takes 160,000 men, women, and children to make the cotton cloth, the use of which is now enjoyed by the people of the United States, who are the best clothed people in the world. If those who do this work were obliged to use machinery no more effective than the spinning wheel or hand loom, it would require, he computes, 16,000,000 persons continuously employed ten hours a day to do the necessary work.

According to the view of a certain class of self-called "labor reformers"—of whom we hear less now than formerly, and less than we are likely to when hard times come again—modern labor-saving cotton machinery must be depriving 15,840,000 men, women, and children of steady work; the "reformers" would assume, remunerative work.

Where are they, and what are they doing? In every department of productive labor, machinery has been and is having a corresponding effect. The displaced millions of mythical hand workers cannot have starved to death, or have been otherwise exterminated, for there has been a rapid increase of population in all manufacturing countries, and the average length of human life is greater than it used to be.

The obvious truth—obvious, that is, to all who can see things as they are—is, that so far from displacing labor, or the demand for it, labor-saving machinery furnishes more and more varied opportunities for remunerative work, larger pay for the worker, and cheaper products for the worker to enjoy.