tirely prevented. This would afford such a practical solution of the whole question as would save and make serviceable large quantities of pipe that are now useless, and would add to the efficiency of fire departments and materially lessen the cost of their operation.—*T. T. Prosser, in Western Manufacturer.*

Roll while the Ingot is Hot.

Mr. Bessemer lately said that he remembered one of the great failures he made in his earlier experiments arose from his not attending to the above. He took advice strongly given to him by Sheffield manufacturers, who were used to their own mode of producingsteel, and he learnt from them, as a fact, that a steel ingot must never have the hammer upon it while it was hot, and that it must never go to the rolls while it was hot, but that it must be left to cool, and the next day it was to be reheated. When one heard those things from practical men who had really made a mark in the world by their products, as the Sheffield manufacturers evidently had done in the olden time, one was apt to be led by it without going very much into reasoning. He thought it was necessary that cooling should take place, and that reheating should follow it. At one of his earlier experiments, made at one of the largest works in that part of the country (when their material was of an inferior kind to that, he was happy to say, all those around him were able to make today), they let one of their ingots get cool. It was rather a large one, and larger than any they had practiced upon at the time. It was reheated in one of the ordinary reheating furnaces—they were all waiting for the result, and the fire was teased most tremendously—they managed to get it gloriously hot on the outside, in fact it almost melted, while in the inside it was almost black. They attempted to put it through the cogging rolls in that condition. The result was a most singular one. The large mass went through the rolls, and about 1 inch to 1½ inch in thickness was stripped off from it, and an apparently black mass shot through the rolls, to the horror and consternation of all of them. After seeing that, he came to the conclusion that to let the ingot get cold was a mistake, if they were not obliged to do so from some circumstance or other. He came to the conclusion that he himself had worked out that an ingot, when cast, was hottest in the middle, and coldest outside, and the small interval that elapsed between the heating and rerolling would allow for cooling the inside and equalize it; but in all cases there would be a tendency for it to be softer inside than outside, instead of, as in the other mode of working, soft on the outside and hard in the center; and he was very glad to find that the conviction of the fact had prevailed and been attended to, and they were able now either to cog or to hammer down ingots in their original heated state from the casting. He thought that was an important addition which he was very glad to find Mr. Holland had so successfully carried out.

The Telephone and the Phonograph in Practical Medicine.

In a communication to the *Lancet*, a writer states his convictions that the telephone, combined with the phonograph, will become a necessity in clinical medicine, inasmuch as we have, in the phonograph, a means not only of registering sounds, but of reproducing them. "However much the telephone may be perfected for clinical purposes, it must always fail in transmitting sounds of the same quality as those received, consequently this defect will necessitate a special education of the ear to interpret the modified sounds. But with the phonograph sound vibrations can be made visible to the eye, registered on paper like pulse-tracing, and kept for future study and reference."

Dr. Steiu has recently invented a method of photographing the beats of the pulse. It consists in photographing a beam of light which has been passed through a perforated vibrating disk. The perforated disk is attached to the artery like the sphygmograph. A strong light passing through the hole in the disk is made to reach a sensitive plate, on which the movements of the disk are recorded in the form of a wavy line. This invention might be made available for registering the sound vibrations of the telephone; for, by attaching a perforated disk at right angles to the receiving telephone drum, the vibrations of the latter could be recorded.

Medical Uses of the Microscope.

Dr. Cutter, of Boston, lately gave a list of Dr. J. H. Salisbury's scientific papers published since 1862 in illustration of original studies of the morbid alterations in blood.

Epithelial cells from the mouth and some from the liver were shown. These microphotographs were those of J. J. Woodward, Surgeon U. S. A., the father of modern microphotography. The nucleus and the bioplasm were pointed out. Attention was called to the fact that the form elements gave no idea of the work performed by the cells. The differentiation lies in the vital endowments of the bioplasm.

The cell that secretes bile or the tears has the same form elements as one that secretes milk. If separated they could not be distinguished apart. A dead bioplast could not secrete, though it may have been much longer in dying than the systemic body. Brunonian movements of the mucous corpuscles were alluded to as protoplasmic. These form good tests for objectives.

Microphotographs of vaccine virus were shown. This gives an excellent idea of Beale's view of a taint. The field is full of granules—germs—which are, he says, degraded bioplasm. A remarkable specimen of a protoplasmic plant that grew in the substance of a seaweed was exhibited. There is every probability that never before has it come under the eyes of man, as Professor Reusch, who prepared it, says it is entirely new. It has many lobes. Notice the buds shooting out. The weird, bizarre outlines remind one of the amœboid forms of the white blood corpuscle. It serves to illustrate vegetable bioplasm and also parasitism. It is probably innocuous.

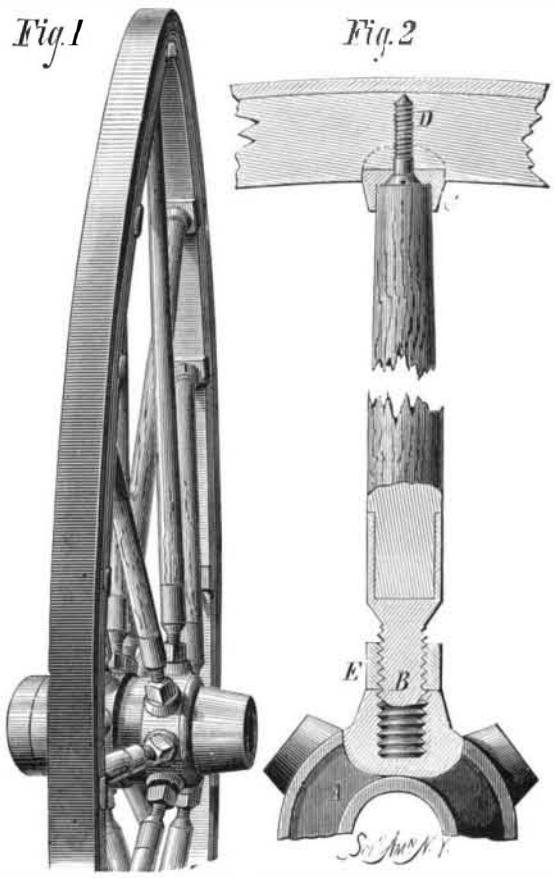
The healthy white corpuscle was clearly seen, and the importance of using microscopes that would show the white corpuscles as white was insisted on.

The white blood corpuscles of consumption and the nameless disease were displayed by means of microphotographs taken with the one seventy-fifth and one fiftieth inch objectives, and attention was particularly called to the physical changes going on inside.

Another illustration was a picture of consumptive cells, taken after three months of remedial treatment in which dietetics bore an important part. The white corpuscles were nearly all reduced to their normal size. The spaces were lessened in number, and the physical relations of the red corpuscles had improved. This was not an isolated evidence. With this reduction in size came a notable restoration to what was termed a healthy condition.

DETACHABLE SPOKE VEHICLE WHEEL.

We illustrate herewith a new vehicle wheel, the principal feature in which is that the spokes can be easily removed and new ones inserted in their stead without disturbing the tire or felly. They are placed in two rows upon the hub, from two to four inches apart, and each spoke is provided with a metal ferrule terminating in a screw. The felly has a metal socket to receive the outer end of the spokes.



DEADERICK'S IMPROVED VEHICLE WHEEL.

The construction will be understood from the sectional view, Fig. 2. It will be observed that there is a metal hub band, A, having suitable elevations, and that the spokes in one row, Fig. 1, stand opposite the spaces between those in the other. B is the spoke ferrule, terminating in a threaded end. C is the felly socket, fastened to the felly by the screw, D. This socket is let into the felly for a short distance, and braces it by semicircular ears. In order to remove a spoke the nut, E, is loosened and screwed up. The socket, C, is then grasped with a wrench, and the spoke, or rather the threaded ferrule end, B, is screwed downward into the hub until the outer end of the spoke is clear of the felly socket, C. It only remains to spring this end clear of the felly, and unscrew the ferrule end, B, from the hub. The spoke is inserted by reversing this process.

When, however, as in a heavy vehicle, the spoke is too stiff to be sprung, it must be of such a length as to reach exactly from hub to felly, and the felly socket must stand further out from the latter and must be detachably secured by bolts. In removing a spoke this socket is first unbolted and slid to one side before the spoke is unscrewed from the hub.

The hub bands, spoke, and felly sockets may be made of malleable cast iron, soft cast steel, or drop forged iron. The weight of the castings varies from two to four pounds per wheel. The felly socket may be a simple plate with ears, and a circular hole through which the tenoned end of the spoke passes into a shallow recess in the felly. No screw is needed to keep it in position, as it is held by the pressure of the spoke. Should the tire become loose, the inventor states that it may easily be tightened by screwing out the spokes against the felly. A loose spoke may also be tightened in similar manner; and by manipulating the spokes the wheel may be straightened, should it get out of plumb. In case the showing of the threads on the spoke ferrule piece is objectionable they may be screwed down close into the hub, and the wheel may be put together, or the felly and tire put on, as other wheels. In order to remove a spoke it will in such case be necessary first to spring out the felly with a lever until the end of the spoke is clear of the socket, and then holding the spoke to one side unscrew it from the hub.

For further particulars address the inventor, Dr. C. Deaderick, Knoxville, Tenn.

Microscopy.

The Myxomycetes of the United States.—Dr. M. C. Cooke, the eminent English mycologist, has from time to time been making revisions of the various orders, genera, and species of American fungi, from material furnished by his correspondents in this country, and publishing the results of his labors in the *Proceedings* of our various scientific societies, so that they shall be readily accessible to American students, the number of which, in this interesting field of research, is largely on the increase. A contribution of this character, with the above title, has recently been published in the *Annals* of the Lyceum of Natural History of New York.

The group which has, in this case, undergone revision consists of fungi that are mostly minute in size, and characterized in their early stage by their gelatinous nature. They have an especial interest for the student of biology, inasmuch as the celebrated Dr. De Bary, some years ago, excluded them from the vegetable kingdom altogether, and made them companions of those low forms of animal life known as *Amœbæ*, etc. The gelatinous material of which they are composed in their first stages bears considerable resemblance to sarcode, and did they never change from this there would, perhaps, be little doubt of their animal nature; but as they mature they lose their mucilaginous texture and become a dusty mass of spores, intermixed with threads, and the whole surrounded by a delicate covering, called the *peridium*. In a systematic arrangement they are placed in the neighborhood of the "puff-balls."

In the present communication (which is necessarily of a technical nature, but of great utility) the author has taken the opportunity of thoroughly revising the North American species of *Myxomycetes*, on the basis of the classification proposed by Dr. Rostafinski, in a monograph published by him in 1875. And it may be stated here, as a remarkable example of the devotion of a naturalist to his favorite pursuit, that his monograph having been written in the but little read Polish language, Dr. Cooke began the study of the latter and mastered it, in order to avail himself of Rostafinski's views. For half a century the species of this order of fungi have been classified according to external characters alone, or such only as could be discerned by the aid of the pocket lens. The advance of microscopy left behind such an incomplete system for years, until Dr. Rostafinskipublished the outlines of a classification based on new principles. As the old method was based wholly on external features, so the new one has nearly all its essential characteristics relating to internal structures. In using the new system, it is first necessary to determine the color of the spores, then the presence or absence of threads (*capillitium*), and finally the character of the latter, and when present, all its details. The dimensions of the spores are also taken into consideration, but are not regarded as of so much importance as the foregoing features.

The threads which are intermixed with the spores in many of these little fungi exhibit, when examined under the microscope, a spiral arrangement which has given rise to as much controversy as the markings of some of the diatoms. The dispute has been whether the spiral markings were external or internal, whether caused by the twisting of the thread or by the presence of an external or internal fiber.

To return to Dr. Cooke's paper: One who is somewhat familiar with the subject will, on turning to the genera and species, as they are here classified, be struck with the newly proposed generic names and the wholesale conglomeration of species that have hitherto been supposed to have a distinct individuality. But, as an offset to this, we have in some cases what have been supposed to be forms of the same thing, separated and elevated to the rank of distinct species. As the system of Rostafinski is the one that will probably be adopted, the synopsis here offered by Dr. Cooke will prove of incalculable value to American mycologists.

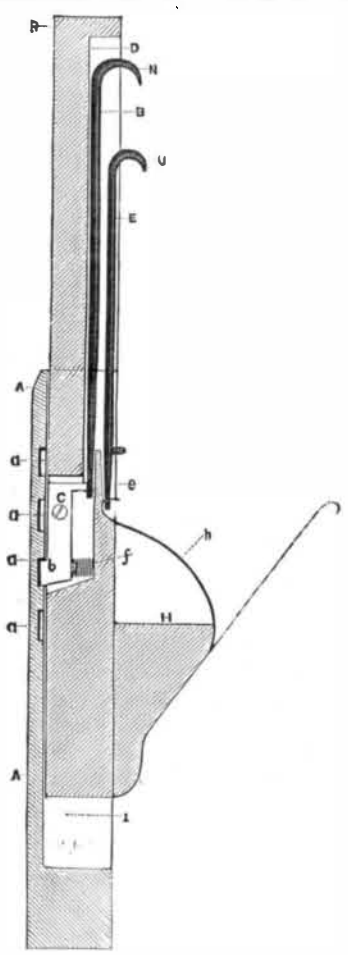
The Stings of Hymenopterous Insects.—At the last meeting of the New York Microscopical Society the President, Mr. Hyatt, read an interesting paper on this subject, made the more valuable from the fact that it embodied the results of his careful studies, extending over a period of eight years. It would be useless to attempt a synopsis of his remarks without the aid of the beautifully executed microscopic drawings which accompanied the paper, and which added so much to its interest and value. The memoir, illustrated with copies of these drawings, made under the personal supervision of the author in order to insure their accuracy, is soon to be published by the society. A point in the structure of the bee's sting, which the author apparently regarded as new, has been mentioned in print several times; and, in fact, has been illustrated in one of the back volumes of *Science Gossip*. We refer to the channels that lead from the central cavity of the sting to the bases of the barbs. Mr. Hyatt stated that, as far as he had been able to discover, no really correct representation of the sting of a bee had ever been published. If this be so the publication of this paper will not only reflect great

credit on the author, but also on the new, but energetic and accomplished, society over which he presides.

Plant Crystals.—At a recent meeting of the East Kent (Eng.) Natural History Society, Professor Gulliver, F.R.S., exhibited numerous drawings of *Raphides*, and other microscopic plant crystals, accompanied by explanatory remarks. From the latter we glean the curious and novel information that some trees and other plants, from stem to branches and leaves, are invested with a most delicate network, or tessellated pavement like mosaic work, of cells all studded with *sphæraphides*, so that each cell is set and adorned with a gem of one of these beautiful crystals. The "Angelica tree" (*Aralia spinosa*) was said to form an example, beneath its bark or epidermis, of this external skeleton of crystalline tissue. And an internal crystalline skeleton was shown in other plants, including some *Leguminosæ*, as may be well seen in the common white clover, the crystals being arraged in chains along the vascular bundles. Mr. Gulliver remarked that, boiling a portion of the plant before its examination, in the solution of caustic potash which is kept by druggists, exposes the crystals very clearly. He added that he had learned that the long crystal prisms of the iris tribe are admirably suited for experiments on polarization of light; and he believed that the whole subject of plant crystals belongs to the vast domain of the cell biography of plants, which has hitherto been too sadly neglected, but which must be diligently cultivated before we can hope for the most complete system of botanical classification and knowledge of the laws which govern the vegetable kingdom.

SHUTE'S ADJUSTABLE SAFETY STILT.

The accompanying engraving is a sectional view of a new stilt, which is so constructed as to be capable of being raised



IMPROVED STILT.

to any desired distance from the ground, and from which the wearer can release himself in case of falling by freeing a spring hoop which passes over the foot. The device is made in two parts, one having guides and sliding in a channel, I, in the other portion, A. There are recesses or indents, *a*, in the bottom of the channel, I, to any desired number. R is the handle, and H the foot piece made on its lower end. The handle is provided with a catch, *b*, pivoted in a recess at *c*, with a spring, *f*, placed behind to throw it outward; and the lower end of rod, B, sliding in a groove, D, made in the handle, is connected to the rear side of the catch at its upper end. When the rod, B, is pulled upward by the hook, N, the lower protruding end of the catch *b* is drawn in, when the socket, A, being moved a little up or down, and the rod released, the catch, *b*, will snap into any of the recesses, *a*, as may be desired to make the stilt longer or shorter, or the foot piece, H, nearer to or farther from the ground. In moving it up or down the handle, it is kept in proper position in the channel, I, by cleats fastened to the face of the socket, A. In the same groove, D, is a rod, E, held down by a staple, and spring hoop, *h*, is secured to the other side of the foot piece, H, which is sufficiently long to be bent inward over the foot piece. Its upper end is secured inside the latch rod, *e*. The object of this spring hoop, *h*, is to assist in securing the foot to the foot piece, H, and it may be released and the spring caused to fly outward instantly (as shown by dotted lines in the engraving), if there is any danger of falling, by pulling up the latch rod, E, by the hook, U.

For further particulars as to rights or for descriptive circulars, address the inventor, Mr. Charles S. Shute, Springfield, Mass.

TOO MANY NAMES.

Professor Hayden, at the late meeting of the Academy of Sciences, called attention to the inconveniences arising from the duplication and even multiplication of the same name, as applied to towns or geographical localities in this country. There was some discussion as to the best means of checking this source of annoyance to geographers and the Post Office people, and Professor Gilbert thought that the Land Office might in some way interfere to check the repetition in new towns of the West. But this would not help matters for places that are already named. For instance, the current *Post Office Guide* gives twenty-eight Washingtons, and fifteen places have Washington as a prefix, with the further designation of Corners, Court House, and in one case the euphonious Gulch. There are three New Yorks, seven Philadelphias, a dozen Bostons, sixteen Albanies, and thirteen Providences. The ubiquitous Smith has modestly given his cognomen pure and simple to but one town, but he lavishes it in connection with various endings. Smith has eight "Mills," three "Landings," twenty-three "Villes," besides innumerable "Fords," "Gaps," "Flats," and "Ferries." A few moments' examination of any gazetteer will show that this practice of multiplying names is degenerating into a nuisance, and, in directing notice to the fact that in fixing new localities through the surveys of the Western Territories the same multiplication is constantly occurring, Professor Hayden utters timely warning.

It is not so easy, however, to devise a remedy. Certainly any man who makes a clearing and builds a log cabin has the inalienable right to call his habitation what he likes; and if somebody else builds alongside of him, that somebody may designate his hut as he pleases. This is the English style, where everybody that has a country seat, if it is on only a twenty-five foot lot, calls it this or that Hall, or some other fine sounding name, and the Post Office people eventually learn and remember it. But if settler No. 2 agrees with settler No. 1 that both cabins shall be known as Paris, they are not infringing any law of the land; neither are settlers Nos. 3 and 4, who squat five miles off and agree to call their hovels Paris also. There is nothing in the Constitution about this, and we fail to see how the military or civil power could reasonably be requested to interfere and pull down one or the other Paris in the event of the owners thereof declining, like Romeo, to throw off the name which is no part of them. In fact we do not see how any reform could be made among the twenty-eight Washingtons, for example. Shall we establish a court and try the cause on the interference principle, making each town prove priority of application of name? The result would be twenty-seven nameless towns, and twenty-seven populations eagerly demanding information as to where they lived anyhow. Or shall we devise a system of geographical copyright or patent, so that any town which appropriates a "new and useful" name may have exclusive right to the same, after an official examination? The opportunity of calling into existence a new host of officials should render this scheme especially luring to the congressional mind; and the litigations incident to disputes between similarly named towns would be useful to the legal profession. The last resort is, when we take the next census, to require county authorities, in which there are similarly entitled localities, to alter the names. The State authorities might then carry through a like revisal in cases where similar names occurred in different counties, and the United States Interior Department adjust matters where similar names occurred in different States. This would be a troublesome and probably costly proceeding, and the result now would be scarcely worth the labor; but, on the other hand, if similar names are to go on multiplying throughout the West as they have in the East, the line will have to be drawn somewhere, if only out of regard to the rising generation, who must study the geography of the country.

Photos in Colors.

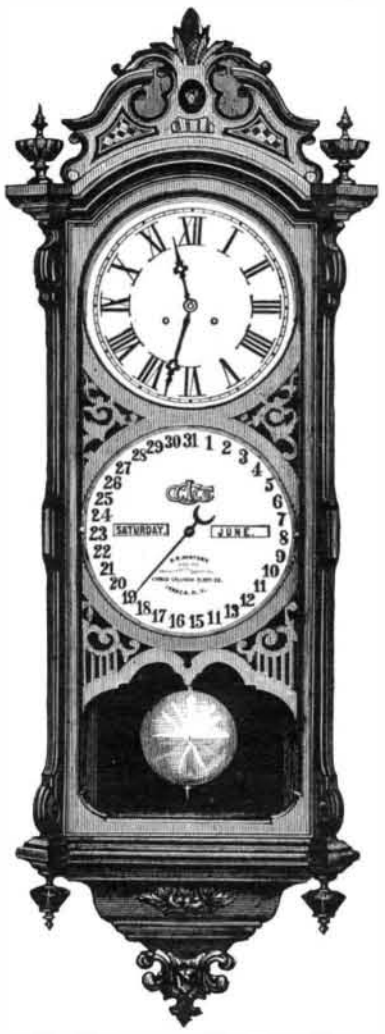
The principle of the production of the Albert process for the production of colored photographic prints is that three negatives are made after the colored original, one in which the blue had no effect upon the plate, but all the other colors. This negative is used for the production of the Lichtdruck plate for blue color. In the second negative all colors take effect except yellow; in the third, all colors except red. The second negative, therefore, forms the Lichtdruck plate for the yellow; the third, that for the red color. All three plates are printed upon the same paper, and furnish the complete picture.

Gold Lace.

Gold lace is not gold lace. It does not deserve this title, for the gold is applied as a surface to silver. It is not even silver lace, for the silver is applied to a foundation of silk. The silken threads for making this material are wound round with gold wire, so thickly as to conceal the silk; and the making of this gold wire is one of the most singular mechanical operations imaginable. In the first place, the refiner prepares a solid rod of silver about an inch in thickness; he heats this rod, applies upon the surface a sheet of gold leaf, burnishes this down, applies another coating, burnishes this down, and so on, until the gold is about one hundredth part the thickness of the silver. Then the rod is subjected to a train of processes which brings it down to the state of fine wire; it is passed through holes in a steel plate lessening step by step in diameter. The gold never deserts the silver, but adheres closely to it, and shares all its mutations; it is one hundredth part the thickness of the silver at the beginning, and it maintains the same ratio to the end. As to the thinness to which the gold coated rod of silver can be brought, the limit depends on the delicacy of human skill; but the most remarkable example ever known was brought forward by Dr. Wollaston. This was an example of solid gold wire without any silver. He procured a small rod of silver, bored a hole through it from end to end, and inserted in this hole the smallest gold wire he could procure; he subjected the silver to the usual wire-drawing process, until he had brought it to the finest attainable state—being, in fact, a silver wire as fine as a hair, with a gold wire in its center. To isolate this gold wire he subjected it to warm nitrous acid, by which the silver was dissolved, leaving a gold wire one thirty thousandth of an inch in thickness—perhaps the thinnest round wire that the hand of man has yet produced. But the wire, though beyond all comparison finer than any employed in manufactories, does not approach in thinness the film of gold on the surface of silver and gold lace. It has been calculated that the gold on the very finest silver wire for gold lace is not more than one third of one millionth of an inch in thickness, that is, not above one tenth thickness of ordinary gold leaf.—*Coventry Standard.*

IMPROVED CALENDAR CLOCK.

Our engraving represents an ingenious clock, wherewith is combined a calendar that perpetually indicates the hour of the day, the day of the week, the day of the month, and the month of the year. This calendar apparatus, being purely a gravity machine, not operated by any spring or levers, and requiring but a very slight weight to be raised



THE ITHACA CALENDAR CLOCK.

and dropped once in twenty-four hours, does not entail, we are informed, any perceptible labor upon the clock movement, as the necessary work is evenly divided through the whole twenty-four hours. The most delicate watch movement made, it is claimed, has ample power to operate the largest calendar. The apparatus within itself makes all the leap year changes, and if properly started (there being carefully printed directions with each clock), kept wound up, and running perpetually, will show upon its face accurately all the information above noted. Each calendar, before leaving the manufactory, is tested on a specially invented machine for that purpose, whereby all changes through eight years of time are repeated, so as to render a perfect record certain when the clocks go into service. The illustration represents a bank calendar clock with 12-inch dials, of the type often used by jewelers for regulators. For further particulars see advertisement of the Ithaca Calendar Clock Company in our advertising columns.

William Orton.

We note with much regret the death of Mr. William Orton, President of the Western Union Telegraph Company. Mr. Orton was a self-made man, beginning life as a printer's boy, and gradually rising through various positions in mercantile and political life, until in the office he last held he found ample scope for his great enterprise and rare executive ability. He possessed a ready appreciation of inventors' work, and was quick to advocate the adoption and use of new and improved devices calculated to add to the extension and efficiency of the telegraph system or the convenience of the public. He died at the age of fifty-two years.