published, by permission, in The New York Sun. The letter, which is of considerable length and detail, will be found in the current issue of the SUPPLEMENT, and we must be content to give in these columns one or two of the leading facts from this most interesting "log."

In the first place, the "Oregon," it seems, though rated as a vessel of a little over 10,000 tons, actually displaces about 12,000 tons with full stores and 1,500 tons of coal on board. The run of 4,076·5 knots from San Francisco to Callao was made on 900 tons of coal at a speed of 11·49 knots, or at the rate of 4·24 knots per ton. The highest speed was 14·55 knots for the 132 miles from Port Tamar to Sandy Point, when the ship burned 1 ton of coal for every 2 knots. This was done under "semi-forced draught," and the speed rose to within 0·45 knot of her contract speed. Although the ship carries four double-ended boilers, only three were in use at one time—the fourth being used whenever leaky tubes demanded repairs in any of the other boilers.

Mr. Offley attributes the success of the motive power to the excellent work put into the engines and boilers by the builders and to the great care which was taken to always "keep everything as nearly up to perfection as possible," every wear or failure, however small, being at once detected and set right.

FREDERIC WARD PUTNAM.

BY MARCUS BENJAMIN, PH.D.

This week the American Association for the Advancement of Science celebrates the fiftieth anniversary of its existence. In 1847 the American Association of Geologists and Naturalists, which had been formed in 1840 as the Association of American Geologists, met for its annual meeting in Boston. It was then determined to enlarge its scope and broaden its work. This it accomplished chiefly by the adoption of a new constitution which provided for the admission of all lovers of science to membership and the acceptance of the larger name. Accordingly, the first meeting of the American Association for the Advancement of Science was held in Boston, although it was not until 1848, a year later, that the first regular meeting of the newly formed organization was held in Philadelphia under the presidency of William C. Redfield, an early leader in American meteorology.

Regular annual gatherings of this, the fifth oldest scientific society in the United States, have since been held, except in the years 1861 to 1866, the period of the civil war. In 1866 the Association met in Buffalo under the presidency of the learned Frederick A. P. Barnard, who, for a quarter of a century, presided with conspicuous ability over Columbia University in New York city.

This year the Association turns to the place of its birth and meets in the hospitable precincts of Boston. The selection of a suitable candidate to preside over the deliberations of this semi-centennial meeting was not a difficult one. An officer—indeed, the executive officer—of the Association, after a faithful service of a quarter of a century, resigned his place at the Detroit meeting last year.

Of New England ancestry, an alumnus and a member of the faculty of Harvard University, Prof. Putnam was at once recognized as the only candidate possible, and he was, without dissenting voice, promoted from the most active office to the most honorable one in the gift of the Association. Equally was American science honored by this selection, for whether as a naturalist or as an anthropologist, Prof. Putnam is recognized as easily one of the foremost of American scientists.

Frederic Ward Putnam was born in Salem, Massachusetts, on April 19, 1839, and is a direct descendant of John Putnam, who was one of the first settlers in Salem. If we cross the ocean, the Putnam line may be traced to Puttenham of Puttenham, who died in 1642. His ancestry likewise includes the Appleton, the Ward, and the Fiske families, all well known New England names.

As a boy, young Putnam showed unusual fondness for the study of natural history, and his parents afforded him every facility in the pursuit of this favorite subject. One of the results of his fondness for the study of nature was the preparation by him of an accurate "Catalogue of the Birds of Essex County, Massachusetts," which was published by the Essex Institute in 1856, when he was only sixteen years of age, and which resulted in his being made Curator in Ornithology in that institution.

It was about this time that the attention of Louis Agassiz was attracted by the young man's devotion to natural history, and he was thus drawn to Cambridge, where, in 1856, he entered the Lawrence Scientific School of Harvard University and became one of that brilliant band of young men among whom were the younger Agassiz, Morse, Packard, Scudder, Shaler, and Verrill, all of whom now hold high rank among living naturalists in this country.

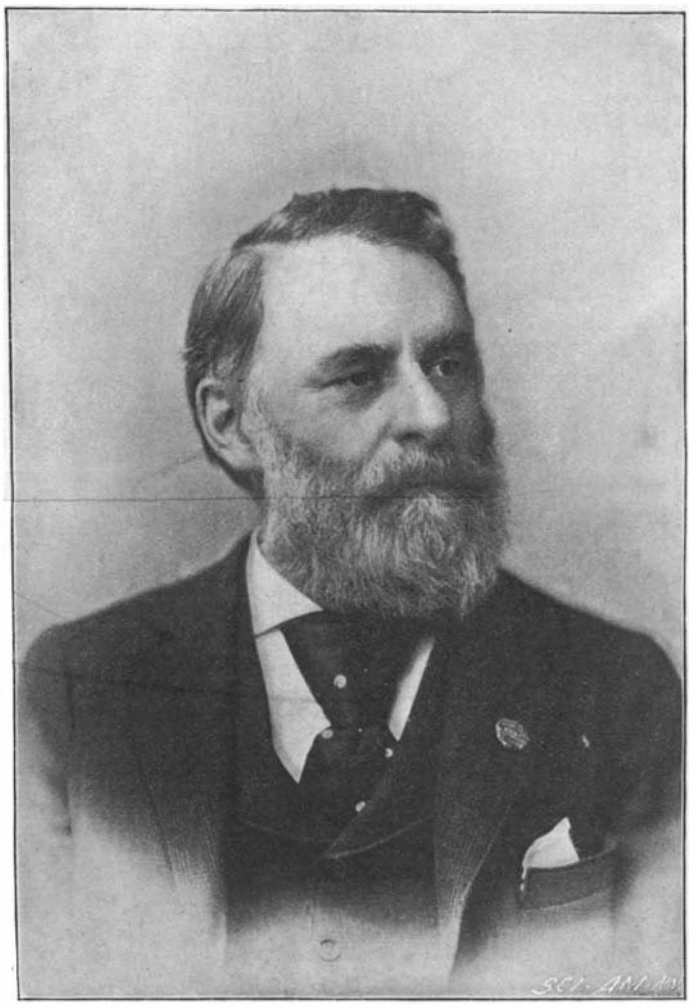
It was Putnam's intention to take a course in the Medical School, but the influence of Agassiz proved irresistible, and he soon became assistant in charge of the collection of fishes in the Museum of Comparative Zoology, which office he retained until 1864.

He then returned to Salem, where he accepted the place of director of the museum of the Essex Institute, and in 1867 he was made superintendent of the East Indian Marine Society's Museum. A few years later, largely as a result of his influence, the Peabody Academy of Science was organized by the combining of these two collections, and he was made director of the new institution.

When a student, his attention had been directed to American archæology, and in 1857, while in Montreal, Putnam discovered a shell heap, which, on investigation, he determined to be refuse material from an ancient habitation-site, and thus he became one of the first to attribute such shell-heaps to ancient man.

Although the first years of his scientific career were occupied with zoological investigations, still, on the death of Jeffries Wyman, in 1874, he was called to the charge of the collections in the Peabody Museum of American Archæology and Ethnology, in Cambridge, of which institution, in 1875, he was made curator.

His life work has since been devoted to the newer field of anthropology, but the change was not an abrupt one, and in 1876 he resumed his charge of the department of fishes in the Museum of Comparative Zoology. Thereafter, until 1878, he divided his time between the two museums, and then he decided to devote his chief attention to the growing demands of anthropology. The wisdom of this course has since been abundantly proved by his rich contributions to American archæology, and received its most conspicuous recognition in 1886, when he was called by Harvard University to fill the new chair of American archæology and ethnology, which he still holds.



PROF. F. W. PUTNAM.

In February, 1891, he was made chief of the Department of Ethnology in the World's Columbian Exposition, and in that capacity he directed the researches of seventy-five assistants in archæological, ethnological, and somatological investigations in all parts of America. The results were exhibited in the Anthropological building and afterward formed the nucleus of the anthropological department of the Field Columbian Museum in Chicago. Indeed, Prof. Putnam was the first to call attention to the importance of establishing a scientific museum in Chicago as a result of the World's Fair, and his article in The Chicago Tribune, in May, 1890, was the first public appeal to the wealthy citizens of Chicago, to secure such a museum for that city.

Prof. Putnam was called in April, 1894, to the curatorship of the department of anthropology in the American Museum of Natural History, in New York city, and since then he has had the direction of the various expeditions that have been sent out under the auspices of that institution for the purpose of forming an anthropological collection worthy of that great museum.

Brief mention must be made of other duties with which he has been active. In 1874 he was a member of the Kentucky Geological Survey, and made a special investigation of the caves of that State, and during the summer of the same year he was an instructor in the Penikese School of Natural History. He was appointed in 1876 to take charge of and report upon the anthropological material collected by the Geological Survey west of the one hundredth meridian, and three years later his results were published as Volume vii. (Archæology) in the quarto series of the reports of that survey. From 1882 till 1889 he was State commissioner, in Massachusetts, of inland fisheries.

In connection with his zoological and anthropological work, he has published over three hundred papers. He was the originator and editor of the Naturalist's Directory, as published by the Essex Institute in 1865. He was one of the founders of The American Naturalist in 1867 and an editor until 1874. He edited the Proceedings of the Essex Institute and the Reports of the Peabody Academy from 1864 till 1874, as well as the annual volume of the Proceedings of the American Association for the Advancement of Science since 1872; he has also prepared the annual reports of the Peabody Museum, in Cambridge, and edited all its publications since 1873. In 1890 he contributed to The Century Magazine several articles on his explorations of the famous Serpent Mound in Adams County, O., together with a summary of the archæology of the Ohio Valley, and the preservation of this prehistoric monument by the State of Ohio is due to his influence in creating a public sentiment in favor of such an action.

The degree of A.M. was conferred on him by Williams College, in 1868, and that of D.Sc. by the University of Pennsylvania, in 1874. The French government gave him the Cross of the Legion of Honor, in 1896. He has been elected to membership in fifty-six learned societies in this country and eleven abroad. In 1859 he was elected Curator of Ichthyology in the Museum of the Boston Society of Natural History, of which society he was made vice president in 1880, holding that office till 1887, when he was chosen president. Since 1890 he has been president of the Boston branch of the American Folk Lore Society, and in 1891 he was elected president of the American Folk Lore Society, the parent body. The American Philosophical Society of Philadelphia, the American Academy of Arts and Sciences, and the National Academy of Sciences, the three scientific societies in the United States to which election is only by invitation, include his name on their rolls of membership.

Prof. Putnam joined the American Association for the Advancement of Science at its tenth meeting, held in Montreal, in 1857, and in 1873 he was chosen permanent secretary, which office, by successive re-elections, he has since held. The membership, when he became secretary, was barely 500, and it is now upward of 2,000. The growth and development of the American Association are chiefly due to his tact, untiring energy, and remarkable executive ability.

His elevation to the presidency is an expression of the appreciation and gratitude of the thousands of scientific men both in this country and abroad, with whom he has formed pleasant acquaintance during his faithful service to the American Association, all of whom sincerely hope that, as a permanent member of the council, he may for many years continue to honor its deliberations with the wisdom that has come from his long service and experience.

THE NEW SMOKELESS POWDER FOR ARMY AND NAVY.

The general public has learned in a practical way during the war the great superiority of smokeless powder over the now obsolete brown powder. The interference of our own smoke with our guns at San Juan and Santiago, and the way in which the Springfields, with which the volunteers were armed, drew the Spanish fire were object lessons easily understood and laid to heart by a practical people.

The decision of both the Army and Navy Departments to make the new powder the standard type in both branches of the service will be received with unfeigned satisfaction, as will the announcement that large orders are being placed for its manufacture. One of the chief causes of our backwardness in this matter has been the fact that, for lack of encouragement, manufacturers have hesitated to enter extensively into the manufacture and do the necessary but costly experimental work. Now, however, they not only start with large orders for an excellent powder, but the experience they will gain must necessarily result in a steady improvement in the art as carried out in this country.

In the current number of the SCIENTIFIC AMERICAN SUPPLEMENT will be found a lengthy account of the

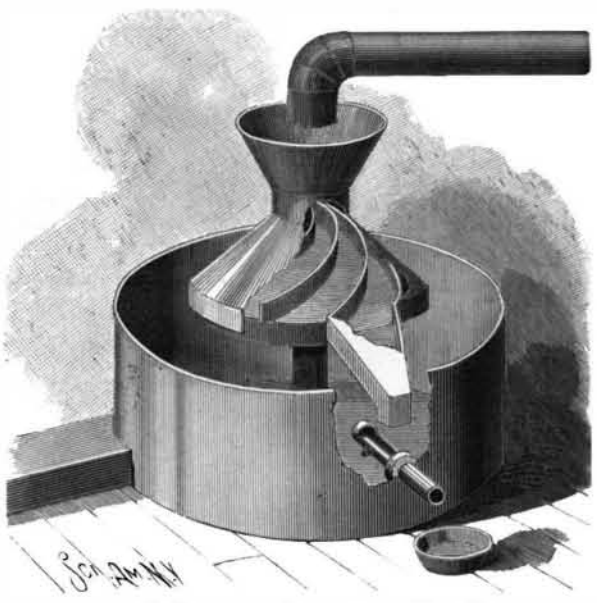
new smokeless powder. It is known as the Maxim-Schupphaus. It is a purely American powder, and in its present perfected form it represents the results of experiments which have been carried on steadily for the past four years. In 1893 the inventors were collaborating in the attempt to find a suitable propellant for firing large masses of high explosives from rifled guns, the object of their search being a powder which would give a less sudden initial acceleration to the projectile, with a more uniformly sustained subsequent acceleration in the gun than was possible with the then known powders. Realizing that the chief trouble with the existing smokeless powders was the serious erosion of the bore due to the high pressure and temperature of the gases, they determined to use gun-cotton, which gives low erosive effects, and to use such a form of grain that the surface at first exposed to the flame of ignition would be relatively small and then increase rapidly as the projectile traveled up the bore.

The theory worked out excellent results on the proving ground, as may be judged from the fact that a 35-pound projectile has been fired from a 4·7-inch gun with a velocity of 2,913 feet a second on a maximum pressure of only 35,000 pounds per square inch. Our new powder is not only free from erosive effects, but it has been proved to be thoroughly stable.

A NEW SAMPLING MACHINE.

The accompanying engraving represents an improved sampling machine which is arranged to utilize the pulp or other material as the motive power for setting the apparatus in motion.

The machine is provided with a fixed casing having an outlet for the discharge of the bulk of the material from which the sample has been taken. From the bottom of the casing a post rises upon which a cone-shaped wheel is mounted to rotate. This cone-shaped wheel has spiral ribs terminating in the apex of the



BYRNES' SAMPLING MACHINE.

cone, so that the material or liquid to be sampled and discharged upon the apex through a hopper, is equally divided by these ribs and flows down the sides of the cone in equal quantities between adjacent ribs. One of the chambers formed between two adjacent ribs terminates at its lower end in a sample chute formed with a downwardly-extending spout. A portion of the pulp or other material can thus be discharged into a sample receiver held in the wall of the casing, thence to be conducted to a receptacle outside of the casing. When the material passes down into the spiral chambers, it is evident that a rotary motion will be imparted to the cone-shaped wheel. The material is therefore discharged mostly into the casing, only a small portion being dropped into the sample receiver at each full revolution of the wheel. Any desired quantity can be taken as a sample of the entire bulk, the proportion being regulated by the make of the machine, the number of chambers, the diameter of the wheel, and the opening of the receiver. The apparatus has been patented by the inventor, Mr. Owen Byrnes, of Granite Butte, via Gould, Mont.

Important Experiments in Aerial Navigation.

The Engineer reports that, on July 27, a series of experiments in aerial research were conducted in the grounds of Shaw House, near Newbury. The experiments were carried out under the direction of the Rev. J. M. Bacon, Dr. R. Lachlan, Mr. J. N. Maskelyne, and others, with the advice and assistance of Lord Kelvin, Lord Rayleigh, and other men of science. The balloon was in charge of Mr. Percival Spencer and his brother, and was filled with 40,000 cubic feet of gas. The main object of the experiments was to discover in what measure the intensity of sound is influenced by altitude, by the presence of clouds, etc. The weather proved favorable for the observations, and the ascent was successfully made at twenty minutes past five o'clock, the balloon drifting steadily in a northwesterly direction. As soon as the balloon had had a fair start the series of experiments commenced. The first experiment in acoustics was with the voice, followed by five tests with musical instruments, these being succeeded by the discharge of rifles and blasts of the siren from an engine. Then came a rifle volley, followed by a roll of musketry, succeeded in turn by discharges of cotton-powder, four ounces being used in each charge. After this came three further discharges of cotton-powder, with eight ounces in each charge. When the balloon had traveled a considerable distance there were two explosions of cotton-powder with double charges, the final experiment being a comparison between a discharge of four ounces of gunpowder and four ounces of cotton-powder. The aeronauts had with them a receiving instrument, and by noting the altitude and the sounds which reached them, took the angular distance. The balloon descended at ten minutes to seven o'clock at North Denford. All the experiments proved highly successful.

A New Pompeii.

This title is perhaps an exaggeration, but it is certain that if the published reports are true, the German archæologists who are excavating on the site of ancient Priene have made a discovery of the highest interest. It is well known that Priene is in Asia Minor, and that the modern city, of Samsoun occupies its ancient site. Several years ago an English expedition unearthed and studied the temple of Minerva, the chief sanctuary of the city, built by order of Alexander; but its ruins, although interesting, were abandoned, and they have since been despoiled by the inhabitants of the neighborhood. In 1895 the Germans resumed the exploration of the region in behalf of the Berlin Museum, at the expense of the Prussian government and under the direction of a young architect, Wilhelm Wilberg. The work of excavation is already sufficiently advanced to enable us to judge of its rare importance; a whole city is being unearthed, in almost as good preservation as Pompeii. And this is the more important because up to the present no similar discovery has ever been made that gives precise indications of the general arrangement of a Greek city, of its public monuments, or its individual dwellings. The city thus exhumed is assuredly of the period of greatest Greek beauty; the streets cross at right angles and are laid out with the greatest regularity, and we can identify colonnades, theaters, market-places, shops, and houses with their decorations and interior arrangement. South of the temple of Minerva has been found the agora, surrounded with great colonnades, while opening on one of its corners is a small square edifice somewhat resembling a theater and constituting perhaps the place of meeting of the city council. It is in admirable preservation, and sixteen rows of seats can be seen still in place. Worthy of note is a vault in one of the walls—a thing extraordinarily rare in Greek architecture. We should add, in closing, that among the structures that have been entirely exhumed is a theater whose scene is intact, which will doubtless solve some of the problems connected with this special part of the Greek theaters.—Literary Digest.

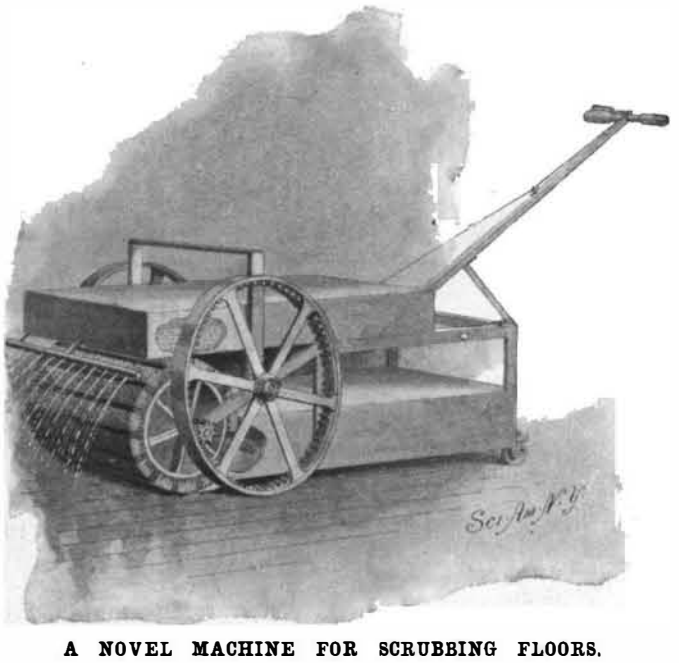
A SCRUBBING MACHINE.

To provide a machine for scrubbing floors, so constructed that it will sprinkle water or a washing compound on the floor, take up the water, dry the floor, and deliver the material taken up into a receptacle forming part of the apparatus, Mrs. Hattie E. Lane, of Colfax, Ind., has invented the machine forming the subject of the accompanying illustration.

The apparatus is provided with a frame, in which wheels are journaled. In front of the wheels a drum is mounted, consisting of alternate sections of rubber and bristles, and operated as shown in the engraving. Above the drum a receptacle is located extending forward to some distance, and containing water or some washing compound. A valve, situated in the receptacle, controls the delivery of the water, and is operated from the handle of the machine. When it is desired to open the valve, a lever on the handle is operated, thus acting on the chain or cord connected with the valve. Springs automatically close the valve when the pressure on the lever is relieved. A receiver is suspended from the rear portion of the frame, and has its concave forward end in contact with the floor and with the drum.

In operation, the valve being open, the machine is pushed along, whereupon water will be delivered to the floor in front of the cleaning drum. The floor will be scrubbed by the brushes on the drum, and will be dried by the rubber strips. The material taken up by the scrubbing drum will be delivered into the receiver suspended in the lower portion of the frame.

This device, it is claimed, will clean a floor as readily and as perfectly as a brush operated by hand.

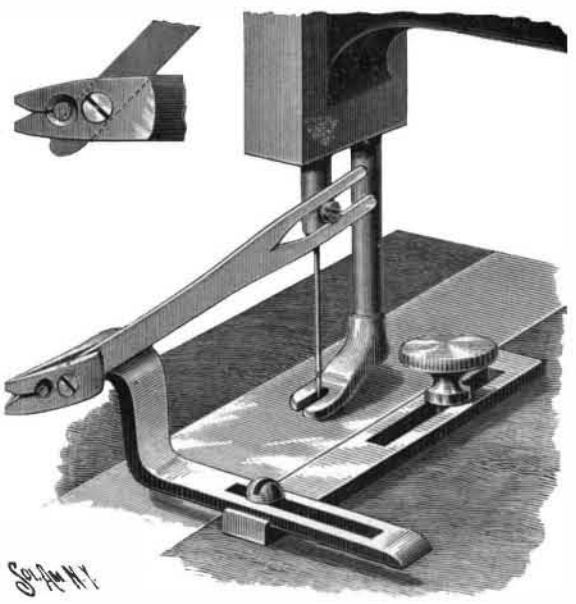


A NOVEL MACHINE FOR SCRUBBING FLOORS.

AN IMPROVED SEAM-RIPPER.

In an invention recently patented by Lemuel Merrill, of 52 Federal Street, Boston, Mass., a novel device is provided for ripping seams which is so constructed as to cause a reciprocating knife held between the members of a body-section to cut the threads of a seam at both up and down movements.

In the attachment illustrated, a shield-like device is provided which is formed to receive the seam and which co-acts with the reciprocating ripper-arm. The shield



SEAM-RIPPER ATTACHED TO A SEWING MACHINE.

forms part of an attachment adapted to be adjustably secured to the sewing machine, and is provided at its front end with a tapered slot terminating in a circular opening. This circular aperture enables the cut threads to leave the shield readily. The ripper-arm is pivoted to the shield and at its forward end is sharpened to a rounded cutting edge. By its reciprocating movement across the slot of the shield, the arm is enabled to cut both at its up and down movements. As shown in the illustration, the arm may be operated by the needle-bar of the machine, the forked rear end of the arm engaging the bar for that purpose.

In practice the invention is also embodied in a hand ripping device, formed after the manner of scissors.

When used in connection with a machine, both hands are free to guide the work. While the threads of a seam may be readily cut by the knife-edge, there is, nevertheless, no danger of cutting the material, since the knife-edge is protected by the shield.

Human Hair.

It is a curious fact that red-haired people are far less apt to become bald than those whose hirsute covering is of another hue. The average crop on the head of the red-haired person is said to be only about 30,000 hairs. Ordinary dark hair is far finer, and over three dark hairs take up the space of one red one; 105,000 are about the average. But fair-haired people are still better off; 140,000 to 160,000 are quite a common number of hairs on the scalp of a fair-haired man or woman. A curious calculation has been made, to the effect that the hairs on the head of a fair-haired person, if they could be plaited together, would sustain a weight of something like eighty tons, equaling that of five hundred people.—Medical Record.

ITALY is the first of the powers to learn a lesson from the war. The Navy Department has given orders that wood shall not be used on battleships.