Scientific American.

[AUGUST 10, 1878.

Scientific American.

ESTABLISHED 1845.

MUNN & CO., Editors and Proprietors.

PUBLISHED WEEKLY AT NO. 37 PARK ROW, NEW YORK.

O. D. MUNN. A. E. BEACH.

TERMS FOR THE SCIENTIFIC AMERICAN.

same proportionate rate. Postage prepaid. Single copies of any desired number of the SUPPLEMENT sent to one address on receipt of 10 cents.

ddress on receipt of the second ddress MUNN & CO., 37 Park Row 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, with handsome cover uniform in size with SCIENTIFIC AMERICAN. Terms of subscription for SUPPLEMENT, \$5.00 a year, postage paid, to subscribers. Single copies

19 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., 37 Park Row, N. Y.

Scientific American Export Edition.

Scientific American Export Edition. The Socient stroke Report Edition is a large and splendid peri-odical, 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 SocieNTIFIC 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. 127 Manufacturers and others who desire to secure foreign trade may have large, and handsomely displayed an-nouncements publised in this edition at a very moderate cost. The SOC SYNTER' AMERICAN EXPORT Edition has a large guaranteed circu-lation in all commercial places throughout the world. Address MUNN & CO., 37 Park Row, New York.

VOL. XXXIX., No. 6. [NEW SERIES.] Thirty-third Year. NEW YORK, SATURDAY, AUGUST 10, 1878.

Contents.

(Illustrated articles are marked with an asterisk.)

Hair removing superior from Prof. Industrial enterprises, new Ink to rule faird lines [7]..... Inventions, new agricultural... Inventions, new engineering.... Inventions, new mechanical... Inventions, new mechanical... Inventions, new mechanical... Journalism, crooked Lathes, attachment for*.... Lemon verbena, new use for.... 91 86 87 89 80 88 80 88 80 88 80 88

86 87 87 N Y Capitol, machinery for Paris Ex, Japanese Building Patent law, our Pens, fountain Petroleum June review Petroleum oils as lubricators Petroleum, short history of. Plants, etc., influence of light on. Points, and a lake, remarkable Point and the state of the state of the state Point of the state of the state of the state Point of the state of the state of the state Point of the state of the state of the state Point of the state of the state of the state Point of the state of the state of the state of the state Point of the state of the state of the state of the state Point of the state of the state of the state of the state Point of the state of the state of the state of the state Point of the state of the state of the state of the state Point of the state of the state of the state of the state Point of the state of the state of the state of the state Point of the state of the state of the state of the state Point of the state of th

Sunsther, and the second secon

TABLE OF CONTENTS OF THE SCIENTIFIC AMERICAN SUPPLEMENT No. 186,

For the Week ending August 10, 1878.

1. ENGINEERING AND MECHANICS.—The Manufacture of Wrought Iron Pipe. Bending the Sheets. Welding the Tube. Manufacture of Gas Pipe. Polishing and Smoothing. A figures. Improved Marine Engine Governor. 1 figure.—Improved Screw Steer-ing A paratus. 3 figures.—West's Reversing Gear. I figure. Figu-neering in Peru. The Oroya Railroad over the summit of the Andës. A remarkable engineering feat. The famous Cerro de Pasco Silver Mines. Extensive Coal Fields.

- Mines. Extensive Coal Ashes as a Civilizer. Grading. Coal Ashes as a Fertilizer.-Utilization of the Waste Waters of Fulling Mills and Woolen Works.-Suggestions in Decorative Art. Marquetry Orna-ments from Florence. S illustrations. Useful Recipes. By J. W. PARKINSON. Cream cake. Kisses. Ap-ples a la Tongue. Mead. Bread without yeast. Biscuit. Doughnuts. Gluire of Eggs. Crumpets. Ratafa de Framboises. Ratafa de Cerises. To color sugar sand. Razberry and currant paste. Cheese cake. Co-coanut macaroons. Orange slices. Ice cream. Fruit juices. Lady fingers. White bride cake. Scalloped clams. Iced souffe. Sugar for crystal work. To restore the fragmance of oil of lemon. Family bread. PERVCH. UNTERPATION. LEXPONDENCE.
- III. FRENCH INTERNATIONAL EXPOSITION OF 1878.—Tobacco at the Exhibition. Manufacture of snuff. The two processes of fermen-tation. The grinding. The packing of the snuff. Manufacture of chewing tobacco. etc. New Cutting Apparatus for Reapers. 1 figure.—The Algerian Court. 1 illustration.—The French Forest Pavilion. 1 illustration.
- IV. CHEMISTRY AND METALLURGY.—A Reducing Agent.—Climbing Salts.—Chloride of Lime.—Action of Watery Vapor.—The Active Prin-ciples of Ergot.—Cadaveric Alkaloids. Outlines of Chemistry. By HENRY M. MCINTIRE.

PROGRESS OF IRON MAKING.

The success of the Dank's puddling furnace fired with pulverized coal seems to be no longer a matter of doubt in England. It is stated that Messrs. Hopkins, Gilkes & Co., the well known iron makers of the North of England, have succeeded in turning out from it from Cleveland pig alone iron capable of bearing tests which Staffordshire iron has not yet surpassed. The English iron manufacturers in their struggle with us are wisely taking advantage of every improvefancied security.

in many articles of manufacture, because so much of our work is done by machinery, and is consequently better and cheaper than can be produced by hand labor at the lowest living rate of wages; but so soon as the English masters and workmenshall fully appreciate this fact, the same machines advantages.

Already we notice several instances in which the workmen, renouncing their prejudices, have willingly consented to the substitution of machine for hand work, and we doubt not | pears a list of some eight hundred foreign commercial that the success of these innovations, conjoined with the pressure of the times, will ere long create a complete revolution'in the ideas of the British workmen, so that instead of longer opposing they will demand the improved appliances and facilities for work, converting them from rivals or opponents to allies. Such a radical change is not necessarily far in the future, for the logic of it has long been working in the brains of both masters and men and may reasonably bear fruit at any time. We fear that when this time arrives our makers of iron, especially, will wake up to the conscious ness that they have not kept up with the advance.

THE TELEPHONE AS A PROMOTER OF SCIENCE.

Every new thing, whether it be in the realm of mind or matter, has an influence on whatever existed before, of a similar kind, to modify, develop, and improve it, or to doom it to oblivion. Whatever is new necessitates a better knowlacquirement of the new thing, but also by a better understanding of things already known.

A discovery, published, sets a thousand minds at work, and immediately there is a host of experimentalists who, in their desire to make and try the new thing for themselves, begin without a knowledge of the science or art to which the discovery pertains, and inevitably fail. After failure comes research, which to be of value must be extended. Every investigator can recall the novelty that induced his first experiments, and can recount his trials in his search for information.

Among the inventions or discoveries that have induced extended experiment, the telephone may, without doubt, be mentioned as the chief, for no sooner was the first speaking telephone brought out than here and there all over the country it was imitated. Persons who never had the slightest knowledge of electrical science had a desire to see and test the telephone. To do this first of all requires a degree of mechanical skill. Acoustics must be understood, and a knowledge of the four branches of electrical science is requisite, as the telephone involves galvanism, magnetism, electrical resistance, induction, and many of the nicer points which can be understood by investigation only, and this not only in the direction indicated, but in the allied branches of physics and also in chemistry. Familiarity with these things develops a scientific taste that will not be easily satisfied. The characteristic avidity with which the American people seize upon a novelty has been wonderfully exemplified by the manner in which the telephone mania has spread. In consequence of this science has received an impetus, and now we have everywhere embryo electricians and experimentalists, where before were only the unscientific.

----LETTER FROM PROFESSOR HUGHES.

We print in another column a letter received from Mr. D. E. Hughes concerning the distinction he finds between his microphone and Mr. Edison's carbon telephone. Mr. Hughes is very confident that the two inventions have nothing in common, and that they bear no resemblance to each other in form, material, or principles.

We would not question Mr. Hughes' sincerity in all this. No doubt he honestly believes that the invention of Mr. Ed ison "represents no field of discovery, and is restricted in its uses to telephony," whilst the "microphone demonstrates and represents the whole field of nature." But the fact of his believing this is only another proof that he utterly fails to understand or appreciate the real scope and character of Mr. Edison's work. To those familiar not only with Mr. Edison's telephone but with the long line of experimental investigation that had to be gone through with before he was able to control the excessive sensitiveness of the elements of his original discovery, it is very clear that Mr. Hughes has been working upon and over-estimating the importance of one phase, and that a limited phase, of Mr. Edison's investigations. We propose shortly to review at length the evidence of Mr. Edison's priority in the invention or discovery of all that the microphone covers; this purely as a question of scientific interest. For the personal elements of the controversy between Mr. Edison on the one side and Messrs, Preece not what happens. What does happen is that the second and Hughes on the other we care nothing.

THE SCIENTIFIC AMERICAN EXPORT EDITION.

The inquiry for American manufactured products and machinery abroad seems to grow in volume and variety daily. And though, in comparison with our capacity to produce, the foreign demand is yet small, its possibilities are unlimited. To increase the demand the immediate problem is to make known throughout the world in the most attractive fashion possible the wide range of articles which America is prepared to furnish, and which other nations have use ment in their line to keep ahead of us, and are likely to be for. As a medium for conveying such intelligence the successful unless our manufacturers arouse from their monthly export edition of the SCIENTIFIC AMERICAN is unequaled. The table of contents of the second issue, to be We are now underselling the English at home and abroad found in another column, will give an idea of the wide range and permanent as well as timely interest of the matter it circulates. It is a magazine of valuable information that will be preserved and repeatedly read. The handsomely illustrated advertising pages supplement the text, and make it at once the freshest, fullest, and most attractive run there with cheaper labor will deprive us of our present periodical of the sort in the world. An examination of the index of advertisers will show how widely its advantages for reaching foreign buyers have been appreciated by leading American houses. In the advertising page xxv. applaces in which the circulation of the paper is guaranteed, as evidence that it reaches those for whom such publications are intended.

----FOUNTAIN PENS.

For several days we have had in use in our office examples of the Mackinnon Fountain Pen, and find it to be a very serviceable and effective instrument. This is a handsome looking pen, with a hollow handle, in which a supply of ink is carried, and the fluid flows from the point in the act of writing. The necessity of an inkstand is thus avoided. One of the difficulties heretofore with pens of this character has been to insure a free and certain delivery of the ink, and also to bring the instrument within the compass and weight of an ordinary pen. The inventor seems to have admirably succeeded in the example before us. The ink flows with certainty, and there is no scratching as with the ordinary edge of the old, so that the world gains not only by the pen; it writes with facility on either smooth or rough paper; writes even more smoothly than a lead pencil; may be carried in the pocket; is always ready for use; there is no spilling or blotting of ink. The construction is simple, durable, and the action effective. One filling lasts a week or more, according to the extent of use. These are some of the qualities that our use of the pen so far has seemed to demonstrate; and which made us think that whoever supplies himself with a Mackinnon Pen will possess a good thing. The sole agency is at No. 21 Park Row, New York city.

THE SUN.

BY S. P. LANGLEY, ALLEGHENY OBSERVATORY, PA.*

When, with a powerful telescope, we return to the study of the sun's surface, we meet a formidable difficulty which our first simple means did not present. This arises from the nearly constant tremors of our own atmosphere, through which we have to look. It is not that the tremor does not exist with the smaller instrument, but now our higher magnifying power exaggerates it, causes everything to appear unsteady and blurry, however good the glass, and makes the same kind of trouble for the eye which we should experience if we tried to read very fine print across the top of a hot stove, whence columns of tremulous air were rising. There is no remedy for this, unless it is assiduous watching and infinite patience, for in almost every day there will come one or more brief intervals, lasting sometimes minutes, sometimes only seconds, during which the air seems momentarily tranquil. We must be on the watch for hours, to seize these favorable moments, and, piecing together what we have seen in them, in the course of time we obtain such knowledge of the more curious features of the solar surface as we now possess.

The eye aches after gazing for a minute steadily at the full moon, and the sun's light is from 300,000 to 600,000 times brighter than full moon light, while its heat is in still greater proportion. The object lens of such a telescope as the equatorial at Allegheny is 13 inches in diameter, and it is such light, and such heat, concentrated by it, that we have to gaze on. The best contrivance so far found for diminishing both, and without which our present acquaintance with the real appearance and character of sunspots would not have been gained, depends upon a curious property of light, discovered by a French physicist, Malus, in the beginning of this century. Let A (Fig. 10) be a piece of plane unsilvered glass, receiving the solar rays and reflecting them to a second similar one, B, which itself reflects them again in the direction C. Of course, since the glass is transparent, most of the rays will pass through A, and not be reflected. Of those which reach B again most will pass through, so that not a hundredth part of the original beam reaches C. This then, is so far a gain; but of itself of little use, since, such is the solar brilliancy, that even this small fraction would, to an eye at C, appear blindingly bright. Now, if we rotate B about the line joining it with A, keeping always the same reflecting angle with it, it might naturally be supposed that the light would merely be reflected in a new direction unchanged in quantity.

- Outmes of chemistry. By HENRY M. MCINTRE.
 V. ARCHITECTURE AND BUILDING.—A Cottage Costing \$150. By S. B. REED, Architect. Plans for cheap summer residence for family of four persons. Dimensions, carstruction, and estimate for all mate-rials and labor, with 6 figures.—Buildings in Glass. Improved method of constructing conservatories, 2 figures.—Buildings and Earthquakes. On structures in an earthquake country. By JOHN PERRY and W. E. AYBUON, Japan. Also a new Seismometer for the measurement of earthquakes.
- VI. NATURAL HISTORY, GEOLOGY, ETC.-Colors of Birds and In-sects.-Microscopy. Minute and low forms of life Poisonous Cater-pillar. Sphærosia Volvox. An Australian Polyzoon. A Chinese Fornado.
- A Chinese Tornado.
 VII. MEDICINE AND HYGIENE --Nervous Exhaustion. By GEORGE M. B&ARD, M.D. Symptoms continued. Mental depression with timidity ; morbid fear of special kinds; headaches; disturbances of the nerves and organs of special sense; localized purphers in numbers and hyperæsthesia; general and local chills and fiashes of heat; local spasms of the muscles. Suggestions and treatment. Electricity. Application of cold ; kind of food; exercise ; medicines. The Art of Preserving the Eyesight. V. From the French of Arthur Chevaligr. Presbyopy, or long sight. Symptoms. Causes. Artificial light. Franklin's speciacles. Speciales for artists. Hygiene for long sight, and rules. Myouy, or short sight. Dilation of pupil, and other symptoms of myopy. Choice of classes. Colored glusses for short sight. False or distant myopy, and glasses to be used. 5 figures.

VIII. MISCELLANEOUS. — The Repair of the Burned Models after the Patent Office Fire of 1877. By GRONGE DUDLEY LAWSON. An Inter-esting description of the importance and difficulty of the work, and the enterprise and care shown. Reconstructing complicated models from miscellaneous fragments. Verneul, winner of the Ascot Cup, 1 illustration.

Price 10 cents. To be had at this office and of all newsdealers.

But according to the curious discovery of Malus this is * For parts 1 and 2 see SCIENTIFIC AMERICAN for July 20 and July 27.