

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.

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., 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, 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.

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 house 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., 37 Park Row, New York.

NEW YORK, SATURDAY, APRIL 23, 1881.

Contents.

(Illustrated articles are marked with an asterisk.)

Adirondack survey, the..... 259 Barometer, registering..... 259 Beans, buggy..... 261 Beet sugar in New York..... 257 Bible, eight thousand dollar, an..... 256 Boiler explosions in 1880..... 253 Bones, study of..... 254 Botanical species, number of..... 263 Botanist, a, in the field..... 262 Calculating machine, Verreaux's..... 258 Cane with toilet combination..... 259 Cars, metallic..... 260 Cask, cooling, new..... 257 Chinese coasts, longitude of..... 264 City sewerage..... 256 Cohahuila aerolite, the..... 256 Curious inhab. of Sargasso Sea..... 263 Dispatch boats, novel..... 257 Don'ts for the varnish room..... 259 Embroidery, new type of..... 261 Engineering inventions..... 257 Exhibition, Cuban, the..... 256 Fence, electric, an..... 257 Finger, mechanical in photo..... 261 Fire loss, annual..... 260 Fish supply of New York..... 260 Fly wheel, bursting of..... 259 Fox, expense, an..... 259 Game counter, new..... 259 Geographical clew, musk ox as..... 263 Goblets, grinding bands on..... 263 Gunboats, French, for the Pacific..... 259 Hats, straw, to dye black..... 265 Hesperides, gardens of..... 263 Inventions, engineering..... 259 Inventions, new..... 262 Inventions, recent..... 258 Japanese coasts, longitude of..... 264 Locomotives for Mexico..... 261 Mining machinery, outfit for..... 264 Natural history notes..... 261 Needles by heredity..... 260 Patents, official examination of..... 260 Patrol system, Chicago police..... 255 Pickett's cave..... 257 Pictures, permanent, on retina..... 257 Plants, ozoniferous..... 265 Progress, legislation against..... 265 Potassic hydric saccharate..... 265 Refuse, utilization of..... 257 Retina, the, permanent pictures..... 257 Sanitary council, Mississippi..... 257 School of philosophy, summer..... 256 Seis earthquake, the..... 256 Sevres vase..... 263 Siamese twins outdone..... 259 Solar parallax, the..... 260 Stone, broken, testing..... 260 Telephone system, Chicago police..... 257 Tools, reversible..... 259 Trout show, Blackford's..... 265 Wre, span of, longest..... 259 Writing, close..... 259

TABLE OF CONTENTS OF THE SCIENTIFIC AMERICAN SUPPLEMENT No. 277.

For the Week ending April 23, 1881. Price 10 cents. For sale by all newsdealers.

I. ENGINEERING AND MECHANICS.—New Railway Car Axle. 1 figure.—Longitudinal section and elevations of Baltimore's new car axle..... 4408 Wheel Flange Lubricator. 3 figures..... 4408 The Pulsator. 1 figure.—Vertical section of Bretonniere's pulsator..... 4409 Darsonval's Steam Pressure Regulator. 1 figure..... 4409 New Two-Color Printing Press. 1 figure.—Alauzet's press..... 4409 Improvements in Combing Machines. By M. IMBS. 1 figure..... 4410 II. TECHNOLOGY AND CHEMISTRY.—Sulphate of Soda.—A new mechanism furnace and a continuous system of manufacturing sulphate of soda. By JAMES MACFARLANE..... 4410 Shots on Hammock Canvas..... 4411 Oil from Schists. By ASTON BONG..... 4414 Brief Review of the Most Important Changes in the Industrial Application of Chemistry within the Last Few Years. By J. W. MALLETT.—Materials and processes connected with the construction of buildings.—Chief building materials for external use.—Stone and brick.—Lime burning, mortar, and hydraulic cements.—Stucco.—Preservation of timber.—Glue and other cements.—Pigments for house painter's use.—Vehicles for paint.—Varnishes..... 4414 Appendix to Building Appliances.—A. Explosive agents used in blasting, etc.—B. Disinfectants..... 4415 Process for Bleaching Cotton in the Dry Way by the Vapors of Chloroform Charged with Chlorine. By ALBERT ENGLER..... 4418 Bleaching and Dyeing Straw Hats..... 4418 Practical Receipts for Dyeing..... 4418 New Process for the Extraction of the Iodine Contained in Sea Weeds.—By M. LAURENT and COLLET..... 4418 Eastern Water. Report of analyses of Cincinnati water for the City Board of Health..... 4419 III. NATURAL HISTORY, ETC.—Exhibition of the English Cart Horse Society, London. Full page illustration..... 4407 The Cart Horse Show..... 4408 Professor Tennant, F.R.S..... 4411 The Materialistic Origin of the Sexes..... 4419 The Microscopical Analyses of Water. 19 figures. Organisms contained in the sediment of London water..... 4413 Rotating Stage for the Microscope..... 4413 Persistence of Vision. 1 figure..... 4413 Determination of Colors by Rotatory Disks. By A. ROSENSTIEHL..... 4413 The Sensitiveness of the Root Tip of the Seedling..... 4417 The Habits of the Northern or Short-finned Squid. By A. E. FERRELL..... 4412 Destroying Witch Grass..... 4422 IV. PHYSICS, ELECTRICITY, ETC.—The Radiograph. 4 figures. Winstanley's Radiograph or Sunshine Recorder..... 4414 Distribution of Light in the Solar Spectrum. Spectrum of the Color Blind. By J. MACE and W. NICHOLSON..... 4414 New Electrolytic Results. By E. F. SMITH..... 4417 Separation of Cadmium and Zinc by Electrolysis. By A. VYER..... 4417 On the Viscosity of Gases at High Exhaustions. By W. W. CROOKES, F.R.S.—Air.—Oxygen.—Nitrogen.—Hydrogen.—The spectrum of hydrogen.—Influence of aqueous vapors on the viscosity of air.—Viscosity of kerosoline vapor.—Discussion of Results.—The ultra gaseous state of matter..... 4416 V. GEOGRAPHY, ETC.—Ascent of Chimborazo and Popotaxi. By EDWARD WYMPER..... 4419 A Lost City. Gour, the ruined and forgotten Capital of Bengal. The Stone Statues of the Ile de Paques, Pacific Ocean. 1 figure. Indian Traditions Respecting their Origin. By T. D. LEWIS..... 4423 VI. SURGERY, MEDICINE ETC.—Clasps as Fastenings for Artificial Dentures. By J. W. CLOWES, D.D.S..... 4418 On the Use of a New Silver Salt in the Treatment of Organic Nervous Disease. By Dr. ALLAN MCLANE HAMILTON..... 4418 VII. ART, ETC.—Suggestions in Decorative Art.—Emblems in Cast Iron. Designed by C. Beck, Stuttgart. 7 figures..... 4412

LEGISLATING AGAINST PROGRESS.

That particular phase of unwisdom which shows itself in opposition to departures from the beaten track of custom is not confined to any locality or greatly influenced by geographical lines.

Two striking illustrations of this unpleasant fact appear in the news columns of a single morning paper. One hails from Mississippi, the other from Connecticut. The first announces that a certain Mississippi planter wanted to turn his land into a stock farm. His cotton growing neighbors protested against the change on the ground that the grass of the stock farm would spread over the adjoining plantations and spoil the land for cotton. They did more; they applied to a court for an injunction to restrain their innovating neighbor from sowing grass seed, and got it! This decidedly reverses the proverbial saying about the beneficent character of the man who makes two blades of grass grow where but one grew before. The Connecticut illustration of anti-progressiveness is even worse.

Along the Connecticut shore the succulent oyster furnishes the most important and remunerative crop, though but comparatively a small portion of the Long Island Sound bed suitable for oysters is yet under cultivation. The chief obstacles to the greater extension of the oyster industry lie in the expense of handling the crop in deep water, and the impossibility of protecting the deeper beds from the inroads of star fish and other vermin, that is, by the old-fashioned means of dredging. Accordingly the more enterprising oystermen have lately substituted steam power for sails and wind in navigating their boats, and the same motive power in place of human muscle for hauling the dredges. The consequence is that oyster cultivation can be economically carried on in deeper water, and a great deal more can be done at all times in handling the crop and fighting its enemies since the workmen are not dependent on favorable winds, which may fail or become unfavorable just at the critical moment. The time is surely coming when the bed of Long Island Sound will be covered with oyster farms for the supply of half the continent, perhaps half the world, the cultivation being done, as it only can be, by steam; the oyster farmers uniting most likely in maintaining a steam patrol whose chief business will be the destruction of the vast swarms of star fish which periodically invade the Sound and ravage the oyster beds, whose owners are unable to cope with them single handed. It is manifest destiny that steam will be and must be relied upon in the development of this great industry. Yet the State Legislature of Connecticut has just passed a bill substantially prohibiting the use of steam dredging, on the ground that it tends to create a monopoly and drive out of the business the men who cling to the slower method of dredging with sail boats.

Ostensibly the bill, we believe, does not undertake to suppress steam dredging on private grounds, that being clearly impossible; but the practical working of the law, if it is enforced, will be nothing less than that. In dredging an oyster bed in water of any considerable depth, the dredging vessel must of necessity pass beyond the boundaries of the bed even where they are clearly marked. Accordingly the steam dredger is always liable to the charge of working "off his ground" and to the risk of having his vessel restrained from operating at a time when cessation from work will be fatal to his crop, when an invasion of star fish is to be combated for example.

If steam dredging is to be prohibited because it gives the steam user an advantage over the man who runs a sail boat, then the latter should be restrained for the advantage he enjoys over the man who has only a row boat; and the oarsman because of his advantage over the man who has no boat and gets his living by "treading." There is no logical halting place between original barbarism and the largest possible use of all the working appliances which invention and art can furnish, whether in oyster culture in Long Island Sound or in the cultivation of Mississippi plantations. With all due deference to the Mississippi court and to the Connecticut Legislature, we are inclined to think that their attempts to arrest necessary and inevitable progress will be no more successful in the long run than they are momentarily creditable.

OUR CITY SEWERAGE.

How to utilize the feculant matters discharged by our sewers is as yet an unsolved problem, although it has received the close consideration of the best engineers and sanitarians. The fecal and other matters of manurial value discharged into them is so diluted with water as to be of but comparatively small value. To save its most valuable products would require the transportation of the water in which they are dissolved. If this could be done cheaply, one of the most powerful and useful manures known to agriculturists would be utilized. As at present constructed, the sewers discharge their contents into the salt water rivers on either side of the city. Now, it is a well known fact that water, holding in mechanical solution or suspension any substances, will precipitate them when coming into violent contact with any body of greater density than itself. Consequently the fresh water from the sewers when discharged against the salt water at the docks immediately precipitates the material which it holds in mechanical solution, what it holds in chemical solution being carried off, lost, and unutilized. This action is greater at the influx of the tides, and is proportional to the momentum of the movement of the tide and the rapidity of the flow of water in the sewers. It is

this which mainly causes the enormous deposits of mud in our docks, and necessitates a large expenditure of money for dredging and its removal seaward. It, in fact, makes enormous silt basins of our docks.

The consumption of croton water in this city is about 100,000,000 gallons daily, equal to 400,000 tons weight (2,000 lb. to the ton). As this enormous weight is immensely increased by the fecal and other matters discharged into the sewers, it will be seen that it would require an enormous amount of mechanical power to remove the whole. To let the fluid matters flow off, and retain the solid matter in silt basins for manurial purposes, would scarcely pay, as the most valuable fertilizing salts in the sewerage are so readily soluble in water, that what is left of them in the silt is but of comparatively little value. If the fluids could be saved it would be necessary to provide some absorbent for them; this might be found in the dry ashes when screened from the cinders intermixed with them. But the great outlay in preparing the silt basins and the other mechanical arrangements necessary for the purpose will probably always remain a bar to the solution of the question. Yet, the experiment might be worth trying with one of the sewers, in order to ascertain whether it would pay. In such an experiment the silt should also be saved and its manurial value properly ascertained. The salt water would have to be carefully excluded.

An Eight Thousand Dollar Bible.

The third part of the sale of the collection of books of the late George Brinley, of Hartford, Conn., was completed in this city April 7.

The most notable book sold was the Gutenberg or Mazarine Bible, which brought \$8,000. Though this copy bears no date it is supposed to have been printed between 1450 and 1455, the printing probably occupying the greater part of the five years. For four centuries the book lay buried in the obscure library of the Predigerkirche, at Erfurt, where it was discovered some fifteen years ago. It was purchased by Mr. Brinley in 1873.

This Bible belongs to the extraordinarily rare first edition, and may properly claim to be the first book ever printed with types. The text is the vulgate of St. Jerome. The type is Gothic, and not only the hundreds of illuminated capitals, brilliantly colored and decorated, but the paucity of typographical errors and the nice execution of detail evince its title to precedence of many other copies in point of origin, and its production as an exemplar. The capitals are many of them emblazoned with ornamentation in gold, and the two volumes are in the original binding—thick oak boards sheathed in calf, beautifully stamped, protected at the corners with ornamented shields of brass, and decorated at the center with designs in the same metal and bosses. The edges of many of the leaves are uncut and show traces of the cues of the rubricator. They are very broad, measuring 15 1/2 by 11 1/2 inches on the leaf.

The book is without title-pages; there is no pagination. The 641 leaves are printed in double columns, of 42 lines each, and the initials and rubrics are in manuscript. The large folio volumes are of nearly equal thickness, the first, of 324 leaves, ending with the Psalms, and the second, of 317, completing the text. One leaf of the first volume is in facsimile and sixteen of the second. The copy is in an excellent state of preservation, unstained by time or mildew, and has evidently never been washed. The decoration is arabesque, and Dr. Trumbull infers from its general sumptuousness that it was originally intended for the library of some prince or nobleman—possibly some kindly patron of the struggling inventor.

The Cuban Exhibition.

The International Exhibition at Matanzas was opened April 3, in the state of general unreadiness characteristic of such shows. The most complete display of industries is that of Cuba. Spain is sparingly represented, probably because the mail company refused for a long time to transport gratis goods intended for the exhibition. The United States is fairly represented, principally in hardware and machinery, though its agricultural products have also received some attention.

The Scio Earthquake.

Great damage was done by an earthquake in the Island of Scio, one of the best known of the isles of the Grecian Archipelago, on Sunday, April 3. In the chief town, Kastrotro, with 15,000 inhabitants, three or four thousand persons were killed and wounded, and but fifty houses were left standing. Later reports state that thirty villages, in other parts of the island, were wrecked, and as many as 40,000 people were made destitute. The entire number of victims is estimated at 5,000. The shocks were widely felt among the islands and along the coasts of the mainland.

The Cohahuila Aerolite.

The University of Rochester has lately purchased from Dr. J. Lawrence Smith, of Louisville, Ky., a portion of the celebrated aerolite found in the Mexican town of Cohahuila in 1866. Originally it was a mass of iron, weighing 434 pounds, and was remarkable on account of the fact that it was cracked almost through and through, so that when sawed the pieces fell apart. It was irregular in shape, but was substantially a foot square. The piece bought by the university is a chunk cut out of the middle, and is a beautiful specimen.