

ESTABLISHED 1845,

MUNN & CO., Editors and Proprietors, PUBLISHED WEEKLY AT

No. 361 BROADWAY, NEW YORK.

O. D. MUNN.

A. E. BEACH.

TERMS FOR THE SCIENTIFIC AMERICAN.

Remit by postal or express money order.

Australia and New Zealand.-Those who desire to receive the SCIENTIFIC AMERICAN, for a little over one year, may remit £1 in current Colonial bank notes. Address MUNN & CO., 361 Broadway, corner of Franklin 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, for U. S. and Canada. \$6.00 a year to foreign countries belong. ing to the Postal Union. Single copies, 10 cents. Sold by all newsdealers (ombined Rates,-The SCIENTIFIC AMERICAN and SUPPLEMENT

will be sent for one year, to any address in U. S. or Canada, on receipt of seven dollars.

The safest way to remit is by draft, postal order, express money order, or registered letter.

Australia and New Zealand,-The SCIENTIFIC AMERICAN and SUPPLEMENT will be sent for a little over one year on receipt of £2 curent Colonial bank notes

Address MUNN & CO., 361 Broadway, corner of Franklin Street, New York

NEW YORK, SATURDAY, DECEMBER 22, 1888.

Contents.

(Illustrated articles are marked with an asterisk.)

American Geological Society 384	Inventions, miscellaneous 394
Books and publications, new 394	Lock, safe or vault door, Brown's*386
Business and personal 394	Locomotive, "Strong," a new 389
Coupling, car, Cleveland & Daw-	Machine, integrating 389
son's*	Machines, veneering, rotary 393
Decisions of the U.S. Courts 388	Madness and murder 384
Drama, electrical aids to*	Maple, white and sugar
Eclipse, total. of January 1, 1899# 385	Milk and typhoidfever
Electricity, death by, experi-	Mississippi, source of 388
menus on*	Motor, Mr. Keely's
Enquiries to be answered 395	Motors, storage battery 387
Failure of Panama Canal Co 385	Notes and queries 395
Forests of Alaska 388	Peak, highest in the world
Guns, torpedo, diverging, im-	Periflora Graeca 389
proved*	Photography, pyrotechnic 389
Homes for the many* 387	Physics, simple experiments in*. 386
House, apartment, new, Brook-	Sassafras. oil of 387
lyn, N. Y.*	Siphon, self-charging* 389
House, dwelling, an attractive	Sling, straw, bottom-trip, Wood's*880
cheap* 387	Steam detrimental to sewers 385
House, Royal E., the electrician* 391	Stranahan, James S. T 392
Inventions, agricultural 394	Swine, healthy, how to have 387
Inventions, engineering \$34	Trade, good, to learn 353
Inventions, index of	Walking on the water 389

TABLE OF CONTENTS OF

SCIENTIFIC AMERICAN SUPPLEMENT

No. 677.

For the Week Ending December 22, 1888.

Price 10 cents. For sale by all newsdealers

PAGE

- 10809
- III. ARMSOF WAR.—Reduction of Caliber in Military Rifles.—An elaborate review of the recent pronounced movement in military circles in the direction of changing the caliber of infantry arms, with full formulæ and tabular statement...... 10812
- BIOLOGY.-The Salmon Fisheries of the Columbia River.-An abstract of a report to the Secretary of War.-By Major W. A. JONES, U.S. A.-Describing the differentOregon salmon, withil-lustrations of leading species.-3 illustrations. 10807
- V. CHEMISTRY.—Note on Spontaneous Combustion..... Marcosa 0il.—By C. J. H. WARDEN.—Ar. oil extracted from India almonds, an officinal preparation of the Indian pharmaco-pœia, its reactions and general properties..... Saccharine.—By DUJARDIN BEAUMETZ.—A protest against the use of saccharine in articles of food..... 10820 10809 . 10822
- 10822 10814

Scientific American.

THE AMERICAN GEOLOGICAL SOCIETY.

working and teaching geologists. The subject was driving the suicidal mood from her. specifically discussed at subsequent meetings, but the been a committee for several years having the matter one hundred fine gowns. in hand, and Prof. N. H. Winchell and Prof. C. H. The "reasoning" mania would seem, from its de-J. Stevenson, of New York, C. H. Hitchcock, of Han-Edward Orton, of Columbus, O. This committee sent murderers and as meriting the same fate. circulars to all members of Section E, and also to others whom they had reason to suppose to be interested. The plan was to class the first hundred who should signify their acceptance of the terms of fellowship as other names have been proposed for membership. Ballots have been cast, though not yet declared, for the responsible for epidemics of scarlet fever. permanent officers. During the Christmas holidays a meeting will be held at some suitable place, to be desigcompleted, the constitution ratified, and other work done. After the first of January, 1889, all working or teaching geologists in America will be eligible to fellowship on election and the payment of their dues.

It is evident that this is an important movement. Among the original fellows are some of the foremost American geologists. It is not intended in any way to interfere with the American Association for the Adtion.

The call for the first meeting of the American Geoloin the Botanical Lecture Room of the Cornell University.

MADNESS AND MURDER.

The deeds of murder recently done in that noisome quarter of London called Whitechapel, all, there is reason to believe, the work of the same hand, seem to have attracted the attention of the neurologist as well as that of the police. What was the motive? Most people who have followed the history of these crimes, coming as they have one so quickly after another, have laid it to this or that cause, or, at least, it would seem so from those that have been made public. Dr. Hammond, well known in the department of neurology, says, in a recent paper, that no distinct motive was necessary or, rather, that it may have been a mere fancy or freak, such as often comes to those with deranged or diseased minds, or even for the mere love of pain and cruelty—a supposition which the hacking of the body in each case would seem to lead to. There have been nine victims so far, all women, but in the once-celebrated case of Helene Jegado there were twenty-eight in three years, all being killed by poison, and ap-

neglected an extensive business. for the sudden impulse The American Association for the Advancement of that came to him to commit murder. One, who was Science took its origin in a convention of geologists at continually battling against an impulse to kill his wife, Philadelphia, in 1840, who announced the object of cut off his own right arm. A young man applied for that society to be the study of geology and natural medical relief for cerebral hyperæmia, admitting that history. During the Cambridge meeting, in 1849, a with it had come a desire to kill a fellow clerk. So subdivision was effected into four sections-of physics, strong it was, indeed, that whenever his back was chemistry, geology, and zoology. There are now eight turned, he could scarce refrain from plunging a knife sections in all; Section E being devoted to geology and into him; once offering a cup of poison, and knocking geography. The great number of papers offered, and it from his hand when he would put it to his lips. A the limited time allowed for their discussion, led the woman with an impulse to jump from her window only geologists who met at the Cincinnati meeting of the escaped because, as she was preparing to spring out, a A. A. S., in 1881, to consider the propriety of organ- market boy slipped on the ice in the street and tumbled izing a national society to consist exclusively of about awkwardly, setting the woman laughing and

Such moods, it seems, may recur and may not. A consummation was delayed till the Cleveland meeting, young man could not see a fine dress without the imlast August, when it appeared to the majority present pulse to injure it; running into the nearest drug store that the hour had come for definite action. There had for vitriol, and before the mood was gone, ruining over

Hitchcock, of that committee, called a special meet-iscription, to be one of the most dangerous, because ating of Section E for August 14, the day before that set tacking those from whom acts of violence are not to be for the A. A. A. S. There was much enthusiasm and looked for. One thus afflicted suddenly tinds himself a strong sentiment in favor of the new society. A with a perversion of the emotions, derangement of the provisional constitution was adopted, and a com- will; "knowing the impulse is a dangerous one, the mittee of organization appointed, consisting of act it imposes an unreasonable one." But he must do Professors Alexander Winchell, of Ann Arbor, John | it, being seized with sanguinary fury. Such persons as are unable to control their impulse to commit crime over, N. H., John R. Proctor, of Frankfort, Ky., and our author looks upon as in the same category with

MILK AND TYPHOID FEVER.

The agency that milk may assume in the propagation of fatal diseases has received much attention during re-"Original Fellows." These have now been found, and cent years. Dr. Klein's investigations have confirmed the belief that milk has in a large number of cases been

Tuberculosis, it is also known; can be developed in cows, and can be distributed in like manner by their nated by the committee, when the organization will be milk. Much consumption is believed to be due to this origin.

A recent epidemic which occurred in a New Jersey suburb of this city goes far toward reducing the probability of milk acting as a disseminator of typhoid fever to a certainty. A florist had been in the habit of supplying five families with milk. He was attacked by typhoid fever, and after an illness of several weeks expired. It was found that he had been in the habit of vancement of Science. One of its regular meetings drinking large quantities of milk himself, while the will be held at the same time and place as that associa-, other members of his household used very little. Typhoid fever also began to appear among the five families whom he supplied. In each house there were one gical Society has been issued for Thursday, Dec. 27, at : or more cases. In one family the suspected milk had Ithaca, N. Y. The formal organization will take place been used for providing cream for coffee, etc., and the bulk of the fluid, or skim-milk, left had been used for cooking. In this house only one case appeared. Upon inquiry, it was found that the invalid, a domestic, had habitually drunk the skim-milk. The others had not used it and were unaffected. New cases were added to the list, but were all confined to the five families in question and to the florist's house. In one family five or six cases occurred, including one fatal attack.

On investigation the water supply of the milkman's premises was found to be far from satisfactory. He received water from the regular water works. He used a portion of the water pipes within his premises for the conveyance of a liquid fertilizer. This inconceivably unclean practice would offer a good clew to the source of trouble had it been continued. But it is asserted positively that, since last February, no liquid manure had entered the pipes. A well of unquestionably bad water existed on the premises, but does not appear to have been used to any extent. The water supply in the meadow where the cows were pastured was contaminated to some extent with sewage. It is very doubtful if a cow could drink water containing the typhoid poison, and, without becoming ill, could communicate it parently for the pure love of killing and witnessing to her milk. None of the cows has shown signs of suffering; in some cases the suffering of those who sickness. The propagation of the disease by milk is had befriended her-masters, mistresses, friends, and almost absolutely proved in this case. Where the poiseveral nuns. And all the while she affected an ardor son or germ came from is altogether uncertain, and the of piety-awhile, indeed, an inmate of a convent. Our problem has not passed the conjectural stage. If imauthor declares that a desire "to kill exists, to a pure water were used for washing the cans, it would

VII. MECHTANICAL ENGINEERINGImproved Steam Pile Driv- erA new direct-acting steam pile driver, having the ram and cylinder in one3 illustrations Compound Tank Engine, Northeastern RailwayA recent tank engine built for the Northeastern Railway.of England, with full dimensions of parts1 illustration		
VIII. METALLURGYAlloysBy Prof. W. CHANDLER ROBERTS- AUSTENA third lecture of this celebrated series, with explana- tions and illustrations of the experiments5 illustrations	10817	

IX. MINERALOGY.-Russian Meteorite at Nowo-Urei.- A meteorite containing carbon in the form of diamond, with analysis...... 1080

X. MISCELLANEOUS.—The Vibratory Law of Progress.—By HOR-ACK C. HOVEY, D.D.—A recent lecture delivered before the Sum-mor School of Christian Philosophy, being a plea against infidelity and an attempt to enunciate a law of progress in nature........ 1082

XI. PHYSICS.-Harcou t's Holophotometer.-A new photometer for measuring the light emitted in every direction by a luminous source.-Silustrations.

XII. TECHNOLOGYBunsen Gas BurnerBy C. AUER VON WELS- BACHAn ingenious modification of the Bunsen burner, produc-	
ing an abrular or Argand flame.—Sillustrations	10814
producing automatically gas from oil or other liquid material1	10012
The Jupiter Light.—A new industrial burner arranged to burn heavy oils without loss from spray.—1 illustration.	10019
The Treatment of Ammoniscal Liquor — An improved method of	
extracting sulphate of ammonia gas or tar liquors, with utilization of waste furnace gases2 illustrations	10814

greater or lesser extent, in the mind of every human afford a satisfactory clew.

being without exception." Some love to kill game or the The lesson to be drawn from this is clear. Greater lower animals, while others have an irresistible desire precaution in the use of water in dairies should be to kill their fellows. The mildest mannered man, he taken. The mere adulteration of milk is bad as a matsays, has it at times, when sufficient cause comes. "It ter of ethics, but when the addition of water may inis inborn, instinctive, and no amount of civilization or volve the absolute poisoning of the milk, the responsirefinement is sufficient to abolish it altogether." He bility for its addition is far graver. There is also a says that crimes are sometimes done by those to whom good side to the question. The occurrence cited in the idea of violence is repugnant, whose reason urges confirming the possibility of milk being the active them against their own acts, yet with not enough agent in contagion also indicates a preventable cause. strength to resist the impulse. Neither delusion nor Recent advances in sanitary engineering have gone to prove that much malaria is of house orgin, and the emotional disturbance need come. At one time he is calm, at another excited, but always conscious of his name "house malaria" has been coined to express the acts. The epileptic may commit acts of violence while condition. In surgical practice Lister introduced the under the influence of a paroxysm, unconscious at the carbolic acid douche, and while he supposed that it was disinfection that he was teaching, really taught time, though remembering every little detail when it is done; but such cases as every neurologist sees, so we surgeons to be clean, and many surgical cases now reach are told, have at times an itching for murder. One a successfulend because of cleanliness in the operations. $_{\rm M}$ man, of amiable disposition, asked to be locked up and Typhoid fever, in one of its methods of dissemination,

DECEMBER 22, 1888.]

Scientific American.

can be absolutely prevented by attention to the purity of the water supply of dairies. Boiling the milk may also be accepted as an efficacious preventive.

It seems a little remarkable that modern science is finding in the cow an agent of injurious disease after the vaccine virus has been used for so many years as a palliative for smallpox.

THE TOTAL ECLIPSE OF JANUARY 1, 1889.

The total solar eclipse of January 1, 1889, visible in this country, will be observed by many American astronomers and possibly some from foreign countries. We present herewith a map of a portion of the path of totality, for which we are indebted to the circular issued by Prof. Holden, of the Lick Observatory, and to the Sidereal Messenger for the following particulars: The shadow of the moon will cross the west line of Nevada at the town of Verdi, and its width on the boundary will be 100 miles, the middle of the path being at a point 32 rods north of the 124th mile post of the Central Pacific railway line. The south edge of pipes reaching above the roofs of the houses. the shadow will pass about half way between Reno and the highest point of Peavine Mountain. Thus production of sewer gas, but destroys the material of Reno will be just outside the shadow. The center of the sewers. Iron pipe lines, especially at the joints, the path will be about six miles north of Winnemucca become seriously weakened; tile pipes lose their hard, and 29½ miles north of Tuscarora. The south edge of ringing character, and crumble away under rapid disthe path will pass north of Wadsworth and south of integration. In brick sewers the cement is attacked, Pyramid, Lovelocks, and Humboldt House. The and the arch soon becomes little better than a cementnorth edge of the path will pass north of Buffalo less structure. The recent leaks in the pipes of the

6. Spectroscopic observations of the lower atmosphere of the sun, prominences, and the corona. 7. Observations with the polariscope upon the polar

ization of the light of the corona. 8. Photography both of the partial phases and of the

corona. The above points are those suggested by Prof. Young

in his New Astronomy.

Steam Detrimental to Sewers,

On November 24 General John Newton, late Commissioner of Public Works of New York, in a report to the Mayor spoke of the defects of the sewerage system of the city. One point that was made in the report was of special interest. The evil effects of steam discharged from engine exhaust pipes was emphasized. The suggestions in the report were principally due to Mr. Rudolph Hering. Touching this question of steam, he proposed the use of intercepting traps or cooling basins, or else the discharge of all such steam into the air from

The admission of steam to sewers not only favors the

ate with the local governments. He also undertook to counteract the hostile public opinion in the United States. Active surveys of the isthmus were begun under his direction in January, 1880, and late in February he arrived in New York, and began a tour which extended from Boston to San Francisco, and embraced a trip to Washington, where he had a personal interview with President Hayes and a hearing before a congressional committee. His first estimate of the cost of the canal was 250,000,000f. On his return to France, he declared that his American tour had been successful, and that opinion concerning the scheme had been considerably modified. A preparatory force of engineers and skilled mechanics was sent out from Havre in January, 1881, and work upon the canal was begun soon after its arrival at the isthmus. This work has been prosecuted at intervals, with greater or less vigor, ever since, although the estimates of cost have been greatly increased, and the time for the completion of the canal extended.

The project was the cause of a long and very important correspondence between the British and United States governments, in 1881 and 1882, over the question of an American protectorate, which finally resulted in the practical abrogation of the Clayton-Bulwer treaty. During all this time M. De Lesseps has been the leading spirit in the canal company, and such progress as has been made is the result of his untiring energy and, it must also be said, of his blindness to the



THE ECLIPSE OF THE SUN ON JANUARY 1, 1889-MAP OF THE PATH OF TOTALITY.

swindler. In the history of visionary undertakings the center of the shadow, and Quincy three miles seriously affected, and all who travel upon Broadway and financial bubbles there are few things comparable north of it. Nevada City will be thirteen miles north can testify to the disagreeable odors produced. It to this old man's canal at Panama. For two years or of the south line of the path. All the towns named seems clear that the distribution and use of steam should more it has been a demonstrable fact that he was movare inside the shadow path, as are Loyalton, Oneida, be attended with more restrictions on the part of our ing rapidly and with a sure step toward inevitable Long Valley, Milford, and all the settlements about city authorities than now apply to it. bankruptcy, and at least one honest journal in France, Honey Lake. All places in or near the center of the the *Economiste*, has not concealed the bitter truth ----Failure of the Panama Canal Company. path will be in darkness two minutes of time. All from the French people. But they preferred to put those at the edges of the shadow will see the sun mo-The telegraph brings the announcement of the finan-⁴ their trust in De Lesseps and their savings into his mentarily eclipsed. The eclipse will begin at about due to its always empty treasury. 1:52 P. M. at Quincy, 1:53 at Honey Lake, and 1:54 at failure to negotiate the further sale of its bonds and He has issued shares and bonds amounting to \$400,-Winnemucca. The shadow travels a northeast course its inability to meet the now gigantic calls upon it for 000,000 at par, and this immense sum in obligations has across the State, leaving it at the northeast corner. interest and current expenses. Whether any new ar-i been taken by the French people, who have probably Mr. Irish very kindly offers to furnish further informa- rangements can be made to prosecute and complete paid him over \$250,000,000 in cash; and the greater tion concerning localities in the path of the eclipse the great work is questionable. Strenuous efforts in part of this has come from the peasantry and small which observers may desire to know. that direction will undoubtedly be made. The fol-landholders of France. He has resorted to the most The points that may profitably receive observers' at- lowing sketch of the enterprise is given in the New unwarrantable financial devices in order to avert the tention are: York Times : fatal day of bankruptcy, such as issuing new bonds to It was in 1879 that M. De Lesseps first turned his 1. Times of the four contacts and the direction obtain funds to pay interest on former issues. of the line joining the cusps during the partial The coming bankruptcy of the company has of late attention to the construction of a canal across the phases. Isthmus of Panama. He was then flushed with the been clearly visible, even to many of its former de-2. Search for intra-Mercurial planets. glory of the successful Suez enterprise, and a second fenders. 3. Observation of fringes which show themselves at attempt of a similar nature was the natural outgrowth of his triumph in the first. the beginning of totality. THE estimates of the expense of the Post Office De-4. Photometric measurements of the intensity of He began his preparation with the earnestness and partment for 1890 are \$66,812,073. The revenues of the light at different stages of the eclipse and during vigor which have always characterized him. Notwithdepartment for the fiscal year ending June 30, 1890, totality. standing the fact that he was then nearly seventy-five are estimated at \$62,508,658. This will leave an appa-5. Telescopic observations of the details of the promyears old, he undertook a journey to Panama in order | rent deficiency for the year ending June 30, 1890, of inences and of the corona. personally to explore the proposed route and to negoti- \$4,403,414.

through the streets in which the steam is conducted.

Meadows, Willow Point, Paradise Valley, Spring steam heating company in New York have produced practically insurmountable obstacles in his path. It is, City, Willow Creek, Cornucopia, and White Rock, similar troubles, and produced serious annoyances indeed, taking a charitable view to assume that he was and will pass ten miles south of Fort McDermitt. merely a self-deceived enthusiast, and not a monstrous In California, Susanville will be 14½ miles north of The insulation of underground electric lines has been