SCIENTIFIC AND PRACTICAL INFORMATION.

CONCRETE TO EXCLUDE RATS.

A correspondent of the *Building News* says: "Nothing can be better to exclude rats than to concrete the surface of the ground beneath wood floors; not only for this, but also to prevent the growth of vegetable matter, and to prevent, as well, damp rising. All ground floors, whether wood, paved, or tiled, should have a layer of concrete, 3 inches to 4 inches thick, between them and the soil. I have been in the habit of doing this for years, and all such houses have dry floors, and are vermin-proof, as far as the latter are concerned, as rats cannot disturb well made concrete. The concrete should be made of moderately fine gravel (broken flint or glass added to it is an improvement), mixed with Portland cement, in the proportion of 1 of cement to 7 of gravel. Not too much water should be used, but the cement must be thoroughly mixed with gravel, and, when deposited in place, well trodden or beaten with a grass beater. Three or four inches, at most, is sufficient in thickness."

A RAT PLAGUE.

Strange news comes from the Hill Districts of Burmah. The English authorities—commissioners and chaplains of Rangoon and others—have sent out a pitiful appeal for help. Ten thousand villagers are starving. It is not drought, as in Bengal, protracted cold and untimely rains, as in Asia Minor, nor grasshoppers, as in Kansas, that has brought so many people to dire necessity. It is rats. An area of six thousand square miles has been overrun with these "British vermin," which have spared nothing in their widespread devastation. The appeal declares that the people are entirely destitute; their accumulations have been exhausted, and they have no occupation but husbandry to depend on for daily food. With rats so numerous as to eat up everything, nothing short of aid from without can keep the people alive. As nothing is said about subsisting on the enemy, it is to be presumed that the up-country Burmese are, like the lately afflicted Bengali, confirmed vegetarians, and would sooner starve than eat flesh.

THE JAPANESE GOLD FIELDS.

We are indebted to Professor Henry S. Munroe of the Imperial College, in Tokio, Japan, for a recent report prepared by him upon the gold fields of the Island of Jesso. The results obtained give very little promise of the precious metal being mined to any great extent, since the highest average value, per cubic yard of the gravel examined in any one field, reaches but 3·77 cents. In the large majority of cases, this value is greatly lessened, being reduced to as low as some hundredths of a mill. The poorest gravel worked in California by the hydraulic process yields from five to ten cents per cubic yard, while the average is said to be from twenty-five to thirty-five cents. These are thick gravel deposits, and thin places, like the Toshibetsu field, which gives the high average above mentioned, are usually much richer. The upper valley portion of this Toshibetsu field, Professor Munroe thinks, might be profitably worked, as it yields 5·66 cents per cubic yard; but this view is again rendered questionable by the enumeration of obstacles in the shape of the dense vegetable overgrowth, and the inefficiency of the laborers.

NEW PLANETS.

During the month of June last, three new planets were discovered, two by Professor C. H. Peters, Nos. 144 and 145, respectively of the 11th and 12th magnitude, and one by M. Borelly, at Marseilles, No. 146, 11th magnitude.

THE JAMIN MAGNET.

There are no phenomena in physical science of which the cause is less understood than the phenomena of magnetism. That there are relations existing between the latter and the phenomena of electricity is well known; the one produces the other, and reciprocally. But as to what takes place within a magnetized body—what changes occur in its interior constitution at the instant when the magnetization begins or ends—no one has yet been able to adduce a certain and definite explanation. To the very lack of this last may be ascribed the slow progress which has been made in improving the construction of the magnets themselves. The nature of the steel, its degree of temper, the number and dimensions of the plates, their form, the area of the polar portions in contact with the armature, the dimensions of the armature itself, all are important elements to be taken into consideration; but the sum of our knowledge, as to the selections to be made under these divers conditions, results in an assemblage of empirical recipes rather than in a logical and connecting series of scientific rules.

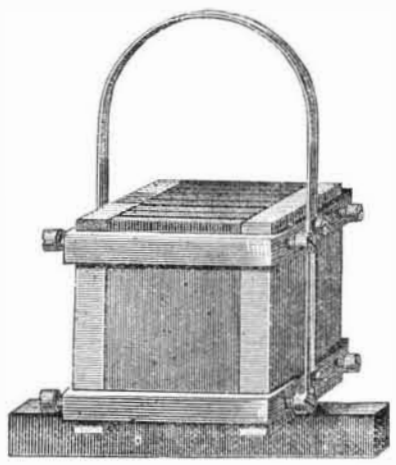
For some four years past we have had frequent occasion to allude to the discoveries and investigations of M. Jamin, a distinguished French physicist, who has succeeded in establishing a large number of important facts, thus realizing advances of great value in the construction of magnets. While it would be impossible, in the space here at our disposal, to review M. Jamin's work in detail, a few of his more salient discoveries may be profitably recalled. At the outset the investigator found himself obliged to invent a method of study. The ordinary way of determining the power of a magnet consisted in applying an armature and measuring the amount of weight which, attached thereto, the magnet would sustain. This plan, besides being crude, frequently involved error, since it may easily happen that one magnet, in reality better than another, will yield to a less weight, while a very slight modification of the polar faces often results in very great differences in the total weight which a magnet is capable of supporting. M. Jamin's device for overcoming these difficulties consists simply of a nail suspended by a string from the arm of a balance. The nail, presented at various points of a magnetized bar or at corresponding points of several bars, is attracted, and the degree of attraction is noted by the balance, so that it is obviously easy thus to measure the magnetism of different localities, and to compare several magnetized plates with each other. If several magnetized bars are superposed, it has been found that the attraction (measured at the extremity of the assemblage by means of the nail) augments with the number of bars, and then becomes stationary. To illustrate, one bar or plate attracts the nail with a certain force, say 750 grains; two plates, superposed, exercise a force of 875 grains; three, 1,425 grains; four, 1,575; and five, either the same as four, or perhaps 15 grains more. The fifth plate, therefore, adds nothing, or nearly nothing, although it has been magnetized in the same manner as the others, and when tested singly is as powerful as any one of them. This, however, is not all; if the plates be separated and re-examined, it is found that they are less powerful than before, and that their union has resulted in loss. They have, in other words, acted upon each other unfavorably.

While the facts contained in the foregoing paragraph are not novel, having already been pointed out by Coulomb, it has been reserved for M. Jamin to discover that they are not exceptional or fortuitous, but absolutely constant and regular, and also to find a means of preventing this tendency of the superposed plates toward mutual deterioration. This means is simply the attaching, to the ends of the bundle of plates, of pieces of soft iron which partake of the magnetism of the extremities. If, under these new conditions, the experiment above described be repeated, the fifth plate is found to add as much as its predecessors, and the number of plates may be largely augmented before the effects, which in the former case are noticeable manifest themselves. Finally, with a certain number of plates, 20 for example, the soft iron pieces become saturated with magnetism, and further additions are of no value or are mutually injurious. If, instead of employing bars, thin ribbons of steel be used, superposed as above explained, the magnet invented by M. Jamin, and represented in Fig. 1, is obtained. The plates are curved, and the poles, brought near together, are separated by a piece of brass to which they are firmly screwed. The various advantages gained by this form, apart from those mentioned above, we have already discussed in detail in back issues of this journal. Perhaps the most important is the facility with which the magnet may be taken apart and put together, or with which the number of plates, and consequently the degree of magnetism, may be varied.

Fig. 1.

The latest form of magnet devised by M. Jamin is represented in Fig. 2 (which, with the former illustration, we extract from *La Nature*). The poles are of soft iron and are applied to the extremities of several steel leaves, which are made broad in proportion to their length. Singly the plates support but very small weights; but when combined with the iron end pieces, the latter absorb the magnetism, rendering the assemblage sufficiently powerful to carry twice or three times its own weight.

Fig. 2.



A very remarkable peculiarity of this magnet, which is not clearly explained, is that neither pole, when tested separately, has any very marked attractive force; but when the armature is applied simultaneously to both poles, it is very strongly held, and yet the attraction does not seem to act over any appreciable distance. It appears, in fact, that the magnetic current must be completed before the maximum force is developed.

Co-Operation in Building.

Hon. Josiah Quincy, in a letter printed in the Boston *Advertiser*, says: A number of Germans who were accustomed in their own country to a system of coöperation, purchased a tract of land in Dedham. Ten of them erected houses for their own use. A separate mortgage for about $2,000 was taken on each house to secure a joint and several bond signed by the ten owners, by which they agreed to pay $6 a week into a savings bank to the credit of the mortgagee and trustee. One half of each deposit is enough to pay the interest semi-annually at seven per cent, and the other half goes on on interest, with a certainty that in a few years it will pay the principal and leave the houses unincumbered. On the first days of January and July, the mortgagers have sent their deposit books to the trustee and mortgagee, who has drawn the semi-annual interest and returned the books with their accumulations to the owners, every payment increasing his security, and the association taking only the risk that every holder of real estate takes who leases his property. Ten or more industrious and temperate men, who had confidence in one another, might form such an association with peculiar advantages. They might choose their locality either together or separately, giving an excellent security that they would pay their interest semi-annually, and the principal in a fixed time.

The Secrets of Philadelphia Butter.

Every one has doubtless heard of the celebrated Philadelphia butter, the delicious flavor of which renders it a delicacy which, in markets outside of its place of manufacture, brings prices which sometimes range as high as a dollar a pound. How it is made is told in a new and excellent little work, recently written by Mr. X. A. Willard, editor of the dairy department of Moore's *Rural New Yorker*, and entitled "Willard's Practical Butter Book." A notice of the volume will be found elsewhere. On the subject of Philadelphia butter, we take from its pages the following:

The celebrated Philadelphia butter comes mainly from Chester, Lancaster, and Delaware counties, Pennsylvania. The spring house is about 18 feet by 24 feet, built of stone, with its foundation set deeply in the hillside, the floor being about four feet below the level of the ground at the downhill side. The floor is of oak, laid on sand or gravel; this is flowed with spring water to the depth of three inches, and at this hight the flowing water passes out into a tank at the lower side of the spring house. The milk, when drawn from the cow, is strained into deep pans which are set in the water upon the oaken floor. Raised platforms or walks are provided in the room for convenience in handling the milk. The walls of the spring house are about ten feet high, and at the top on each side are windows covered with wire cloth for ventilation. The depth of the milk in the pans is about three inches, and the flowing water which surrounds the pans maintains a temperature of about 58° Fah.

The milk is skimmed after standing 24 hours, and the cream is put into deep vessels having a capacity of about 12 gallons. It is kept at a temperature of 58 degrees to 59 degrees, until it acquires a slightly acid taste, when it goes to the churn. The churn is a barrel revolving on a journal in each head, and driven by horse power. The churning occupies about an hour; and after the buttermilk is drawn off, cold water is added, and a few turns given the churn, and the water then drawn off. This is repeated until the water as it is drawn is nearly free from milkiness. The butter is worked with butter workers, a dampened cloth meanwhile being pressed upon it to absorb the moisture and free it of buttermilk. The cloth is frequently dipped in cold water and wrung dry during the process of "wiping the butter." It is next salted at the rate of an ounce of salt to three pounds of butter, thoroughly and evenly incorporated by means of the butter worker. It is then removed to a table, where it is weighed out and put into pound prints. After this it goes into large tin trays, and is set in the water to harden, remaining until next morning, when it is wrapped in damp cloths and placed upon shelves, one above another, in the tin-lined cedar tubs, with ice in the compartments at the ends, and then goes immediately to market. Matting is drawn over the tub, and it is surrounded again by oilcloth so as to keep out the hot air and dust, and the butter arrives in prime condition, commanding from seventy-five cents to one dollar per pound

Mr. Isaac A. Calvert, who markets his butter at those high prices at Philadelphia, attributes his success to three points:—1. The food of his cows. 2. Temperature. 3. Neatness and dainty refinement at every step, from the moment the milk flows from the udder till the dollar in currency is paid for the pound of butter. He says: "I have found that I make my best butter when I feed on white clover and early mown meadow hay. I cut fine, moisten, and mix in both corn meal and wheaten shorts. Next to meal I regard shorts, and prefer to mix them together. I feed often, and not much at a time. I do not use roots, unless it be carrots. My pastures and meadows are quite free from weeds. I cannot make this grade of butter from *foul pastures* or low grade hay.

"*Temperature.*—This I regard as a matter of prime importance in making butter that commands a high price. Summer and winter I do not permit my milk room to vary much from 58°. In summer I secure the requisite coolness by spring water of the temperature of 55° Fah., flowing over stone or gravel floor in the milk house. This can be accomplished without water in a shaded cellar ten feet deep. As good butter can be made without water as with but the milk and cream must be kept at all times a little below 60°.

"We skim very clean, stir the cream pot whenever a skimming is poured in, and churn but once a week, summer and winter. Just before the butter gathers, we throw into the churn a bucket of ice cold water. This hardens the butter in small particles and makes a finer grain. In the hot months this practice is unvarying.

"In working, we get out all the buttermilk, but do not apply the hand. A better way is to absorb the drops with a linen cloth wrung from cold water. The first working takes out all the milk; at the second we handle delicately, with

fingers as cool as may be. The salt is less than an ounce to a pound; but not generally much less. The balls each weigh one pound, and receive a uniform stamp. On packing for market, each ball is wrapped in a linen cloth, with the name and stall of the marketman written upon it. Our tubs are made of cedar plank, 1½ to 2 inches thick, and lined with tin. On the inner face are projections, on which the shelves rest. The balls are not bruised or pressed at all, and pass into the hands of the customers as firm, as perfect in outline, and as spotless as when they left the spring house.

"We find uniformity to be a prime virtue in the butter-maker. We produce the same article whether the cows tand knee-deep in white clover blooms, or sun themselves on the lee side of the barn in February.

"There is a small ice chamber at the end of the oblong butter tub which we use in summer, so that in dogdays the heat within the tub does not get higher than 60° Fahrenheit. I need not add that we observea scrupulous, a religious neatness in every act and in every utensil of the dairy. Milk which, upon leaving the udder, passes through an atmosphere loaded with stable fumes will never make butter for which we can get a dollar per pound. No milk sours upon the floor of the milk room; none is permitted to decompose in the crevices of the milk pans; the churn is scoured and scalded till no smell can be detected but the smell of white cedar.

"Our customers take the napkins with the prints, wash, iron, and return them when tney come to the stand on market day. These are generally Wednesdays and Saturdays. With these prices we have no difficulty in making a cow pay for herself twice a year; if she cost $60, we sell $120 worth of butter from her in twelve months."

It may be remarked that the sour milk is employed by the Philadelphia butter makers as food for swine. It is estimated that such milk will make 100 pounds of pork per cow.

The cows in the district where the Philadelphia butter is made are well sprinkled with the Jersey or Alderney blood, and about a pound per day from each cow is considered a fair average for the best dairies.

The University Athletic Contests.

The annual regatta of the American Universities took place on Saratoga Lake, N. Y., on the 15th of July. An immense concourse of spectators was present. The distance, three miles, was accomplished by the respective crews in the following time and order:

Place.	Time. M.	S.
1. Cornell	16	53¼
2. Columbia	17	04¼
3. Harvard	17	05¾
4. Dartmouth	17	10¾
5. Wesleyan	17	13¾
6. Yale	17	14¾
7. Amherst	17	29¾
8. Brown	17	33¾
9. Williams	17	43¾
10. Bowdoin	17	50¾
11. Hamilton	Not taken	
12. Union	Not taken	
13. Princeton	Not taken	

The victory of the Cornell crew gave great satisfaction to all except the losers.

During the foot races, which took place on July 16, some remarkably rapid walking and running was accomplished. The first trial was a onemile run, in which Messrs. Copeland, of Cornell, Barber, of Amherst, Fort, of Wesleyan, and Shute, of Williams, took part. The Amherst representative won the race in 4m. 44½s., coming in about a yard ahead of the Cornell man. The others withdrew during the contest.

Cornell, Williams, Wesleyan, Princeton, and Harvard contested the one mile walk. Mr. Platt, of Williams, won in 7m. 50s. Times of others not given.

The quarter mile run was won by Mr. Culver, of Union, who reached the goal in 55¼ seconds, closely followed by Yale and Cornell. The severest contest was the seven mile walk. The record is as follows: Mr. Taylor, of Harvard, won in 65m. 5½s., Mr. Driscoll, of Williams, second—fainted at end; Mr. Boyd, of Columbia, third. The Dartmouth and Wesleyan representatives broke down and withdrew. The half mile run was gained by Mr. Trumbull, of Yale, in 2m. 6¾s., against one competitor (Amherst), who came in 50 feet behind. The three mile walk was easily won by Mr. Taylor, of Harvard, in 25m. 23s. Mr. Platt, of Williams, came in second, in 26m. 16¾s.; the third competitor (Brown) broke down. Mr. Culver, of Union, won the 100 yard dash in 10¾s., Williams second, and Yale third. An exciting three mile run was won by Mr. Morell, of Amherst, in 14m. 17s., the Wesleyan and Columbia competitors withdrawing before the finish. Mr. Maxwell, of Yale, won the hurdle race against three others; no time given. The graduates' seven mile run was gained by Mr. Eustis, of Wesleyan, over Mr. Gunster, of Williams, by ten feet; time 69m. 49¾s. Suitable prizes were awarded to the various winners by ex-Governor Hoffman.

Cultivate Good Manners.

It is one of the laws of our being that every inward disposition is strengthened by the outward expression which represents it. Besides this, so much of human happiness is dependent upon the manners that no truly benevolent person, if thoughtful, can disregard them. We haveall experienced the charm of gentle and courteous conduct; we have all been drawn irresistibly to those who are obliging, affable, and sympathetic in their demeanor. The friendly grasp, the warm welcome, the cheery tone, the encouraging word, the respectful manner, bear no small share in creating the joy of life; while the austere tone, the stern rebuke, the sharp and acrid remark, the cold and indifferent manner, the curt and disrespectful air, the supercilious and scornful bearing, are responsible for more of human distress, despair, and woe than their transient nature might seem to warrant.

Whether we aim at self-improvement or the well-being of others, success is largely dependent on our outward demeanor. No one can slight it with impunity. It has many counterfeits and shams which are truly despicable; but where pure motives are supreme, and the aims of life are worthy, the culture of manners is an essential means of progress, conferring dignity and grace upon every noble endeavor.—*Philadelphia Ledger.*

AT the recent Bunker Hill Celebration in Boston, the National Tube Works Company was represented by some fine specimens of lap-welded wrought iron tubing, drawn by six large black horses on a wagon tastefully draped with bunting. The tubing, some of the specimens of which were very large, was effectively arranged to represent a cannon on a gun carriage. The carriage was made of tubing, six sections on a side, the cannon being represented by a section of lap-welded tubing twelve inches in diameter, said to be the largest manufactured in the world. On each of the tubes of which the carriage is composed is the name of one of the original thirteen States, and on the large tube representing the big gun was inscribed:

"Massachusetts, 1775—Our Union Welded—1875."

To remove fruit stains from napkins, etc., wet the spots with chlorine water.

DECISIONS OF THE COURTS.

United States Circuit Court---District of Massachusetts.

DAVID M. WESTON *et al. vs.* NATHANIEL C. NASH *et al.*—PATENT SUGAR MACHINE.

[In equity.—Before SHEPLEY, J.—Decided April, 1875.

The fifth claim of reissued patent of David M. Weston for "Improvement in Centrifugal Machines for Draining Sugar, etc.," dated January 14, 1868, (original dated April 9, 1867), namely, "the construction of the openings, I, in the bottom of the cylinder in such machines, and the valve, J, for the purpose of closing the same, substantially as described"—is not limited to such centrifugal machines only as are constructed in all respects like those described in these specifications.

The term "such machines" in this claim means such centrifugal machines as are so constructed as to admit of the application and operation of the claimed devices in substantially the described mode and by substantially the described means.

The unauthorized use of complainants' openings and valves would be an infringement if used in centrifugal machines, to which they could be usefully applied by reason of there being an unobstructed space at the bottom of the machine, into which the sugar could fall, although the cylinders were not suspended asshown in the patent.

The Weston invention is not anticipated by the device shown in the British patent of Hardman, of 1843, in which the openings in the bottom plate of the rotary cylinder are closed by a disk or plate held up against them while the machine is in operation by a nut and spring, and simply lowered, without being removed, so as to leave a free and unobstructed space, when the sugar is to be discharged.

Nor by the Alliott machine, described in English patent of February 3, 1851, in which the bearings of the shaft and its foundations are directly under the cylinder, so as to render impossible a free and unobstructed space below the cylinder into which the sugar may be discharged.

Although the defendants' valve is operated by turning on the shaft, and, in this respect, may be an improvement upon the valve of the patent, which moves up and down on the shaft, this is not a substantial difference. It is but another form of the same device, with the same mode of operation, so far as the operation is concerned to which the whole device relates—that of discharging through the bottom of the cylinder the purged contents of the charge.

[*George L. Roberts*, for complainants.
James B. Robb, for defendants.]

United States Circuit Court---Southern District of New York.

WILLIAM WICKE *vs.* HENRY AND BARBARA KLEINKNECHT.

[In equity.—Before BLATCHFORD, J.—Decemher, 1874.]

Where a machine was licensed for use in a particular territory: *Held*, that the use of it, by subsequent purchasers, in territory other than that for which it was licensed, was unlawful.

The mere fact that the agent of the patentee, after the transfer of the machine to the unlicensed territory, demanded of the purchasers the back royalties due upon it, conferred no right to use it outside the territory named in the license.

[This was an action brought by the complainant, as assignee of certain territory under the patent of George Wicke, granted to the latter June 16, 1863, for a box-nailing machine. The facts were as follows: The complainant, by assignment, acquired the exclusive right under said patent for the State of New York. The remaining territory was owned by the original patentee, but the complainant was his attorney authorized to collect royalties and grant licenses for said territory. Under this power of attorney he licensed one Oppel to use one of the patented machines in Newark, N. J. Oppel sold this machine to the defendants, who took the same to New York, and there used it. Suit was brought, and defendants pleaded an implied license, which they claim they derived from the complainant through his demand on them for payment of certain royalties due from Oppel at the time he sold the machine.]

BLATCHFORD, J.:

The evidence in this case leaves no doubt that the plaintiff is entitled to a decree. By the purchase by one of the defendants from Oppel of the machine in question, and by the transfer from Oppel to such defendants of the rights of Oppel under the written license given by George Wicke to Oppel, neither of the defendants acquired any right to use such machine in the territory belonging to the plaintiff under the patent.

The plaintiff was the agent of George Wicke in respect to the license to Oppel, and he never demanded any license fee from either of the defendants, in respect of any other use of the machine than a use of it under and in accordance with the terms of the license to Oppel, which did not embrace a use of it in territory owned by the plaintiff.

Oppel had no right to use the machine in the plaintiff's territory, and could convey none. The plaintiff has given no license, direct or indirect, express or implied, to either of the defendants to use the machine in his territory.

[*A. V. Briesen*, for complainant.
J. Van Santvoord and *F. Forbes*, for defendants.]

NEW BOOKS AND PUBLICATIONS.

WILLARD'S PRACTICAL BUTTER BOOK—a Complete Treatise on Butter Making. By X. A. Willard, M. A. Illustrated. Price $1.00. New York city: Rural Publishing Company.

Mr. Willard has long been known to dairymen and agriculturists as President of the New York State Dairymen's Association, as editor of the dairy department of Moore's *Rural New Yorker*, and in general as a practical butter maker of considerable experience. Hence in the work before us—which we believe is the first ever published devoted wholly to the subject of butter and its manufacture—the advice, practical hints, and suggestions and discussions given emanate from one certainly conversant with his subject in all its branches. The book is, in fact, a complete repertory of information for farmers and dairymen, as it treats of everything relating to butter, from the selection, management, and raising of the stock, to the planning of dairies and the merits of the various patented inventions which have been made to facilitate dairy processes. Its low price places it within the reach of every farmer.

HOW TO TEACH CHEMISTRY: Hints to Science Teachers and Students, being the Substance of Six Lectures, delivered at the Royal College of Chemistry, in June, 1872. By Edward Frankland, D.C.L., F.R.S., Professor of Chemistry in the Royal School of Mines. Price $1.25. Philadelphia, Pa.: Lindsay and Blakiston, 25 South 6th street.

The teachers of physical science are largely indebted to Dr. Frankland for this book, which is an admirable and concise treatise on all the methods of exemplifying the action of the chemical forces. It commences with the very simplest experiments, and does not quit its subject until the most elaborate apparatus and its manipulation are fully described. By careful study of this little volume, lecturers and teachers can learn the whole art of illustrating their discourses.

ELECTRICITY, ITS THEORY, SOURCES, AND APPLICATIONS. By John T. Sprague, Member of the Society of Telegraphic Engineers. New York city: E. & F. N. Spon, 446 Broome street.

Mr. Sprague is well known as a writer of authoritative papers on electrica subjects, and many articles from his pen have been printed in our columns. In collecting the most elaborate of these papers into a volume, he has given us a text book of the greatest value, a manual complete, exhaustive, and practical. The chapter on electrolysis is worthy of special commendation and the section devoted to electro-metallurgy is a complete compendium of the art. The book is handsomely illustrated.

THE CONE AND ITS SECTIONS TREATED GEOMETRICALLY. By S. A. Renshaw, of Nottingham, England. Price 12s. 6d. ($3, gold) London: Hamilton, Adams, & Co., Paternoster Row.

This is an admirable treatise on the properties of the cone and the grea importance of those properties to the art of mensuration. The primary properties of the sections are derived from the cone itself, the author following the example of Hamilton in reverting to the method of Apollonius of Perga, whose treatise on conic sections laid the foundation of the science, and whose system has not been superseded by the thousands of books which have since been written on the subject. Mr. Renshaw has reduced all his theories and problems into propositions of the most orthodox form, and has naturally succeeded in imparting comprehensibility and logical demonstration to a complex subject. He has produced a very interesting volume, and enriched it with illustrations of great value.

POPULAR RESORTS, AND HOW TO REACH THEM, combining a Brief Description of the Principal Summer Retreats in the United States and the Routes of Travel Leading to Them. By John B. Bachelder, Author of "The Illustrated Tourist's Guide," etc. Illustrated with One Hundred and Fifty-Two Engravings. Price $2.00. Boston, Mass.: John B. Bachelder, 41 Franklin street.

The desire to travel is universal; and the favorite recreation of all classes, be their leisure hours few or many, is found either in visiting the haunts of men, to observe the changes in social life and manners, or in fleeing from cities to view the works of Nature. Mr. John B. Bachelder, whose numerous works on the topography of the battlefield of Gettysburgh are widely known, has collected, in the volume now before us, a vast amount of information on nearly all the pleasure grounds of the United States, and has placed it before his readers in a most attractive and readable form. The illustrations are especially commendable, and the work is sure to have a large sale at the present time, to which its intrinsic merits fully entitle it.

HANDBOOK OF LAND AND MARINE ENGINES, including the Modeling, Construction, Running, and Management of Land and Marine Engines and Boilers. With Illustrations. By Stephen Roper, Engineer, Author of "A Catechism of High Pressure or Non-Condensing Engines," etc. Philadelphia, Pa.: Claxton, Remsen, and Haffelfinger, 624 to 628 Market street.

Mr. Roper needs no introduction to our readers as a competent and trustworthy authority on steam engineering; and the present volume will prove useful to all operatives who desire a treatise combining scientific accuracy with a popular style, free from formulas and ultra-mathematical expressions. The tables with which the book is interspersed are numerous and valuable; and there is at the end an interesting historical account of the steam engine.

PRACTICAL GUIDE TO THE DETERMINATION OF MINERALS BY THE BLOWPIPE. By C. W. C. Fuchs, Professor in the University of Heidelberg. Translated by T. W. Danby, M.A., F.G.S., Associate of the Royal School of Mines. Price $2.50. Philadelphia, Pa.: Claxton, Remsen, and Haffelfinger, 624 to 628 Market street. New York city: D. Van Nostrand, 23 Murray and 27 Warren streets.

This treatise is adapted to the use of any one who desires to easily recognize and comprehend the qualities of any mineral, provided he has an initial acquaintance with chemical manipulation. Although the work is fully descriptive, it is compendious, and will be found well adapted to use in the field.

INSECTS OF THE FIELD. By A. S. Packard, Jr., Editor of "The American Naturalist." Price 25 cents. Boston, Mass.: Estes and Lauriat, 143 Washington street. New York city: Dodd and Mead.

A very interesting little treatise, adapted for students' and amateurs perusal. It forms part 7 of the publishers' excellent series of "Half Hour Recreations in Natural History."

GREATER CHICAGO, Illustrating the Buildings Recently Erected in the Reconstructed City. Price $1.00. Chicago, Ill.: J. M. Wing & Co., Ashland Block.

This pamphlet consists entirely of illustrations, which are intended to convince the world that Chicago's commerce is on a scale commensurate with her indomitable energy and the public spirit of her citizens Many of the buildings represented are of considerable architectural merit.

A BRIGHT MOON, SUN, AND STAR SHINING POCKET MIRROR OF THE UNIVERSE. By D. L. Stinchfield, New Richmond, Ohio.

"Our spiritual kingdom of Heaven is three times divided," says our author, "vertically into the three seats, or two antagonistic, positive and negative extremes, and their saving mediator with positive electricity found at the bottom of this great spiritual and pacific and specific ocean of the atmosphere." There is some deep significance in this; and as we feel bound to confess our inability to extract it, we cheerfully resign the task.

STATEMENT OF REASONS FOR EMBRACING THE DOCTRINES AND DISCLOSURES OF EMANUEL SWEDENBORG. By the Rev. George Bush. New York city: E. H. Swinney, 20 Cooper Union.

GRANULATION OF GUNPOWDER. By Commander J. D. Marvin, U. S. N. Naval Experimental Battery, Annapolis, Md.

THIRD ANNUAL REPORT OF THE BOARD OF MANAGERS OF THE ZOOLOGICAL SOCIETY OF PHILADELPHIA, PA.

Inventions Patented in England by Americans.

[Compiled from the Commissioners of Patents' Journal.]

From May 18 to June 3, 1875, inclusive.

AMALGAMATOR.—S. F. Clouser, New York city.
BLANKS FOR SHOVELS.—E. Binns *et al.*, Pittsburgh, Pa.
BOILER BATTERY.—G. Crompton, Worcester, Mass.
BOTTLE STOPPER, ETC.—N. Thompson (of Brooklyn, N. Y.), London, Eng
CARDING MACHINE, ETC.—G. S. Harwood, Boston, Mass.
COMBINATION FURNITURE, ETC.—A. E. Barnes, New York city.
ELECTRIC ENGINE.—C. A. Hussey, New York city.
ELECTRIC MOTOR.—H. M. Paine *et al.*, N. J.
FLOODING TO PREVENT FIRE.—J. H. Morrell, New York city.
FURNACE BAR.—C. Tood, New York city.
GAS ENGINE.—D. V. Bruce *et al*, San Francisco, Cal.
GAS STOVE.—J. J. West, Chicago, Ill.
HOIST.—W. D. Andrews, Brookhaven, N. Y.
LAMP, ETC.—H. G. Moehring, Philadelphia, Pa.
LATHE.—A. Wood, Worcester, Mass.
LIQUID METER.—H. S. Maxim, Brooklyn, N. Y.
MAKING ALKALIES, ETC.—J. Bennett, Mich.
REGULATING CLOCKS, ETC.—L. Eaton, Worcester, Mass.
SAIL HANK.—D. G. Low, Chelsea, Mass.
SCREWING PIPES, ETC.—F. W. Allin, New York city.
SEWING MACHINE.—J. J. Thompson, New York city.
SHOVEL, ETC.—T. J. Blake, Pittsburgh, Pa.
SMELTING IRON, ETC.—W. Rogers, Leechburg, Pa.
SPARK ARRESTER, ETC.—T. Shaw, Philadelphia, Pa.
STEAM ENGINE.—F. Alden *et al.*, Pittsburgh, Pa.
STEAM PUMP.—C. H. Hall, New York city.
TINNED PLATE.—G. E. Taylor, Philadelphia, Pa.
TOY MENAGERIE.—C. M. Crandall, Montrose, Pa.
TREATING WASTE GASES, ETC.—J. Turner, Chicago, Ill.
WATER METER.—P. Ball *et al.*, Worcester, Mass.
WHEEL AND AXLE.—R. W. Davis, Flushing, N. Y. *et al*