

**The Civil Engineers' Convention at Philadelphia.**

The eighth annual convention of the American Society of Civil Engineers is now in session in the Judges' Hall at the Centennial. The meeting opened on the 13th of June, Mr. G. S. Greene, C. E., of New York, presiding. Among the papers thus far read is one by Mr. T. G. Ellis, of Hartford, on the Centennial History of Engineering, in which he reviewed progress in this science over the past century. All the facts presented by Mr. Ellis have been fully noted by us in the series of editorials in American progress which recently appeared in these columns. The first regular business transacted by the members was the discussion of a previously published essay, by Mr. C. Bender, on the theory of continuous girders in relation to economy in bridge building. Mr. Pettit, architect of the Main Exhibition Building, read a paper on the character of the engineering work, therein giving the reasons for the adoption of the plan selected. The peculiarity of construction is that it is like the framework of a table. The long iron supports carry the dead weight, and the trusses resist the side pressure. A good test of its stability was made in February last, when a wind having a pressure of 18 lbs. per square foot caused no perceptible vibration. The amount of iron used was 8,340,000 lbs. The iron, flat, angle, and round, measures 141 miles in length and if made into a cubic block, it would measure 25 feet 10 1/2 inches on each edge. There is 1 square foot of glass for each 4 square feet of surface covered. Mr. Pettit also described the general plan of installation of exhibits; and Mr. Schwartzmann, architect of Memorial Hall, explained his construction of that edifice. Complete abstracts of all papers read will appear in the SCIENTIFIC AMERICAN SUPPLEMENT.

**Correspondence.**

**The Locust Pest.**

To the Editor of the Scientific American:

The facts mentioned by your correspondent J. F. Dunwoody, of Louisiana, Mo., are interesting, and, for one, I am always glad to get such exceptional facts; but they do not invalidate the other facts recorded by me in the article on locust prospects from which you condensed in a recent number. That locust eggs are destroyed by excessive moisture, and especially by alternately soaking and drying, I have abundantly proved by experiment; and I do not doubt the correctness of the observations of the Minnesota Commission. My conclusions as to locust injuries in 1876 are also most thoroughly substantiated by the experience of the past two months, which, considering the contrary opinions very generally entertained and promulgated last winter, is very strong proof of the correctness of the statements upon which my opinions were based. It is not improbable that eggs in a tenacious slough bottom, continuously covered with water for months, would suffer less than those alternately soaked and dried in a porous soil, on the same principle that vegetation under like conditions would rot sooner in the latter case; and if Mr. Dunwoody were to state the circumstances attending the fact he mentions with more explicitness, so that we could know the nature of the slough bottom, and feel confident that the locusts observed subsequently to its drying up actually hatched there from eggs laid before it was overflowed, we should without doubt find that his observation admits of an explanation in harmony with the opinions which he thinks it invalidates.

As to freezing, the eggs, as I have shown in my own writings, will withstand with impunity almost any amount of it, and the young locusts may also be frozen in solid ice and yet live; but the fact nevertheless remains, and is supported by such extensive experience as not to be gainsaid, that, when the young of the Rocky Mountain species prematurely hatch in fall or during mild winter weather, they are subsequently destroyed by continued severe freezing, or by continued freezing and thawing.

St. Louis, Mo.

C. V. RILEY.

**Remarkable Example of Spontaneous Combustion.**  
To the Editor of the Scientific American:

A singular instance of spontaneous ignition took place in my house some time ago. On entering the house about noon, I detected the smell of something burning. An immediate search was made, and upon entering the parlor I noticed smoke rising from a center table that was placed near a south window. I stepped up to the table and noticed some pieces of cotton goods on fire, which I smothered out with my hand. Alongside of the goods that were on fire lay a stereoscopic instrument that was exposed to the direct rays of the hot noonday sun. It so happened that such was the position of the two lenses that they caused a burning focus on the goods and set it on fire. Had we been absent till an hour later, the fire would have extended itself, to the destruction of the house and all that was in it.

Round Mount, Texas. G. P. HACHENBERG, M. D.

[Accidental fires produced by lenses have frequently come to our notice. The glass globes filled with water and used to contain gold fish will converge the sun's rays to a focus of sufficient intensity to ignite light materials, and have thus started incipient conflagrations. The heavy glass bullseyes sometimes used for dead lights in ships have also produced similar effects; and we once called attention to a remarkable case where a bulb of glass, formed in a large sheet used as a window pane in a store, and due to a defect in the manufacture, proved the means of setting fire to objects displayed inside. Druggists' show globes of colored water also form powerful lenses, and we once knew of an enterprising apothecary who employed them as a cheap source of heat for his distilling apparatus. Of course there have

been many attempts to utilize the high temperature of the sun's converged rays. Huge mirrors have been built to melt refractory substances. Ericsson has devised a solar engine, and probably the latest invention of the kind is M. Mouchot's solar boiler, where the steam generator is placed in the focus of a concave reflector.—Eds.]

THE *Scientific Farmer* says that the best way to prevent overheating of compost is to pack the surface down solidly, by simply treading upon the heap with the feet (after pulverization), or, still better, to spread a little earth over the pile, taking care to pack it somewhat. Either method tends to exclude air, and thus prevents too rapid oxidation.

**NEW BOOKS AND PUBLICATIONS.**

**ELEMENTS OF PHYSICAL MANIPULATION.** By Edward C. Pickering, Thayer Professor of Physics in the Massachusetts Institute of Technology. Part II. Price \$4. New York city: Hurd and Houghton, 13 Astor Place.

Professor E. C. Pickering's first volume was received with general favor. He has now largely extended the scope of the work, and has introduced subjects not usually considered to belong to the domain of pure physics. The new volume contains an admirable chapter on mechanical engineering, including details of boilers, steam pipes, and indicator diagrams, as well as articles on speed and friction of shafting, belts, and pulleys. The friction brake and transmission dynamometer are fully explained; and some valuable methods of testing speeds of piston rods, shafts, and fly wheels, which are, we believe, entirely new, are described and illustrated. The apparatus employed in the growing science of meteorology occupies one of the most interesting chapters in the book; and the section headed "Practical Astronomy" contains a clear description of the instruments in common use for nautical and stellar observation. Tables of squares, cubes, powers, logarithms, tangents, and sines, and of the properties of metals, liquids, gases, and vapors, are added in appendices, with full explanations. The description of a good physical laboratory and a list of test experiments for students' use complete the work. The laboratory described is that under the charge of the writer, in which about 100 students are instructed every year. We cordially commend the work to all teachers of science classes, as one which they should study themselves and place in the hands of their pupils.

**HANDBOOK OF ELECTRICAL DIAGRAMS AND CONNECTIONS.** By Charles H. Davis and Frank B. Ræ. Price \$1.50. New York city: The Graphic Company, Park place.

The authors of this work are employees of the Western Union Telegraph Company in this city; and by their joint labor, they have produced a book of the highest value to the telegraph profession. It contains engravings of all the instruments (single, duplex, etc.), relays, batteries, etc., in ordinary use, with well written and detailed descriptions. The historical portions of the book are especially commendable for their accuracy, and for their fairness to the many claimants to the credit of originating the telegraph and its details, who are frequently so numerous and so contradictory as to bewilder the reader. Thirty plates and a map of the world showing all the telegraph cables in existence are added, all being executed by photolithography, in the best style of the art. The work is one of the most complete and useful handbooks we have seen for some time.

**THE INFLUENCE OF THE BLUE RAY OF THE SUNLIGHT AND OF THE BLUE COLOR OF THE SKY, IN DEVELOPING ANIMAL AND VEGETABLE LIFE, ETC.,** as Illustrated by the Experiments of General A. J. Pleasonton and others. Philadelphia, Pa.: Claxton, Remsen, and Haffelfinger.

A good description of the purport and matter of this remarkable work appears in an article on p. 388 of our volume XXXIV. We have little to add to the description there published, except that the book itself is more eccentric than we could have believed, unless guided by a perusal of its contents. The incidents of the cure of rheumatism in a mule by putting panes of blue and colorless glass in the transom window of its stable, the cure of a woman suffering from a complication of undescribed disorders by a similar application, the cure of spinal disease by use of a bath of blue light, and many similar cases cited by the author, remove this book beyond the sphere of legitimate criticism, and place it among the many melancholy burlesques of science and inductive investigation, by the publication of which certain authors are now trying to obtain notoriety.

**PRACTICAL TREATISE ON THE CONSTRUCTION OF IRON HIGHWAY BRIDGES,** with a Short Essay on the Application of the Principle of the Lever to the Analysis of Strains. By Alfred M. Boller, A. M., Civil Engineer. Price \$2.50. New York city: John Wiley & Sons, 15 Astor Place.

The author states in his preface that he intends this work for the use of town committees; and he has succeeded in producing a work that will be useful to any such bodies having to provide for the construction of bridges. The points to be regarded in designing an efficient structure are enumerated and fully described; and the author's cautious advice regarding specifications and contracts will, if followed, relieve local authorities from much responsibility as to the security of the work. The book is likely to disseminate some practical knowledge of great value and importance.

**THE CENTENNIAL NEWSPAPER EXHIBITION,** in Fairmount Park, Philadelphia. New York city: George P. Rowell & Co., Park Row.

The publishers of this volume own the well known extensive advertising agency in this city, and the admirable display of American newspaper literature at the Centennial is due to their zeal and enterprise. A description of the very large and varied exhibit of our newspapers and the statistics of American journalism will be found in this handbook, which should be read by every visitor to the Centennial Exhibition, who will find in the Newspaper Building one of the most attractive displays to be found in the whole show.

**CHEMISTRY, THEORETICAL, PRACTICAL, AND ANALYTICAL,** as Applied to Arts and Manufactures. Parts V. to X. Philadelphia, Pa.: J. B. Lippincott & Co., 715 Market street.

The publication of this work was announced when the first four numbers reached us; and the subsequent ones need no comment, being printed in similarly handsome style, with the same characteristics. We must, however, again protest against the concealment of the names of the compilers. Twenty dollars is too much to pay for a book which does not establish its authenticity and accuracy by giving information as to its authorship.

**PRINCIPLES OF APPROXIMATE COMPUTATIONS.** By Joseph J. Skinner, C. E., Instructor in Mathematics in the Sheffield Scientific School of Yale College. New York city: Henry Holt & Co.

This treatise is likely to prove of especial value in solving those numerous problems which involve repeating decimals, as well as those in which our measurements with instruments capable of giving only a limited degree of precision. These difficulties are dealt with by the author in a very practical manner; and his method produces results which are little at variance with those obtained by continued calculation.

**THE AMERICAN SYSTEM, GERMAN.** A Record of Professor C. C. Schaeffer's High School Test Course. Philadelphia, Pa.: Charles, Brother, & Co.

This book is the record of a vast amount of information, imparted to the pupils of the Philadelphia Central High School, in six lessons of 45 minutes each. Although published without any evident order or arrangement, it contains several excellent features, among which may be mentioned the construction of German sentences, the explanations of gender and *Umlaut*, and a quaint lecture on "The Philosophy of the English Language."

**PRICE LISTS OF GOODS MANUFACTURED IN THE BIRMINGHAM DISTRICT, ENGLAND.** Part I. London, England: Published by the Proprietors of "Iron," 12 Fetter Lane.

**HIGH MASONRY DAMS.** By John B. McMaster, C. E., Author of "Bridge and Tunnel Contracts." Price 50 cents. New York city: D. Van Nostrand, 23 Broadway and 27 Warren street.

A practical and valuable little treatise, being No. 22 of Mr. Van Nostrand's Science Series.

**SEVENTH ANNUAL REPORT OF THE STATE BOARD OF HEALTH OF MASSACHUSETTS,** just published, is replete with useful information. Most of the legislative publications of the Old Bay State are so; but this cannot be said of many statistical reports issued by some other States, or of a great number which are authorized and published by approval of Congress. We are indebted to the State Board of Health, each year, for an early copy of their report, from which we are enabled to extract much useful information for our readers. The document before us leaves no branch of the subject of sanitary science untouched; and the statistics, especially those affecting population and mortality, are sufficient to convince any one of the national importance of the compulsory observance of health regulations. The report, moreover, furnishes to other State and city boards an excellent model for the preparation of such volumes, and a guide for the investigation of the subjects, which it would be well for them to follow.

**DECISIONS OF THE COURT**

**Supreme Court of the United States.**

PATENT ERASER PENCILS.—JOSEPH RECKENDORFER, APPELLANT, vs. EBERHARD FABER.

Appeal from the Circuit Court of the United States for the Southern District of New York.

Mr. Justice HUNTER delivered the opinion of the Court. This is an appeal from a decree of the United States Circuit Court for the Southern District of New York, dismissing the bill of complaint which was filed to restrain the infringement by the respondent of certain letters patent, and for an accounting and damages.

These patents relate to the manufacture of combined pencils and erasers. The first was granted to Hymen L. Lipman, March 30, 1858, and was extended for a further term of seven years from the 30th of March, 1872.

The material parts of the specification are as follows: "I make a lead pencil in the usual manner, reserving about one fourth of the length, in which I make a groove of suitable size, A, and insert in this groove a piece of prepared india rubber (or other erasing substance) secured to said pencil by being glued at one edge; the pencil is then finished in the usual manner, so that on cutting one end thereof you have the lead B, and on cutting on the other end you expose a small piece of india rubber, C, ready for use, and particularly valuable for removing or erasing lines, figures, etc., and not subject to be soiled, or mislaid on the table or desk. "In making mathematical, architectural, and many other kinds of drawings, in which the lines are very near each other, the eraser is particularly useful, as it may be sharpened to a point to erase any mark between the lines; and should the point of the rubber become soiled or inoperative from any cause, such cause is easily removed by a renewed sharpening, as in the ordinary lead pencil."

The claim is as follows: "I do not claim the use of a lead pencil with a piece of india rubber, or other erasing material, attached at one end for the purpose of erasing marks; but what I do claim as my invention, and desire to secure by letters patent, is the combination of the lead and india rubber, or other erasing substance, in the holder of a drawing pencil, the whole being constructed and arranged substantially in the manner and for the purposes set forth."

The drawings forming part of the specification exhibit a continuous sheath of uniform size, with interior grooves of different sizes: the eraser groove being larger than the lead groove.

The second patent is for an improvement upon the invention of Lipman, and was granted to Joseph Reckendorfer, the complainant, the 17th of November, 1862, and reissued on the 1st of March, 1872.

The material parts of the specification are as follows: "My invention is intended to provide a means whereby articles of greater size or diameter than the lead pencil may be securely held in the hand by one of otherwise ordinary or suitable construction without making the body of the pencil cumbersome or inconvenient. To this end my invention consists: "First.—Of a pencil composed of a wooden sheath and lead core, having one end of the sheath enlarged and recessed to constitute a receptacle for an eraser or other similar article, as hereinafter stated.

"Second.—Of a pencil, the wooden case of which gradually tapers from its enlarged and recessed head toward its opposite end for the whole or a portion of its length, as hereinafter set forth.

"The receptacle for the eraser or other article is formed in the head, without too much weakening the wood, owing to the form of the sheath, while for the same reason the end of the pencil which contains the ordinary lead is not cumbersome or clumsy, but can be readily held between the fingers, just as an ordinary pencil is."

Having thus described his invention, Reckendorfer claims—

1. A pencil composed of a wooden sheath and lead core, having one end of the sheath enlarged and recessed to constitute a receptacle for an eraser, or other similar article, as shown and set forth.

2. A pencil, the wooden case of which gradually tapers from its enlarged and recessed head toward its opposite end for the whole or a portion of its length, substantially as shown and described."

HOW THE PATENTABILITY OF AN INVENTION IS DETERMINED. The points we propose here to discuss are two: First.—Is the invention of which the plaintiff and his assignor, and for the infringement of which patents this action is brought, a patentable invention within the laws of the United States?

Second.—Is it within the power of the courts to examine and determine this question, or is the decision of the Commissioner of Patents, when, by issuing a patent, he decides that the invention is patentable, final and conclusive on the point?

The plaintiff contends that the decision of the Commissioner is conclusive upon the point of invention, and that the question, as distinct from that of want of novelty, is one not open to the judgment of the court. In the natural order of things this question is the first one to be examined. For if it shall appear that the contention of the plaintiff is correct in this respect, the question in regard to the patentability of the instrument now before us will not arise. The point will have been decided for us, and by a controlling authority.

The act to revise, consolidate, and amend the statutes relating to patents and copyrights, passed July 4, 1836, (5 U. S. Stats., 118.) is the act regulating this case.

By the 6th section thereof it is enacted "that any person having invented or discovered any new and useful art, machine, manufacture, or composition of matter not known or used by others before his invention or discovery thereof, and not at the time of his application for a patent in public use, or on sale with his consent or allowance as the inventor or discoverer, and shall desire to obtain an exclusive property therein, may make application in writing to the commissioner expressing such desire, and the commissioner, after the proceedings had, may grant a patent therefor if he shall be satisfied that he believes himself to be the first inventor or discoverer thereof, and that he does not know or believe that the same has ever before been used."

Looking at this section alone it may be safely said no one is entitled to a patent unless (1) he has discovered or invented an art, machine, or manufacture; (2) which is new and useful; (3) which is not known or patented as herein mentioned. It is not sufficient that it is alleged, or supposed, or even adjudged by some officer to possess these requisites. It must in fact possess them, and that it does possess them the claimant must be prepared to establish in the mode in which all other claims are established, to wit, before the judicial tribunals of the country.

The 7th section of the act (p. 120) provides that on the filing of any such application, etc., and the payment of the duty required by law, the commissioner shall make, or cause to be made, an examination of the alleged new invention or discovery, and if on such examination it shall not appear to the commissioner that the same has been invented or discovered by any other person in this country prior to the alleged discovery, or patented, or described in any foreign publication, or been in public use, or on sale with the consent of the applicant, and if he shall be of the opinion that the same is sufficiently useful and important, the commissioner shall issue a patent therefor.

Before the commissioner is authorized to issue a patent it must appear to him that the claimant is justly entitled to a patent; that is, that his art, machine, or manufacture possesses all the qualities before mentioned. The commissioner must also be satisfied that if it possesses these qualities it is sufficiently useful and sufficiently important to justify him in investing it with the *prima facie* respect arising from the governmental approval. These restrictions are wise and prudent, are intended to secure at least a probable advantage to those who deal with the favorites of the government, for they may justly be so termed who receive the exclusive right of making or using, or vending particular arts or improvements.

THE JUDGMENT OF THE COMMISSIONER OF PATENTS IS NOT CONCLUSIVE.

It is nowhere declared in the statute that the decision of the commissioner as to the extent of the utility or importance of the improvement shall be conclusive upon that point. In the section just quoted it is placed in the same category with the want of novelty and the other requisites of the statute, and it is expressly conceded by the appellant that the judgment of the commissioner on the question of novelty is not conclusive, but that that point is open to examination. On that subject the practice of the courts is uniform in holding it to be subject to enquiry.

The plaintiff's counsel, in his brief, puts his argument in this form: "The commissioner, then, passes on these questions: 1. Did the applicant himself make the invention? This question is settled by his oath." This is true to the extent and for the purpose of issuing a patent, and to this extent only. When the patentee seeks to enforce his patent, he is liable to be defeated by proof that he did not make the invention. The judgment of the commissioner does not protect him against the effect of such evidence.

"2. The counsel says: was the invention new? This question is solved by the examination required by the act." To the same extent only. The defence of want of novelty is set up every day in the courts, and is determined by the court or the jury as a question of fact upon the evidence adduced, and not upon the certificate of the commissioner.

"3. The counsel says again: is the invention sufficiently useful and important? This the commissioner settles for himself by the use of his own judgment. It is a question of official judgment." These questions are all questions of official judgment, and are all settled by the judgment of the commissioner. His judgment goes to the same extent upon each question. He determines and decides for the purpose of issuing or refusing a patent. When the patent is sought to be enforced, the questions, and each of them, are open to judicial examination. We see many reasons why all the questions of invention, novelty, and prior use should be open to examination in each case, and such we believe to be the course of the authorities and practice of the courts.

A reference to some of the most recent cases, and to those decided by this court will be sufficient. A review of all the cases in this court and the various circuit courts where this question has been alluded to will not be profitable.