

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.

To Advertisers.—The regular circulation of the SCIENTIFIC AMERICAN is now Fifty Thousand Copies weekly. For 1880 the publishers anticipate a still larger circulation.

The Scientific American Supplement

is a distinct paper from the SCIENTIFIC AMERICAN. THE SUPPLEMENT is issued weekly. Every number contains 16 octavo pages, with handsome cover uniform in size with SCIENTIFIC AMERICAN. Terms of subscription for SUPPLEMENT, \$5.00 a year, postage paid, to subscribers. Single copies 10 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 houses. 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, FEBRUARY 28, 1880.

Contents.

(Illustrated articles are marked with an asterisk.)

Table listing various articles such as American industries, inventions, and scientific notes with corresponding page numbers.

TABLE OF CONTENTS OF

THE SCIENTIFIC AMERICAN SUPPLEMENT

No. 217.

For the Week ending February 28, 1880.

Price 10 cents. For sale by all newsdealers.

Detailed table of contents for the Scientific American Supplement No. 217, listing sections I through VI and their respective page numbers.

PASSAGE BY THE HOUSE OF REPRESENTATIVES OF A LAW FOR THE ENCOURAGEMENT OF SWINDLING.

In the SCIENTIFIC AMERICAN of January 3, and again January 17, the injustice and mischievous tendency of certain bills for the protection of such as purchase patented articles and processes from parties unauthorized to sell, were pointed out and discussed at considerable length. The bills referred to are still with the House Committee on Patents.

Meantime bills of similar purport have been introduced and referred to the Committee on the Revision of the Laws, which appears to have been more favorably disposed toward schemes of that nature. At any rate the bill approved by this committee (H. R. No. 4419, introduced as a substitute for House bill 3767), covers the same ground as the bills of Messrs. Baker, Colerick, and others above referred to, in providing that "hereafter in any suit in any court having jurisdiction in patent cases for an alleged use or infringement of any patented article, device, process, invention, or discovery, where it shall appear that the defendant in such suit purchased the same in good faith for his own personal use from the manufacturer thereof, or from a person or firm engaged in the open sale or practical application thereof, and applied the same for and to his own use and not for sale, if the plaintiff shall recover a judgment for \$5 or less as damages the court shall adjudge that he pay all costs of suit; and if the plaintiff shall not recover the sum of \$20 or over the court shall adjudge him to pay all his own costs, unless it shall also appear that the defendant at the time of such purchase or practical application had knowledge or actual notice of the existence of such patent; provided that nothing contained herein shall apply to articles manufactured outside of the United States."

On February 9 Mr. Thomas, of Illinois, moved to suspend the rules and discharge the committee from the further consideration of the bill quoted, and that the bill be passed; which was done without discussion.

The alleged object of this bill is to keep farmers from being swindled by sharpers who, fraudulently pretending to own patent rights, offer to sell what they have no power to deliver, thereby making the unwary buyers liable to suits for infringement when the rightful owners of the patents come along.

It is said that actual owners of patent rights have sometimes entered into conspiracy with such swindlers, the one selling without right, the other following and collecting a second payment. Speaking of the proposed law as a remedy for such practices, the New York Herald says:

"Nothing but such a law—unless it be a properly handled shotgun—will dispose of the numerous sharpers that have played into each other's hands so successfully that many people, particularly farmers, are afraid to purchase patented articles of any kind. No citizen who is not a special student of Patent Office records can be expected to know anything about infringements or how to guard himself against them; therefore the power which makes the right of a patentee absolute should defend honest purchasers. A better method of defense could hardly be devised than the bill that is now awaiting further action, for the profits of sharp practice would be brought down to nothing if the wily prosecutors were compelled to pay the costs."

It is safe to say that no honest patentee would object to a law, however stringent, for the suppression of "sharpers" and "sharp practices" of the sort alleged. It is equally safe to say that the swindling practices so volubly described by the advocates of the proposed law are purely imaginary. They have no real existence—certainly not to anything like the extent pretended by those who make them a pretext for legislative interference with the property rights of patentees. We have yet to hear of the first well-authenticated case of the sort, and confidently challenge the friends of this bill to produce one. And even if there were such conspiracies, and they were as numerous as they are said to be, they would still fail to furnish any justification for this bill.

Years ago a similar swindle was practiced with horses. A man would ride into town with a handsome horse, which, on one pretext or another he would offer to sell for much less than the animal's real value. Some "innocent" buyer would pay the price and chuckle over his bargain. As soon as the seller could get well out of the way his confederate would appear in pursuit of the alleged stolen horse, prove his property, and ride on to divide the proceeds of the fraudulent sale, and repeat the trick. For a time this sort of business was a paying one. It was ultimately broken up, not by a law making purchase in good faith a bar to the rightful owner's claims, but by compelling purchasers of stolen animals to surrender them and look to the thief for the return of the money. It did not take long for men to discover the impolicy of buying horses without plentiful evidence of the seller's right to sell. Suppose that, instead of letting the evil correct itself in this legitimate way, a special law after the model of this bill had been passed; would anybody have been benefited except horse thieves and dealers in stolen horses?

In like manner, who but infringers and those who wish to use inventions without paying the inventor's royalty, would be benefited by the law proposed in this bill? To forestall a few swindlers and protect their innocent victims, is put forth as a pretext for the wholesale invasion of inventors' rights; the real purpose of the bill is as clear as the motives of the wolves in the fable, when they volunteered to stand guard over the lambs.

The great majority of patent rights rest upon inventions the products of which are individually of small cost, though

of great utility and practical value. In many cases an infringer can produce and put upon the market such articles under conditions which make it next to impossible for the rightful manufacturer under the patent to find him out. The manufacturer's only recourse then is to spoil the market for such fraudulent goods by proceeding against their users. This reasonable protection is barred him by the proposed law, which makes him pay all the costs of suit, however culpable the defendant may be, when the damages do not exceed \$5; and his own costs, when the damages are less than \$20, except when he is able to prove that the infringer actually knew he was infringing.

Such a law substantially says to intending purchasers: "Go on; the chances are all in your favor. Buy anything that is offered without question. Ignorance is innocence. It will cost the patentee a great deal more to sue than he can get from you in damages, even if he succeeds, and the probabilities are that he will not bring suit with such heavy odds against him."

With a safe market thus made for his goods, the infringer need have no fear of success, so long as he skillfully covers his tracks.

Meanwhile the inventor, we suppose, is expected to toil on patiently, inventing for the fun of it, or because he cannot help himself; and to continue to take out patents which he can defend in the courts if he has money enough to pay his opponent's lawyers as well as his own.

Fortunately the Senate will have a word to say about such proceedings, and it is to be hoped that the friends of inventors and of just laws will lose no time in presenting the facts of this case to their senators in such a manner as may prevent in the Senate a repetition of the hasty action of the House.

The argument that people cannot be expected to know anything about patent infringements, and therefore should be protected in their unwarranted purchases of patented articles and processes, is pure childishness. No man can be expected to know the owner of every horse in the United States; but he can be and is expected to find out whether the would-be seller of any horse he wants to buy has a legal right to sell. If he does not take that trouble, the risk should be his and not that of the real owner, in case the horse has been stolen.

No man can be expected to know all the bonds and other papers of value that have been lost or stolen; but every man is expected not to buy such property without a sufficient guarantee that the seller came honestly thereby. To pass a law shielding men from loss in case they violate this plain rule of trade would simply put stolen bonds on the same footing in the markets as honest property, and remove the chief disadvantage which burglars and pickpockets labor under. They would heartily approve of such a law, no doubt, and so would all dealers in stolen property; but how would it suit the honest owners of financial paper?

If such a law would favor the dishonest and react injuriously upon the honest when applied to horses, or bonds, or any other form of property liable to be misappropriated, it would be not less unjust and mischievous when applied to patent rights.

Besides, the proposed law is open to the objection of being unnecessary. If we mistake not, there are already in force laws against conspiracy to defraud, whether the means employed are patent rights or anything else, quite sufficient to deal with the swindlers whose operations furnish a pretext for a new law. There would, however, be no occasion even to appeal to such laws, if men would simply learn not to buy anything from unknown and irresponsible parties.

But, as we have intimated again and again, the ostensible object of this bill is not its real object. Its actual purpose is so to hamper the patentee in the defense of his rights as to make it impossible for him to sustain them in connection with any article of small cost and general utility that farmers and others wish to use without payment of royalty.

In addition to its needlessness and injustice, the law proposed is open to the serious objection that it is a special law, designed to affect a limited range of persons and cases. If we must have a law of the kind, let it be a general law, applicable to all departments of trade. Such a law might run somewhat as follows:

"Hereafter, in any suit brought in any court for the collection of lawful debts, or for the recovery of the value of goods sold, or for the recovery of damages for the felonious procurement, possession, or use of any description of property unlawfully held or used by another, if the plaintiff shall not recover a judgment for \$5 or less, the court shall adjudge that he pay all the costs of the suit; and if the plaintiff shall not recover the sum of \$20 or over, the court shall adjudge him to pay all his own costs; provided that nothing contained herein shall apply to articles manufactured outside the United States."

It is respectfully suggested that the foregoing, or something of like effect, be submitted as a substitute for, or amendment of, the more limited bill (H. R. No. 4,419), which has come up to the Senate for consideration.

—FLOUR VS. BRAN.

At a recent meeting of the National Association of British and Irish Millers held in London, a most interesting discussion took place relative to the comparative merits of what was styled the "old school" system of making flour and the new methods now being so largely adopted. There was a large attendance of the leading millers of the United King-

dom, and the milling industry of England, which has heretofore been conspicuous for its slow-going conservative qualities, seems at last to have awakened to the fact that "flour is manufactured of a highly superior quality by other nations," which is finding its way there "in quantities that threaten to exercise a depressing influence" upon their business.

It was generally conceded that the idea of the "brown bread" school, that flour was more nutritious when it contained a portion of the bran, was erroneous, for while the bran might have, in some cases, a beneficial effect medicinally as a laxative, it lessened the nutritive power of flour in the exact proportion in which it was present. How, then, to make the best flour—how best to "divide the flour portions of the wheat berry as completely and distinctly as possible from the offal"—is the question which the English millers find foreign competition now forces them to give more attention to. The different methods of milling were compared, and various arguments urged as to their relative merits, but the principal question seemed to be as to the advisability of substituting milling by rollers made of chilled cast iron, for the old way of grinding by millstones, either wholly or partially. Many other points were discussed, but the principal interest of the meeting centered around this one question. Diagrams were shown upon the wall of the hall where the meeting was held illustrating the roller mill, which squeezes flat the kernels of wheat, from which the flour bursts out, without spoiling the bran, while it was claimed that heavy millstones operated more by friction than by pressure, tearing, rubbing, and fretting the grain, giving, even with the greatest care, a large mixture of bran dust with the flour, and so fine that it could never afterward be thoroughly separated from it. Notwithstanding there were many millers present who had large amounts of money invested in the making of flour by the old millstone process, and there was an evident reluctance to acknowledge the great superiority of the flour milled by rollers, numerous specimens of each of which were presented for examination, the general sentiment seemed to be in favor of the adoption of the new process, although there were many who manifested a disposition to oppose it step by step, and who will only give way as the better brands of flour, with the smallest proportion of bran and woody substance, drive out the inferior grades.

The thorough cleaning of the wheat before milling was also put forward as a most important essential in the making of the highest grade of flour, and for this purpose the American Brush machine was highly spoken of. One speaker said that the American theory was that a light cleaning was sufficient, which he thought was not correct, "as it is by no means a light treatment which the wheat is subjected to in passing between the stones in the operation of grinding." Therefore, he argued, "as much of the outside of the wheat as can be proved by examination of the bran is at present ground off by millstones should, if possible, be removed while it can be kept by itself," and one of the wants of the future in the milling business was a machine which would make the outside of the wheat, before passing through the stones, resemble the outside of the bran as it now comes from the stones. This, it was claimed, would prevent a good deal of bran dust from becoming a part of the flour, and tend to the making of that perfect article when all the flour might be put into one sack and the offal into another, or "the complete separation of every particle of flour from every particle of the other constituents of the wheat."

The American International Exhibition of Milling Machinery and Mill Products, to be held at Cincinnati, in June next, in connection with the annual fair of that city, was referred to at length by several of the speakers, and the hope was expressed that there would be general participation, especially as arrangements had been made whereby machinery might be entered for exhibition without any payment of duties.

A NEW GOVERNMENT BUREAU PROPOSED.

A bill to create a Department of Manufactures, Mechanics, and Mines has been introduced in the House of Representatives. The duty prescribed for the new bureau is to collect information concerning the manufacturing, mechanical, and mining industries of the country; to secure information as to the condition of the producing classes, especially as to their wages and cost of living as compared with the value of their productions, and to investigate the moral, social, educational, and sanitary condition of mechanics and laborers, and as to the causes that may operate injudiciously upon these conditions; to collect statistics of the leading manufactures of the several States, the amount of capital invested, value of raw material used, wages paid, value of produce, and number of persons employed; also, to secure information as to the location of the mineral lands, the number of persons employed, and quantities of minerals produced. The department is to be under a commissioner of manufactures, mechanics, and mines, to be appointed by the President for four years, upon a salary of \$4,000, with a chief clerk, upon a salary of \$3,500 per annum, and as many clerks as may be necessary, at salaries in no case exceeding \$1,500 per annum.

Wisely planned and administered such a department might be of great benefit to the industries of the country, and would furnish a proper complement to the Departments of Education and Agriculture, also assuming them to be wisely administered. In a country like ours, education, agriculture, manufactures, and mining involve interests of

infinitely greater importance than those which fall under the jurisdiction of the Army and Navy Departments. And, though it is no part of the business of the government to interfere in either of these great lines of individual effort—and such interference should not be tolerated—it is still possible for a central bureau to be of great service in collecting and disseminating exact information with respect to their condition and needs.

There is a serious risk, however, that the new bureau might be anything but beneficial. In the hands of an incompetent commissioner it might simply pile up antiquated, inaccurate, and useless statistics, as has been done to a wearisome extent by the Commissioners of Education and Agriculture, especially the former, or it might fall into worse hands and be wholly prostituted to partisan ends. Besides the educational, moral, social, and sanitary condition of mechanics and laborers is no more in need of official investigation than the corresponding condition of merchants, lawyers, clergymen, politicians, or any other portions of the community. The ill success of the late Labor Committee, in its efforts to gather information with regard to the industrial affairs of the country, illustrates only too clearly the probable value of the information which the proposed department would collect when administered for partisan purposes.

On the other hand, it is quite conceivable that the new bureau might be, in each and all of the several fields of inquiry prescribed for it, as successful as the Massachusetts Labor Bureau has been in investigating the industrial interests of that State. In such case its benefits would be incalculable.

THE PREVENTION OF FIRES.

There is nothing which can be said under this head which does not receive the close attention of all officers of fire insurance companies. They have the most direct and powerful motives to impel them to obtain and publish every scrap of information which will in any way tend to make fires less frequent, and will lessen their destructiveness when they do occur. The fire insurance companies now control such a vast amount of capital, and have such an army of experts in their employ, that there is very little which is presented in their line that does not meet with the most exhaustive examination, and the rates charged on risks are varied according to their judgment as formed on many and widely different grounds. The mutual system of insurance, started among the cotton goods manufacturers of the Eastern States in 1835, first gave the great impetus to this method of particular discrimination, as, where every one insured was thereby made to a proportionate extent his own insurer, and correspondingly interested in the safety of all other property in the same company, there was every motive to see that all possible provision should be made against loss by fire, and each risk should be closely valued.

Among the subjects which have particularly engaged the attention of the mutual companies, and in regard to which all the other companies quickly followed their example, were the building, arrangement, and location of buildings to be used for factory purposes. A leading president of a mutual insurance company in Boston the other day remarked that every one now knew in what a model factory consisted, so far as the question of insurance was concerned; the floor beams must be far apart, instead of close together, and covered with three inch plank for flooring; where the beams were let into the wall they must be rounded on the top corner and the bricks laid on loose, so that in case of fire they would drop out without pulling the wall down; the roof must be nearly flat, and everything else in the general plan after such a calculation as would give the firemen ready access, in case of fire, to every part of the structure. In addition to this, such parts of the work as are supposed to be especially dangerous are often placed in separate buildings; the picker room in cotton factories is generally so provided for, and water pipes are so disposed as to make it comparatively easy to flood such apartments at an instant's notice. In tanneries and leather factories the bark grinding is generally done at a distance from where the drying lofts are, as well as from where the stocks of bark are stored, and so, with every industry, care is taken, as far as possible, to isolate those parts of the business in which fire would most readily happen, or where it would be most destructive if it did occur.

Another matter which has attracted considerable attention from the insurance companies has been the various kinds of hose in use for fire engines. Until a comparatively recent date nothing was considered quite as good as leather hose; but it may now be safely said, that while there is annually a great increase in the total amount of fire-hose used in the country, there is no increase in the amount of such hose manufactured from leather. With good care leather hose will probably outwear any other variety, but it requires a vast amount of attention, and some little amount of experience for a proper understanding of how it should be treated, while that made of rubber, or linen, or cotton, rubber lined, involves no such labor. Many varieties of the latter, also, will withstand a much higher pressure before bursting than leather can be successfully subjected to. At a trial which was made in December last, before some inspectors of a mutual fire insurance company, it was found that one sample of 6-ply cotton rubber-lined hose, weighing twenty ounces to the foot, withstood a pressure of over 1,100 pounds to the square inch, while similar hose weighing eight to twelve ounces to the foot withstood a pressure of from 300 to 500 pounds to the inch. The fact, however, that the officers of

insurance companies, who are in a comparatively independent position, as related to the different manufacturers of hose, are taking the initiative in such trials, and have a strong interest in seeing that the best and most reliable article is everywhere employed, proves a great stimulus to the manufacturers, and has provoked a rivalry which cannot fail to be of benefit to the public generally.

CHASTANT'S OBSERVATIONS ON YELLOW FEVER.

Dr. Alcée Chastant, of New Orleans, takes strong ground against the germ theory of the origin of yellow fever. All investigations to discover the manner of its introduction into the large cities of Europe and the United States have failed, he says, with all the experience so far had, to establish definitely the real origin of the disease. Unless the microscope shall ultimately prove the contrary his opinion is that while the conditions which produce yellow fever can be known, the essential nature of its direct cause will ever remain a mystery. From a study of its geographical limits and its more or less irregular irruptions he thinks that its outbreaks must be some combination of meteorological and telluric conditions especially favorable to the development of the disease, such as a high temperature with dampness, conjointly with certain emanations from the earth.

Touching the character of the disease, Dr. Chastant's long experience warrants, he thinks, the opinion that each epidemic of yellow fever is of its own peculiar and special type, varying according to the locality and the influences which have been instrumental in bringing it about. The immediate cause of the disease is the introduction into the human organism of a specific inorganic poison, which has never been chemically or microscopically demonstrated, a poison which develops under the influence of heat, moisture, and other favorable circumstances.

"Yellow fever is not imported, but is most certainly endemic. When, however, climatic and telluric conditions concur, and foreign cases are existing, it then spreads and becomes epidemic." Such epidemics cannot be prevented, but can be mitigated by general sanitary measures and precautions. He agrees with the late Dr. Warren Stone, in regarding the disease to be non-contagious, but taken from the atmosphere poisoned by telluric emanations. The germ theory he regards as not only unproved, but highly improbable. On several occasions Dr. Chervin swallowed the matter of black vomit and suffered no harm. Neither did Dr. Guyon, at Martinique, from similar experiments. Dr. Firth inoculated dogs with the fresh matter, and subjected himself to the same operation. He applied the fluid to the surface of a cut made on his arm, and secured it there for two days by means of sticking plaster, and repeated the experiment above twenty times in various parts of his body. He inserted the matter in his eyes, and swallowed a large quantity of black vomit, pure and dilute, and no injurious effects ensued. Cats, dogs, and fowls were fed with it without sensible effects, and the fumes obtained by evaporating black vomit did not harm those who inhaled them. Such heroic experiments may not disprove the germ theory, but they certainly tell very strongly against it.

Sporadic cases of yellow fever, Dr. Chastant holds to be produced by natural causes, arising exclusively from the *eremacausis* which takes place in the filth of gutters, as well as on the immediate surface of the earth in certain localities, and these cases do not extend beyond the sphere of these causes. Although these natural causes, whenever they exist, help to increase the yellow fever, yet its epidemic feature arises from a more general law of the soil, the effect of which is produced by a geological *repercussive action*. Sporadic cases may precede an epidemic, but he doubts if they can produce an epidemic, unless there is a concurrence of both causes.

An Unexpected Comet.

A dispatch has been received from Dr. Gould, formerly of the Dudley Observatory, Albany, N. Y., but now director of the Cordoba Observatory, South America, stating that a great comet is in the neighborhood of the sun, passing northward. No large comet has been expected this year, and no small one at this season, Winnecke's comet not being due until near the end of this year. Reports by mail are awaited with great interest. Should Dr. Gould's dispatch be confirmed, a new member must be admitted to our cometary system; and possibly the nations north of the equator may also be treated to a sight of it.

Railroad Crossings.

Mr. James Torrance, of Troy, N. Y., proposes the following method of abolishing the danger attending the present style of railway crossings. He would use for such crossings a rail of special form, rolled in one piece of the usual length, with a groove wide enough for the flange of the car wheel to run in; the groove to be wedge-shaped and widest at the top, with plain sides, so as not to catch the feet of men or animals. In this way he would get rid of the usual trap between the planking and the rails. Such a grooved rail could easily be kept clear of snow and ice; and the extra cost of rolling would be nothing, he thinks, compared with its advantage in doing away with the risk to life and limb attending the present style of crossings.

A JOINT resolution appropriating \$20,000 to enable the Commissioner of Fish and Fisheries to represent the United States at the International Fishery Exhibition to be held in Berlin next April, was adopted by the House of Representatives, February 4.