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No. 385,

For the week ending June 3, 1882.

Price 10 cents. For sale by all newsdealers.

Table listing sections I through VI: I. ENGINEERING AND MECHANICS, II. TECHNOLOGY, III. CHEMISTRY, IV. ART, ARCHITECTURE, ETC., V. PHYSICS, VI. MISCELLANEOUS.

THE TOTAL SOLAR ECLIPSE.

The solar eclipse of the 17th of May was successfully observed by English, French, and Italian parties at Soham, a village in Lower Egypt, on the Nile. The duration of totality at that point was only seventy-two seconds, but the observers did prompt and efficient work in this short space of time.

The precious seconds when the sun's face was hidden by the moon's dark shadow revealed in the first place a comet near the sun. It could not be Comet alpha or Comet Wells, for this much talked of visitor to northern skies does not reach perihelion until the 10th of June, and has, therefore, three weeks' time in which to speed its course to the near neighborhood of the great luminary.

The second item coming from the eclipse observers is more astounding than the first, for the darkening of the lines of the spectrum, as seen by the French astronomers, gives indication of a lunar atmosphere. If this observation is substantiated there will be a revolution in existing ideas concerning lunar physics.

One more meager item closes the first bulletin from the eclipse expeditions. It is that the spectrum of the corona was photographed for the first time. We may, therefore, hope for increased knowledge of the constitution of the sun's magnificent appendage, seen only in a total eclipse, so grandly beautiful as to make the beholder feel like veiling his eyes in the celestial presence.

The English eclipse expedition, observing at Soham, with Professor Lockyer as the chief director, laid out an organized plan of operations. Some of their points of observation were to note if the abundance and activity of the rosy protuberances gave proof of the present disturbed condition of the sun while passing through its maximum period of sun spots.

Photography was greatly relied upon in the solution of these intricate problems, and so much have methods improved in the rapidity with which the image can be impressed on the sensitized plate that seconds will now record more than minutes did twenty years ago.

There is every reason to hope for noteworthy results to be obtained from the recent solar eclipse with the best astronomical instruments the world can furnish, and with astronomers of world-wide renown to use them effectually under the cloudless sky and in the serene atmosphere of the station on the Nile.

on the thin line of totality, and to wait for fuller details and photographs that will tell more of the good news.

Professor Lockyer and his assistants spent three months in hard work to prepare for seventy-two seconds of observation. They traveled thousands of miles and transported thirty cases of instruments to aid them in the work.

INSATIATE VAMPIRES IN MICHIGAN.

It is a fortunate circumstance that Mr. Burrows did not content himself with denouncing in general terms, in his peculiarly forceful style, "the bands of patent right inquisitors which infest the country and plunder the people."

Mr. Burrows recited twenty-eight "well authenticated instances of outrages" upon people of his district and State. About half of these involved the collection of a royalty of \$100 for the use of the Birdsall clover huller.

Mr. J. M. Failling refused to pay the royalty demanded for using a huller; was sued for it; and learned at a cost of \$417 that the United States District Court of the Eastern District of Michigan knew more of the value of the patent than he did.

It would seem to be a specially annoying feature of these "outrages" that the United States Courts are in substantial collusion with the persecutors and sustain their iniquitous demands.

Another remarkable feature of these cases is the curious fascination which clover hulling machines seem to have upon the minds of Mr. Burrows' constituents. They will use them even at the risk of having to pay royalty therefor to the "vampires" who own the patents.

There seem to be several varieties of these fascinating clover hullers, for several of different makes serve as the basis of "well authenticated outrages." In some cases royalties as high as \$125 have been demanded for their use.

Other cases of "outrage" were based on claims of royalty for the use of a circular saw guide, a sawmill dog with attachments, and other trifles, not exceeding \$75 in value.

It is a notable circumstance that in every one of the cases litigated—save one which is still pending—the courts sustained the patentees, and the innocent victims of judicial inquisition fared worse than those who settled at once with the vampires.

In the course of his speech Mr. Burrows laid special stress upon the necessity of freeing from "persecution" the purchasers in good faith, not only of clover hullers but of patent fence gates, barbed wire fence, drive-wells, and a hundred other articles necessary to the farmers of the great West.

LEGISLATIVE CONFISCATION.

In the House of Representatives, April 28, Mr. Caswell asked consent to report from the Committee of Patents, as a substitute for House bill No. 784, a bill (H. R., No. 6018), providing that no action for damages or proceeding in equity shall be sustained, nor shall the party be held liable under

Sections 4919 or 4921 of the Revised Statutes of the United States, for the use of any patented article or device when it shall appear on the trial that the defendant in such action or proceeding purchased said article for a valuable consideration in the open market.

Objections were raised. Mr. Hutchins said: "It seems to me that a bill of that kind, nullifying the patent laws of the United States, ought not to pass without our understanding it."

Mr. Vance said: "This has received the unanimous consent of the Committee on Patents, and also the approval of the Commissioner of Patents, and it has been petitioned for extensively by the people."

Failing to obtain an immediate consideration of the bill, Mr. Caswell asked that it be placed on the House Calendar, and the bill, with the accompanying report, be printed. His request was granted.

Thinking it very strange that the Commissioner of Patents should, as Mr. Vance alleged, approve of a bill "nullifying the patent laws of the United States," as Mr. Hutchins aptly described it, we caused inquiry to be made at the Patent Office, discovering that it was not true that the commissioner ever approved the bill; that Mr. Vance must have "misunderstood" a letter which the commissioner had written in reference to another bill on the same subject, a bill which was never introduced to the House.

The matter was brought before the House again, May 15, by Mr. Caswell, who asked the immediate passage of the substituted bill under a suspension of the rules. Mr. Caswell declined to state the reasons for the bill until after the opposition had exhausted the brief time allowed them for remarks.

Mr. Robinson, of Massachusetts, protested against hasty action upon a bill which, under the guise of protecting the innocent purchaser, protected others who ought not to have any protection, but against whom the whole power of the Congress ought to be invoked in aid of the inventor who may have put the energies of his life and all the means of himself and family into the invention that he has made. "This bill," he said, "undertakes to protect those parties who, it is said, have bought inventions in open market for a valuable consideration. But what remedy is afforded to the patentee? He is turned back to the person who sold the instrument or machine, and is deprived of redress against the party using it; and the seller is ordinarily, perhaps wholly, worthless—is an irresponsible person from whom no damages can be recovered. Thus you relieve from liability the man who ought to be responsible and who ought to pay the damages."

Mr. Rice, of Massachusetts, called attention to the confusion and injustice that would result from the operations of the proposed law. "There are machines, the product of which in a single year would be a fortune to any man. Under this bill the man buying one of these machines in open market, for a valuable consideration, has the advantage over everybody else who may use similar machines. He cannot be interfered with, his use of the machine cannot be stopped, he cannot be made to pay damages, while everybody else may be held to liability for unauthorized use of the invention. Hence the result of this bill would be injustice and confusion in all the mechanical and industrial branches of business. Certainly the gentleman from Wisconsin (Mr. Caswell) does not wish to tear up, root and branch, the entire patent law of the country, as he surely would do by the adoption of this bill."

Mr. Caswell admitted that the bill might impair to some extent the rights of patentees in their patents; but, on the other hand, it would "give relief to more than one hundred persons who have purchased a patented article in entire good faith and are innocently using it." That these persons had any just ground for claiming such relief at the cost of patentees was not asserted; but it was assumed that they must have it because they noisily demanded it. Said Mr. Caswell: "The time will come, unless something is done to protect a man who purchases an instrument in open market for his use without notice, when there will be an uprising, and they will overthrow the patent laws."

Mr. Springer asked: "What is there in this bill to prevent an irresponsible person from selling the most valuable patent right and giving a good title to it and allowing the purchaser to use it during the lifetime of the patent without any remedy on the part of the patentee against the purchaser?"

"I conceive that abuses may arise," said Mr. Caswell; then he went on to declaim about the hardships of his innocent clients, but showed no disposition to consider the question whether the real abuses introduced by the bill would not exceed the alleged abuses arising from the over-readiness of Wisconsin farmers to buy patented articles from unauthorized and irresponsible venders.

Mr. Peelle, who favored the bill, made the grotesque remark that the bill would "most likely have a tendency to admonish patentees to be more careful in the disposition they make of their patented articles."

A law to prohibit the recovery of stolen cattle, sold "in open market," to "purchasers in good faith," would be equally pertinent, and would similarly admonish farmers to be more careful of their live stock; but it is doubtful whether they would be grateful for the admonition.

The main champion of the bill was Mr. Burrows, of Michigan, who made a blustering demand that his constituents should be protected from "the bands of patent right inquisitors, which infest the country and plunder our people." After reciting some "well authenticated instances of outrages" to which the people of his district had been subject-

ed by "patent right inquisitors," Mr. Burrows said: "In some instances the vender and the owner of the patent seem to be in collusion. For instance, a set of men go through the country with wagon loads of gates, and dispose of them to the farmers, who pay a full consideration and have no knowledge that they are patented, and after they are set up and in daily use another set of men scour the country and notify the purchasers of these gates that the hinge or some other portion of it is patented, and that they are the owners of such patent, and thereupon a demand is made for five, ten, or twenty dollars damages for infringement, and if payment is refused suit is threatened in the United States Court. To avoid this they often submit to an outrageous exaction; and so, under threat of judicial inquisition, our people are being plundered without stint or mercy. I hope this measure will receive the prompt approval of this House, that the people who purchase patented articles in the open market in good faith and for a full consideration, shall not be hunted down by these insatiate vampires."

This seems to have carried the day.

It was temperately suggested that a bill taking from inventors the right of property vested in them by the constitution ought not to be forced through under a suspension of the rules and without proper consideration; that the indefinable "open market" would be a fruitful source of trouble; that it would not be wise to deprive the country of the benefits of the patent laws to cure an evil that could be reached in a better way; that, in the words of Mr. Hewitt, the bill was "confiscation, not legislation," and so on; but without avail.

The picture of insatiate vampires going about the country and plundering people without stint or mercy, to the extent of five, ten, and fifteen dollars damages, for infringements, was overpowering, and the bill was passed. We may note here that just before the vote the Commissioner of Patents was again cited as having expressed himself in favor of the bill.

According to the press reports, the disorder which prevailed in the House, while the bill was before it, was so great that it was difficult to understand any of the speakers. It was not desired that speakers should be heard, the manifest aim being to choke off discussion and to rush the bill through. Elections are coming, and farmers' votes are coveted.

It would be interesting to know how many of the 155 members who voted for the bill would have done so had there been any likelihood of its being favorably considered by the Senate. The opportunity to make temporary political capital without serious risk was too good to be lost.

The only public damage likely to result from this seeming triumph of misrepresentation and the other acts of the demagogue is that certain people may be encouraged in expecting that Congress can and will, some time or somehow, exempt them from the natural consequences of indiscriminate trading with irresponsible venders of property to which the venders cannot give good title. Congress has no power to override the Constitution; and any attempt it might make to invade—as this bill proposes to do—the constitutional rights of patentees, would be promptly thwarted by Executive veto or by Supreme Court decision. The infringement of patent rights cannot be legalized, and in pretending to try to do it vote-seeking politicians merely trifle with and play upon the prejudices of their constituents.

TUBERCLE PARASITE.

Prof. Tyndall's letter in relation to the discoveries of Dr. Koch as to a parasitic vegetation which he has found to cause consumption, has justly excited public attention. Hitherto the medical profession confess to an ignorance of the real intimate nature of consumption. Terminology even shows this, besides showing the poverty of language. Literally, "consumption" means to consume. "Phthisis," a synonym, is derived from a Greek word—*phthō*, "I dry," "I fade." Tubercle is the diminutive of tuber, meaning a little tuber. A potato is a tuber, but little potatoes are not tubercles, or little "knots" or "kernels." Consumption is not always attended with tubercles or little knots in the lungs.

Tubercle is regarded as an accidental result of the disease, and while tubercle occurs in connection with consumption, consumption occurs without tubercle. Lately phthisis has been further divided up into fibrous, caseous, etc., according to the lesions produced. There is so much refinement in distinctions that one who had made a specialty of consumption for nearly a half century wrote, not long ago, that if he followed modern writers he did not know as he could tell a case of consumption when he saw it. But taking the disease as ordinarily found and noted in the bulletins of our boards of health—and this is what Prof. Tyndall refers to in his letter—tuberculous consumption is characterized generally by wasting and by local death and breaking down of the lungs previously invaded with tubercles—the phthisis pulmonalis of authors.

Prof. Tyndall tells us in his letter that Dr. Koch has discovered and cultivated a bacillus or parasitic vegetation which he cultivated to many generations, by means of whose inoculation quite a number of small animals have died of consumption or tubercle thus artificially induced. Now, what is a bacillus? It is not an animalcule or little animal, or infusoria, but a plant like to or the same as those described for some years as bacteria, and which were regarded as a supposed genus of oscillatoriaceæ or confervoid algæ, which has been noted in natural history as one of the earliest organisms appearing in decaying and putrefying animal and

vegetable solutions; by some supposed to cause decomposition and to form the microzymes of zymotic diseases. "Bacillus" means a stick, and "bacterium" about the same. There is, however, a difference of opinion among observers, some regarding the bacteria, bacilli, etc., as simply the embryonic forms of vegetation capable of reproduction in this stage. Others, as Koch, regard them as ultimate forms of vegetation. The former would regard the bacilli as simply the automobile protoplasmic seeds of a vinegar yeast, or *Mycoderma aceti* of some writers, which is the tough gelatinous leathery mass floating on the surface of fluids rich in sugar when undergoing fermentation at ordinary temperatures, and conversion into vinegar called the "the mother of vinegar," and which, growing on animal soil, has as one of its results the so-called "tubercle."

But it has been some time ago reported by some European observers that consumption in animals has been induced by the inoculation of foreign substances into the animal economy, by subcutaneous injection under the skin and into the blood, the tubercles being produced by the mechanical and chemical effects, blocking up the capillary vessels and the interference with the nutrition of the part. Now, this embryonic form of the vinegar yeast was found in 1858 by Dr. J. H. Salisbury, of this city, in the blood, sputa, and excretions of persons suffering with consumption. In the blood the plant forms masses by itself, grows inside the white blood corpuscles, causes the fibrin filaments of the blood to be larger in size and stronger, the red blood corpuscles to beropy, sticky, adhesive, making small clots or "thrombi," which become "emboli" or plugs, and block up the capillaries and blood vessels. The growth of the vinegar yeast in its embryonal stage, combined with the mechanical interference with the nutrition, causes abnormal growths in the substance of organs, called tubercle, and the concurrent inflammatory results in addition to the chemical action of the vinegar or acetic acid, causes the death and breaking down of the organs invaded, the lungs for example. That this is not opinion only is shown by the fact that over 246 swine were, at his instance, destroyed by feeding on farinaceous food in a state of alcoholic and vinegar fermentation, the vinegar yeast traced in the blood, found in the excretions, and 104 of the dead swine were subjected to *post mortem* examinations and their lungs found broken down and diseased as in ordinary consumption.

In carrying out his experiments he took men in companies of six, all healthy and with no vegetations in the blood, and put them also upon farinaceous food containing alcoholic and vinegar fermentations. He lived with them himself, and kept them under a sort of military discipline, that they might eat no other food save coffee with sugar and milk.

He marched them out on the street for exercise, so that they should not suffer from inactivity. He made daily chemical and morphological examinations of the blood, sputa, skin, urine, and fæces. First came on diarrhea, followed always by the presence of vinegar yeast in the blood and excretions, and afterward, in the course of three months from the time of beginning the experiments, the men had consumption of the lungs as indicated by the physical signs of the chest. In this manner he discovered what has been described as a new physical sign of the pretubercular state, and thus renders it possible to detect consumption any time within one year before the breaking down of the lungs. This has more significance when it is remembered that medical men are well agreed that consumption can be handled if taken early enough. It is nearly a quarter of a century since Dr. Salisbury has been treating this disease, and the mode of treatment has been given to the world.

In SCIENTIFIC AMERICAN SUPPLEMENT, No. 198, is republished the treatment of consumption by Dr. Salisbury, taken from the *Virginia Medical Monthly*, September, 1879. From this we quote as follows:

"The cure is accomplished by getting the system in splendid condition. It is a disease arising from continued unhealthy alimentation, and must be treated by removing the cause. This cause is fermenting food and the products of this fermentation: alcoholic yeast and alcohol, vinegar yeast and acetic acid, carbonic acid gas, embolism, and interference with nutrition. Consumption of the bowels can be produced at any time in the human subject in from 15 to 30 days, and consumption of the lungs inside of 90 days, by special exclusive and continued feeding upon the diet that produces them; that is, food containing starch and sugar in alcoholic and acetic acid fermentation."

Now, these are not opinions, but the relation of facts from experience, which have been more or less fully brought to the notice of medical societies and prominent men in this country by Dr. Ephraim Cutter in corroboration.

Inasmuch as we have given the treatment of consumption on the Salisbury plan without committing ourselves pro or con, so also as historians of the day we have said what we have in order that all shall have a fair presentation of their facts and opinions based on these facts, but opinions not based on practical experience and study are not desired. Prof. Tyndall's letter has given this opportunity of alluding to this newly opened field, which so sadly needs cultivating. Certainly we think the evidence submitted shows that Dr. Salisbury has come nearer to the real intimate nature of consumption than Dr. Koch or any one we know of. There is a simplicity, directness, breadth, and positiveness rarely seen in the treatment of a medical subject. Indeed, it is doubtful if there are any such conclusive and extensive experiments, as to time and number, approaching consumption from so many points at once.