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THE SCIENTIFIC AMERICAN SUPPLEMENT

No. 517,

For the Week Ending November 28, 1885.

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PROGRESS OF THE TELEPHONE LITIGATION.

The first attempt to secure the co-operation of the government in an effort to break down the Bell telephone monopoly having failed by reason of technical irregularity in the proceedings, the Bell adversaries have joined' hands for a new effort. The first step in the new departure is to obtain the approval of the Patent Office, which is called upon to say whether there are any facts which show the Bell patent to have been improperly granted, or any reason to suppose that the patentee's claims have a wrongful foundation.

A hearing was lately accorded to all the parties by the Secretary of the Interior, and many affidavits of experts and many long winded arguments were presented for his consideration.

After the hearing, time was allowed for putting in the lawyers' briefs. No decision by the Secretary has yet been made, but it may soon be expected. We have not space to traverse all the evidence; it is sufficient to say that the opponents of the Bell monopoly presented a very strong case, and the Secretary would appear to have good ground to report in favor of a United States trial.

A most interesting portion of the evidence was that contained in Prof. Elisha Gray's affidavit, in which he shows that Bell's success in the electrical transmitting of speech was due to the knowledge he obtained from Gray's caveat, the contents of which were wrongfully made known to Bell by the Patent Office examiner. Gray states substantially that he filed his caveat for a telephone Feb. 14, 1876, the same day that Bell filed his application for a patent for an improvement in "multiple telegraphy," and it is this patent of Bell that has been twisted by the lawyers so it now covers all creation. Prof. Gray says:

In a few days after the issuance of that patent, Bell made an instrument with which he transmitted speech. Long afterward he learned that Bell first transmitted articulate speech through a liquid transmitter, substantially as described in his (Gray's) caveat, and unlike anything described in Bell's application. For a long time he believed that Bell actually invented that instrument independently of his (Gray's) device. He now believes that Prof. Bell, on the contrary, had learned in some way of his caveat and its contents, and that he made use of that knowledge in constructing the instrument with which he first successfully transmitted articulate speech. He (Gray) had supposed that his discovery remained a secret in the Patent Office, as it should have done, and was not known to Mr. Bell. What he now states on the subject is in view of information which satisfied him that Mr. Bell, having obtained his secrets, claimed his discovery as his own, and by this means got the credit of his (Gray's) invention.

IS THE PANAMA ROUTE PRACTICABLE?

The climate and the necessity for a great dam at Gamboa still present serious obstacles to the construction of the Panama interocean canal. The Panama *Star and Herald* is reported as saying: "The successful completion of the canal is considered a mere question of time and money." This seems to be a carefully accurate statement. As for time—we can wait; but it may be doubted if the most patient capitalist, let him wait as long as he will, could get any return for his money, if any such sum is expended as that which it is now estimated a possible canal at this point would cost. The simple statement, "a dam at Gamboa must be built," conveys but an imperfect idea to the casual reader of what is really required. There are different kinds of dams. We have the mill-dam, an obstruction of wood and stone, for the storage of hydraulic energy and the giving of power by increased head; the dam for rendering the river above it navigable by increased depth; the irrigation dam for flooding lands; the coffer dam for raising sunken ships and building bridges; and the tinker's dam, a ridge of putty for stopping the run of molten lead. But the dam required at Gamboa is none of these. It must be large enough and strong enough to stop and hold the mountain torrents and floods while yet on their way down the sides of the declivities. In other words, these torrents must be held suspended above the proposed canal, and safely conducted to other parts. Else they are so fierce and powerful that they would quickly fill up the canal.

It is estimated that, in order to fulfill the requirements, this dam should be of solid masonry; about five miles long, thirty feet high, and fifteen feet broad. The extent of the waters it must hold in check may be estimated from the fact that, in the rainy season, the mountain torrents have been known to flood the valley of the Chagres for many miles to a depth of about sixteen feet.

So far the French company have done little more than scratch a new highway across the Isthmus, and yet almost the entire sum estimated for the completion of the canal has been expended. Only one-thirtieth of the dredging and one-fiftieth of the rock cutting has been done. M. De Lesseps, who is a diplomat rather than an engineer, is now trying to raise another $120,000,000, believing, as he says, that this is all that will be required to finish the canal. Expert engineers, on the other hand, say that $430,000,000 will have to be added to the $120,000,000 originally subscribed, to insure its completion; making $550,000,000 in all.

Via Panama is certainly a tempting route. Look at the map, and you will see that at no place along the narrow strip of land separating North from South America, 1,200 miles in extent, is the distance from ocean to ocean so short as at Panama.

But the map, like the reconnoissance made by Lieut. Lucien N. B. Wyse, of the French Navy, and described to the Canal Congress that met in Paris, May 15, 1879, fails to picture the engineering difficulties and the climate. When these and the estimated cost of a possible canal at this point are considered, the good judgment of the American engineers in condemning it must be clearly apparent.

These men favor Nicaragua as the most practicable route for a canal, but the ship railway scheme of Mr. Eads, by way of Tehuantepec, has gained many friends, and in truth has much to commend it. This scheme, which has been fully illustrated in the SCIENTIFIC AMERICAN, provides for the transportation of ships across the Isthmus by rail; and while those who have not looked into the details might perhaps be inclined to regard it as visionary, it really demands no other mechanical processes than are already in daily use in the shipyard and the drydock. Its originator successfully carried out a scheme for the improvement of the mouths of the Mississippi, notwithstanding the opposition of a large portion of the engineering fraternity, who were inclined to view it as visionary and impracticable.

SUGAR CANE MILLS.

An unusually large plant for crushing sugar cane has lately been constructed at the iron works of Messrs. Deeley & Co., New York. It is expected to be at work crushing the cane on one of the Cuban plantations before the year ends. The three large crushing rolls, 34 inches in diameter and 6½ feet long, are made of cast iron, about six inches in thickness, and weigh, with shaft and gear wheel, nine tons each. Two are placed alongside of each other, and but a short distance apart, while the third is mounted above and between the other two. All these rolls are grooved circumferentially.

A steel knife, supported between the two lower rolls by a wrought iron beam, has one edge almost touching the grooved face of one of the rolls. It is then curved toward the other roll, and serves to guide the bagasse, or extracted cane, through the second opening, while the juice falls into the pan below the rolls. The construction of this knife is a special feature of the Deeley machines, and, it is claimed, prevents any interruption of the work by the jamming of the bagasse between the rolls.

Engines of one hundred horse power are required to drive the rolls. The motion is quite slow, being about 18 feet circumferentially per minute. An inclined platform leads down to the opening between the upper and lower rolls, and is provided with a continuous feeding device which delivers a layer of fresh cane two feet thick. As this opening is only one-eighth of an inch, and the older cane has a toughness almost equal to young pine wood, it will readily be seen that enormously heavy machinery is required to pass the bagasse through so small an opening, and extract the juices with any degree of thoroughness.

As much as 400 tons pressure is exerted between the upper and lower rolls. The king bolts used to lock the machinery together are made of wrought iron, six inches in diameter. Such a plant will treat 50 tons of cane in 10 hours. After treatment, the sirup is conveyed to the evaporators, and the bagasse is submitted to two or three days' drying in the open air, or is taken directly to the furnaces to be consumed as fuel.

The low price of sugar, and the competition from the beet root, have forced upon the manufacturers of cane sugar the necessity of the closest economy, of which these large and carefully built plants are an essential element. The industry is also becoming of commercial importance among the resources of Mexico, and similar but smaller plants for that republic are now under construction at the same works.

SHELL FISHERIES OF CONNECTICUT.

Since the year 1881, much time and labor have been given to the important work of mapping the oyster grounds within the jurisdiction of the State. There are now 772 lots of various sizes and dimensions; and in order to survey them properly, twenty-seven main signal posts were erected, besides many minor ones, and the commissioners' line was run from headland to headland, leaving the bays and estuaries inside that line to the jurisdiction of the several towns lying along the southern shore. The natural beds were then explored, surveyed, and mapped. Maps were finally prepared, known as "occupation maps," making use of a careful system of triangulation, by means of which every oyster lot in the portion of Long Island Sound belonging to Connecticut can be accurately described. The work in this respect is not yet done,