

INVESTIGATIONS AT THE KEELY LABORATORY.

In our last issue we noted the fact that the Keely laboratory, at 1420 North Twentieth Street, Philadelphia, Pa., had been examined by experts, and that the discoveries seemed to confirm the views held by the SCIENTIFIC AMERICAN in 1884, that the phenomena were produced through the medium of compressed air. A representative of the SCIENTIFIC AMERICAN was at once sent to Philadelphia, and through the courtesy of Mr. Clarence B. Moore, who has the lease of the premises, unique photographs and diagrams were obtained.

The laboratory is an inconspicuous brick building two stories in height. After Mr. Keely's death the laboratory was given up, and all the apparatus, wires, tubing, etc., in fact, everything which could be used as a clue to the discovery of the principles underlying the alleged motor, but it is shown by the result that Keely had not taken anyone into his confidence, and accounts for even his supporters being ignorant of the existence of the remarkable things which we are to describe.

The investigations were carried out under the auspices of the Philadelphia Press.

Every bit of flooring was ripped up and every nook and cranny explored in the floors, walls, and ceilings, and it was found that the building was honeycombed with traps, holes for piping, etc., for carrying on the bogus experiments. Everything was conducted with such secrecy and ceremony, and the laboratory lent itself so admirably to the

Back of this was a room to which no one was ever admitted, and here a remarkable discovery was made. A steel sphere forty inches in diameter, weighing 6,625 pounds, was found embedded in a pit underneath a trap. The sphere had two projections or trunnions: both had a hole through them; one of these holes had been filled up and then faced off, and the other, near the iron pipe shown in our small illustration, was open and was of the proper size for charging the reservoir. Midway between the two trunnions a small hole drilled

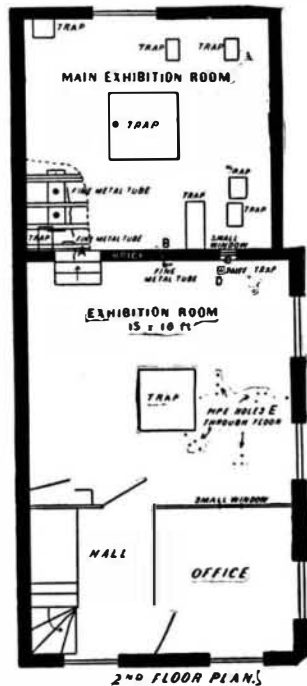


Tapped End of Sphere.

specially made for the purpose. It was tested up to 28,000 pounds, or only one ton less than the powder chamber pressure required in tests of United States ordnance. Steel tubes were also tested with this powerful hydraulic pump. The tubes were 9 inches in diameter and the bore was only 3 inches. These were split with enormous pressure and the stockholders and the general public believed that the tubes were burst by the "etheric vapor." Mr. Rickert states that they ran tubes to the lever machine which indicated pressure, and one of the tubes recently discovered Mr. Rickert believes to be a tube running to that machine. He also states that Keely never allowed the men to entirely complete any connection to the machinery; he assumed that part of the business himself. A very heavy iron pipe with high pressure joints, 13½ feet long, ran diagonally under the floor to a point in a trap in the front room. This was undoubtedly used in distributing the compressed air. The room where the sphere was discovered had a wooden ceiling nailed on to the joists, while in the front room the joists were exposed. This ceiling gave 16 inches of space, which, of course, gave an excellent opportunity for running tubes or concealing apparatus. The private room in the rear was used by Mr. Keely when resting from his arduous labors and was handsomely fitted up.



Exterior of Keely Laboratory.



Plan of Second Floor of Laboratory.



Front Exhibition Room, Showing Trap, Pipe Holes, and Operating Window.



Three-ton Sphere Discovered Under the Building.



Threshold of Rear Exhibition Room, Showing Concealed Tube, A.

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purposes of deception, that it is little wonder that this nineteenth century thaumaturgist should have been successful, for the border line between science and quackery is always attractive.

The ground floor has no cellar under it and at places the joists were sawn away and the flooring had been removed and replaced in sections, forming what is known in stage parlance as "traps." Most of the spaces between the sawed joists were filled with ashes, and here valuable finds of tubing and connections were made. The center room contains four traps and a pit.

into the side of the sphere was found to be the proper size for connecting with one of the small brass tubes connecting with the second story. These tubes, while of small diameter and having a small bore, have very thick walls, showing that they could resist enormous pressure. Of course, the sphere possessed great strength and must have been an ideal storage reservoir for air or gas at a great pressure. William Rickert, who was formerly employed in Keely's laboratory, has come forward with valuable evidence. He says he helped to test the steel sphere with a hydraulic pump which was

The second floor was divided into an office and two exhibition rooms, where progress was reported at intervals. Sometimes the front exhibition room was used, but generally the rear exhibition room was utilized. A small window connected the exhibition rooms and also the office. Keely would station himself behind the small window, C, connecting the exhibition rooms, and after asking the favored few who were allowed to see the manifestations what pressure they desired or what speed they wished, depending upon the nature of the apparatus which he was then exhibiting,

he would then play a violin, a zither, or a harmonica to set in motion the harmonic vibrations upon which he depended for obtaining his remarkable manifestations. The first exhibition room has many auger holes, which have been indicated by our artist. These holes were, of course, hidden by the oilcloth which covered the floor, and one of the holes was covered with a piece of tin with a hole cut out of it the same size as the auger hole, as shown in the diagram at *D*. It is surmised that these holes, and specially the last one to which we have referred, permitted the "etheric flow" of compressed air from the receiver in the cellar to the apparatus on exhibition to be controlled by a spring valve operated by the foot. Other holes seemed to have been located under the apparatus and doubtless aided in the experiments.

The upper floor of the main exhibition room was torn away during the investigation, and showed that tubing of the same kind as the alleged "wires" of Keely's lever machine passed under the joists, through the brick partition, under the threshold of the door at the point, *A*, connecting the two exhibition rooms. This is in a way the most remarkable of the find, as it was so carefully hidden in the brickwork, which had been removed and reset. The tubing ran through the brick partition under the steps, where it apparently descended into the room below, but this end was broken off. At the point, *B*, another piece of tubing was found running out into the front room from the rear room below. Those who assisted at the investigation were Prof. A. W. Goodspeed, Prof. Carl Hering, Dr. M. G. Miller, Mr. Moore and Mr. Sellers, and the investigations were so thorough and the results obtained were so satisfactory that it is to be hoped that, once for all, the Keely motor may be considered to be exposed, though we have no doubt that, like the scotched snake, the tail may still continue to wiggle.

THE NEW PANAMA CANAL.

There is a broad difference between the Panama

canal on the Nicaragua route, for the construction of two practically contiguous canals would mean the bankruptcy of both.

HISTORICAL.—In 1879 an international congress met in Paris, and, after investigating various routes, re-

commended the building of a sea-level canal from Colon, on the Atlantic, to Panama, on the Pacific. Many of the best informed members of the congress, it should be said, considered that a sea-level scheme presented too many difficulties and advocated a canal



6.—French excavators at Work in the Emperor Cut.



7.—The Work at Outlet of Culebra Cut on Pacific Slope.

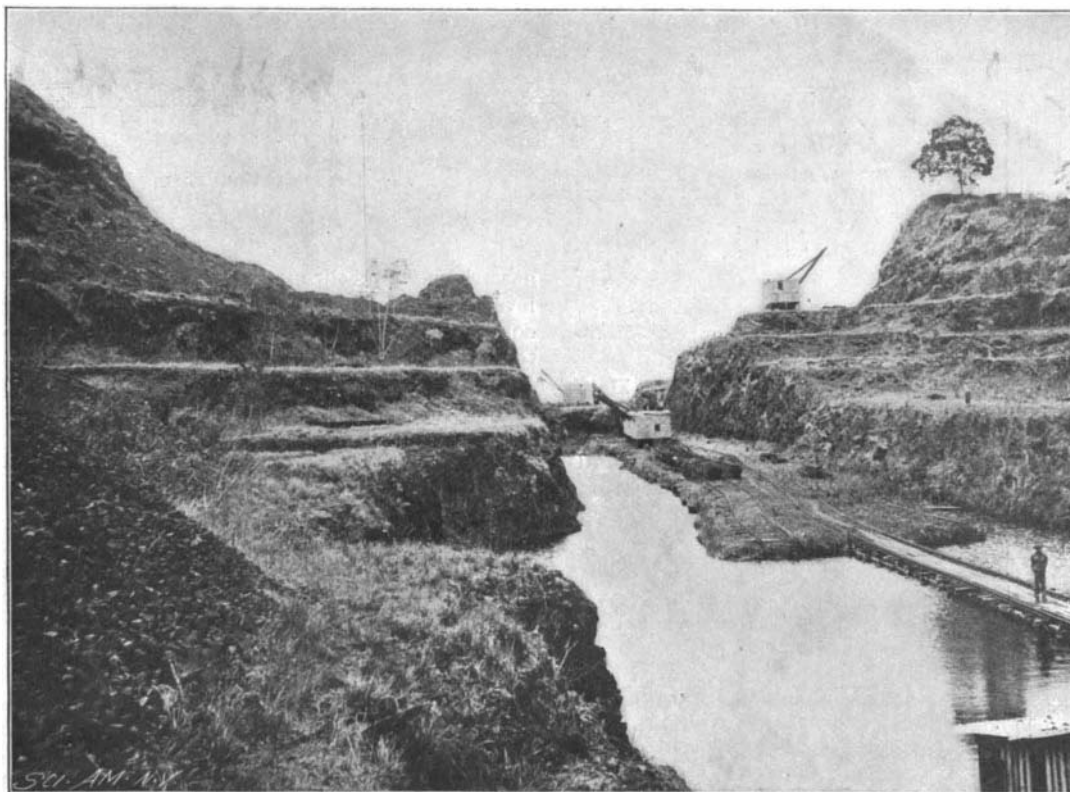
with locks; but the influence of M. de Lesseps prevailed and the sea-level route was adopted. The calculated time for completion was set at twelve years, and the cost, including interest on capital, at \$240,000,000.

Now, when it is stated that the route of the proposed canal followed for over twenty-five miles a river which in the rainy season is subjected to enormous freshets, and that in passing through the Cordillera mountains an excavation 8 miles in length and varying from 100 to 325 feet in depth had to be made, it is evident that the first duty of De Lesseps was to secure the results of careful gaging of the rainfall, and to make elaborate borings along the route of the canal to ascertain the nature of the material to be excavated. Neither of these precautions was taken, or if taken, were so incompletely carried out as to leave the engineering features of the scheme very much in the air.

Work was begun in 1881. A large amount of the capital of the company was swallowed up in purchasing and placing along the line the necessary plant, in constructing shelter for 15,000 laborers, and building the necessary workshops and hospitals. The first opening up of the surface soil induced an appalling amount of sickness, and the enormous floods of the Chagres River proved altogether beyond the control of the engineers. Moreover, the upper layers of material in the great Culebra cut proved to be of a treacher-

Canal as it actually is and the Panama Canal as it exists in the public mind. It would be difficult to find another great undertaking about whose present status there is so much general ignorance or positive misinformation as there is concerning the artificial waterway with which Ferdinand de Lesseps attempted to join the waters of the Atlantic and Pacific Oceans. It is a matter of history how the distinguished Frenchman, emboldened by his success in cutting the Suez Canal, undertook to open a great sea-level cutting through the mountains of the Panama Isthmus and failed—the physical difficulties of the project, assisted by gross corruption on the part of the promoters, serving to bankrupt the company when only a fragment of the sea-level scheme had been completed. The odium of that ill-considered and worse executed project still attaches in the public mind to the Panama Canal as such, and it is only the small minority, who have followed the subsequent course of events on the isthmus and are familiar with the heroic and successful attempts that have been made to bring order out of chaos, who are alive to the fact that the new Panama Canal project is on a sound engineering and financial footing and is within a calculable distance of completion.

The present article is written for the purpose of putting the public in possession of the facts regarding the present status and future prospects of this undertaking. In view of the fact that one canal at the isthmus will be amply sufficient to accommodate the traffic, the question of the completion or abandonment of the Panama scheme becomes of supreme importance in considering the advisability of building a



8.—Rock Out at La Corosita, 28 Miles from the Atlantic.
THE NEW PANAMA CANAL.—PRESENT CONDITION OF THE WORK.