WHO INVENTED THE MICROPHONE?

During the past week we have received several American papers containing articles, reports, and letters referring to the disputed claim to the invention of the microphone. Some of these bear the stamp of the Edison Laboratory, Menlo Park, from which we assume that we may accept as authentic the statements reported to have been made by Mr. Edison. In one paper, the New York *Sun*, of June 9, we find an account of an interview which a reporter of that journal had with Mr. Edison, to whom he showed the accounts in the London papers of Mr. Preece's lecture on the microphone. After a perusal of these accounts Mr. Edison is represented to have said: "I declare that is the coolest, cleanest steal that I ever knew. This man talks of this thing as though it were entirely new, and as though he believed it was the invention of Hughes, when he has the most positive evidence that the thing is mine." In reply to a question whether Mr. Edison had shown Mr. Preece the microphone, the former is represented to have said: "Of course I did, because the microphone is contained in the telephone; it is nothing but a finely-adjusted telephone. To say that the microphone is a superior invention to the telephone is absurd, because it is only a part of the telephone. There would be no use in adjusting a telephone to such a delicate pitch, because the jar of a building, the hum and roar of the city would keep up a continual buzz." Mr. Edison, in short, claims that the principle of the whole thing is based on his undisputed discovery that certain substances, called "semi-conductors," such as carbon, several oxides and sulphides, vary their resistance to the passage of the electrical current when subjected to pressure, and in July, 1877, he "filed a patent" for an instrument which is, when properly adjusted for transmitting the sound of the voice, a telephone, but when delicately adjusted, which can be done by turning a screw, a microphone. Mr. Edison states that Mr. Preece was shown over 200 different combinations of one material and another with carbon, and also the effect of pressure on the passage of the current. The reporter of the *Sun* gives an extract from a letter addressed to Mr. Edison by Mr. Preece, in which the latter says: "Hughes' doings border very closely upon yours, and it is quite difficult to distinguish between what you have done." Under the circumstances Mr. Edison thinks it quite impossible to point out the difference, for he contends that the whole principle of the discovery was published by him a year ago, and six months ago he obtained a British patent for what Prof. Hughes "pretends to have discovered." Mr. Edison is represented as saying that "if you take the shilling piece and this nail business that he talks about, it will give sound. By means of the carbon we reproduce the original sound..... The discovery that I have made and patented consists in finding some material that would transmit waves of electric current which should be proportionate to the sound waves. That was my discovery." In the Washington *Star* of April 26, 1878, we have a report of the proceedings at the National Academy of Sciences, in which we find the following epitome of Prof. Barker's speech when introducing Edison's telephone:—"The peculiar point about Mr. Edison's invention is a little plate of carbon in the instrument, on which its efficiency depends. Carbon is susceptible to a difference in conductivity by a change in pressure. Mr. Edison has succeeded in discovering a kind so suitable for his purpose that pressure of the most extreme delicacy, even the slightest breath, may be detected. He is the discoverer of the principle on which his telephone operates, and not simply an inventor." The last sentence should help to settle the question in dispute; but while we have thought it right to give Mr. Edison's version, we must not omit the following sentence which occurs in Prof. Hughes' paper, and which has been reproduced in the reprints of it published in America:—"Edison and others," says Prof. Hughes, "have produced variations in the strength of a constant current by causing the diaphragm to press directly upon some elastic conductor, such as carbon, spongy platinum, &c., the varying pressure upon these materials varying the resistance of the circuit, and consequently the strength of current flowing." If Prof. Hughes has not gone further than Edison, it seems strange that he should have taken the trouble to mention what the latter had accomplished. However, both sides have now been heard, and we leave the facts to speak for themselves.—*English Mechanic.*

NOTE.—Since this article was published, Mr. Edison has been awarded the prize at the Paris Exposition.

WATERPROOF GLUE.—Fine shreds of Indiarubber dissolved in warm copal varnish make a waterproof cement for wood and leather.

A HANDY FRET-SAW MACHINE.

(See page 309.)

I inclose a photograph of a fret-saw machine I have made, and which I find a very useful addition to my workshop. It can be fixed either upon the lathe bed and driven from a pulley upon the crank shaft, or it may be fixed upon a bench and driven from any source of power. I drive it about three hundred strokes per minute, and can cut baywood 1¼ in. thick without difficulty. In sawing fret-work I cut through several thicknesses at once, which is not only a saving of time, but in delicate work lessens the liability of breakage. I can also cut brass ⅛ in. thick. I use any kind of saw suitable for the work I am engaged upon, from the finest German to a strong coarse one. The machine is so simple that an explanation is hardly requisite. The only part that may require any explanation is the following:—From a stud A, on slide B, is an india-rubber band C, passing around a knob D, cast on cap E; this band acts as a spring, and is of sufficient strength to draw up the slide B, &c.; by so doing all "blacklach" or shake of crank pin F, and stud H, are got rid of, so that when the saw is at work there is little or no rattle. The saw being well strained, and the frame moving in a straight line, makes the cut clean and square through the wood, which is not the case in many of the small machines I have seen, which are little better than toys, as they will not cut wood more than ¼ in. or ⅜ in. thick, and even then the path of the saw is rather uncertain. I may add in conclusion that all the sliding parts were planed in my planing machine.—*English Mechanic.*

EXAMINATION FOR TRICHINA.

We are not aware that the dread trichina has yet been found alive in the States, though no one can tell how soon it may appear. Notes of the best ways to recognize it may be of value to our amateur microscopists. For a first examination under a microscope, use a one-inch objective. Place a fine piece of the muscle in question on a glass slide in a drop of serum, or aqueous humour, or a 1% solution of common salt. Teaze out the fibres and separate them from one another by means of fine needles set in sticks for handles; keep the eye all the while on the work, and watch for the dim outlines of the worm. Perhaps the cyst will appear first; it may be that your manipulations will have torn the cyst and let the worm out. A little dilute hydrochloric acid added when the cyst is once discovered will decalcify it and render the parasite visible through its translucent walls. When the tissue is well displayed by the above means, a thin glass cover should be placed over it; the focusing will be better and the parts more distinct. Judicious pressure on the cover glass may often be made to bring the trichina into view by thinning and displacing the parts under it. It is often an aid to use some staining fluid; Beale's carmine, or the hæmatoxylon fluid. I have had often placed a drop of this fluid at the edge of the cover glass, watching the fiend while it made its way by capillary attraction among the fibres of the tissue, and have seen the outlines of the parasite come out clearly and distinctly when nothing could be seen before.

The examination by thin sections may be practiced with advantage. If the muscle be carefully dried, very beautiful sections may be made with a sharp razor dipped in dilute alcohol. These may be easily handled with a camel's hair pencil. The thinnest should be placed upon a slide under a cover glass, and may be examined directly in staining fluid or in the salt solution. Excellent sections may be cut from frozen tissue or from tissue soaked for a few weeks in strong alcohol, or in a 10% solution of bichromate of potash.

CUTTING RAILS.—It is a very difficult thing to cut red or nearly white hot rails so that they are of the same length when cold, as, if cut at different temperatures, they will vary in length on cooling. The following ingenious mode of obtaining a standard temperature has been adopted in some German and Russian rail mills: The glowing rails are looked at through a dark glass; when they are cooled to a certain temperature they can no longer be perceived. Using a dark blue or orange-yellow glass, *e. g.*, the rails may still be at a red glow, when the light radiated from them disappears in the dark glass. It may be considered that the light from two rails observed from the same dark glass disappears at the same temperature, and thus one is guided in cutting the rails while in this similar state, each rail after rolling being allowed to cool till it can no longer be seen at a given distance through the dark glass; thus they can be all cut of the same length.