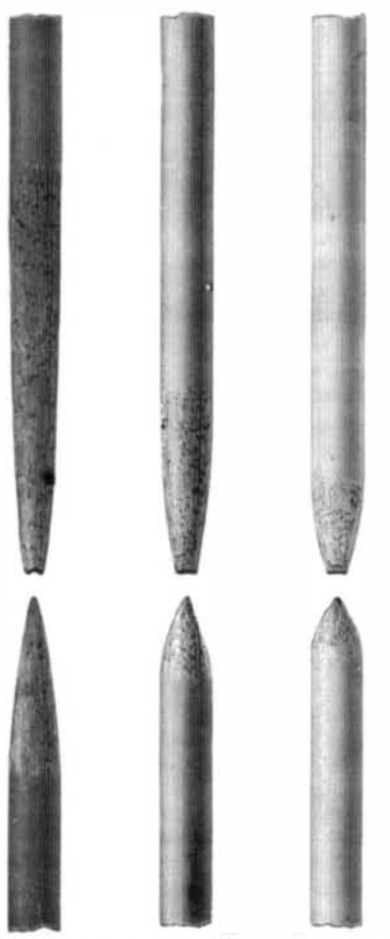
COMPARATIVE EXPERIMENTS MADE WITH NAKED AND METALLIZED CARBONS.

BY E. REYNIER.

These experiments were made at the works of Lautter & Lemonier, using a Gramme machine of the type of 1876, and burning Carré carbons. The positive carbons covered with copper gave a very good shape, and an excellent one when covered with nickel; with the negative carbon the shape was

Fig. 1. Fig. 2. Fig. 3.



Dimensions	State of the surface.	Consumption per hour in millimeters.			Length of the consumed part in millimeters.		Light in Carcel burners.
		+	−	Total.	+	−	
Diam., 7 millimet'r	Naked, Fig. 1 ...	166	68	234	53	23	947
	Coppered, Fig. 2..	146	40	186	24	10	?
	Nickeled, Fig. 3..	106	38	144	12	7	947
Diam., 9 millimet'r	Naked	104	50	154	45	22	523
	Coppered	98	34	132	27	7	553
	Nickeled	68	36	104	21	7½	516

a little too short when nickeled. Independently of the improvement of the shape of the positive carbon, the nickel increased the duration of carbons nine millimeter diameter *fifty per cent* and those of seven millimeter *sixty-two per cent*. The coppered carbons thus occupy a position mid way between the naked carbons and the nickeled ones.

For equal section the metallization does not modify the illumination.

Among the refractory metals nickel is to be preferred, especially for the positive pole (iron being very difficult to apply in thin coats).

The figures represent the shapes of the naked and metallized carbons: Fig. 1, the naked carbons; Fig. 2, copper covered; Fig. 3, those covered with nickel.—*Translated from La Lumière Electrique, by Clarence Sterling.*

TYNDALL'S EXPERIMENT ON RADIANT HEAT.

BY GEO. M. HOPKINS.

In the entire range of Prof. Tyndall's investigations nothing possesses more timely interest (or affords a better test of the possible sufficiency of cheap appliances) than his recent experiments for testing acoustically the capacity of vapors and gases to absorb radiant energy.

It often happens that students who would like to test experimentally the results arrived at by distinguished investigators, are kept from such instructive pleasures by the notion that for delicate experimenting nice and expensive apparatus is required. Such apparatus is undoubtedly good to have and pleasant to work with; but where it is not to be had a little courage and ingenuity may provide cheap substitutes which will amply answer the student's purpose. The rude apparatus, herewith figured, illustrates this fact.

The interesting experiment referred to seems to have been suggested by Prof. Bell's photophonic experiment in which musical sounds are obtained by the action of an intermittent beam of light upon solid bodies. Referring to this, Prof. Tyndall says:

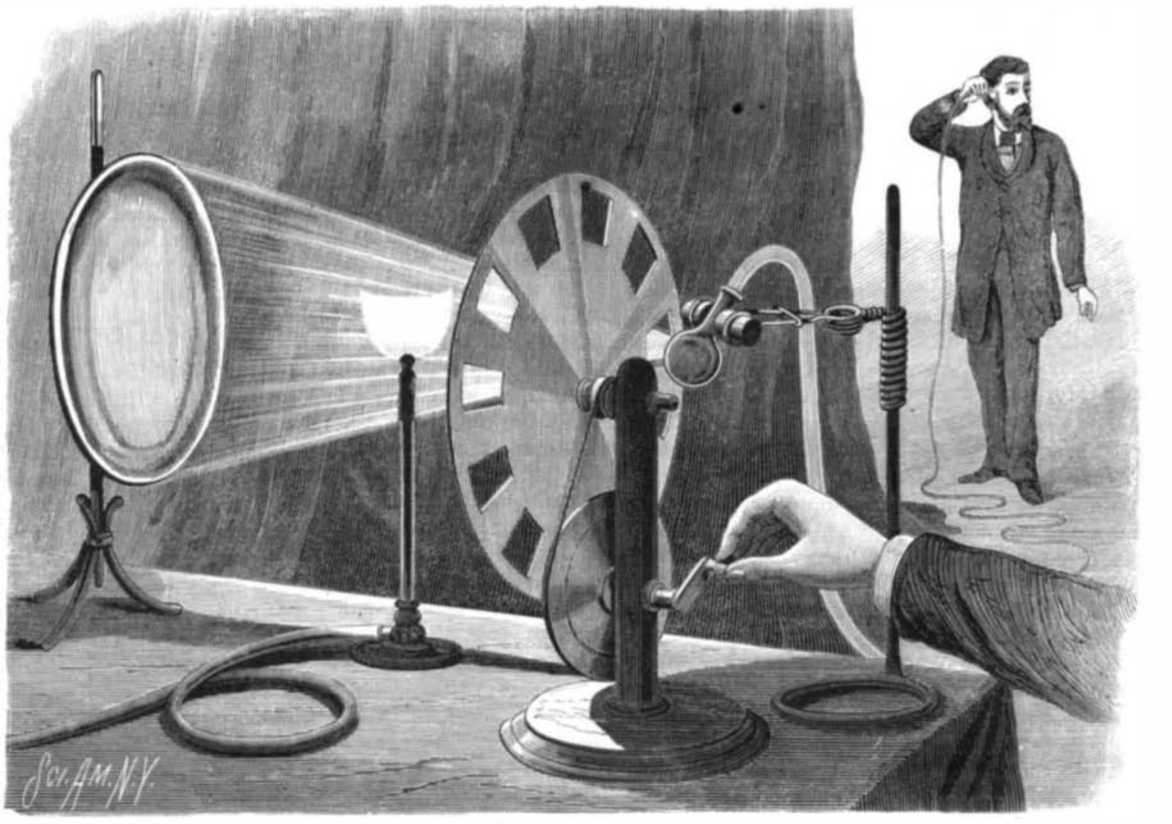
"From the first I entertained the opinion that these singular sounds were caused by rapid changes of temperature, producing corresponding changes of shape and volume in the bodies impinged upon by the beam. But if this be the case, and if gases and vapors really absorb radiant heat, they ought to produce sounds more intense than those obtained from solids. I pictured every stroke of the beam responded to by a sudden expansion of the absorbent gas, and concluded that when the pulses thus excited followed each other with sufficient rapidity, a musical note must be the result. It seemed plain, moreover, that by this new method many of my previous results might be brought to an independent test. Highly diathermanous bodies, I reasoned, would produce faint sounds, while highly athermanous bodies would produce loud sounds—the strength of the sound being, in a sense, a measure of the absorption. The first experiment, made with a view of testing this idea, was executed in the presence of Mr. Graham Bell, and the result was in exact accordance with what I had foreseen."

I have successfully repeated Prof. Tyndall's experiment with the simple apparatus shown in the illustration, and have verified the results obtained by him. Utilizing apparatus already at hand, I mounted a small sized bulbous glass flask, 1¾ inches in diameter, in a test-tube holder, and placed it behind a rotating pasteboard disk, 12 inches in diameter, having twelve apertures 1½ inches wide and 1¼ inches long. I provided several flasks of the same capacity, and filled them with the different gases and vapors, and stoppered them, to be used at convenience. Near the disk I placed a common gas flame, and into the mouth of the flask was inserted one end of a long rubber tube, the other end being provided with a tapering ear tube, placed in the ear of the listener, whose position was sufficiently remote from the apparatus to avoid any possible disturbance from the revolving disk or the operator. The disk being rotated so as to rapidly intercept the thermal and luminous rays of the gas flame and render the rays rapidly intermittent, the effect on the gases and vapors contained by the different bulbs was noted. Dry air produced no sound; moistened it yielded a distinctly audible tone, corresponding in pitch with the rapidity of the interruptions of the thermal rays.*

Among gases tried, nitrous oxide and illuminating gas yielded the loudest sounds. Among vapors, water and sulphuric ether were most susceptible to the intermittent rays. A candle flame produced distinctly audible sounds in the more sensitive gases, and a hot poker replacing the gas flame yielded the same results.

By using an ordinary concave spun metal mirror the heat of the flame was satisfactorily projected from a considerable distance. Considering the crudeness of my apparatus and the delicacy of the action which produces the sounds, it appears remarkable that any satisfactory results were obtained, and the experiment shows that any one interested in the finer branches of scientific investigation may often, with the exercise of a little care, enjoy, without material expense, those deeply interesting experiments. I have not recounted, at length, the details of Prof. Tyndall's experiments in this direction, as they are fully given in SCIENTIFIC AMERICAN SUPPLEMENT, No. 272, of last week, and are, therefore, accessible to the reader.

* The tone to be expected from the gas or vapor when acted on, may be determined by blowing through a tube against the apertured portion of the rotating disk.



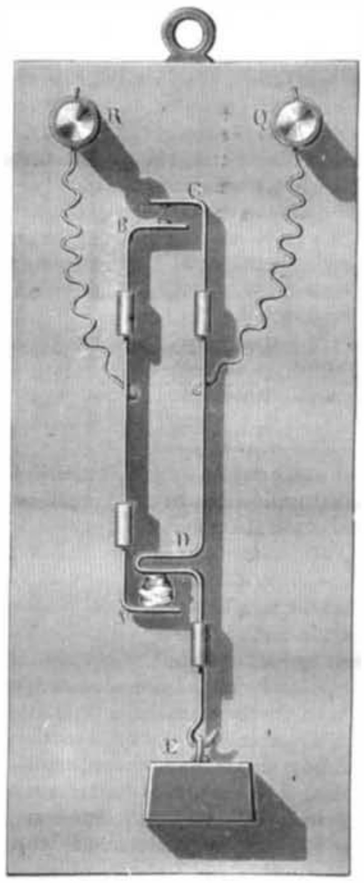
APPARATUS EXHIBITING THE ACTION OF RADIANT HEAT ON GASEOUS MATTER.

Lamp of 100,000 Candle Power.

A Brush electric lamp of 100,000 candle power was successfully tested in Cleveland, Ohio, March 6. This is fifty times the illuminating power of the ordinary street electric lamp. It is the largest and most powerful lamp ever made, and is to be used in the British Navy. The carbons are two inches and a half in diameter. The light requires 40 horse power to maintain it.

ELECTRICAL FIRE INDICATOR OF M. G. DUPRE.

A large number of electrical fire indicators have been devised and constructed, but the one represented in the engraving is one of the simplest and most practical of any that we have examined.



ELECTRICAL FIRE INDICATOR.

It consists of a small mahogany board upon which are arranged two small copper rods, one, A B, fixed, connected with the binding post, R; the other, C D, movable, connected with the binding post, Q, and supporting a weight, E. A battery and bell are inserted between the binding posts, R and Q, and a small lump of tallow is placed between the horizontal bends of the rods, the movable rod, C D, resting upon it.

When the temperature of the locality where the apparatus is placed rises above the melting point of tallow it melts, and the movable rod descends under the action of the weight, E. An electrical contact is then established between the two branches, B and C, and the bell is set in motion.

By replacing the tallow with any other fusible non-conducting material the apparatus may be employed to indicate the precise instant when a given temperature is reached.

A metallic substance may be placed between the points, A and D, the fusible metal of Darcet, for example, on condition that the rod, A B, be cut at some point in its length, in such a manner as to interrupt all metallic communication between the two parts of the rod.

The apparatus is simple, inexpensive, compact, and may be used in connection with the domestic batteries and bells, without other adjunction to the apparatus, because when the temperature at which the apparatus is set has been reached the bell will sound until the fusible substance has been replaced, and consequently those interested have been duly informed.

A system of this kind has been in use by M. Hellesen, of Copenhagen, for a number of years.—*La Lumière Electrique.*