culi, *Spirochæta plicatilis*) may often add considerably to its bulk, and may, perhaps, modify its characters under certain conditions.

The slime which exists around and between the teeth is composed of the same constituents as the fur on the tongue; all the organisms which are found in the one are found also in the other. *Bacillus subtilis* exists, however, in greater quantity in this tooth-slime than in the fur, and the rods and filaments are usually much longer in the tooth-slime, probably because they are not subjected to so much disturbance.

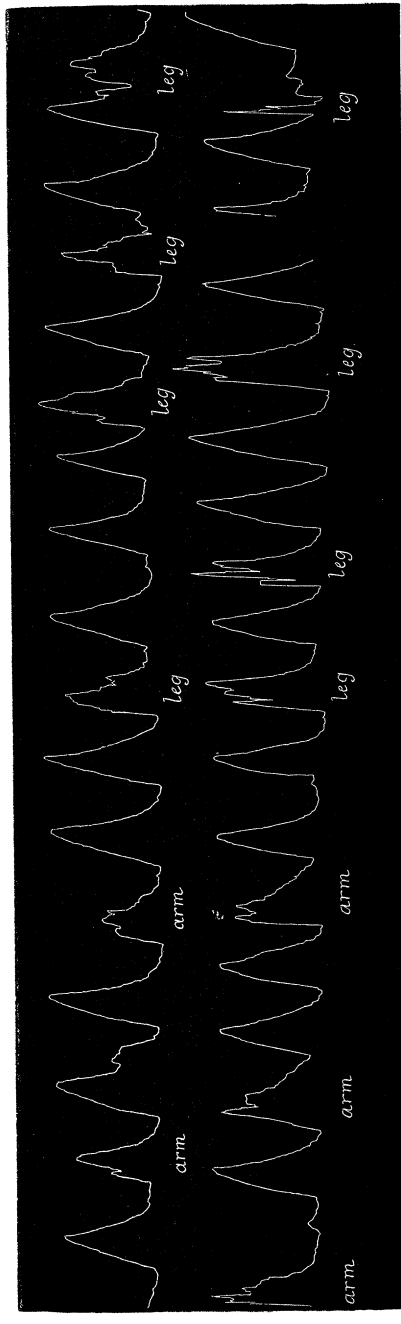
In conclusion I have to thank Dr. Burdon Sanderson and Dr. Lauder Brunton, for valuable suggestions, and for the kindly interest they have shown in this work.

A List of the principal Works relating to the Nature and Character of Tongue Fur.

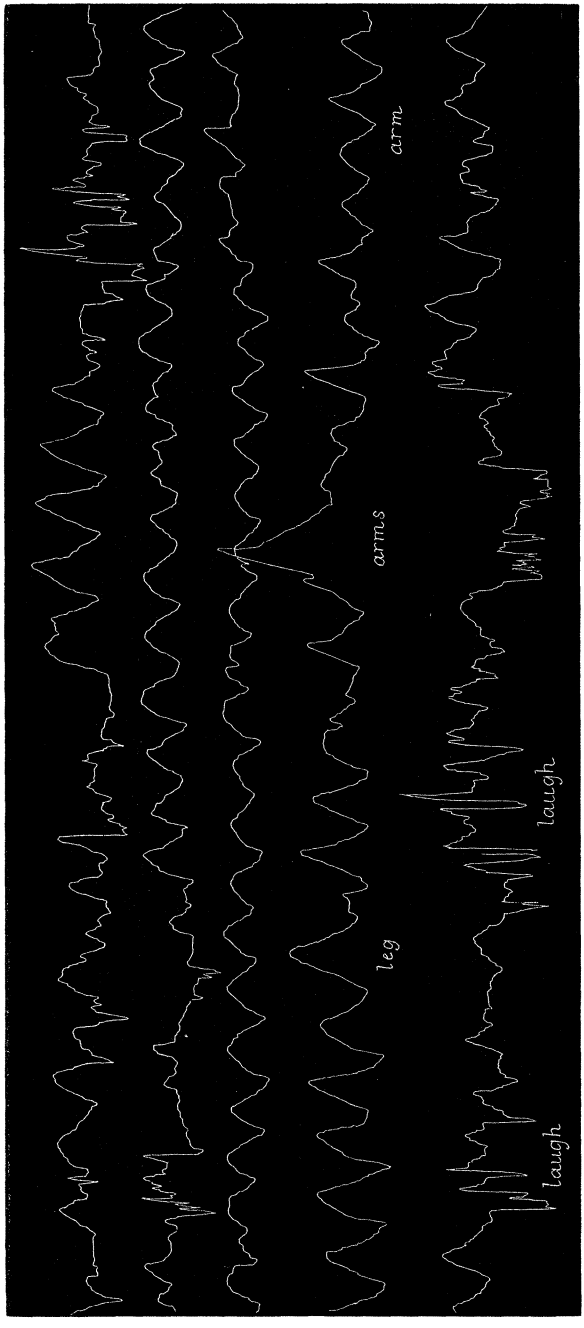
1831. Piorry. "Du Procédé Opératoire." Paris, 1831.
1845. Remak. "Diagnostische und Pathologische Untersuchungen." Berlin, 1845, s. 221.
1849. Pfeufer. "Der Mundhöhlenkatarrh." Henle u. Pfeufer. Ztchft. f. Rat. Med., Bd. 7, 1849, s. 180.
1850. Miquel. "Untersuchungen über der Zungenbeleg." Prager Viertel Jahrschft., 1850, Bd. 28, s. 44.
1853. Robin. "Végétaux Parasites." Paris, 1853, p. 345.
1861. Neidhardt. "Mittheilungen über die Veränderungen der Zunge in Krankheiten." Arch. d. Wissensch. Heilkunde, Bd. v, 1861, s. 294.
„ Hyde Salter. Todd's "Cyclopædia of Anatomy and Physiology." Art. "Tongue." Vol. iv, pt. 2, p. 1161.
1866. Hallier. "Die Pflanzlichen Parasiten." Leipsig, 1866.
1867. Kölliker. "Handbuch der Gewebelehre." 5th Auflage. 1867. Ss. 348—349.
1873. Fairlie Clarke. "Diseases of the Tongue." London, 1873, p. 93.
1874. Billroth. "Coccobacteria septica." Berlin, 1874, s. 94.
„ Robin. "Leçons sur les Humeurs." Paris, 1874, p. 550.
1877. Koch. "Untersuchungen über Bacterien." Cohn's Beiträge zur Biologie der Pflanzen, Bd. II, Hft. 3, s. 399.

II. "Note on the Supplementary Forces concerned in the Abdominal Circulation in Man." By J. Braxton Hicks, M.D., F.R.S. Received March 26, 1879.

During the ordinary inspiratory effort, the descent of the diaphragm, most noticeable in the male, necessarily produces pressure on the abdominal viscera in contact with its lower surface; these in their turn press down the intestines, which, acting as fluid enclosed in closed elastic sacs, press equally in all directions. Thus during each descent the abdominal walls are projected forwards, as may be readily seen by adapting an instrument similar to a cardiograph resting on three feet,



Tracings of the Abdominal Respiratory Wave in the Male. Showing also the disturbance caused by the elevation of the arm and leg, the person being in the supine position.



Tracings of the Abdominal Respiratory Waves, from a Female. The *first three lines* show head and thorax movements, such as turning to look to the side, &c. The *fourth* line shows the effects of moving the arm and leg. The *last* line shows the effect of laughing and giggling. The *third* line gives the ordinary wave the most free from interruption.

the button in the centre attached to the tambour fairly touching the abdominal wall. On revolving the drum attached, a well marked tracing is obtained, showing the respiratory wave; more marked in the male, but almost always well pronounced in the female. The height of these waves, of course, marks the difference of the elevation of the centre of the area and the circle described by the three legs before mentioned, the amount indeed of the bulging of that portion. By this arrangement the effects of the various movements of the body can be also registered with great ease, so far as these movements compress the walls of the abdominal cavity.

But although the abdominal walls in front yield, yet the descent of the diaphragm, which accompanies the inspiratory act, must put pressure on the contents of the abdomen: and thus tension is created, which is in a certain degree lessened—1st, by the yielding of the walls just mentioned, and, 2ndly, by the escape of blood from the vessels within the cavity of the abdomen; and this would be more marked in the case of the venous blood.

In the case of the *arterial blood*, the pressure would tend both upwards and towards the heart, and downwards towards the lower extremities and the abdominal walls. The movement towards the thorax would probably be but slight, yet it would to a certain extent add somewhat to the arterial tension, noticed as commencing at the beginning of inspiration. The other, the downward movement, acting in the direction of the arterial current, would increase also the arterial tension in the lower extremities and abdominal walls. But upon the *venous system* the effect would be greater.

1st. Upon the *systemic* its effects would be cut off in the downward direction by the valves, though this would tend to increase the venous tension in the lower extremities. But this probably would be soon neutralized, or nearly so, by the freedom which the incipient vacuum caused by the expansion of the chest gives the blood to enter the heart. But the pressure caused by the descent of the diaphragm tends to press the blood in the vena cava also upwards, thus facilitating the flow in the natural direction; but any tension to which the vessel is subjected is probably immediately or simultaneously relieved by the suction-action of the chest, which is well known to diminish considerably the blood-pressure in the large veins close to the thorax during the inspiratory movements. That this pressure of the diaphragm on the abdominal contents nearly if not quite balances the suction-action, is shown by the fact that in the sciatic vein the diminution of the blood-pressure during inspiration is not observed.

2nd. The *portal system* is subjected likewise to pressure, and its contained blood would tend to both its incipient and terminal capillaries; and the resultant would be to facilitate its movement towards the area of least resistance, namely, towards the hæpatic veins.

In computing the effect of the descent of the diaphragm we must always bear in mind the effect of the expansion of the lower part or base of the thorax; for this by lifting off as it were the pressure of the abdominal muscles attached to it from the viscera beneath, lessens the effect of the descent of the diaphragm. Notwithstanding this there is a notable residuum of force.

The effect of expiration on the abdominal circulation would be probably to gradually permit a restitution of the balance interfered with. The elasticity of the walls would sustain, to a considerable degree, the pressure; the portal vein and vena cava would gradually accumulate blood, and this in coincidence with an increment in that of the superior cava and right cavities of the heart till the irritation of its presence causes another inspiratory act.

It may be noticed that the tension of the arterial pulse would be naturally increased during the expansion of the lungs, because of the greater supply of blood to the left half of the heart shortly after the commencement of the inspiration, and thus the resistance to the flow of venous blood through the lung capillaries is lessened; and this action it is impossible to ignore when we are discussing the effect of the incipient vacuum on the venous blood-pressure during inspiration.

The same method of registering the effect of the respiratory movements on the abdomen also is applicable to marking the effects of the general movements of the body. The elevation of the arm or the leg, coughing and laughing, &c., are easily seen to compress the abdomen.

It would be beside the intention of this note to discuss the manner in which this effect of movements of the body is produced; but I may point out that in the act of coughing and laughing we have, as indeed might be expected, evidence not only of high pressure (shown by the sudden elevation of the wave), but also a tendency to vacuum, as illustrated by the sudden descent of the wave below the line.

These actions must tell violently on the blood-current of the abdomen, and tend to force it out of this cavity; and, as before remarked, the resultant of this must be to facilitate the current in its normal direction. The same effect must be produced on the other fluids in the abdomen, and must assist the movement of the secretions contained in the ducts of the various organs, notably that of the liver.

(Received April 16.)

In the foregoing note no calculation has been made as to the amount of the forces produced by the descent of the diaphragm in ordinary respiration. Its extreme violent action has been calculated by Professor Haughton at 20 lbs. on the square inch; but the amount of pressure on the contents of the abdomen must vary much, according to the resistance exerted by the parietes. When the intestines are empty of gaseous contents, and the previously over-distended abdomen

is suddenly emptied, as immediately after delivery in woman, this resistance is at the lowest, consequently the effect of descent of the diaphragm on the circulation is but slight, compared with that state which obtains when the parietes are in a high state of health, and the intestines are fully distended with gas, &c.

It must be evident that the amount of blood contained in the vessels within the abdomen must vary much, according to the tension of the parietes; but this matter does not belong to the subject of this note.

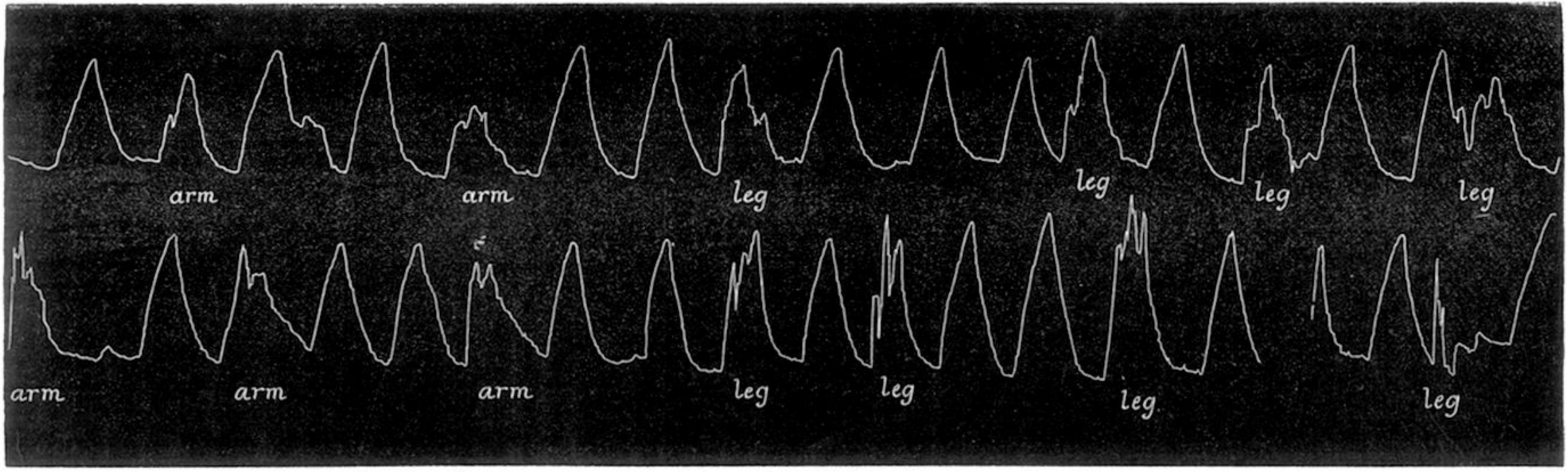
III. "Note on the Auxiliary Forces concerned in the Circulation of the Pregnant Uterus and its Contents in Woman." By J. Braxton Hicks, M.D., F.R.S., F.L.S., &c. Received March 26, 1879.

Whatever view we may take of the structure of the placenta, it is generally admitted that both in the large sinuses in the walls of the pregnant uterus, and also in the decidual processes in the placenta as well as in the intervillal spaces the motion of the fluids can be but very slow, that is, if the circulation wholly depended upon the maternal cardiac impulse.

However, in 1871,* I pointed out a fact which had not been before observed, that the uterus was in the habit normally of alternately relaxing and contracting every five, ten, or twenty minutes during the whole of the pregnancy from the earliest period, at least from the second month, and not as had before been believed only under irritation, and towards the end of gestation. This movement is doubtless homologous with the peristaltic movements in the uteri of the lower animals.

In that paper I pointed out—1st, that these movements of the uterus provide for the frequent movement of the blood in the uterine sinuses and the decidual processes; and, 2ndly, that they facilitate the movement of the fluid in the intervillal space of the placenta, or in that which has been called the placenta sinuses, and I remarked, "Whatever view we may hold of the structure of the placenta, whether on the one hand there be blood amongst the villi in maternal sinuses, or on the other merely a serous fluid, in any case it is through one or the other medium the villi absorb the material for the aëration of the fœtal blood; and there can be no doubt that from its position it must be in a more or less stagnant state. It is not difficult, therefore, to recognise the effect which the change in the solidity and shape must produce on the fluids in the placenta, as well as in the uterine walls.

* "Obst. Trans. Lond.," vol. xii. "On the Contractions of the Uterus during Pregnancy: their Physiological Effects and Value in the Diagnosis of Pregnancy."



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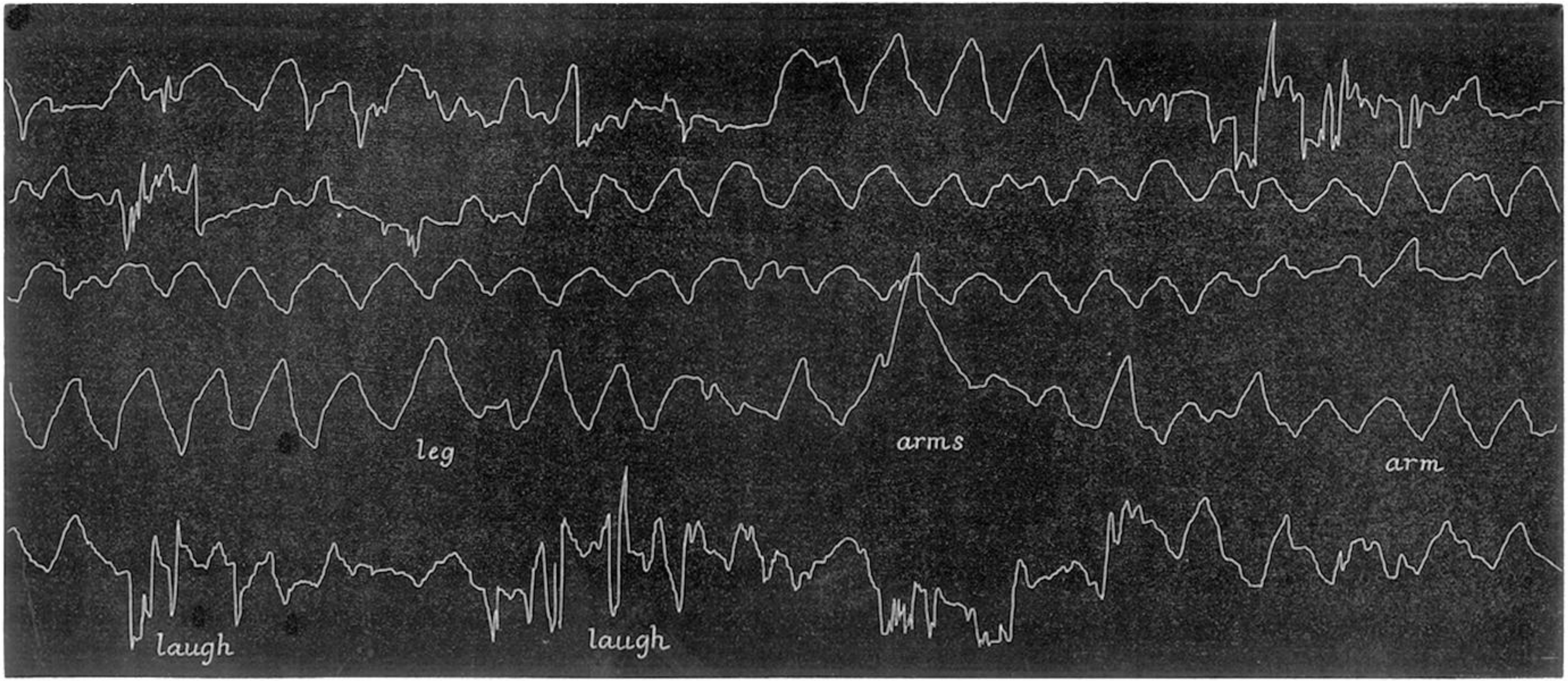

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