HUMAN COMPUTERS SELECTED TIMELINE

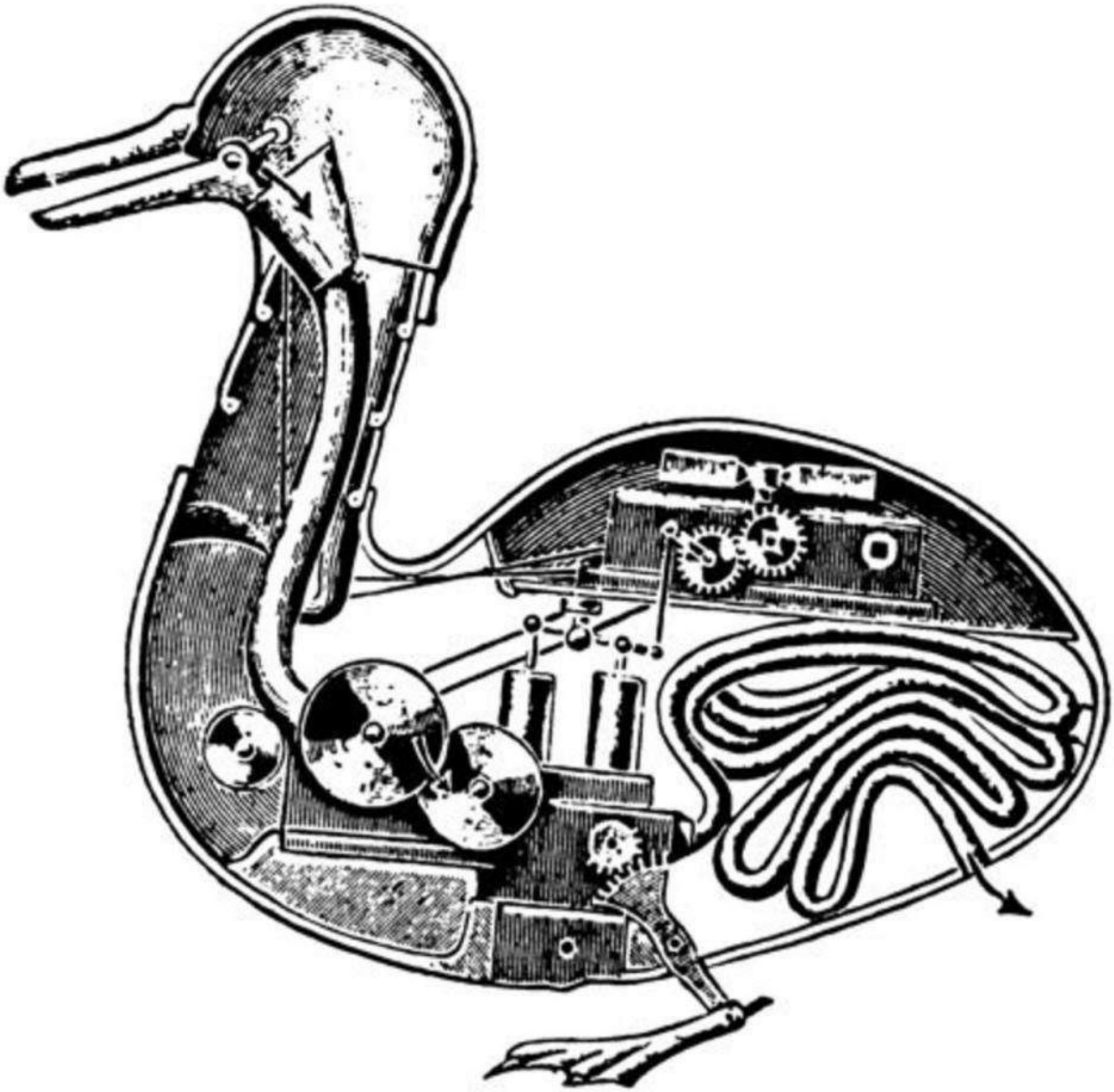
1714

In his short story *The Fable of Bees*, the dutch satirist and philosopher Bernard de Mandeville discusses the benefits of the division of labour. He will be quoted by Adam Smith in the *Wealth of Nations*:

"But if one will wholly apply himself to the making of Bows and Arrows, whilst another provides Food, a third builds Huts, a fourth makes Garments, and a fifth Utensils, they not only become useful to one another, but the Callings and Employments themselves will in the same Number of Years receive much greater Improvements, than if all had been promiscuously follow'd by every one of the Five...

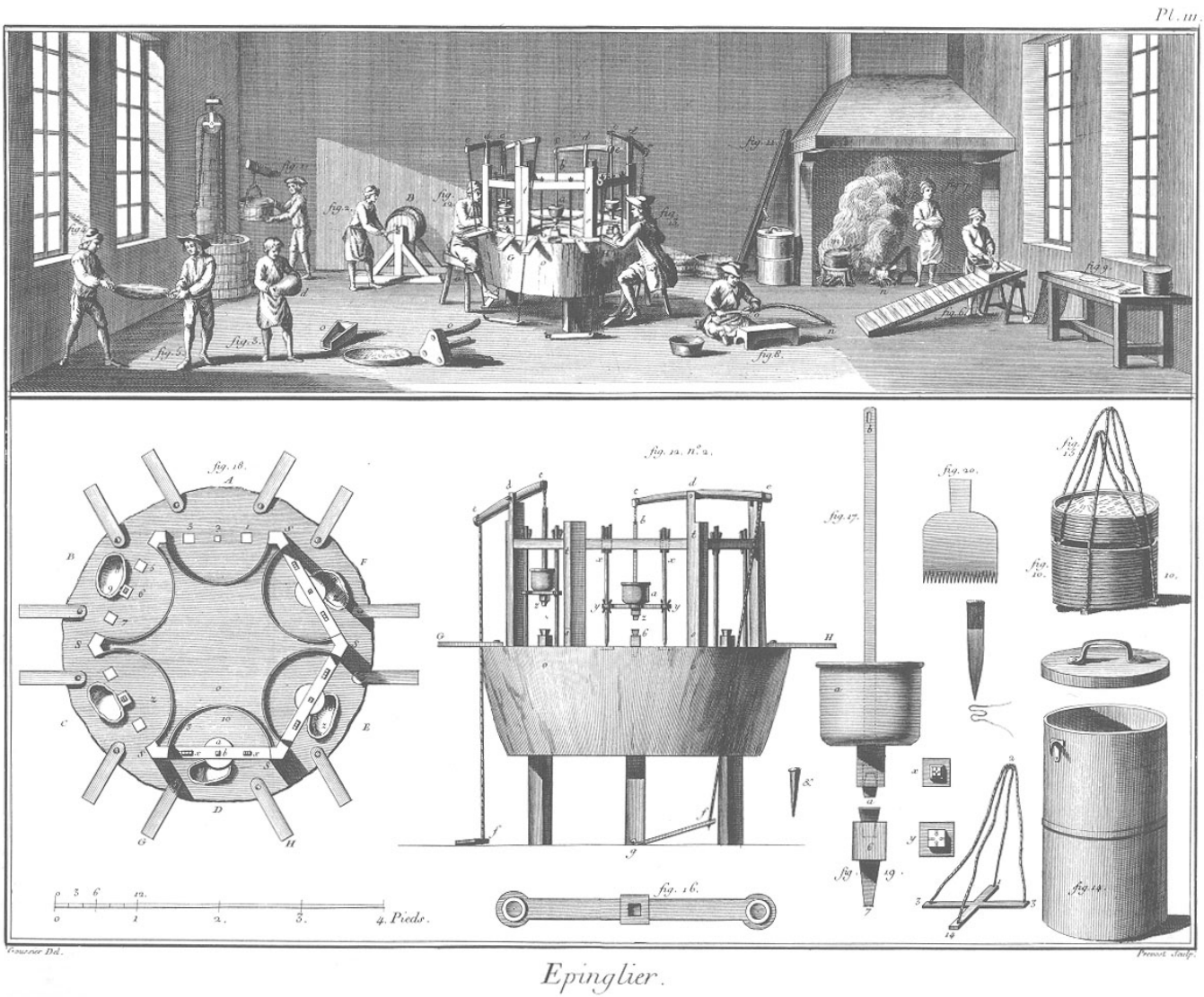
In Watch-making, which is come to a higher degree of Perfection, than it would have been arrived at yet, if the whole had always remain'd the Employment of one Person; and I am persuaded, that even the Plenty we have of Clocks and Watches, as well as the Exactness and Beauty they may be made of, are chiefly owing to the Division that has been made of that Art into many Branches. (The Fable of the Bees, Volume two)"

1739



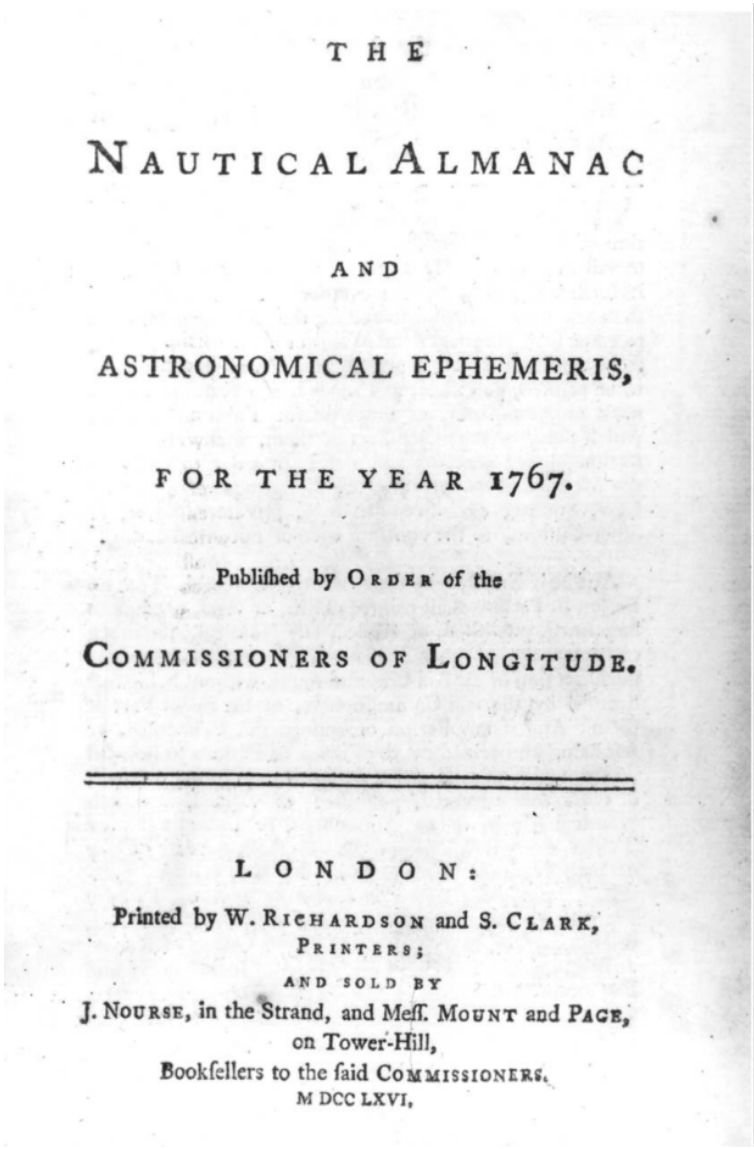
Jacques de Vaucanson builds the digesting duck, an mechanical duck that appears to have the ability to eat kernels of grain, and to metabolize and defecate them. Vaucanson describes the Duck's interior as containing a small "chemical laboratory" capable of breaking down the grain. But when the stage magician and automaton builder Jean-Eugène Robert-Houdin examine the Duck in 1844, he claims that Vaucanson has faked the mechanism, and the Duck's excreta consisted of pre-prepared breadcrumb pellets, dyed green. Robert-Houdin describes this as "*a piece of artifice I would happily have incorporated in a conjuring trick*". The Duck is destroyed in 1879, in a fire at a museum.

1751



The Encyclopédie, ou dictionnaire raisonné des sciences, des arts et des métiers, of D'Alembert and Diderot publishes an article by Deleyre and Boucher d'Argison on the pin manufactures, describing meticulously the eighteen operations required to produce a pin. The article will greatly influence Adam Smith, who reproduces the description in his essay, *The Wealth of Nations*.
1758

November 14, Alexis-Claude Clairaut, Joseph Jérôme Lalande and Nicole-Reine Lepaute, three mathematicians and astronomers, reports to the science adcademy the results of their six months calculation of the return of Halley's Comet after the celestial object's 76-year absence. Their prediction mispredicted the coming back of a month, but achieved to compte the perihelion. To achieve the operation, they set a method of divided computation, that will become one of the first example of computation division.
1767



THE

NAUTICAL ALMANAC

AND

ASTRONOMICAL EPHEMERIS,

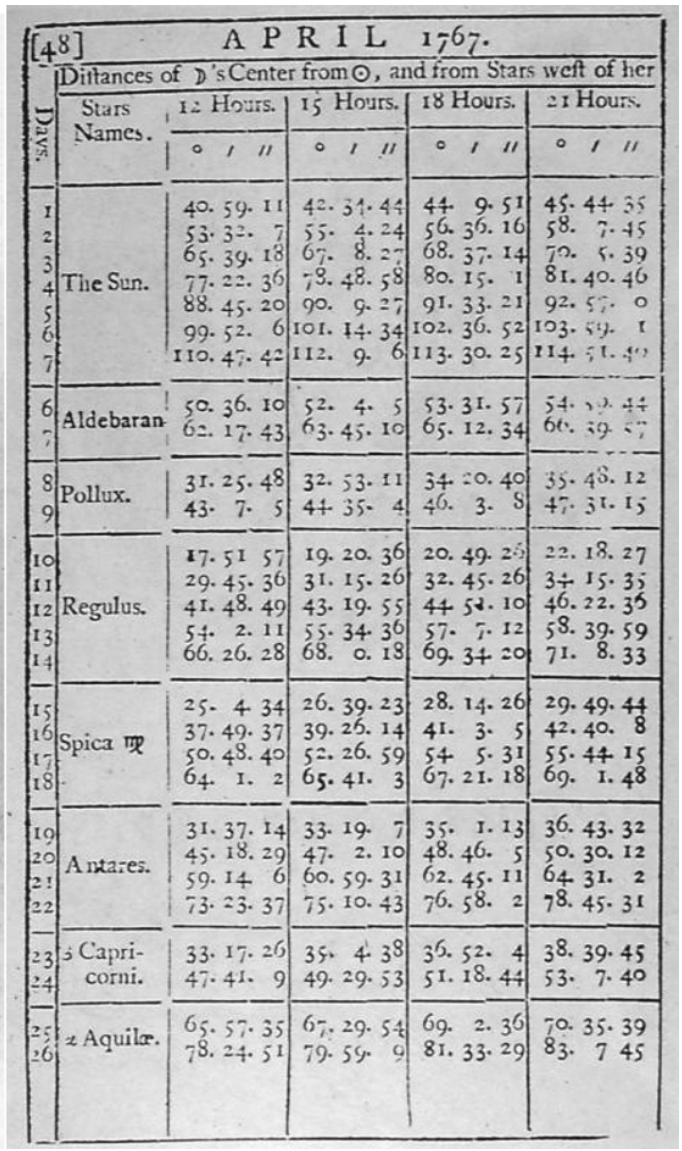
FOR THE YEAR 1767.

Published by ORDER of the

COMMISSIONERS OF LONGITUDE.

LONDON:

Printed by W. RICHARDSON and S. CLARK,
PRINTERS;
AND SOLD BY
J. NOURSE, in the Strand, and Meſſ. MOUNT and PAGE,
on Tower-Hill,
Bookſellers to the ſaid COMMISSIONERS.
M DCC LXVI.

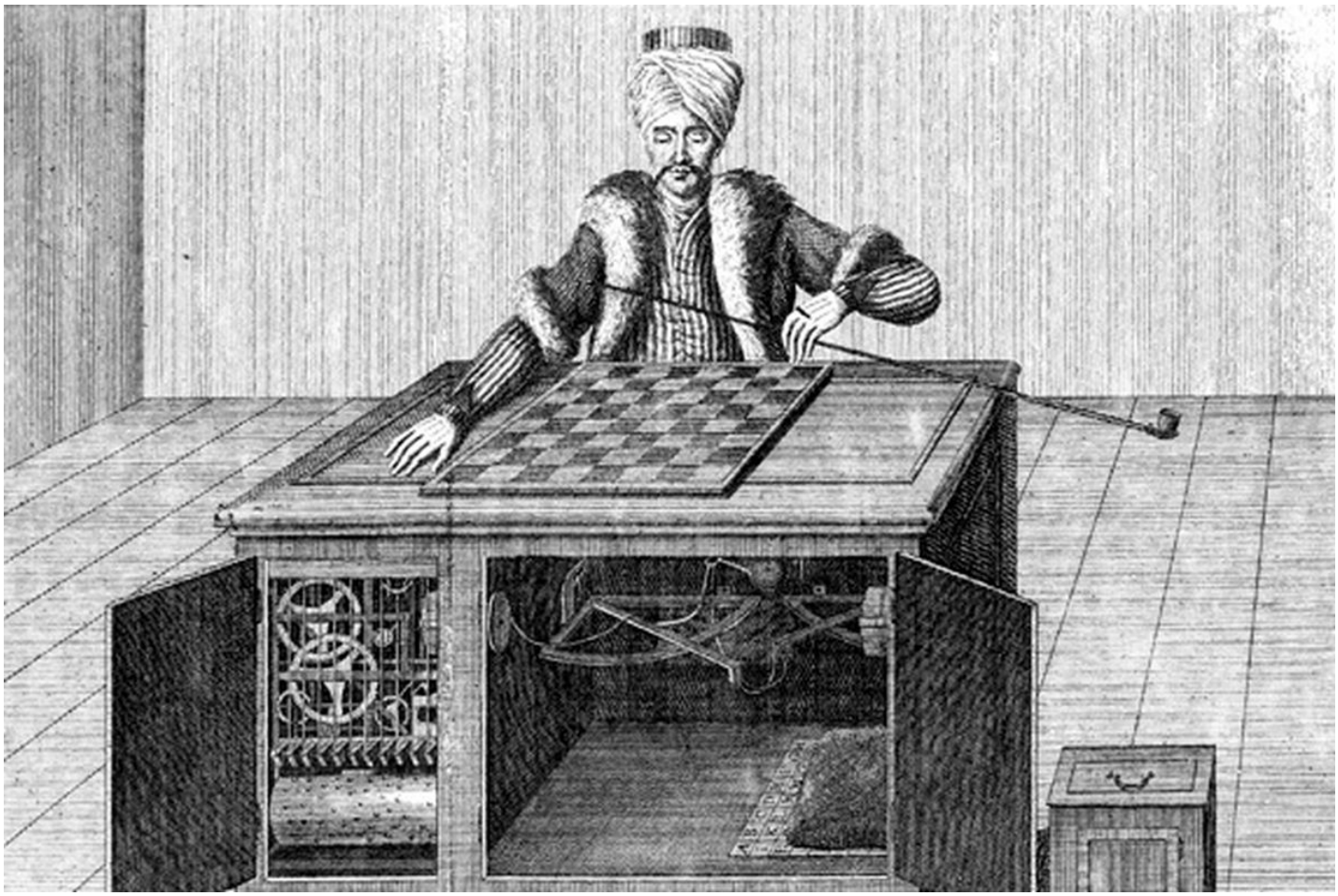


[48] APRIL 1767.

Diſtances of ☽'s Center from ☉, and from Stars weſt of her

DAYS.	Stars Names.	12 Hours.	15 Hours.	18 Hours.	21 Hours.
		° ′ ″	° ′ ″	° ′ ″	° ′ ″
1	The Sun.	40. 59. 11	42. 31. 44	44. 9. 51	45. 44. 35
2		53. 32. 7	55. 4. 24	56. 36. 16	58. 7. 45
3		65. 39. 18	67. 8. 27	68. 37. 14	70. 5. 39
4		77. 22. 36	78. 48. 58	80. 15. 1	81. 40. 46
5		88. 45. 20	90. 9. 27	91. 33. 21	92. 57. 0
6		99. 52. 6	101. 14. 34	102. 36. 52	103. 59. 1
7		110. 47. 42	112. 9. 6	113. 30. 25	114. 51. 40
6	Aldebaran	50. 36. 10	52. 4. 5	53. 31. 57	54. 59. 44
7		62. 17. 43	63. 45. 10	65. 12. 34	66. 39. 57
8	Pollux.	31. 25. 48	32. 53. 11	34. 20. 40	35. 48. 12
9		43. 7. 5	44. 35. 4	46. 3. 8	47. 31. 15
10	Regulus.	17. 51. 57	19. 20. 36	20. 49. 26	22. 18. 27
11		29. 45. 36	31. 15. 26	32. 45. 26	34. 15. 35
12		41. 48. 49	43. 19. 55	44. 52. 10	46. 22. 36
13		54. 2. 11	55. 34. 36	57. 7. 12	58. 39. 59
14		66. 26. 28	68. 0. 18	69. 34. 20	71. 8. 33
15	Spica ♍	25. 4. 34	26. 39. 23	28. 14. 26	29. 49. 44
16		37. 49. 37	39. 26. 14	41. 3. 5	42. 40. 8
17		50. 48. 40	52. 26. 59	54. 5. 31	55. 44. 15
18		64. 1. 2	65. 41. 3	67. 21. 18	69. 1. 48
19	Antares.	31. 37. 14	33. 19. 7	35. 1. 13	36. 43. 32
20		45. 18. 29	47. 2. 10	48. 46. 5	50. 30. 12
21		59. 14. 6	60. 59. 31	62. 45. 11	64. 31. 2
22		73. 23. 37	75. 10. 43	76. 58. 2	78. 45. 31
23	δ Capri-	33. 17. 26	35. 4. 38	36. 52. 4	38. 39. 45
24	corni.	47. 41. 9	49. 29. 53	51. 18. 44	53. 7. 40
25	α Aquilæ.	65. 57. 35	67. 29. 54	69. 2. 36	70. 35. 39
26		78. 24. 51	79. 59. 9	81. 33. 29	83. 7 45

The British admiralty publishes The Nautical Almanac and Astronomical Ephemeris, containing astro-navigational and general astronomical data to the use of navigators. The publication is supervised by Nevil Maskelyne with a team of by five computers. Each table is computed twice by two different computers, working at home, and compared by a comparator. The almanac is still published today.
1770



Wolfgang Von Kempelen builds the Mechanical Turk. A automated chess player, constructed to impress the Empress Maria Theresa of Austria. The mechanism appeared to be able to play a strong game of chess against a human opponent, while it is in fact a hoax. The Turk is a mechanical illusion that allowed a human chess player hiding inside to operate the machine. With a skilled operator, the Turk won most of the games played during its demonstrations around Europe and the Americas for nearly 84 years.

1776

Adam Smith publishes The Wealth of Nations, where he describes the modern division of labour. The very first sentence of the book says: "*The greatest improvement in the productive powers of labour, and the greater part of the skill, dexterity, and judgment with which it is anywhere directed, or applied, seem to have been the effects of the division of labour.*"

1793

Gaspard de Prony experiments a computing factory, based on Adam Smith theories, to realize the calculation of the logarithmic tables with a group of nearly 90 computers. The group is said to be composed of unemployed "perruquiers" that lost their because of the 1789 revolution. De Prony will directly quote Adam Smith saying:

"*One could manufacture logarithms as easily as one manufactures pins*."

De Prony tables will never be published, however its methods innovate and will irrigate the computation field, especially with the error-checking methods of differencing.
1805
Johann Nepomuk Mälzel buys back the Mechanical Turk.
1809
Louis Napoléon Bonaparte plays against the Mechanical Turk in Vienna. Napoléon played two games against the automaton and lost both of them. Nethertheless, he is quite amused by the Turk's skills.
1813

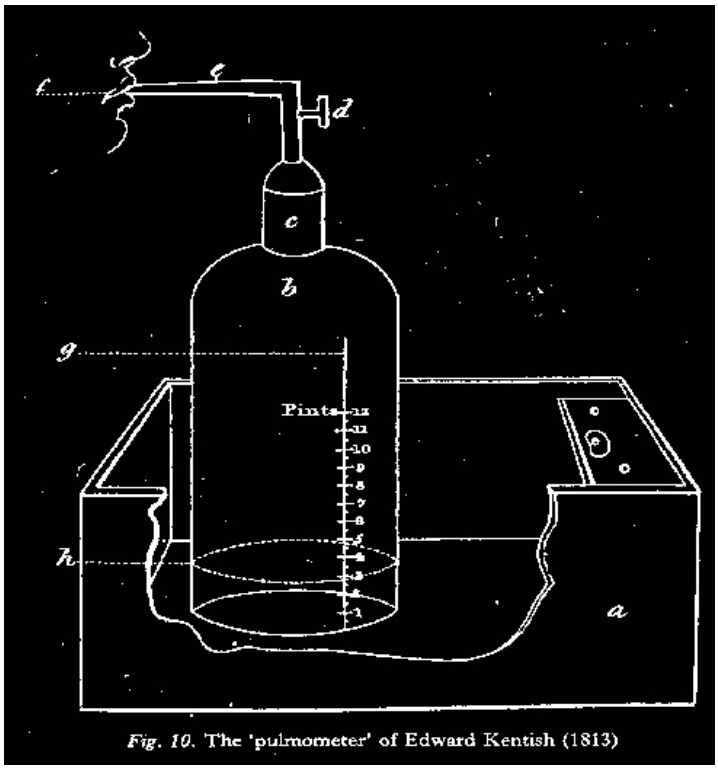
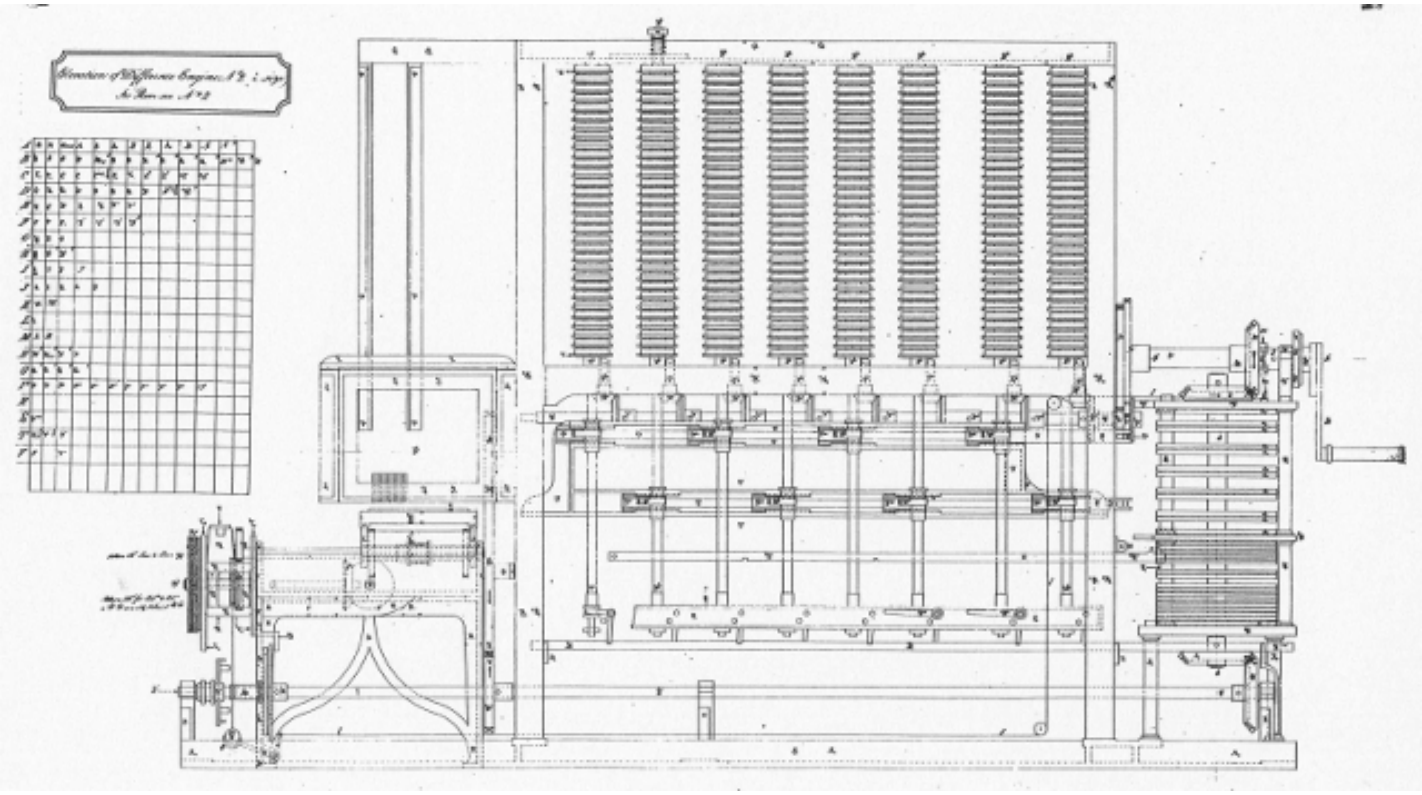


Fig. 10. The 'pulmometer' of Edward Kentish (1813)

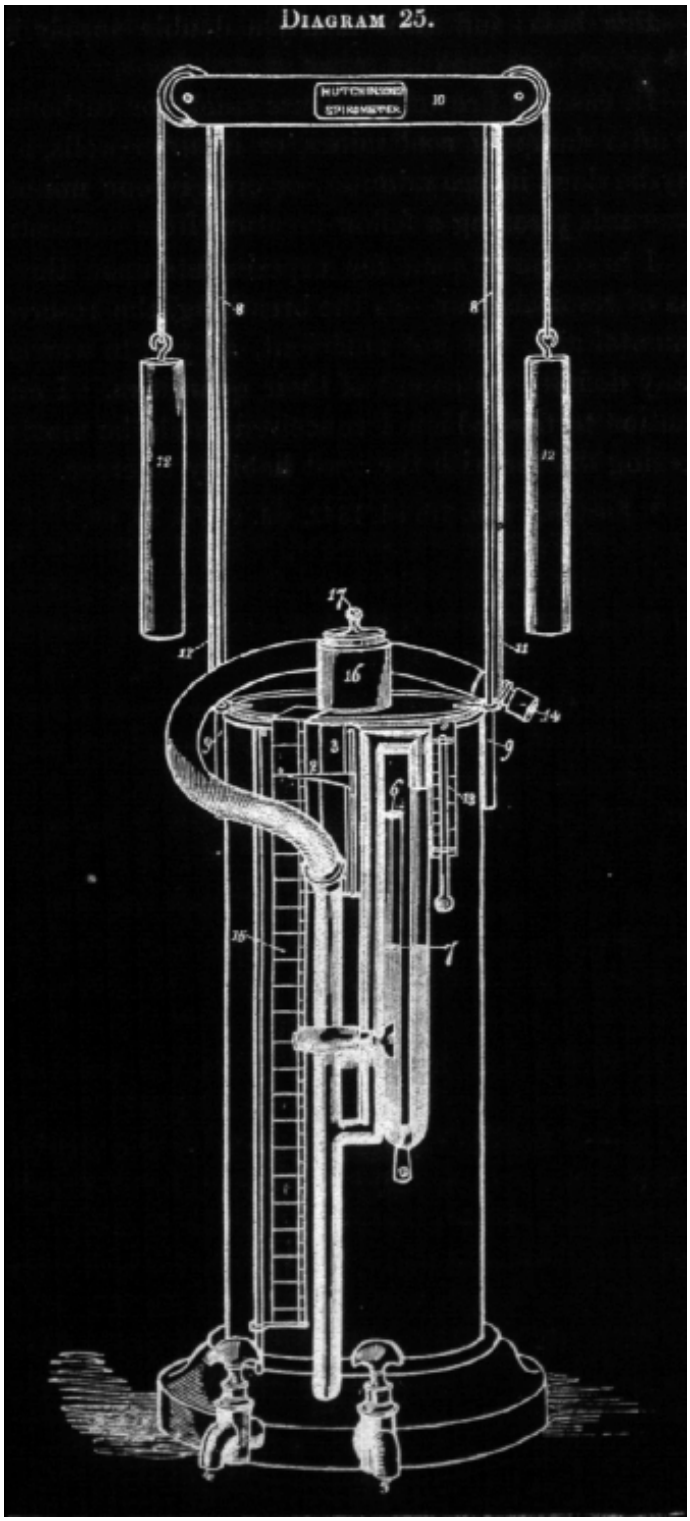
Pulmometer, by Edward Kentish Source: pftforum.com
1816

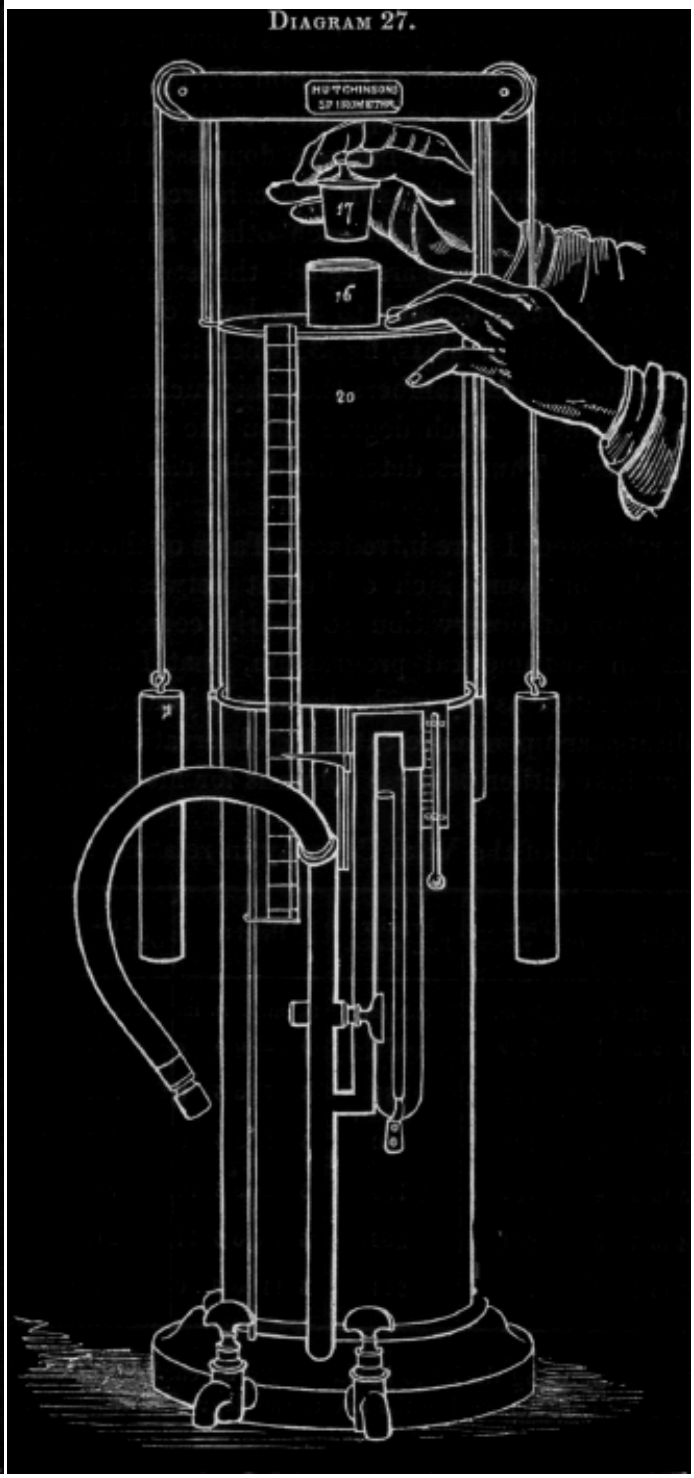
Maelzel is attributed the patent of the metronome, invented by the dutch inventor Dietrich Nikolaus Winkel. The metronome will be later used for work cadence of workers and dactylographes.
1819
Charles Babbage visits the Observatory of Paris, and consults the archives from De Prony.

1820
Charles Babbage plays against the Mechanichal Turk. Impressed by the overall demonstration, he will also use an automaton during the presentations of his machine, the Silver Lady.
1822



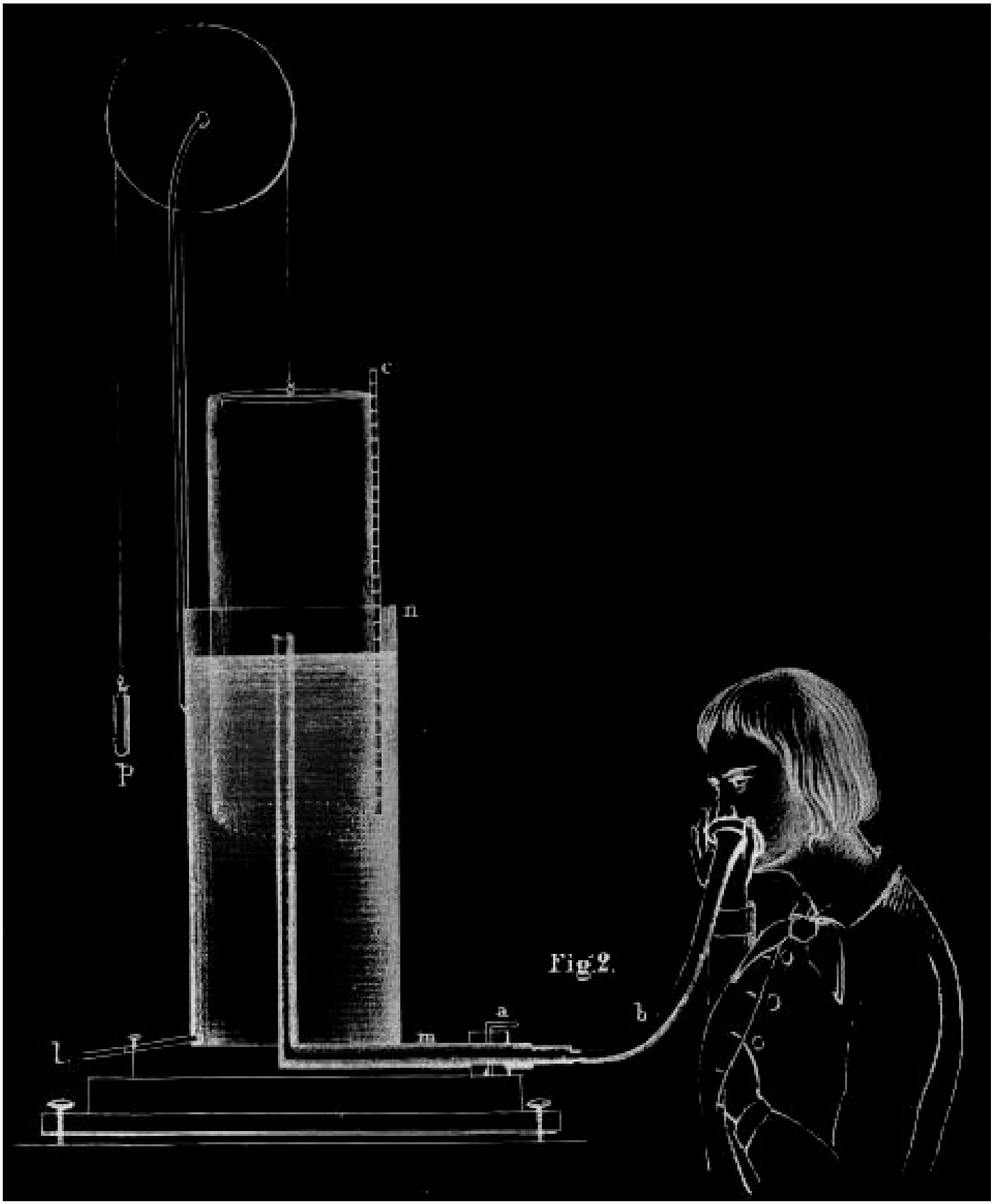
Charles Babbage finishes to assemble the Difference Engine 0, started in 1819. He publishes a paper where he describes its invention : Note on the application of machinery to the computation of astronomical and mathematical tables.
1832
Charles Babbage publishes its book On the Economy of Machinery and Manufactures.
1835
The Greenwich Observatory organises a computing division, under the supervision of George Airy, to process the observatory data, in the famous Octagon room, using methods inspired by De Prony.
1836
Edgar Allan Poe publishes its essay Maelzel Chess-Player, which contains a meticulous desciption of the Mechanical Turk, and a comparison between the mechanical turk and the difference engine of Charles Babbage.
1837
Charles Babbage describes the Analytical Engine, whose study began in 1834. The machine will be achieved only after his death, various reduced versions will be built, notably a pi calculator by Henri Babbage in 1906, the Analytical Engine Mill. A definitive version will be built only in 1991 by the London Science Museum, The Difference Engine N°2.
1846





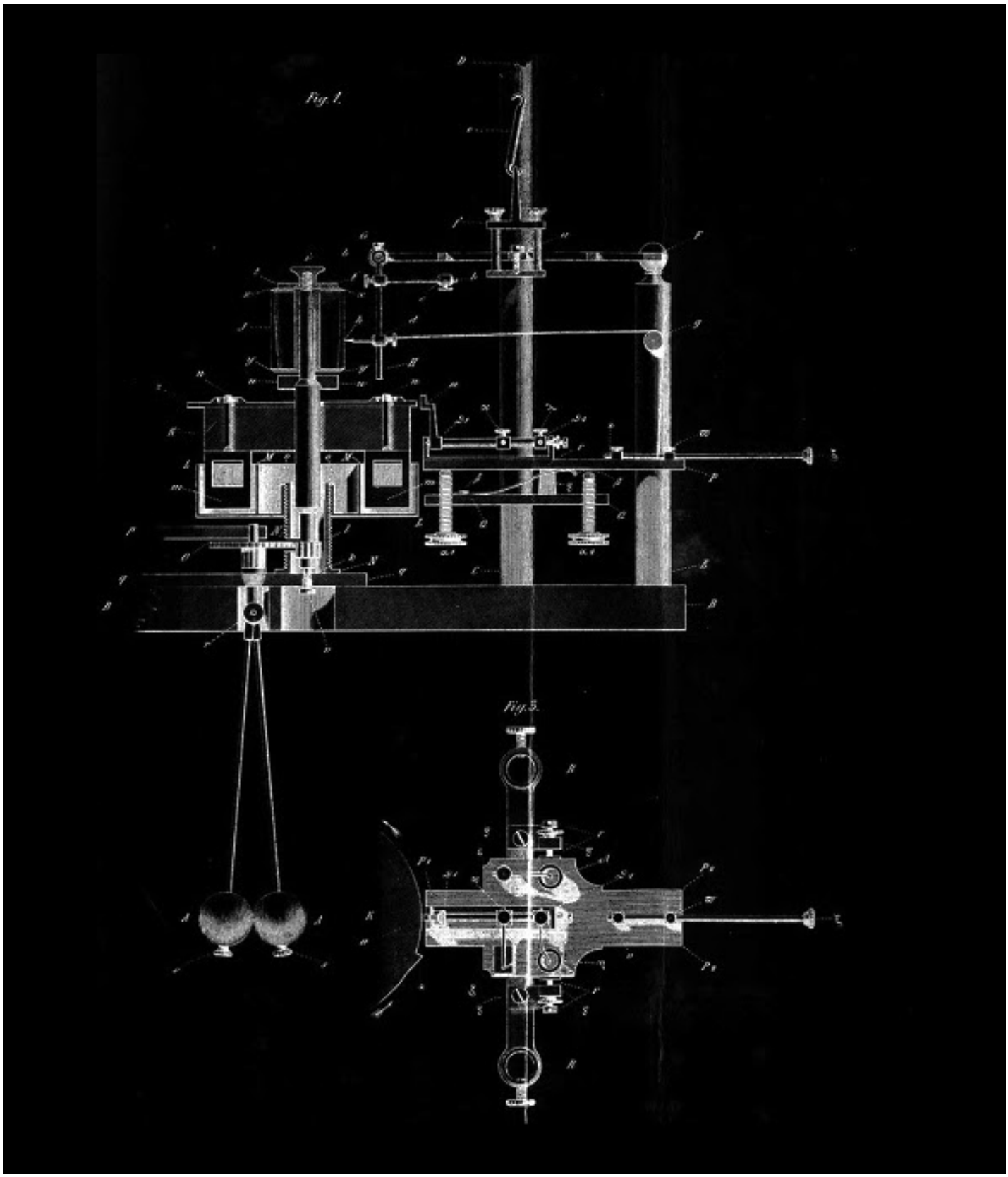
Spirometer, John Hutchinson

In 1846 John Hutchinson published his treatise “On the capacity of the lungs and on the respiratory functions”. His spirometer design was based on the gasometer, originally invented by Antoine Lavoisier then popularized and commercialized by James Watt in the 1790’s. Hutchinson turned the gasometer into a precision scientific instrument. Just as importantly, his observations on the relationship between the vital capacity and an individual’s gender, height and age galvanized many other researchers.
Source : pftforum.com
Publication : Béclard, J.. - Traité élémentaire de physiologie humaine ; 4è éd. Paris : P. Asselin, 1862. scan
1850



Spirometer, Simon Vogel.

Source: pftforum.com
1852



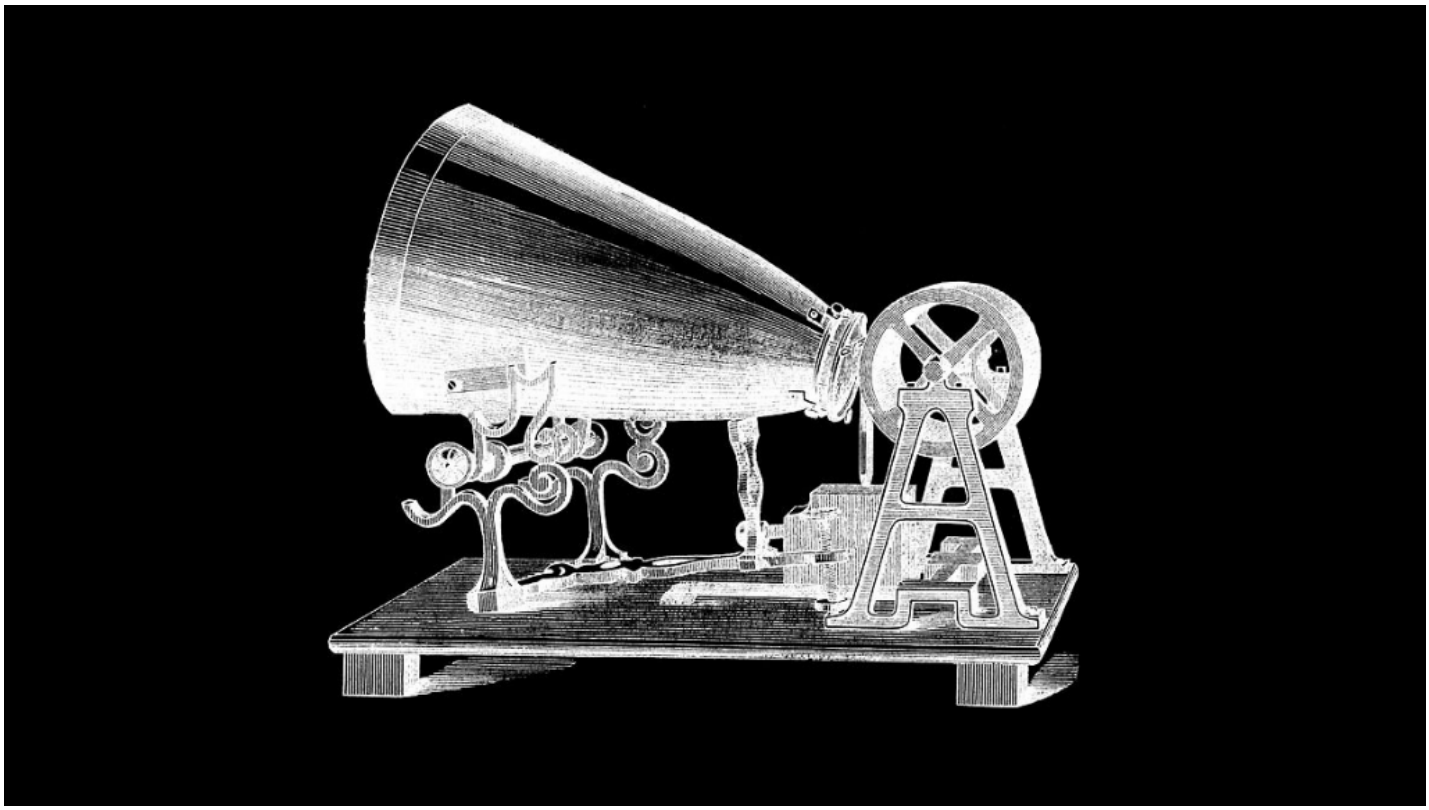
Myograph, Hermann von Helmholtz

Hermann von Helmholtz discovered the principle of conservation of energy while studying muscle metabolism. In his book *Über die Erhaltung der Kraft* (On the Conservation of Force, published in 1847, he try to demonstrate that no energy is lost in muscle movement.

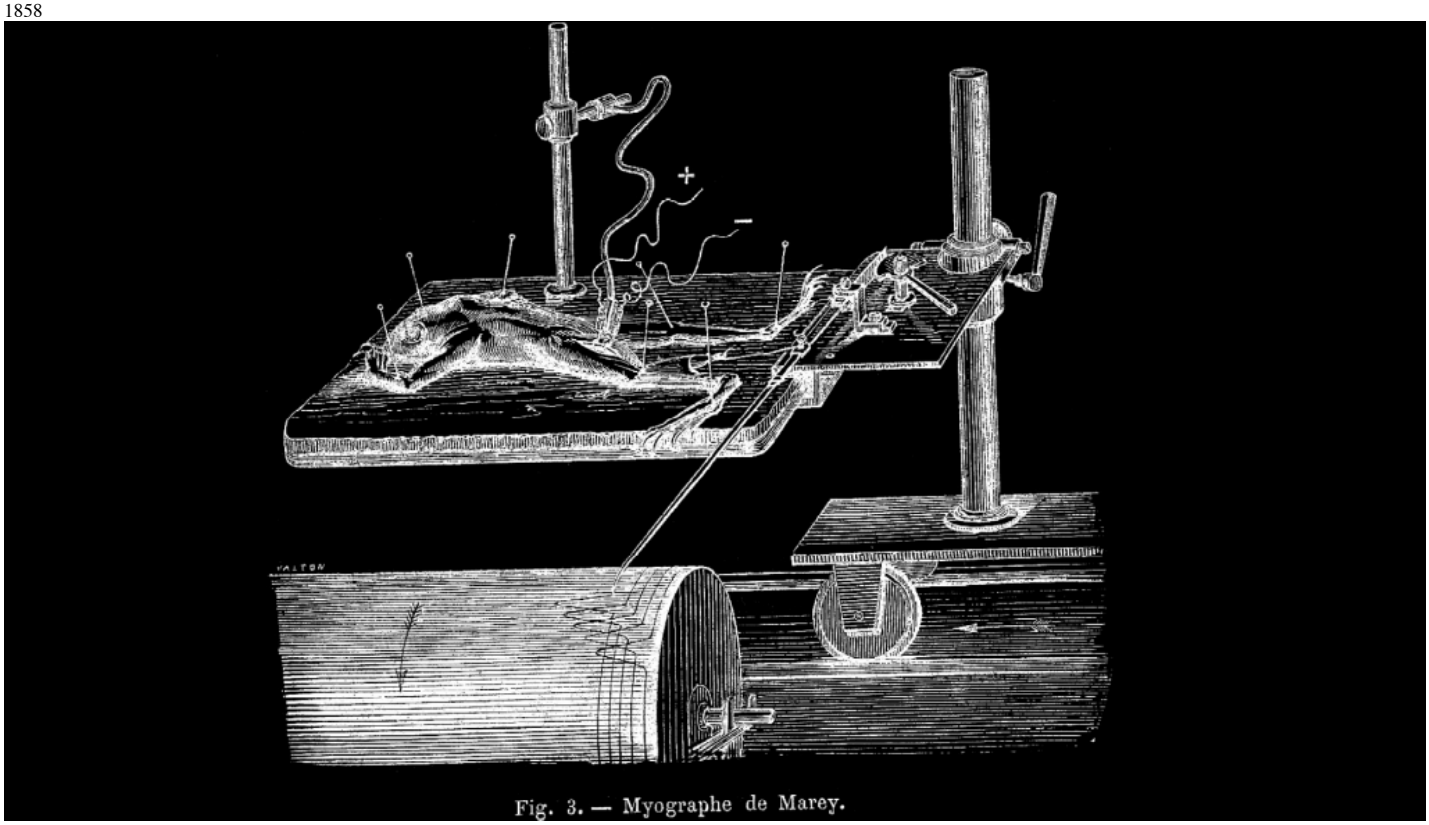
With the thermodynamics laws of energy conservation, the human body of worker is seen as a human motor where energy is transformed into work force - Helmholtz's concept of "Kraft". Measurement and data capture start to be applied to worker bodies, to reduce loss at work. Modern science (from mecanist materialism, physiology, ergonomy and hygienism to psychology and social sciences) is the vortex of invention of many kind of instruments used to mesure, record and analyze physical and intellectual human effort and fatigue at work, to optimize performance in a productivist vision.
1854

Spirometer, Alton Wintrich.

Source: pftforum.com
1854
After discovering the planet Neptune, Urbain le Verrier becomes the director of the Paris Observatory. He transformed the institution by introducing innovative methods of management, inspired by the division of labour principles and industry.
1857

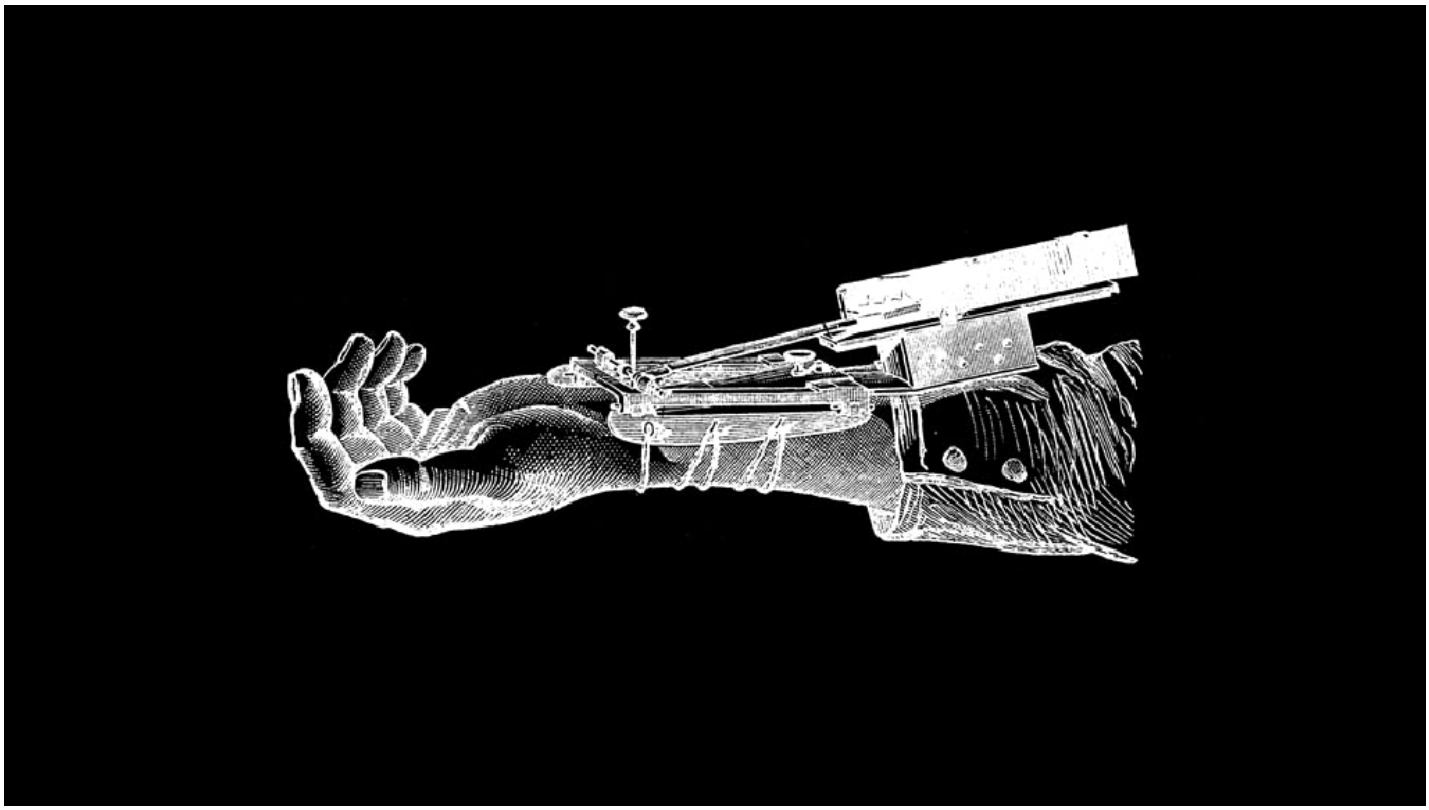


Phonautograph, Edouard-Léon Scott de Martinville
This sound recording device will be used later by Franciscus Donders for his study of the human reaction time in cognitive processing.
1858

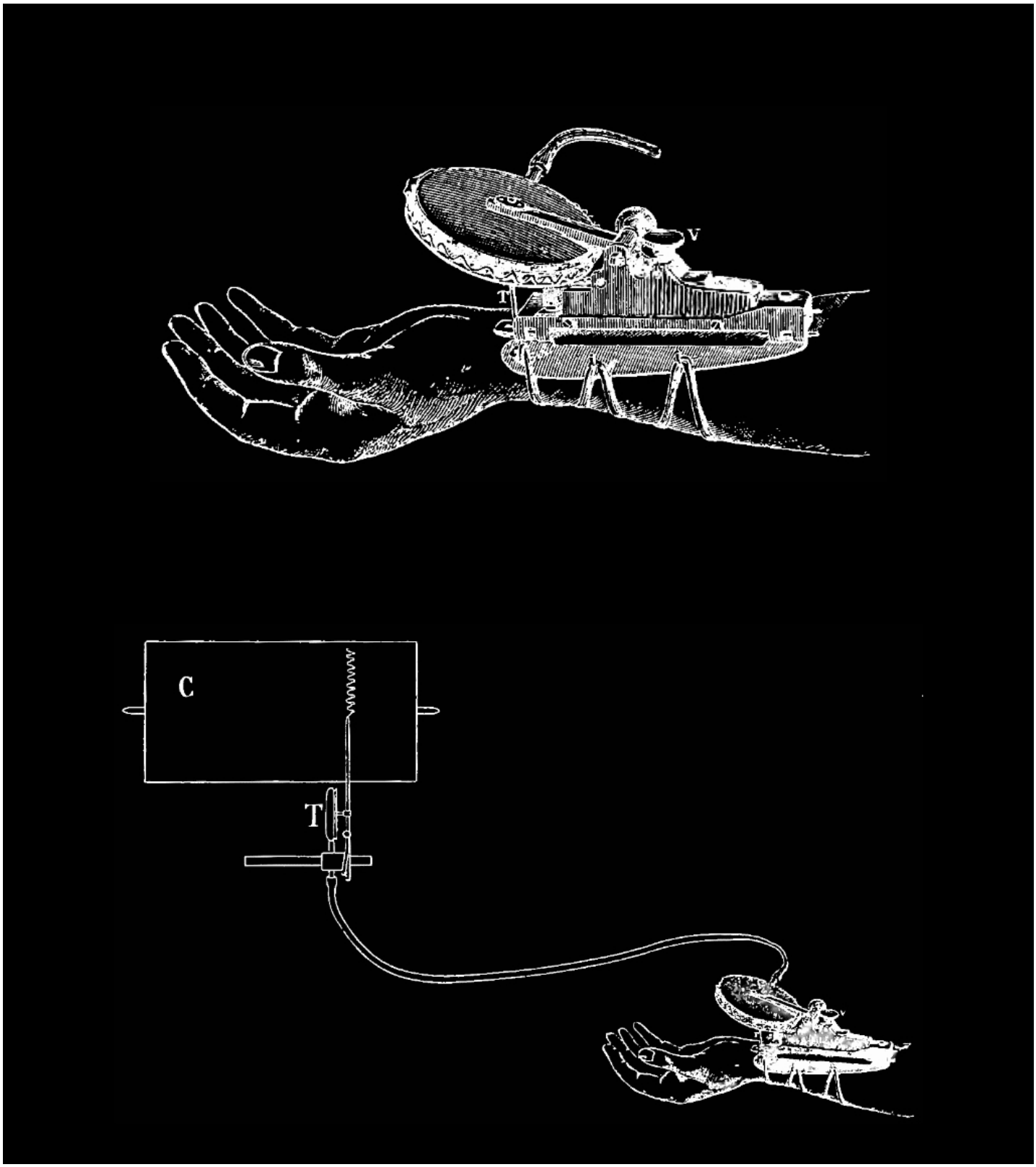


Myograph, Etienne-Jules Marey

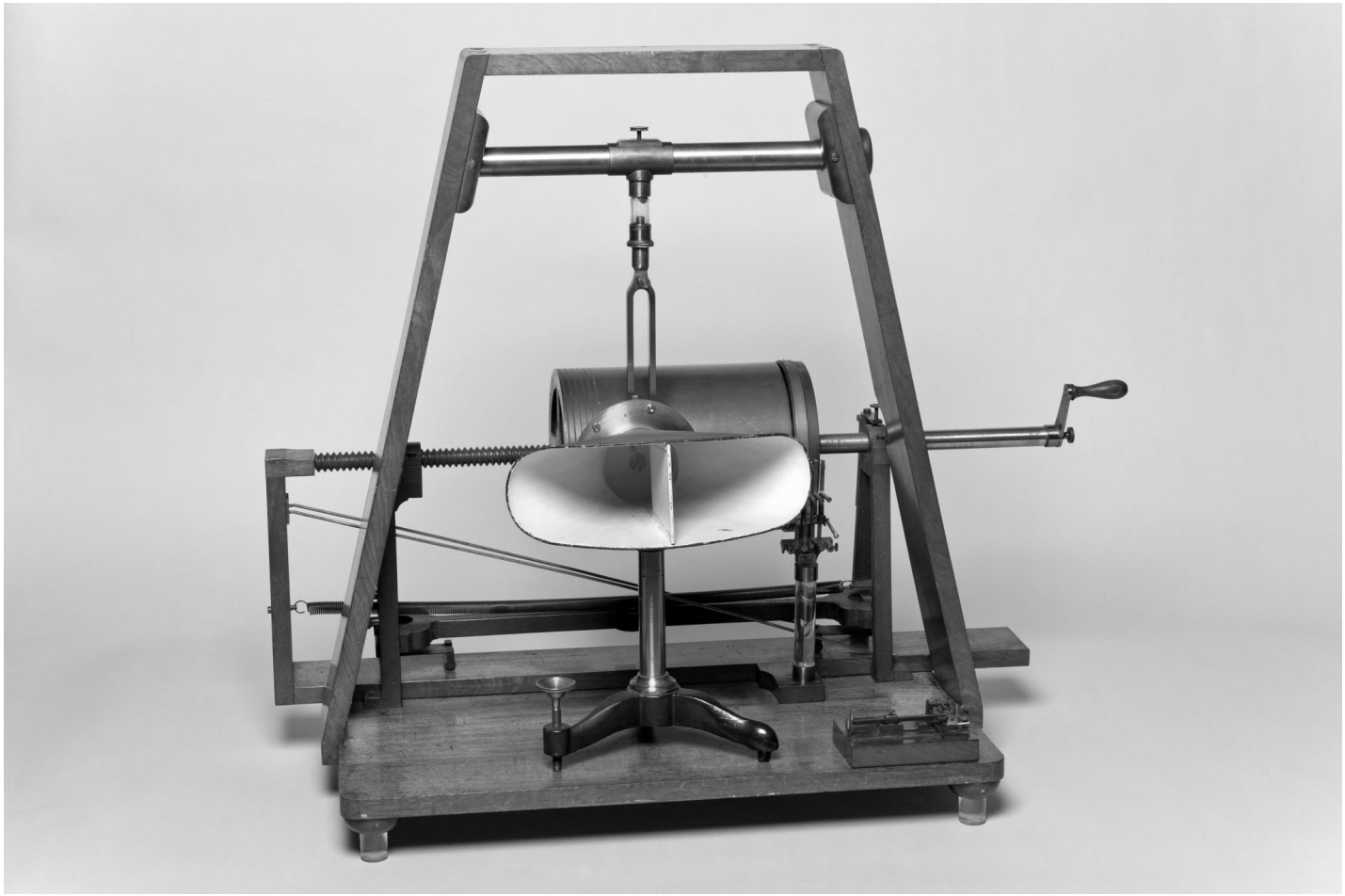
Recording of the muscular contractions of the frog. Marey improves Helmholtz'myograph. This study of the muscular contractions intensity, and its recording in various conditions, supplies the first records of muscular fatigue.
1860



Portable sphygmograph, Etienne-Jules Marey, "Méthode graphique".
Mechanical device used to measure blood pressure.
1863

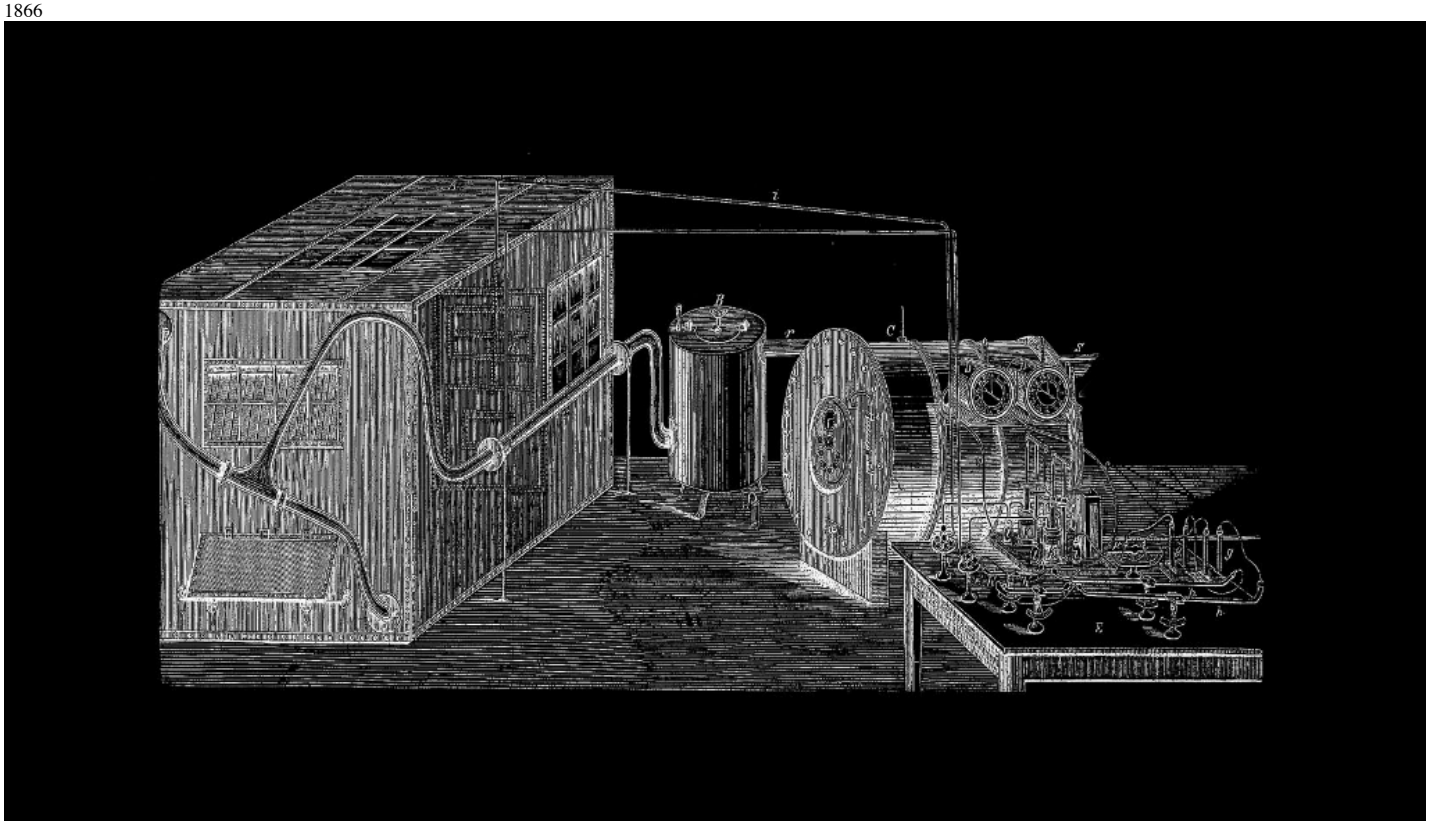


Remote recording sphygmograph, Etienne-Jules Marey, "Méthode graphique".
Overview of the graphic method. In C, the cylinder on which one writes a feather; this feather is connected with the rubber membrane of the writer drum T. A rubber tube gathers the writer drum in the drum of the sphygmograph.
1866



Noematachograph, Franciscus Cornelius Donders
Instrument allowing to measure the physiological time of psychological processes.

Donders is inspired by Adolph Hirsch's *phychological time* measurement (1862) which is the reaction time elapsed between the presentation of the stimulus and the subject's reaction to it, in man. He is also inspired by Hermann von Helmholtz measurement of the nerves transmission rate (based on Jean Müller, Emile du Bois-Reymond researches). Donders focuses on the *psychic act* itself contained in the phsychological time. The Noematachograph is based on the graphical method, and the precision is in milliseconds. Composed by a cylinder covered with soot, a tuning-fork used to trace the chronoscopic line (chronoscopic unit), and instruments to record the stimulus and the reaction, depending on their nature. If the stimulus is an induction spark, it marks the chronoscopic line at the same time it is percieved by the subject (seen, heard or felt as electric choc). The stimulus can also be a vocal sound, recorded through the use of a phonautograph (Scott-König's phonautograph or the simplified version constructed by König for Donders - in the picture) ; the reaction signal was traced using electromagnets, then with the use of a simple wood stick manipulated by hand when the reaction was the movement of the hand, or with the use of the same phonautograph when the reaction is a vocal repetition of the vocal stimulus. The averaged result is approximatively between 39,24 and 75,03 milliseconds.
1866



Respiration apparatus, Max von Pettenkofer and Carl von Voit

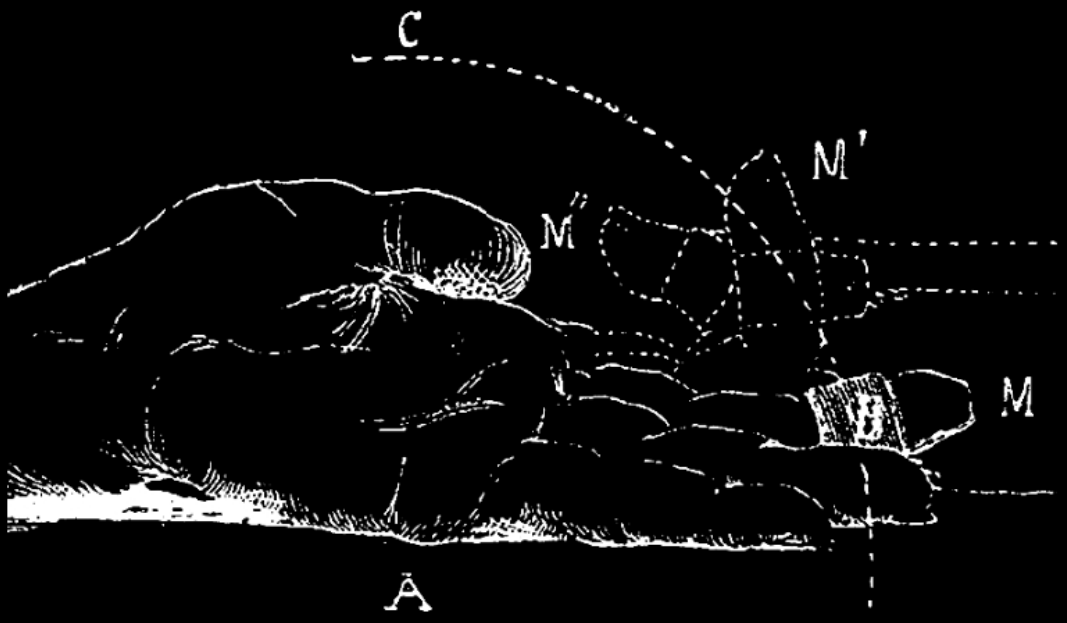
Device which allows to control the absorption of food and waste emitted for a given period of time(weather) Voit (physiologist, Munich) investigates the “laws” of animal nutrition, and demonstrates that the daily contribution in carbonne, hydorgene, nitrogen, and oxygen found itself in the excretions of the body and the exhaled gases.
1868

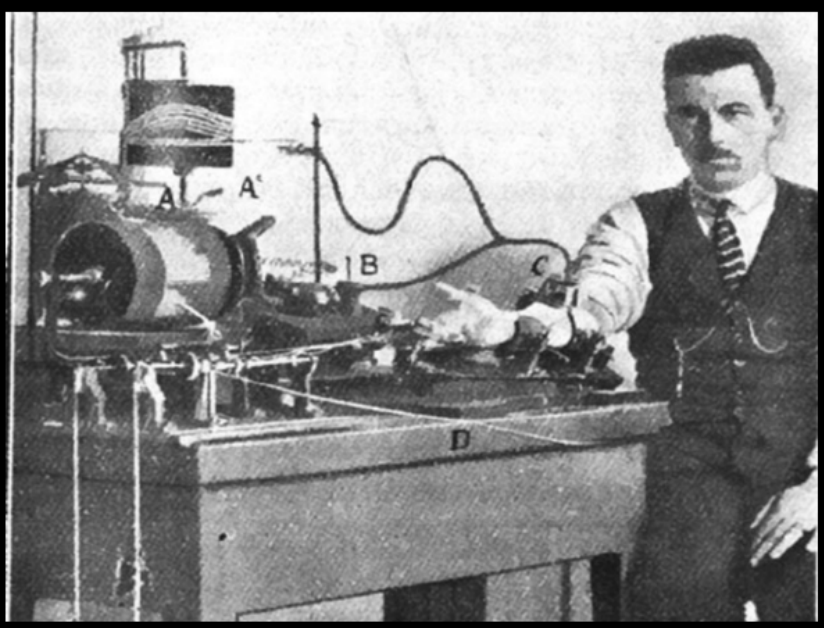
Charles Hooper, a cabinet maker, introduce its chess-playing automaton, Ajeeb, for the first time to the Royal polytechnical Institute. A particularly intriguing piece of faux mechanical technology (while presented as entirely automated, it in fact concealed a strong human chess player inside), it drew scores of thousands of spectators to its games, the opponents for which included Harry Houdini, Theodore Roosevelt, and O. Henry. The device's name was derived from the Arabic/Urdu/Persian word عجيب (ʿajīb) meaning "wonderful, marvelous."
1875

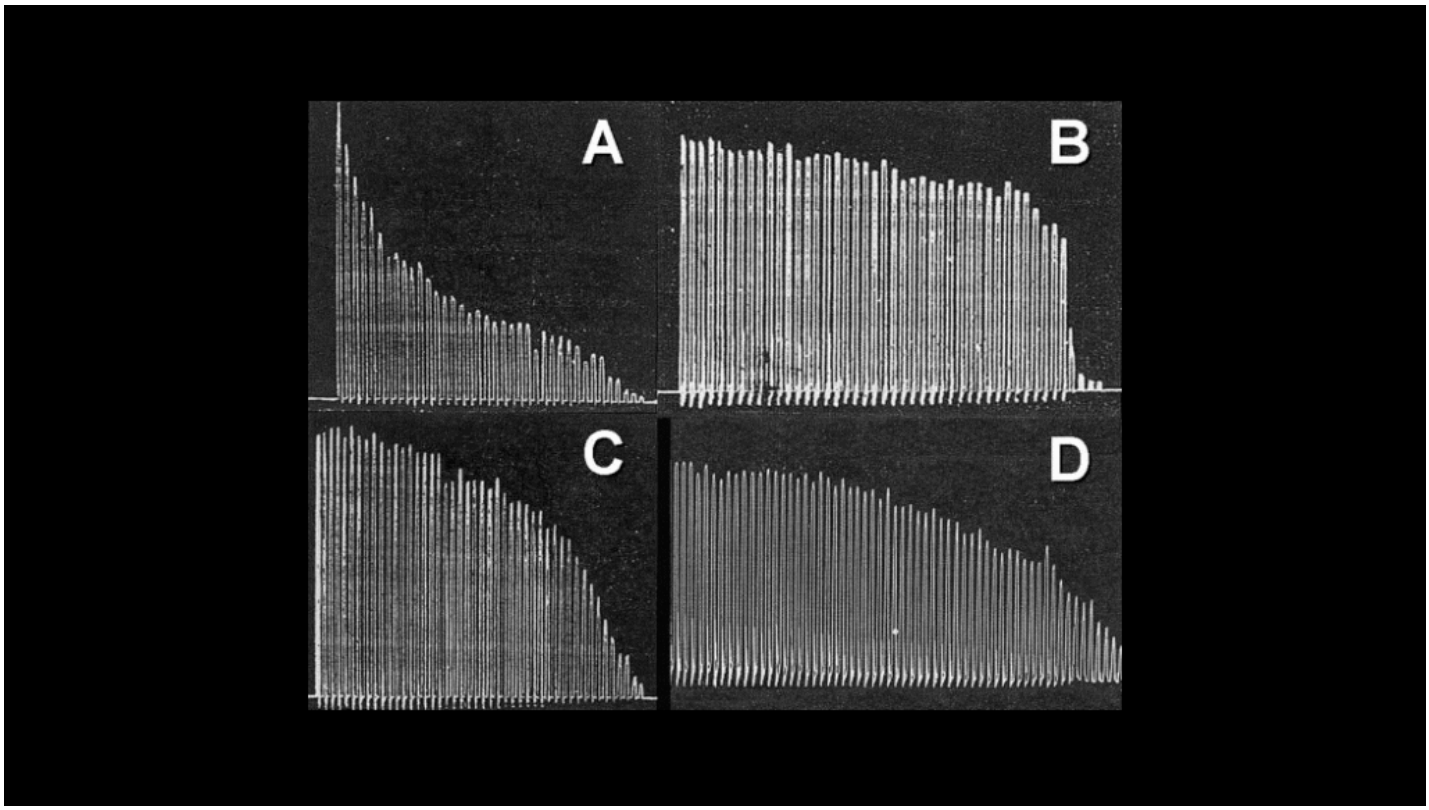
The Harvard Observatory, under the direction of Edward Charles Pickering (1877 to 1919) had a number of women working as skilled workers to process astronomical data. Harvard was the first such institution to hire women to do this type of work. Among these women were Williamina Fleming, Annie Jump Cannon, Henrietta Swan Leavitt, and Antonia Maury. Although these women started primarily as calculators, they often rose to contribute to the astronomical field, and even publish in their own names. This staff came to be known as the Harvard Computers or, more derisively, as "Pickering's Harem". This was an example of what has been identified as the harem effect in the history and sociology of science.
1876

Mephisto, a chess-playing "pseudo-automaton" built in 1876 by Charles Godfrey Gumpel, an Alsatian manufacturer of artificial limbs. Unlike The Turk and Ajeeb it had no hidden operator, instead being remotely controlled by electromechanical means. Mephisto was shown at the Paris Exposition of 1889, operated by Jean Taubenhaus. After 1889 it was dismantled and its subsequent whereabouts are unknown. Mephisto consisted of a life-size figure of an elegant devil, with one foot rendered as a cloven hoof, dressed in red velvet and seated in an armchair in front of an unenclosed, open-sided table. This table set-up was provided to reassure the player that there were no compartments beneath the board where a man could be hidden (as in "The Turk"). In addition, the public was invited to inspect the contraption before each exhibition, with the intention of demonstrating that there was no player inside. The chessboard was noted as having had indentations on each square that held the bases of the chessmen to prevent them from moving unintentionally. The figure of Mephisto itself was bolted to the table at the chest to enable its arm full reach across the board. It was the first automaton to win a Chess tournament when it was entered in the Counties Chess Association in London in 1878 and at one time had its own chess club. In 1879 Mephisto, with Gunsberg, went on tour, defeating every male player. When playing ladies, however, Mephisto would first obtain a winning position before losing the game then courteously offer to shake their hand afterwards.
1879
The Harvard Observatory, publishes *The Observatory Pinafore*, a parody of Gulbert and Sullivan's opera H. M. S. Pinafore (1878), describing the joy and harassment of the daily routines of human computers, and which was played by the computers themselves:

"We work from morn till night
For computing is our duty
We're faithful and polite
And our record book's a beauty
With Crelle and Gauss, Chauvenet and Peirce
We labor hard all day;
We add, substract, multiply and divide,
and we never have time to play."
1882
Étienne-Jules Marey invents the chronophotographic gun, an instrument was capable of taking 12 consecutive frames a second, with all the frames recorded on the same picture. Using these pictures he studied studied animal and human motions. The technique will be later on used to analyse and optimize motion of workers.
1884

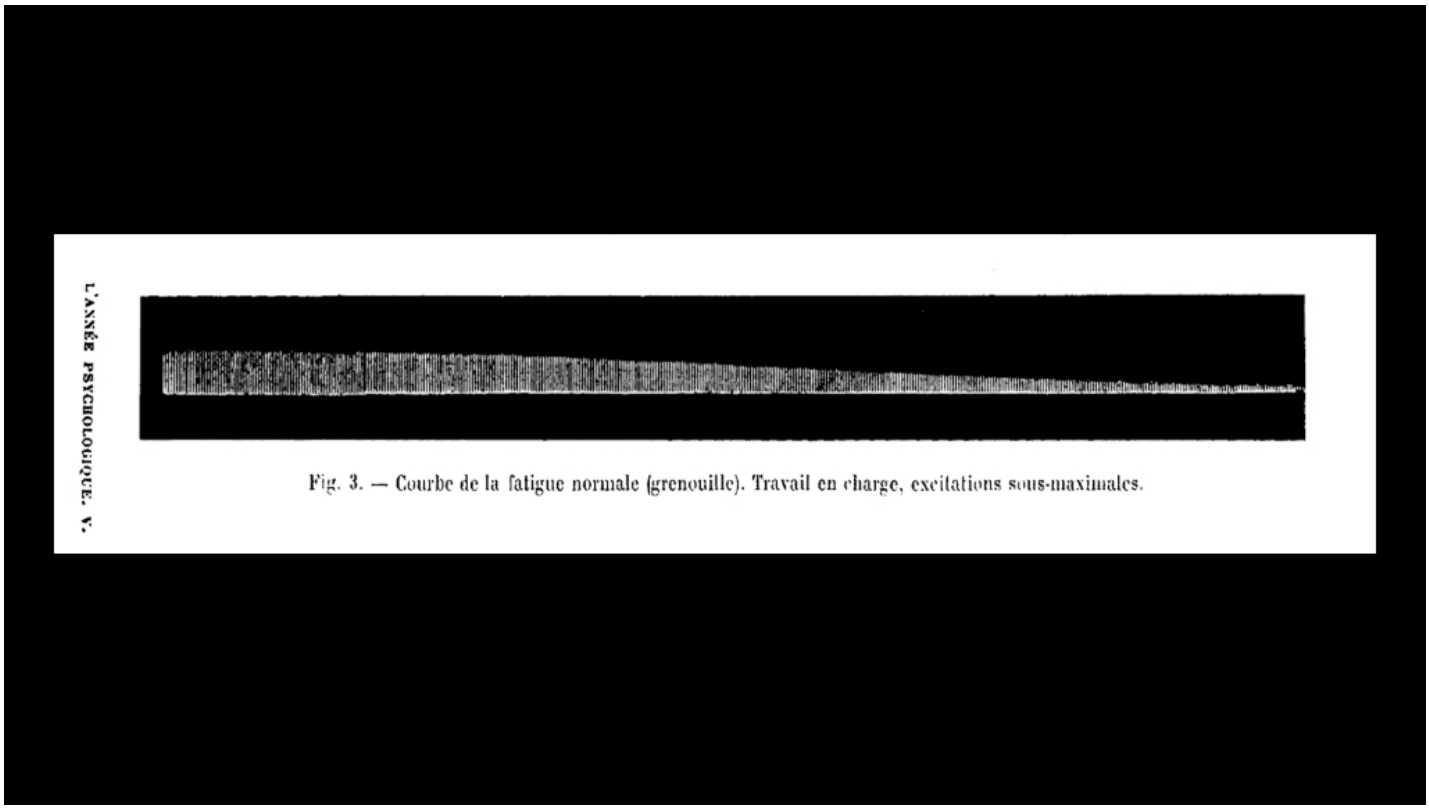

C
M'
M''
M
A


A
A'
B
C
D

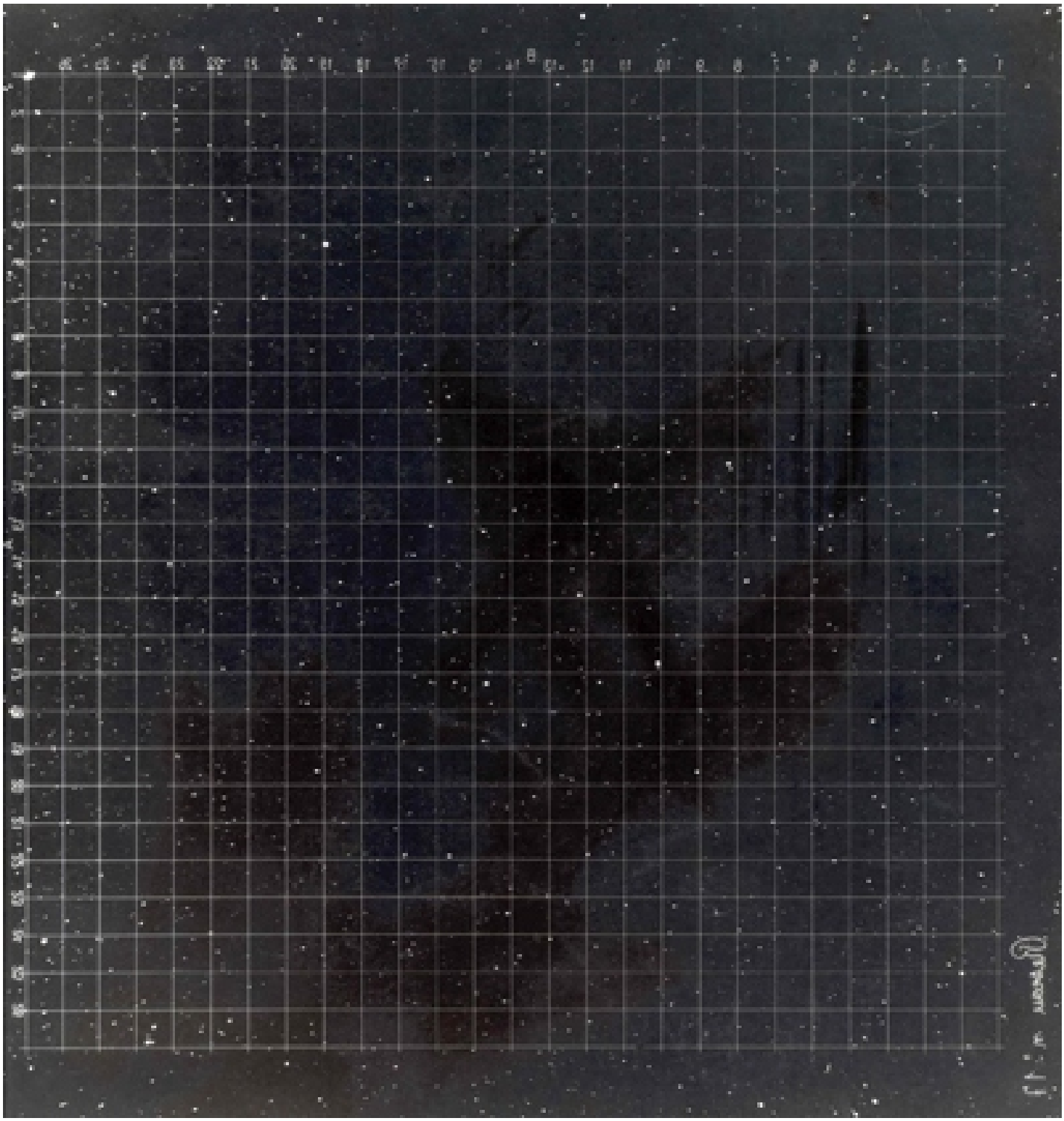


Ergograph, Angelo Mosso
Allows to measure the mechanical work of humans muscles and the changes led by fatigue.
The hand was attached to a table, a weight attached to the major, via pulley, and the major must be folded up (lifting the weight) until exhaustion.

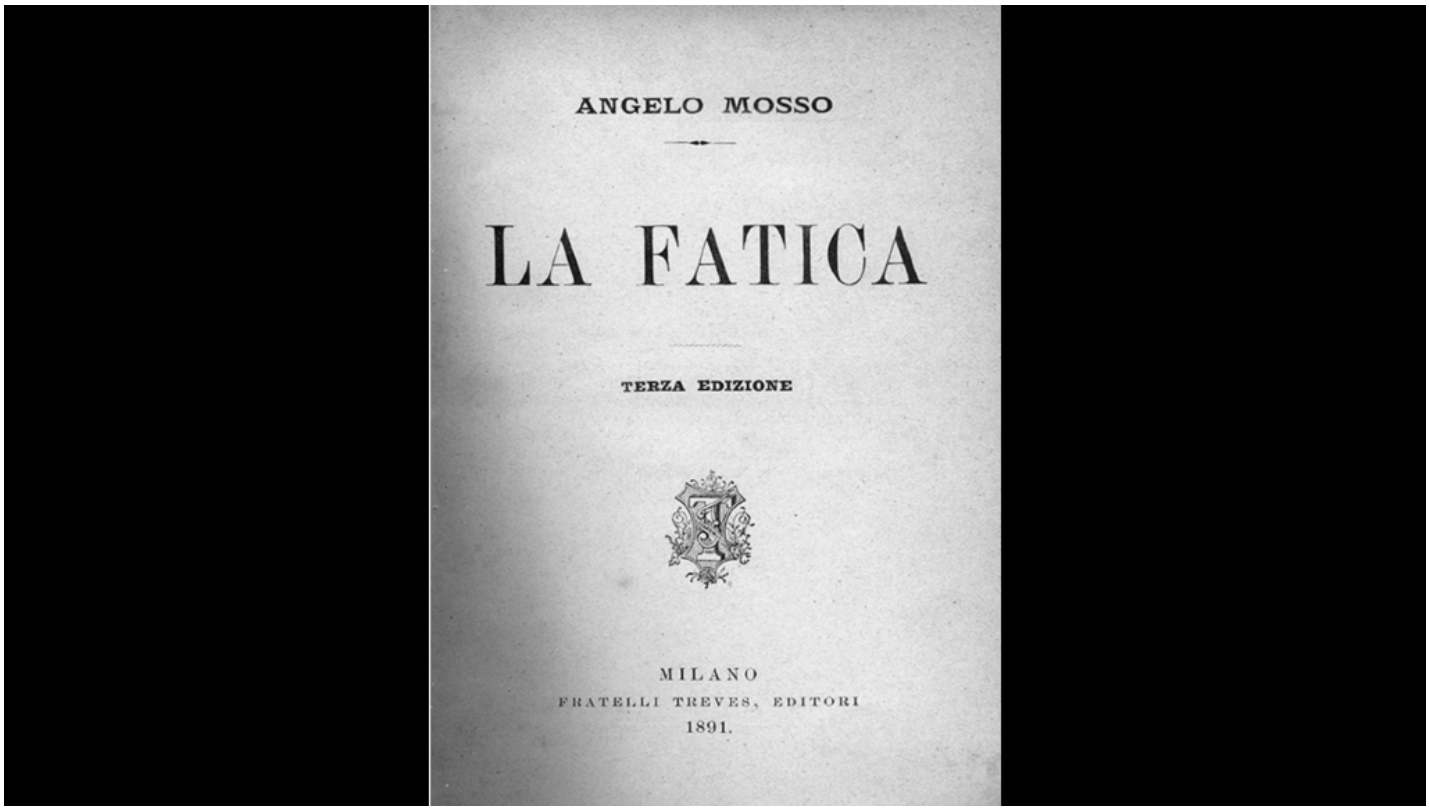
Marey's graphical method is applied either to the body, nor to the members and to the muscles, but to the phenomenon of the fatigue.
1884



Courbes de fatigue, Angelo Mosso
1887



On the initiative of its new director, the admiral Amédée Mouchez, the Observatory of Paris initiates an international program to map the stars, the Carte du Ciel project, in collaborartion of 18 international observatory around the globe (Algiers, Bordeaux, Greenwich, Sydney, Toulouse, etc.).
1889
Max Rubner, student of Voit, physiologist hygienist, invents the calorimeter.
1891



Angelo Mosso, physiologist and social educator in Turin, mechanist materialism approach, studies muscular fatigue, takes part of the science of the fatigue.
1892
The Observatory of Paris, to process the data of the Carte du Ciel project, opens a computing division mainly constituted by women, under the direction of the american astronomer Dorothea Klumpke, first woman to receive a PHD in astronomy.
1894

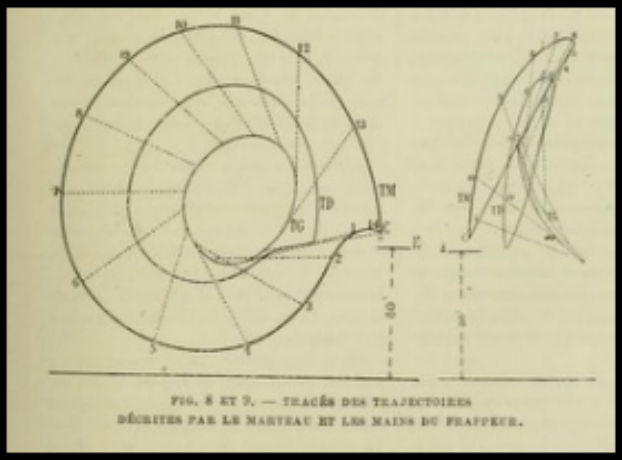
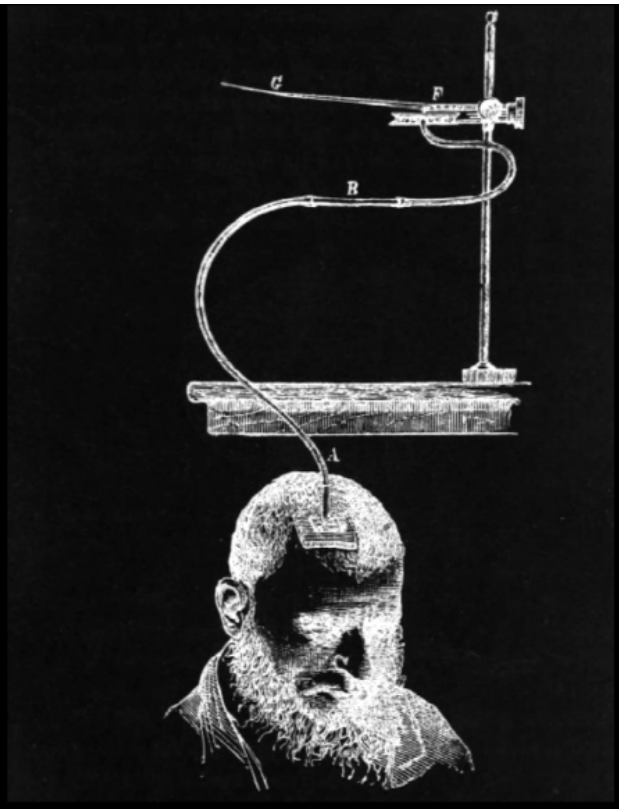


FIG. 8 ET 9. — TRACÉS DES TRAJECTOIRES
DÉCRITES PAR LE MARTEAU ET LES MAINS DU FRAPPEUR.

Charles Frémont, an assistant of Étienne-Jules Marey, publishes in le monde moderne, a series of chronophotogaphs of a study on "the motions of workers in their professional environement".
1894



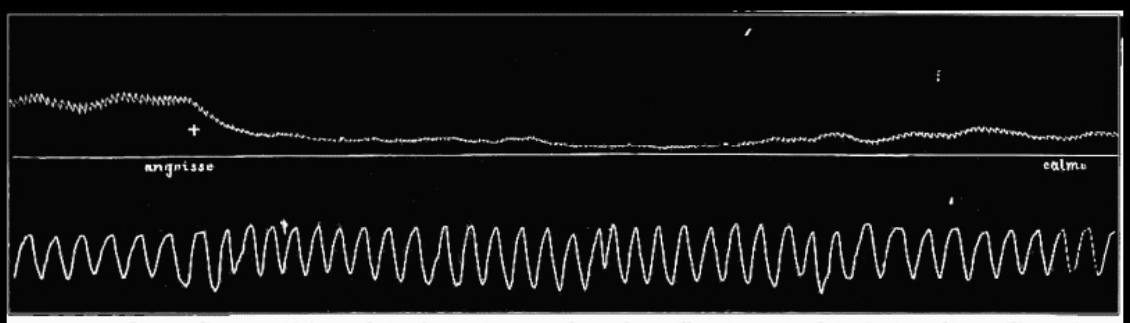


Fig. 34. — Influence d'une anxiété morale sur la respiration et le pouls capillaire. Le sujet doit réprimander un élève qu'on attend au laboratoire, et il est vivement ému en entendant un coup de sonnette, croyant que c'est l'élève qui arrive. Le coup de sonnette a lieu à l'endroit marqué par une croix. Le mot calme est écrit au moment où le sujet déclare spontanément qu'il est redevenu calme et que son émotion est terminée.

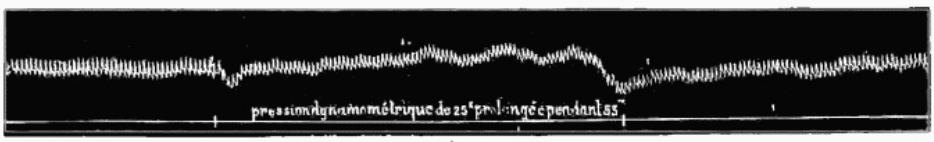
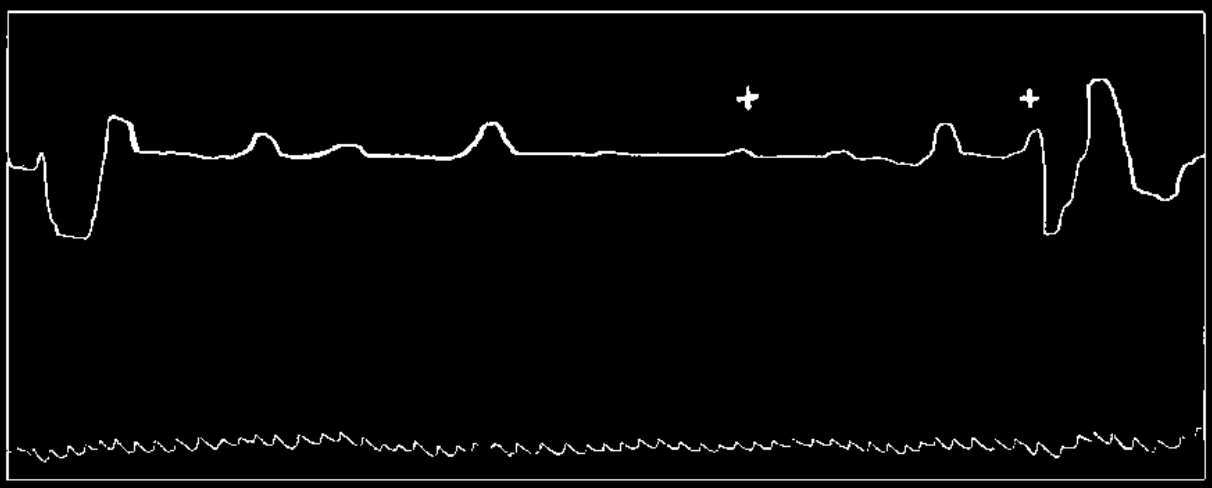


Fig. 35. — Influence de l'effort musculaire d'une main sur le pouls capillaire de l'autre main. Pendant l'effort, le pouls se rapetisse ; après l'effort, il augmente d'amplitude et présente un dicrotisme amolli.



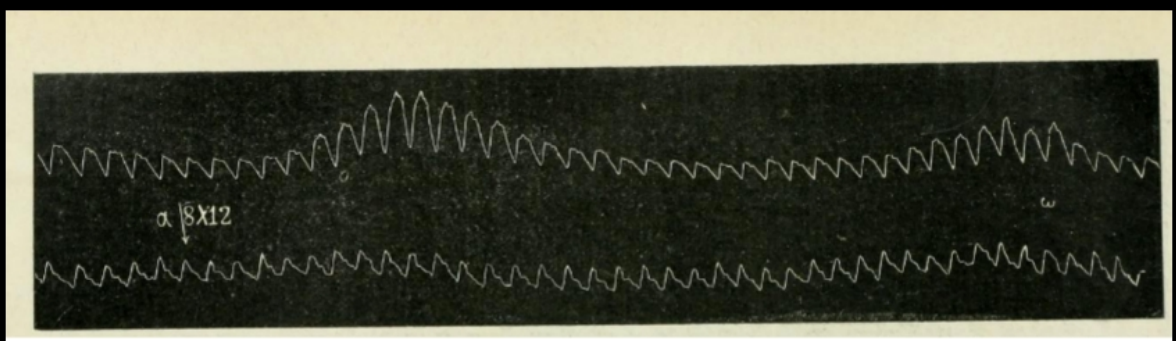


Figure 3.4 Pulse of Head and Hand During Mental Work. From Alfred Binet, *La fatigue intellectuelle* (Paris: Schleicher Frères, 1898), 78.

Etude de la fatigue mentale, Alfred Binet
Alfred Binet, hygienist.
His tests of intelligence conduct to a metric scale of intelligence. Fatigue is taken as a physiological phenomenon.
Alfred Binet uses ergometer and aesthesiometer to mesure the intellectual fatigue.
1894
"*Psychologie des grands caculateurs et joueurs d'échecs*", Alfred Binet

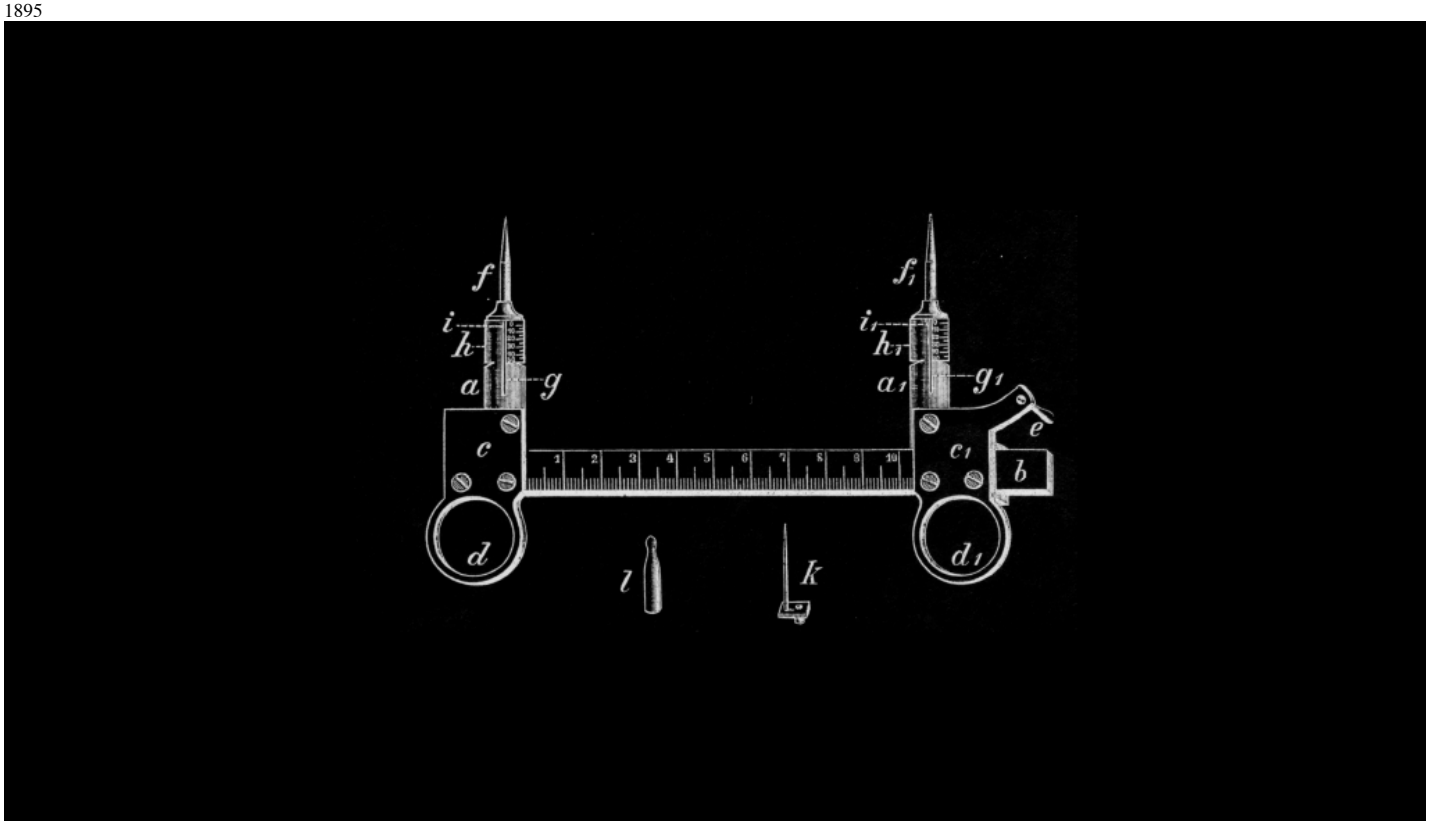
This article presents the result of an investigation conducted by A. Binet on chessplayers. This investigation aims to understand what kind of mental effort is produced by a chessplayer playing simultaneous parties, in a blind mode.

"*Les joueurs consultés s'accordent d'abord à déclarer que la vision mentale des pièces elles-mêmes leur serait plus nuisible qu'utile : ce qu'ils retiennent et se représentent de chaque pièce, ce n'est pas son aspect extérieur, mais sa puissance, sa portée et sa valeur, enfin sa fonction. Un fou n'est pas un morceau de bois de forme plus ou moins bisarre: c'est une "force oblique". La tour est une certaine puisssance de "marcher en ligne droite", le cavalier "une pièce qui équivaut à peu près à trois pions et qui se meut selon une loi toute particulière", etc. Voilà pour les pièces prises isolément. Voici maintenant pour la partie elle-même. Ce qui est présent à la mémoire du joueur, c'est une certaine composition de forces, ou mieux une certaine relation entre des puissances alliées ou hostiles. Le joueur refait mentalement l'histoire de la partie depuis le début. Il reconstitue les événements successifs qui ont amené la situation actuelle. Il obtient ainsi une représentation du tout qui lui permet, à un moment quelconque, de visualise telle ou telle partie. Cette représentation abstraite est d'ailleurs une. Elle implique une pénétration réciproque de tous les éléments les uns dans les autres. Ce qui le prouve, c'est que chaque partie apparaît au joueur avec une physionomie qui lui est propre. Elle lui donne une impression sui generis. "Je la saisis comme le musicien saisit dans son ensemble un accord", dit un des joueurs consultés. Et c'est justement cette différence de physionomie générale qui permet à la mémoire du joueur de retenir plusieurs parties sans les confondre entre elles.*"

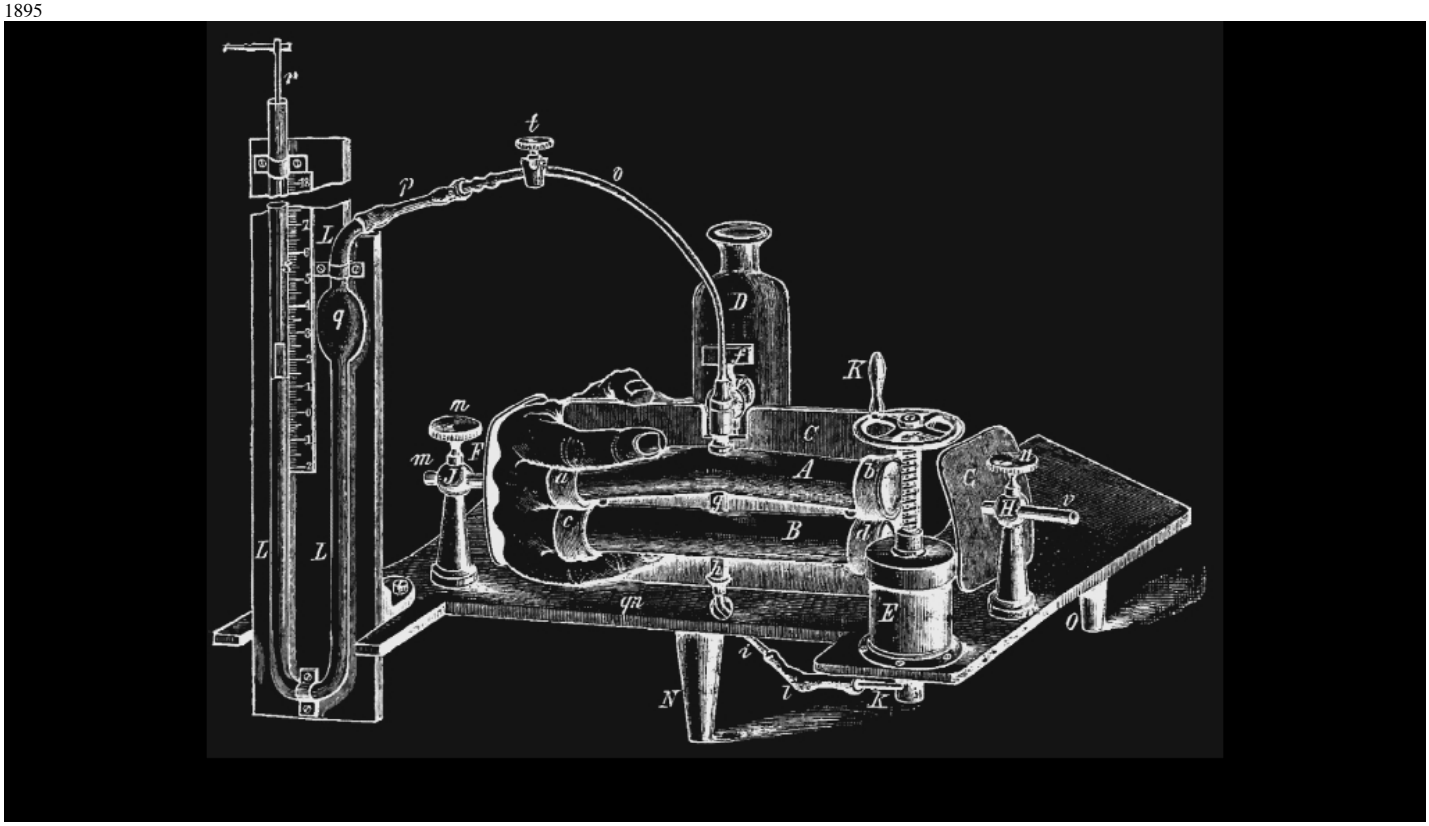
Source: Binet Alfred. H. Bergson, Note sur la conscience de l'effort intellectuel. In: L'année psychologique. 1901 vol. 8. pp. 471-478. Binet, in his article "Note sur la conscience de l'effort intellectuel" quotes Henri Bergson (H. Bergson, L'effort intellectuel. In: Revue philosophique. jan. 1902 T53. pp. 1-27) who refers to Alfred Binet himself (Binet, Psychologie

des grands caculateurs et joueurs d'échecs, Paris 1894).

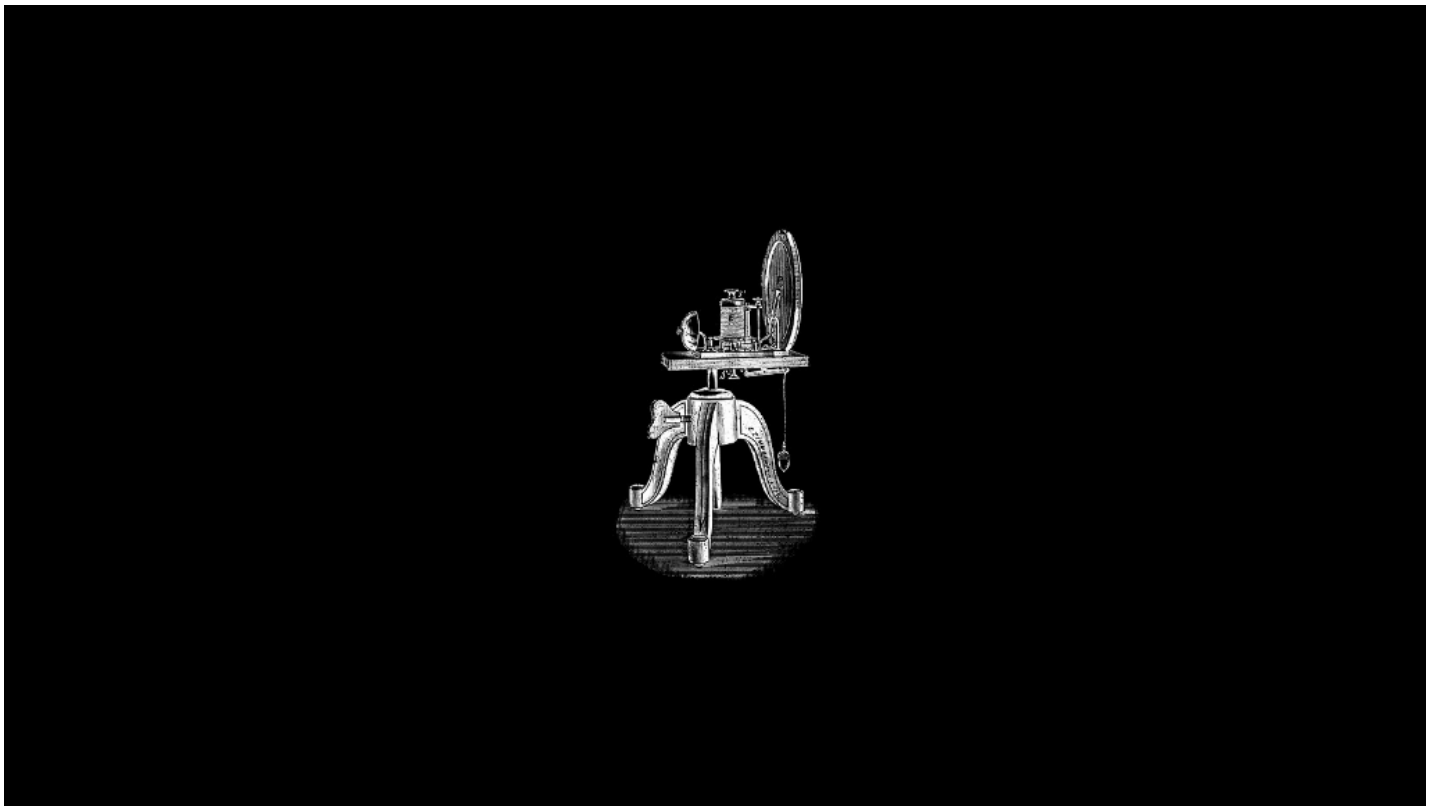
1895



Aesthesiometer, Herman Griesbach
1895

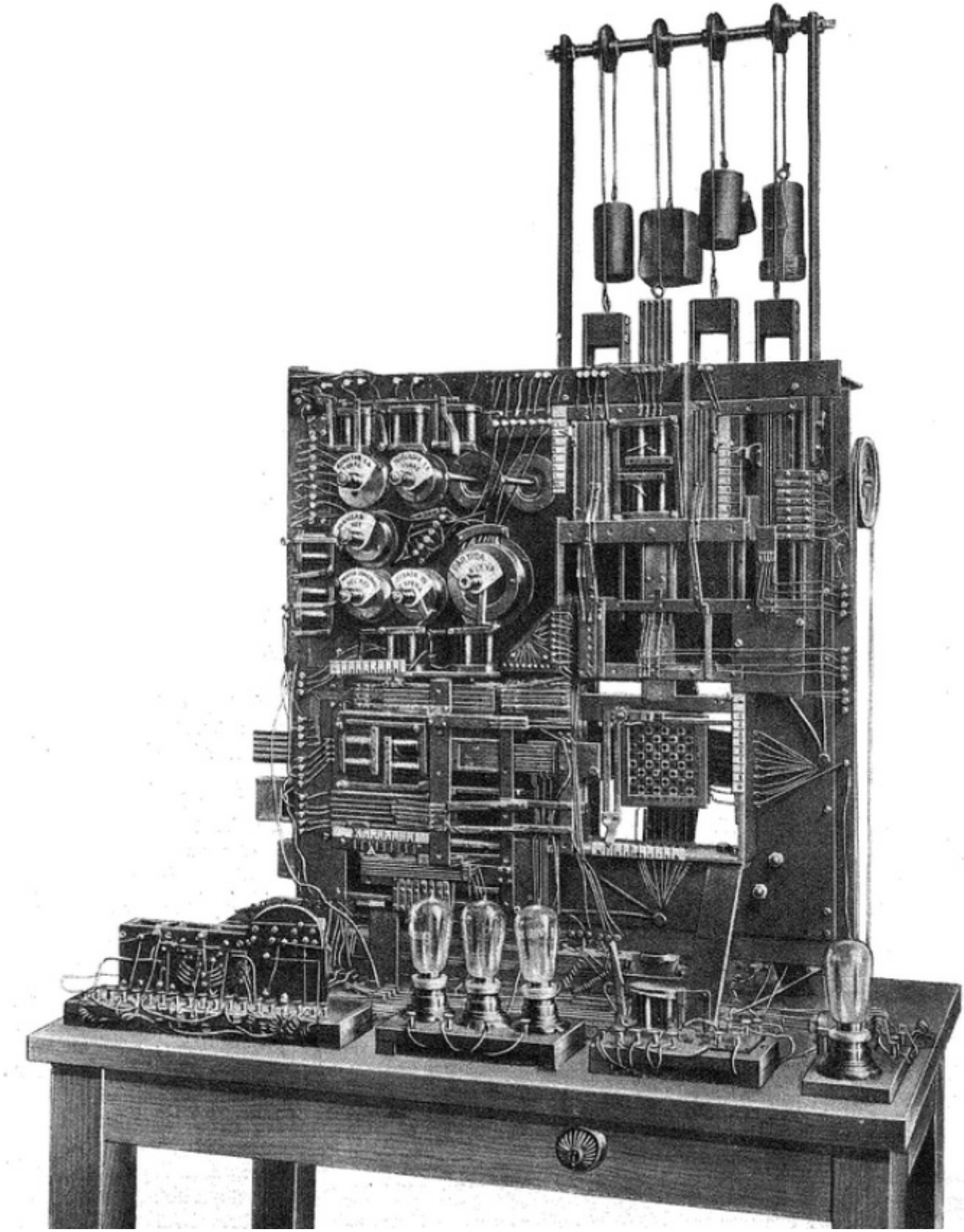


Sphygmomanometer, Angelo Mosso (publication date of the schematics, in L'année psychologique. Alfred Binet. 1895. Vol. 2, n° 1., pp. 582-588.)
To measure humans blood pressure.
1895
1895. Creation of Le bureau des Dames , in Toulouse Observatory, within the project Carte du ciel. The bureau is first constituted of two women computers, and will only grow afterwards.
1901



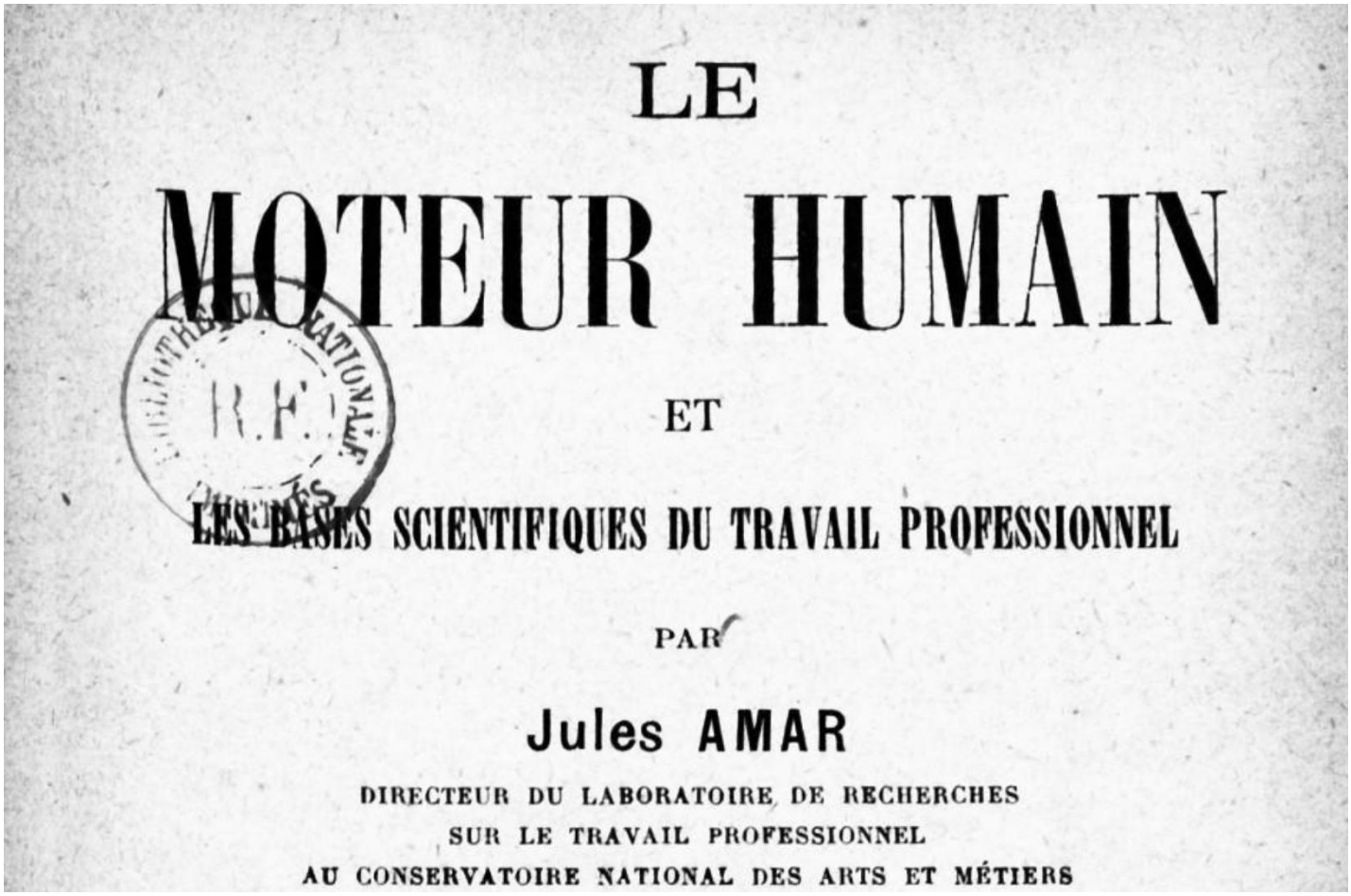
Audiometer (attention mesurement), Emile Kraepelin
Emile Kraepelin, german psychiatrist, was a strong and influential proponent of eugenics and racial hygiene. Wellknown for his work on mental desease classification.
Emile Kraepelin has worked on the impact of fatigue on work performances and efficiency. He rejects the use of ergograph to mesure the fatigue, and invent a methodology of intellectual fatigue based on the count of errors during the execution of simple mental exercises.
He invents a system of tracking of scholars, classified according to their working capacity, according to the needs of a civilization based on productivity.
Anson Rabinbach (The human motor, 1992) resumes Kraepelins vision as "Psychic and physiologialc processus need to be ajusted to the rythme of the machine, into harmonize corporal mechanisms with the machine's' ones".

Emile Kraepelin also worked on on diagrammatic representation of the "performance way" of the working performances. The course of the curve is affected by sign of tiredness appearing at every sequence of work, working fluctuations, exercise, adaptation, distraction, new impulse. According to Kraepelin, the danger of work lies in fatigue. "c'est dans la fatigue que réside le danger du travail".
1904
Following the researches of Francis Galton, Karl Pearson opens the Biometrics Laboratory at the university of London, experimenting with a new type of science of measurment that will establish later as statistics, recording data of various human and natural phenomena, to establish graphs and find correlations patterns. While working on various fields of anthorpology, botanics, eugenics, craniology, the laboratory specializes itself on statistical mathematics, inventing the Chi-squared test, and various formula for correlations. The input will be decisive to the rise of statistics.
1911
1911, FW Taylor, lays the bases of Taylorism in "The Principles of Scientific Management". The principles of scientific management propose a double division, where tasks are mainly conceived by enineers, transforming the work experience into an alienation. Many critics contended that it ignored "the human factor" and reduced workers to machines.
1911, Lous Renault visits several factories in the USA, discovering the disassembly line of slaugterhouses. The visit will be decisive and urges Louis Renault to implement in his factories an assembly line to produce shells and tanks in 1913.
1912



1912, Leonardo Torresy Quevedo built El Ajedrecista, one of the first fully automated chess player. In the first version, the pieces were plugged into the board, and the game states of check and checkmate were signaled with light bulbs. Leonardo's son Gonzalo made an improved chess automaton based on El Ajedrecista in 1920, which made its moves via electromagnets located under the board. It also included a sound effect, with a voice recording announcing checkmate when the computer won the game. Both machines are still working and are on display at the Colegio de Ingenieros de Caminos, Canales y Puertos in Madrid.
1913

1913, first introduction of an assembly line in Ford factories. The implementation of assembly lines in factories will grow slowly until the 20's, generalizing itself and leading to what is commonly known as Fordism. The assembly line system was introduced at Ford Motor Company, by William "Pa" Klann, upon his return from visiting a slaughterhouse in Chicago and viewing what was referred to as the "disassembly line", where carcasses were butchered as they moved along a conveyor.
1914


LE

MOTEUR HUMAIN

ET

LES BASES SCIENTIFIQUES DU TRAVAIL PROFESSIONNEL

PAR

Jules AMAR

DIRECTEUR DU LABORATOIRE DE RECHERCHES
SUR LE TRAVAIL PROFESSIONNEL
AU CONSERVATOIRE NATIONAL DES ARTS ET MÉTIERS

Le Moteur humain et les bases scientifiques du travail professionnel, Jules Amar, publication

Jules Amar wrote this book while he was Director of the professional muscular work's researches Laboratory, CNAM (1913-1920).
Source: Gallica, BNF
1914

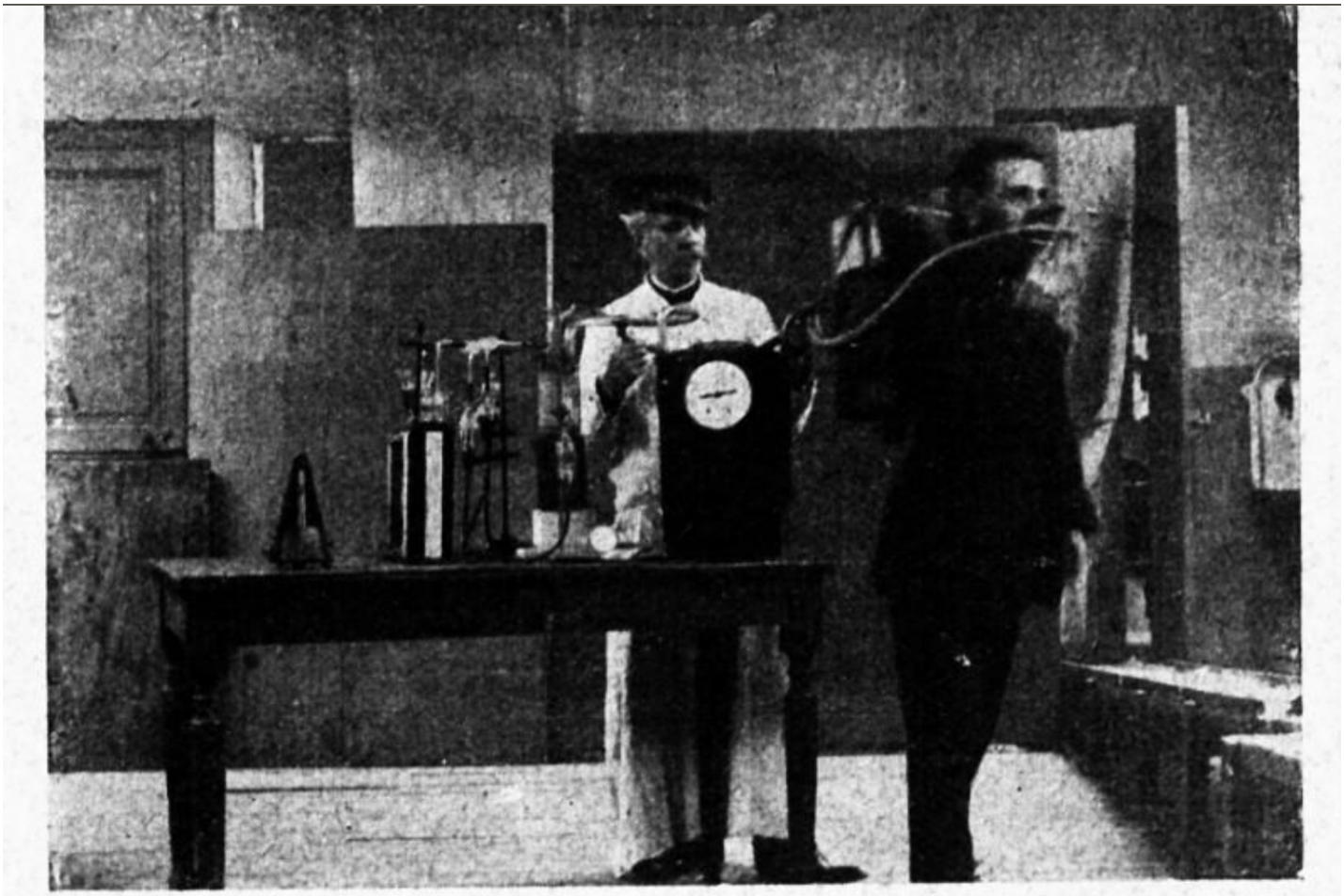


Fig. 132. — Mesure des échanges gazeux d'un homme chargé (dispositif de l'auteur).

Gaz exchanges measurement of a man loaded, Jules Amar

Source: Gallica, BNF Le Moteur humain et les bases scientifiques du travail professionnel, par Jules Amar,... Avec une préface de Henry Le Chatelier,... (1914)
1914

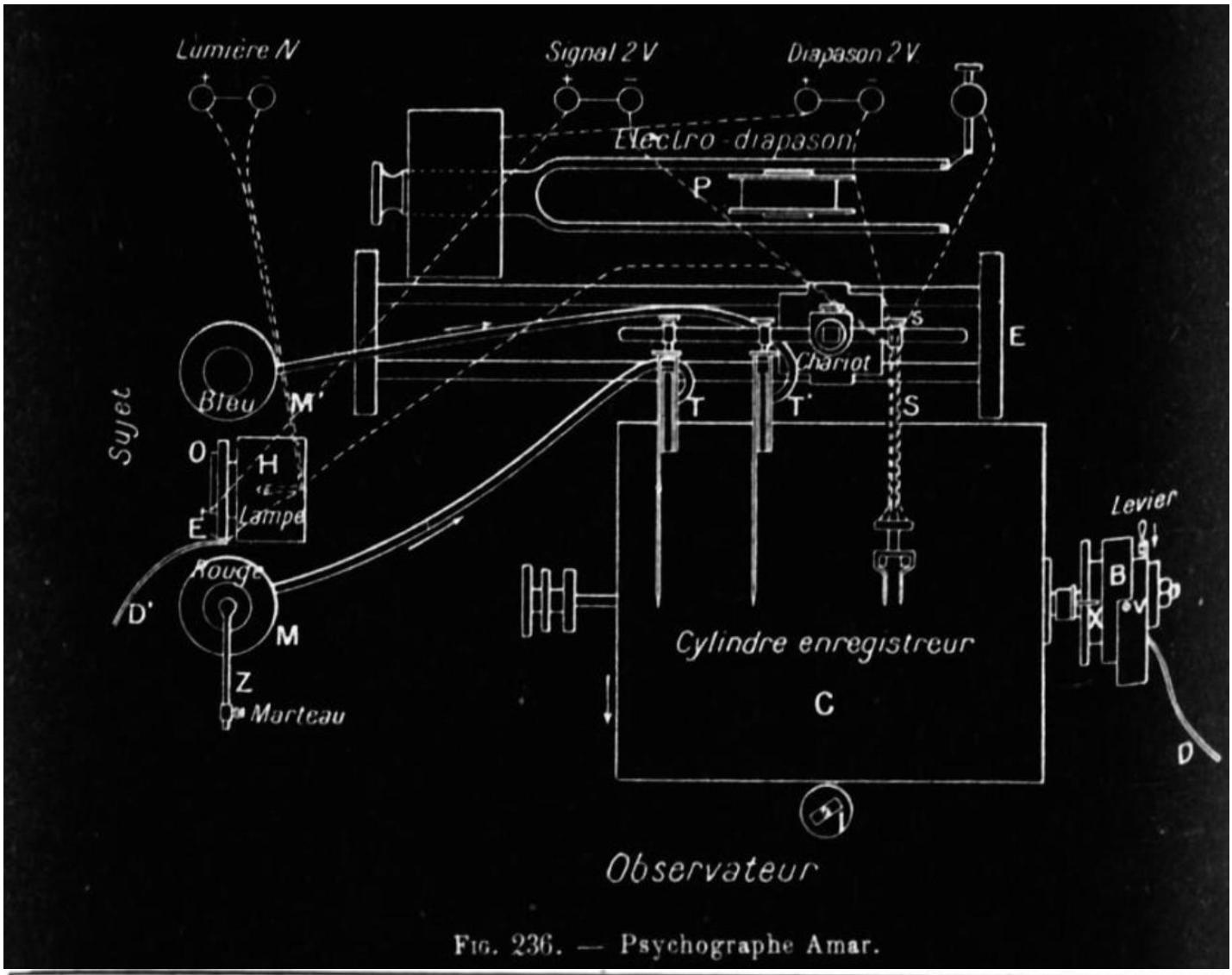
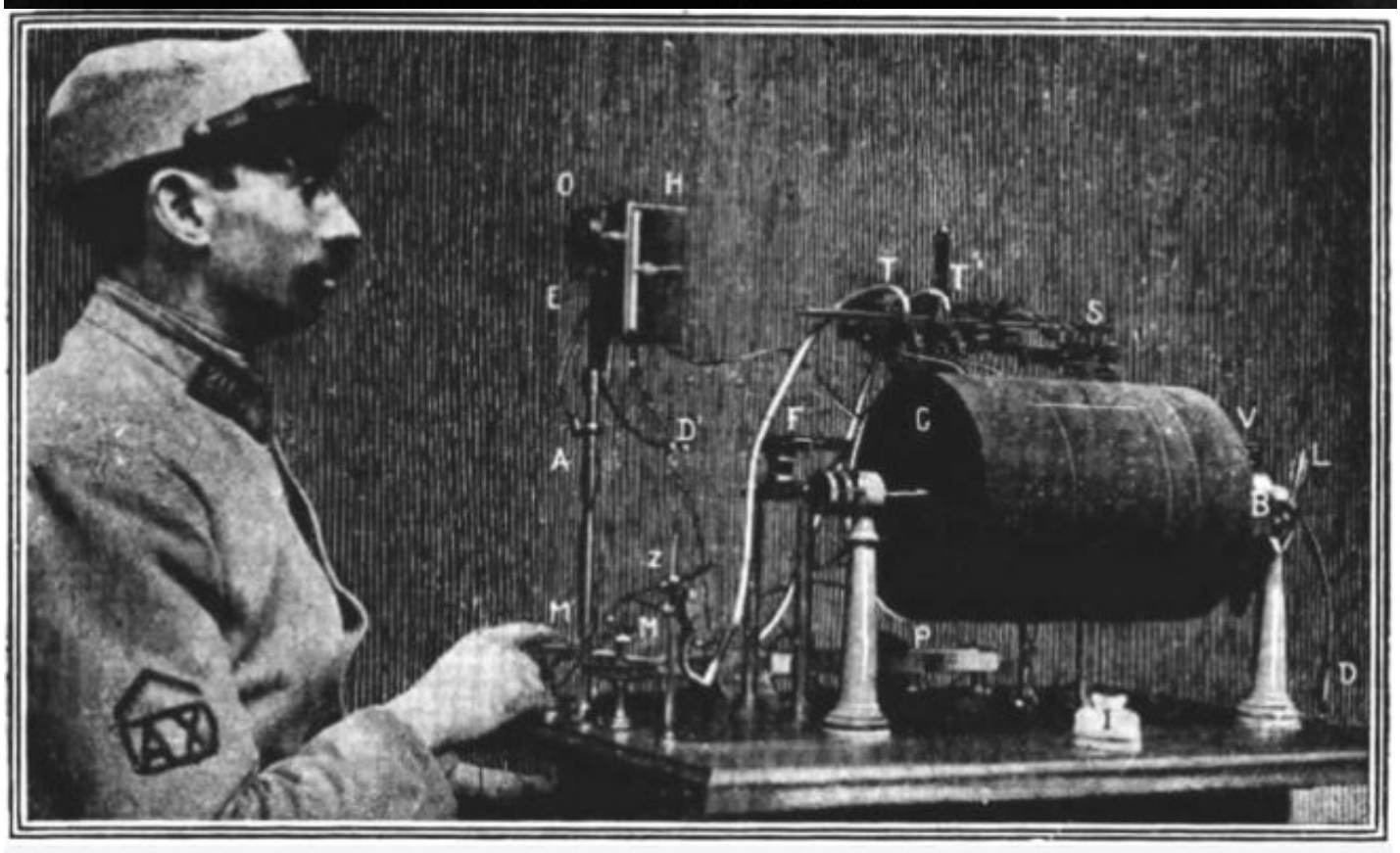
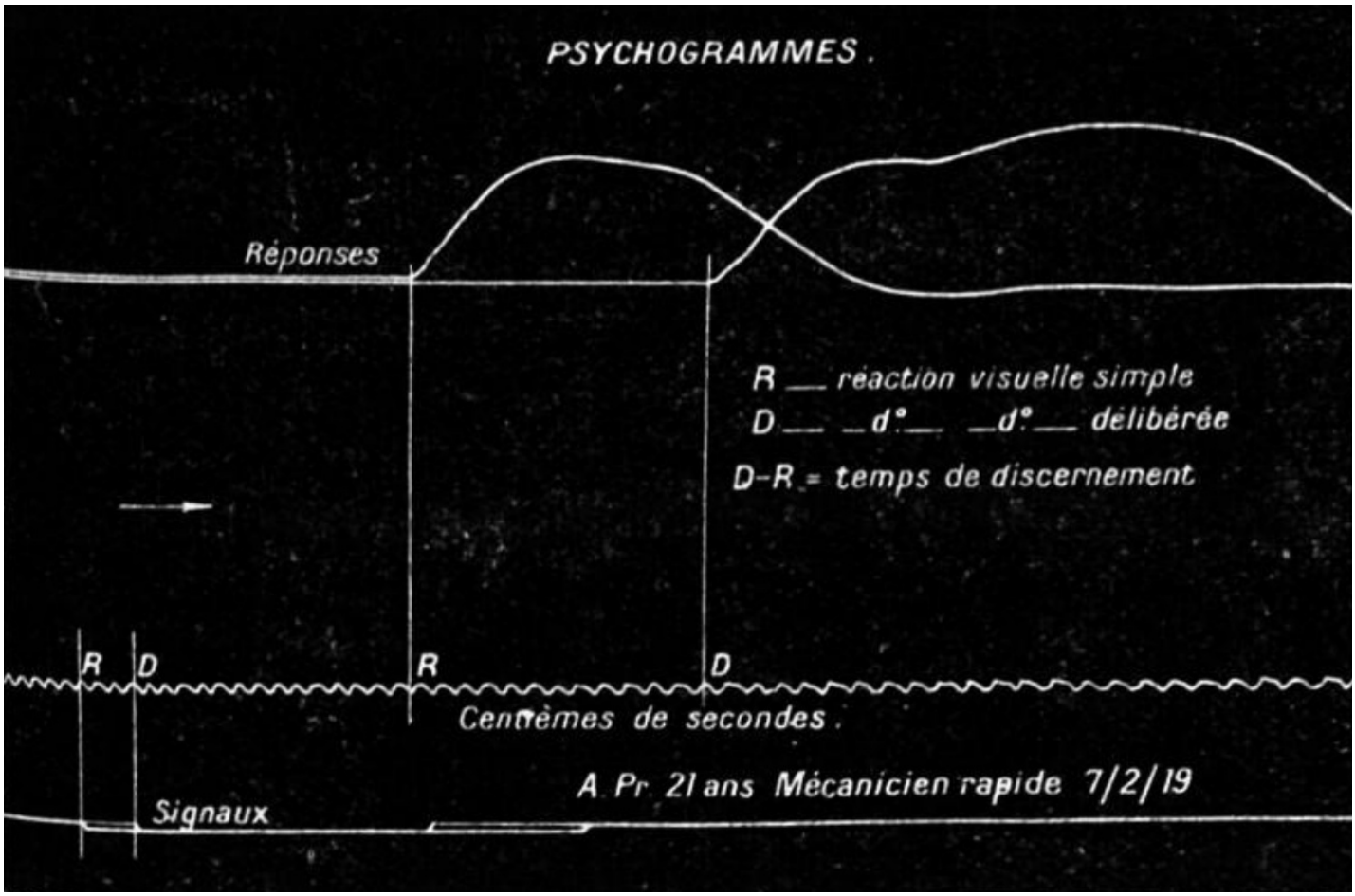


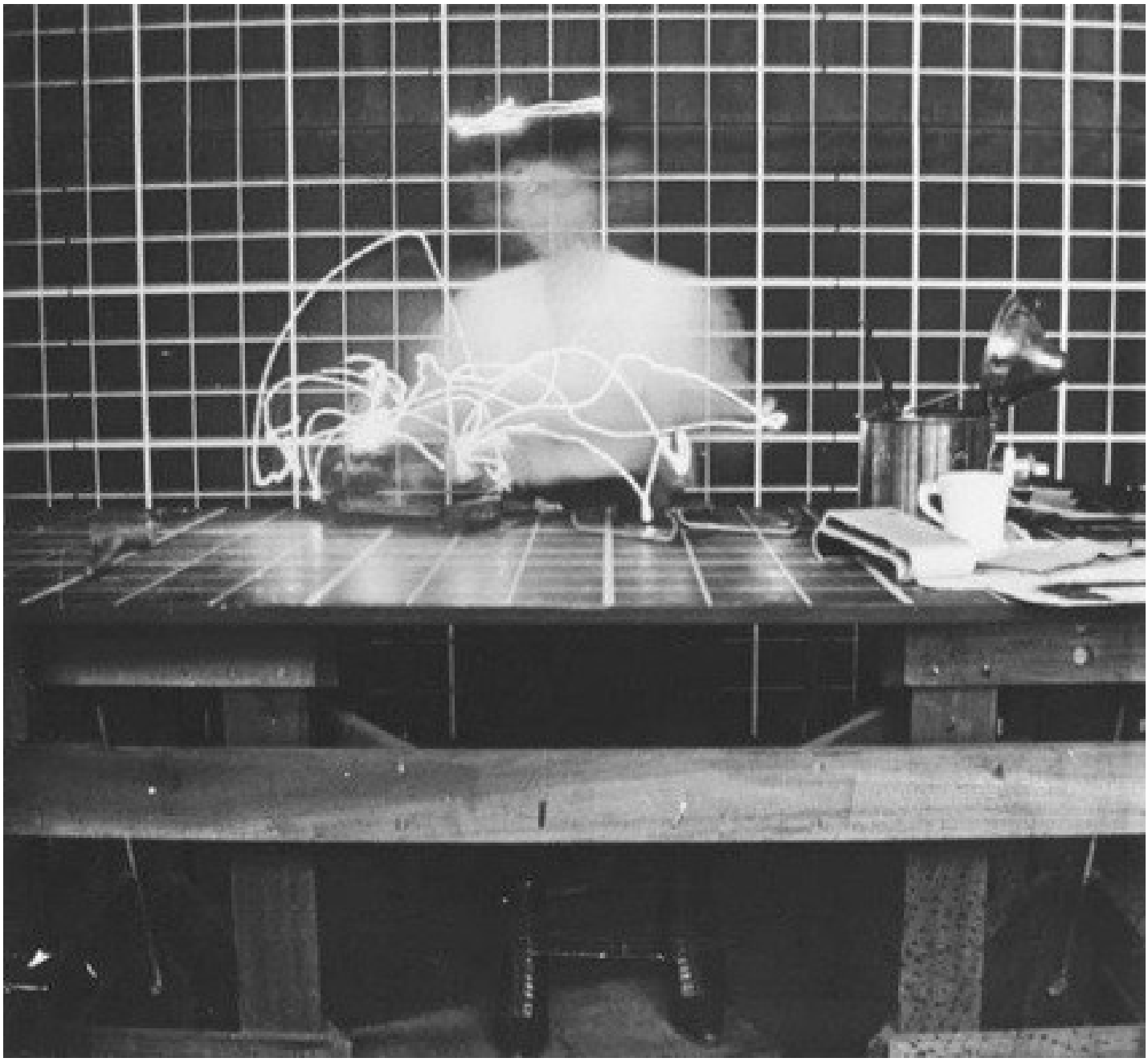
Fig. 236. — Psychographe Amar.





Psychograph, Jules Amar

The psychograph used to measure the acuity of the senses and the attention of the subject. For the sight test, the subject places a finger on a manometer (pressure gauge) and sets a target. As soon as he perceives a light appearing in front of him, he presses the manometer. A cylinder records the time between vision and reflex. Applications : factories recruitment and professional orientation. Source: Gallica, BNF Le Moteur humain et les bases scientifiques du travail professionnel, par Jules Amar,... Avec une préface de Henry Le Chatelier,... (1914)
1914



1914, Frank and Lillian Gilbreth begin their study on motion and efficiency and develops the technique of Chronocyclograph. Frank Gilbreth original films :

Frank Bunker Gilbreth (1868-1924). Original Films (motion study)

1914

1914, as the first World War generates a high demand on human computers to work on ballistic trajectories. Karl Pearsons Biometrics laboratory and its 10 computers turns their activities towards mathematical ballistics. After Meteorology and Statistics, computation establishes a new branches in ballistics.

1916

1916, Henri Fayol publishes its treaty on labor division Administration industrielle et générale, its theory will lead to Fayolism.

1918

1918, launch of the Aberdeen Proving Grounds, in Maryland, USA, under the supervision of Oswald Veblen. The Aberdeen site hosts engineers and mathematicians calculating shell trajectories, with a group of 42 compuers. The site is connected to the Washington office of experimental ballistics, that employs 16 computers. Among the mathematicians working in the Aberdeen Proving Grounds, a certain Norbert Wiener.

1920

1920, Czech writer Karol Čapek publishes its play R.U.R (Rossumovi Univerzální Roboti), It premiered on 25 January 1921 and introduced the word "robot" to the English language and to science fiction as a whole. The play begins in a factory that makes artificial people, called roboti (robots), from synthetic organic matter. They may be mistaken for humans and can think for themselves. They seem happy to work for humans at first, but a robot rebellion leads to the extinction of the human race.

1935, the Langley Memorial Aeronautical Laboratory (LMAL) the main research center for the National Advisory Committee for Aeronautics (NACA), opens a computing division. In 1946, the computing division have around 400 computers.

1938

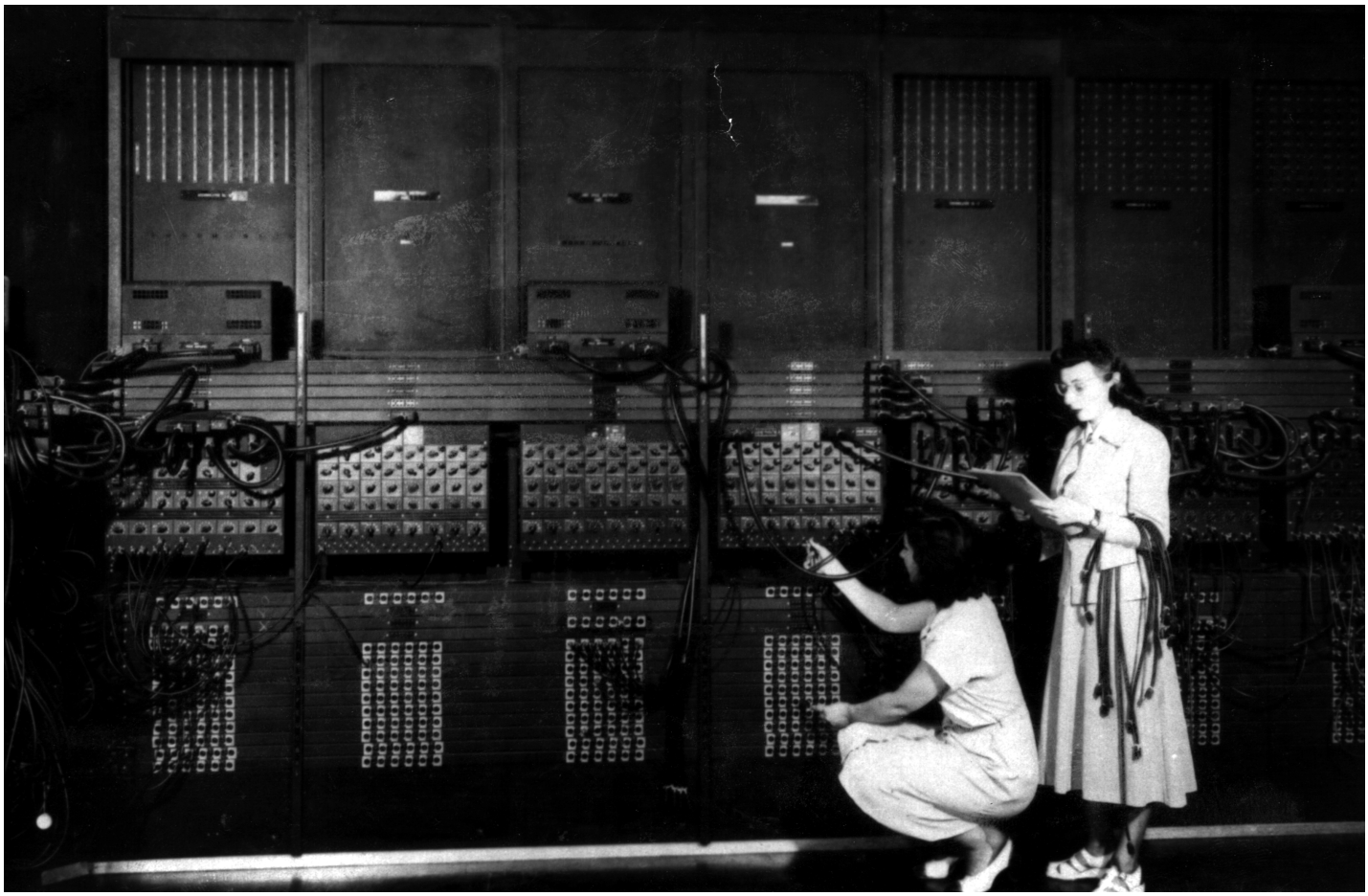
1938, the Works Progress Administration (WPA) initiates the Mathematical Tables Project, a work relief program for the achievement of mathematical tables project. The WPA employs about 450 clerks, and 120 computers to tabulate higher mathematical functions (such as exponential functions, logarithms, and trigonometric functions). All these tables are published by Columbia University Press in 28 volumes. The mathematical leader of the WPA was Gertrude Blanch, who had just finished her doctorate in mathematics at Cornell University.

1943

1943, despite of the termination of the WPA program, the Mathematical tables project continues its activity, under the supervision of the national Bureau of Standards, with a reduction of its staff, lowered to 25 computers. The computing division will compute various problem as a reserve computing ressource for the Manhattan project, or other military efforts. The MTP will be terminated in 1949.

1943, 49 computers of the Mathematical Tables Project, led by Milton Abramovitz, are moved by the Applied Mathematics Panel and the US NAVY, in the hudson terminal building to compute the tables for the LORAN navigation system, a joint program of Bell labs, MIT and the US Navy.

1943, in Los Alamos, working on the Manhattan Project, the T-5 computing group is led by Donald Moll Flanders, working on the Fat Man program. Mathematical plans are established by Richard Feynman. Computers were mostly women, and included Mary Frankel, Josephine Elliot, Beatrice “Bea” Langer, Augusta "Mici" Teller, Jean Bacher, Kay Manley. On the follwoing of de Prony and Gertrude Blanch Feynman radiclizes the division of work, by introducing standard index cards that moves to computers. The method is so fats that it rivals IBM Punched-Card tabulators. A race is organized between human computers and IBM computers, won by the latter.
1944
1944, the units "girl-years" and "kilogirl" (1 thousand hour of computation) are used by the Applied Mathematics Panel. David Grier, in his reference book on the subject also claims that : "*sometime in 1944, computers became girls*".
1946



1946, 14 february, the ENIAC is formally dedicated in Philadelphia, at the University of Pennsylvania. THe operators, commonly known as the ENIAC Girls, are recuited in the former AMP project. Their names are : Kathleen McNulty, Frances Bilas, Betty Jean Jennings, Elizabeth Snyder Holberton, Ruth Lichterman and Marlyn Wescoff.
1948
1948, The Mathematical Table projects is asked to compute a problem on elimination by John Von Neumann, in order to compare computing peformances of humans towards machine. While human computers accomplish the problem in 21 days, the ENIAC completes it in only 9 hours.
1950

MC22 F 102

15.51

South Tamworth, New Hampshire

August 13, 1949

Mr. Walter Reuter
Union of Automobile Workers
Detroit, Michigan

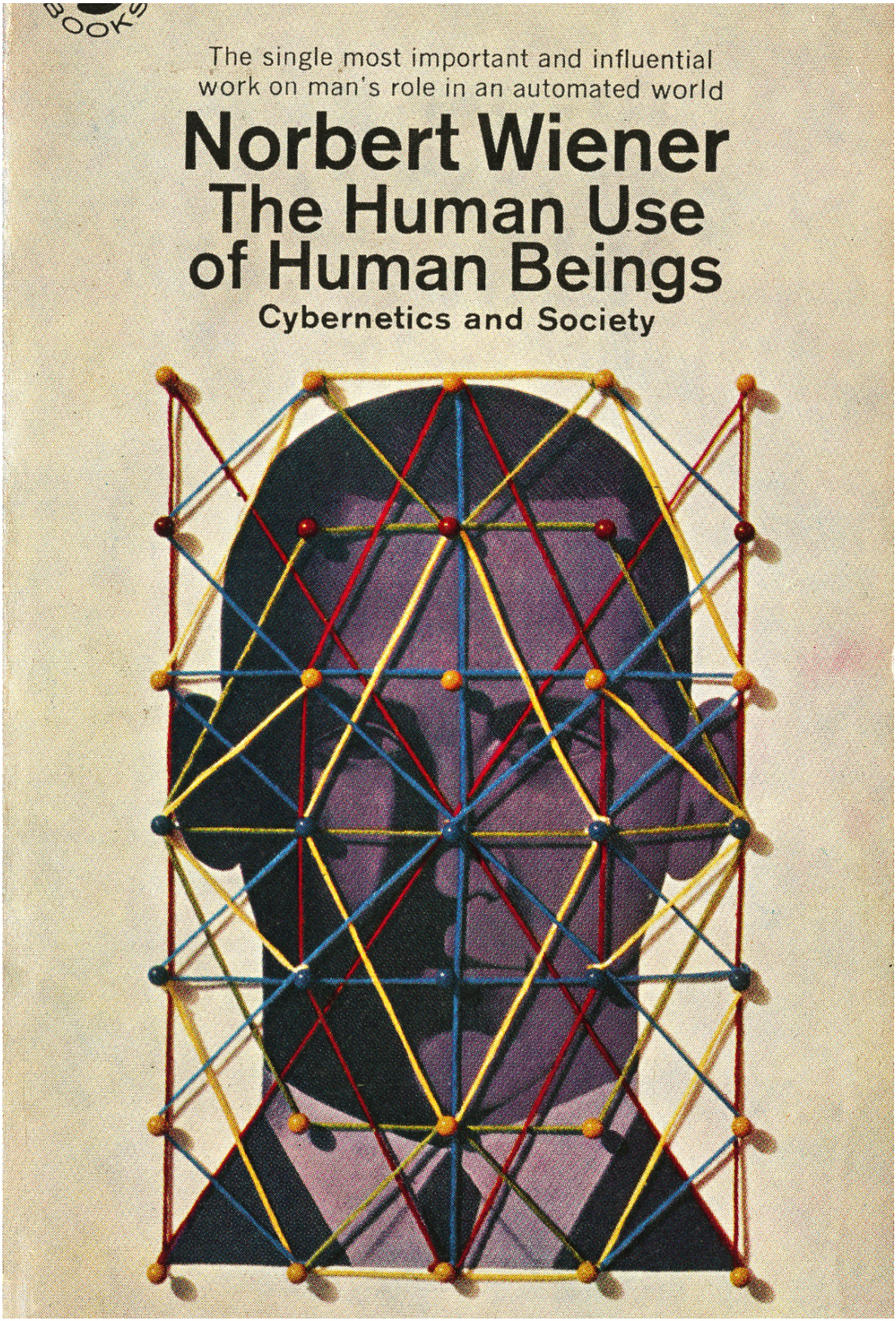
Dear Mr. Reuter:

First, I should like to explain who I am. I am Professor of Mathematics at the Massachusetts Institute of Technology, and I am the author of the recently published book, Cybernetics, (Wiley and Sons and the Technology Press). As you will see, if you know of this book, I have been interested for a long time in the problem of automatic machinery and its social consequences. These consequences seem to me so great that I have made repeated attempts to get in touch with the Labor Union movement, and to try to acquaint them with what may be expected of automatic machinery in the near future. This situation has been brought to a head by the fact that I have been approached recently by one of the leading industrial corporations with the view to advising them as to whether to go into the problem of making servo-mechanisms, that is, artificial control mechanisms, as part of their extended program.

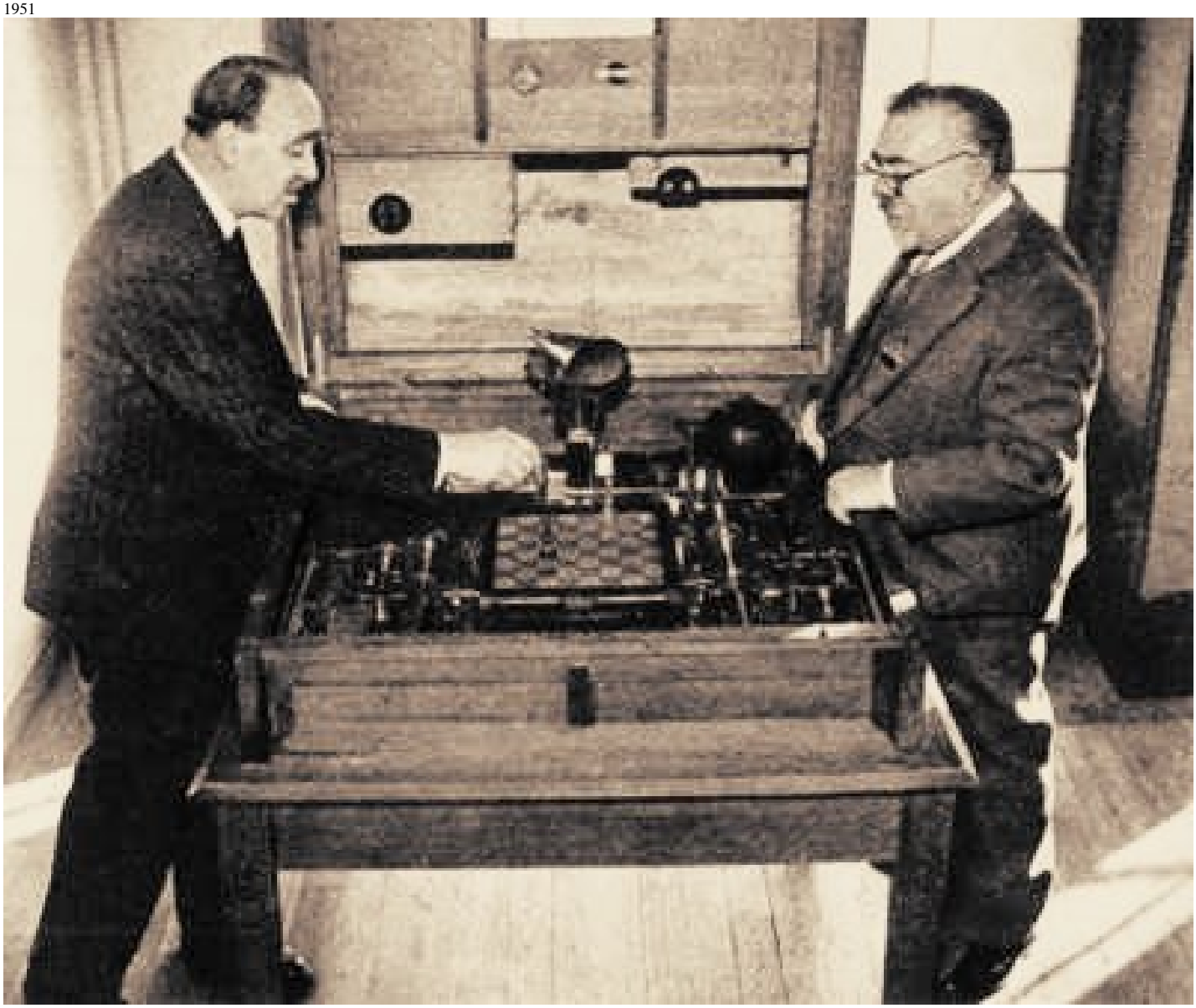
Technically I have no doubt what direction my advice should take. My technical advice would be to construct an inexpensive small-scale, high-speed computing machine, together with adequate apparatus for putting the readings of photo-electric cells, thermometers, and other instruments into the machine as numerical data, and for putting numerical output data into the motion of shafts and other output apparatus. The position of these output shafts should be monitored by proper sense organs, and be put back into the machine as part of the information on which it is to work.

The detailed development of the machine for particular industrial purpose is a very skilled task, but not a mechanical task. It is done by what is called "taping" the machine in the proper way, much as present computing machines are taped. This apparatus is extremely flexible, and susceptible to mass production, and will undoubtedly lead to the factory without employees; as for example, the automatic automobile assembly line. In the hands of the present industrial set-up, the unemployment produced by such plants can only be disastrous. I would give a guess that a critical situation is bound to

Norbert Wiener sends a letter to the Union of Automobile Workers President, Walter Reuter, to warn the against automation, and its possible effect on workers and employment.
1950
1950, Alan Turing proposes the Turing Test in its seminal article Computing machinery and intelligence. The test proposes a new definition of what could be artificial intelligence.
1950


BOOKS
The single most important and influential work on man's role in an automated world
Norbert Wiener
The Human Use of Human Beings
Cybernetics and Society

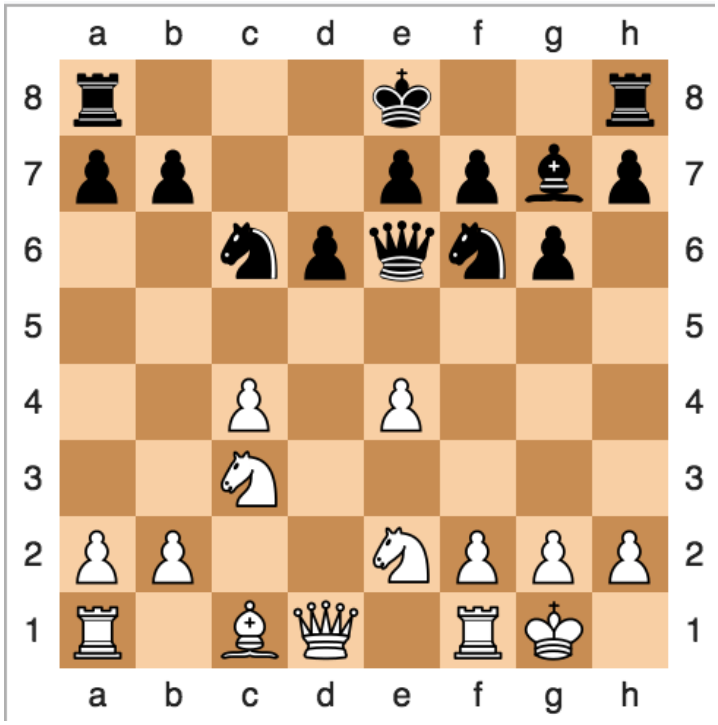
Norbert Wiener publishes "The Human Use of Human Beings, Cybernetics and Society", a vulgarized verion of his seminal book Cybernetics, without any mathemiatcal equations.
1951

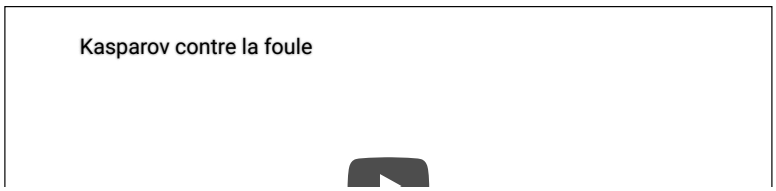


Norbert Wiener plays against El Ajedrecista in the 1951 Cybernetic Convention in Paris.
1962

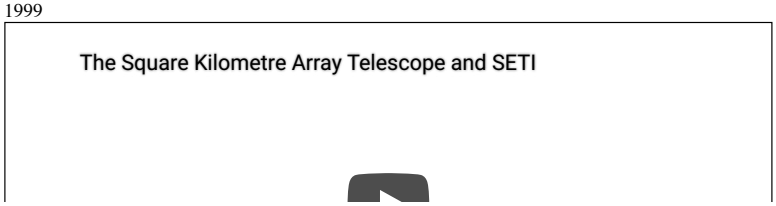
Toyota adpots the principles of "Just in Time" Production, by Taichi Ohno, later known as Toyotism.
1996

IBM's Deep Blue wins against Garry Kasparov.
1999

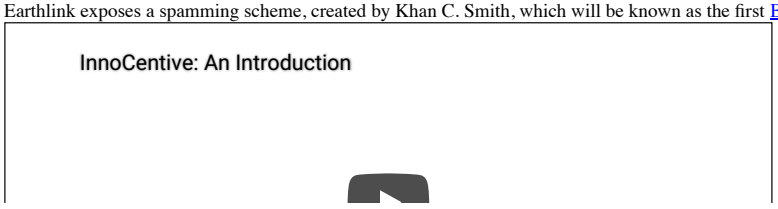




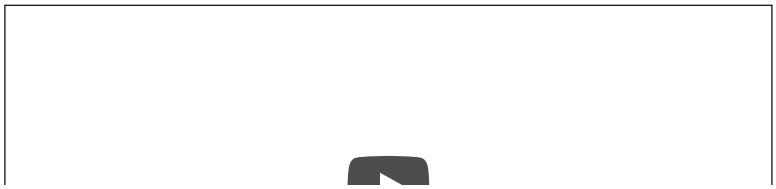
Garry Kasparov is invited to play against 50 000 amateur players from 75 different countries, all together : In this collective chess game, each move from the crowd is determined by a vote. Players have 24 hours to propose the move they deem most appropriate for the next round, after which the choice of the majority is reproduced on the chessboard. The game lasted 4 mounths.
After his victory, Kasparov said "It is the greatest game in the history of chess. The sheer number of ideas, the complexity, and the contribution it has made to chess make it the most important game ever played". cf. Kasparov Against the World, Gary Kasparov, Daniel King (2000).
Source: La sagesse des foules I, Mehdi Moussaïd (researcher at Max Planck institute, Berlin)
1999



Debut of SETI@home, an Internet-based public volunteer computing project employing the BOINC software platform created by the Berkeley SETI Research Center and is hosted by the Space Sciences Laboratory, at the University of California, Berkeley. Its purpose is to analyze radio signals, searching for signs of extraterrestrial intelligence, and as such is one of many activities undertaken as part of the worldwide SETI effort.
2000
Luis von Ahn and Blum developp the CAPTCHA method (Completely Automated Public Turing test to tell Computers and Humans Apart).
Launch of Distributed Proofreaders, a web-based project that supports the development of e-texts for the Project Gutenberg, by allowing many people to work together in proofreading drafts of e-texts for errors.
ClickWorkers, a small NASA experimental project, used public volunteers (nicknamed "clickworkers" on the site) for scientific tasks. Clickworkers are able to work when, and for however long they choose, doing routine analysis that would normally require months of work by scientists or graduate students.
2001
Earthlink exposes a spamming scheme, created by Khan C. Smith, which will be known as the first BotNet.



InnoCentive, an open innovation and crowdsourcing company. They enable organizations to put their unsolved problems and unmet needs, which are framed as ‘Challenges’, out to the crowd to address. InnoCentive provides a network of over 380,000 problem solvers. Awards, typically monetary, are given for submissions that meet the requirements set out in the Challenge description. The average award amount for a Challenge is $20,000 but some offer awards of over $100,000.
2005
Amazon launches its MTurk service, a micro-task website, whose name is a direct reference to Von Kempelen's hoax.
2006
August 1st, launch of Stardust@home, a citizen science project that encourages volunteers to search images for tiny interstellar dust impacts. The project began providing data for analysis on August 1, 2006.
Birth of ChaCha, a human-guided search engine. The company was disabanded in 2016. ChaCha answered questions through the use of independent contractors called Guides. Guides were paid $0.02 per answer.
2007
Creation of Mahalo.com, a web directory (or human search engine. It differentiated itself from algorithmic search engines like Google and Ask.com, by tracking and building hand-crafted result sets for many of the currently popular search terms. Mahalo.com contracted human editors to review websites and write search engine results pages that include text listings, as well as other media, such as photos and video.
Release of ReCPATCHA, a system designed to protect websites from bots, and, at the same time, assist in the digitization of books.



Launch of Galaxy Zoo is a crowdsourced astronomy project which invites people to assist in the morphological classification of large numbers of galaxies. It is an example of citizen science as it enlists the help of members of the public to help in scientific research. Galaxy Zoo recruited volunteers to help with the largest galaxy census ever carried out. Opening the project to the general public saved the professional astronomers the task of studying all the galaxies themselves, resulting in classification of a large number of galaxies undertaken in a shorter time than what smaller research teams would be able to do, classifying 900,000 galaxies in months rather than years if done by smaller research teams. Computer programs had been unable to reliably classify galaxies: several groups had attempted to develop image-analysis programs.

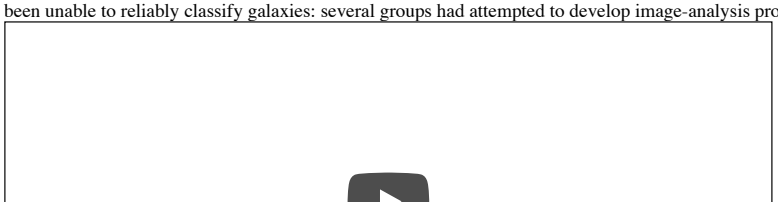
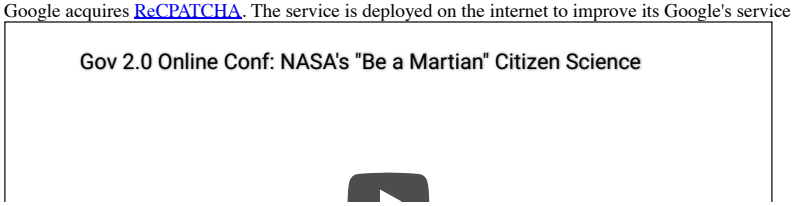


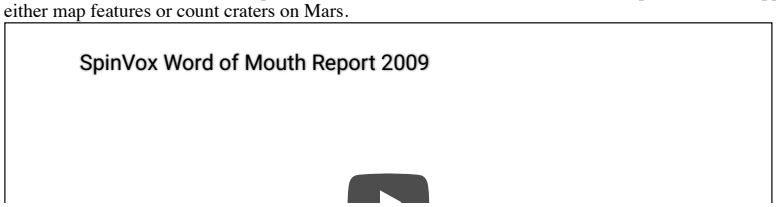
Figure Eight is a human-in-the-loop machine learning and artificial intelligence company based in San Francisco. The company has raised $58 million in venture capital. Figure Eight works with companies such as Autodesk, Google, Facebook, Twitter, Cisco Systems, GitHub, Mozilla, VMware, eBay, Etsy, Toyota and American Express.

2009

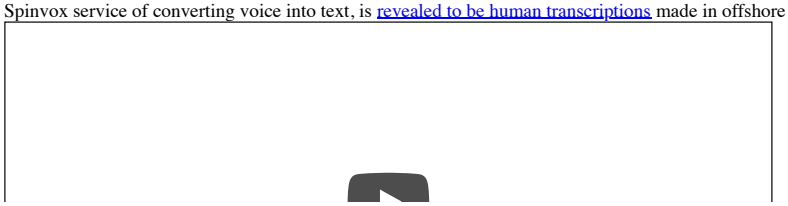
Google acquires ReCPATCHA. The service is deployed on the internet to improve its Google's service of book digitalization and train its automatic character recognition.



NASA announced to have developed a new website to allow volunteer users to help in Martian mapping. The site Be a Martian went live on November 17, 2009, and allows users to either map features or count craters on Mars.



Spinvox service of converting voice into text, is revealed to be human transcriptions made in offshore centers, in south africa and philippines.

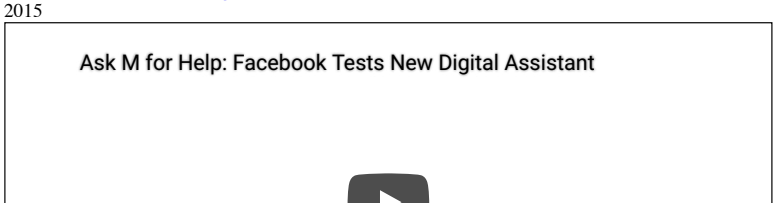


2010, the company Internet Eyes launched a service where in return for a potential reward, home viewers would watch live CCTV streams and alert shop owners of potential theft in progress.

2014

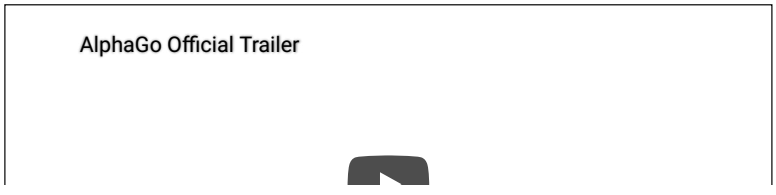
Twitter announces on its blog that it uses Amazon MTurkers to refine searches correlations.

2015

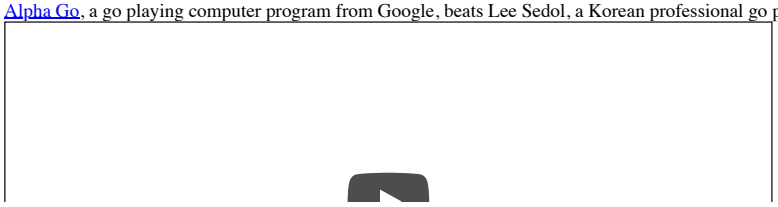


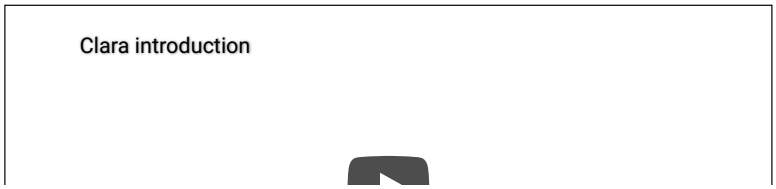
Facebook Virtual Assistant M, is unveiled being sub-powered by humans. Mike Schroepfer, Facebook's CTO, explained that : *"It's primarily powered by people. But those people are effectively backed up by AIs. The idea here is, you can ask it any question, not just the set of questions that it's capable of. The thing that's cool about this is it gives us a much wider training set, like what are the things people actually want it to help them [with]."* Service is shut down on 8th jan 2018.

2016

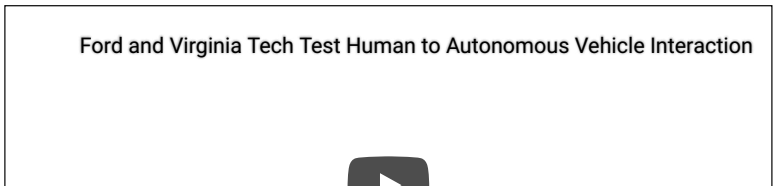


Alpha Go, a go playing computer program from Google, beats Lee Sedol, a Korean professional go player.

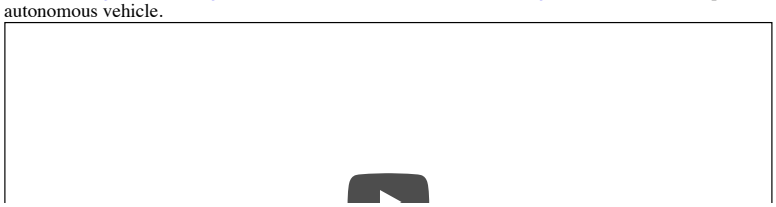




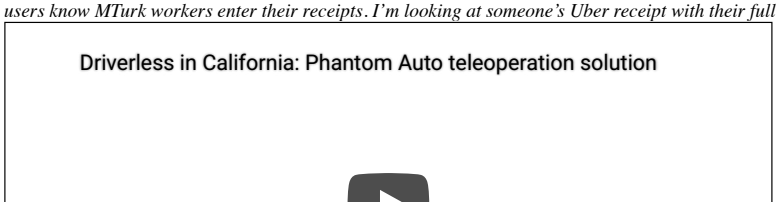
an article from Ellen Huet details that the chatbots Clara and Amy Imgram (from X.ai), but also virtual assistants such as Mezi, Magic, GoButler, supposedly based on powerfull AI, are in fact human fueled.
2017



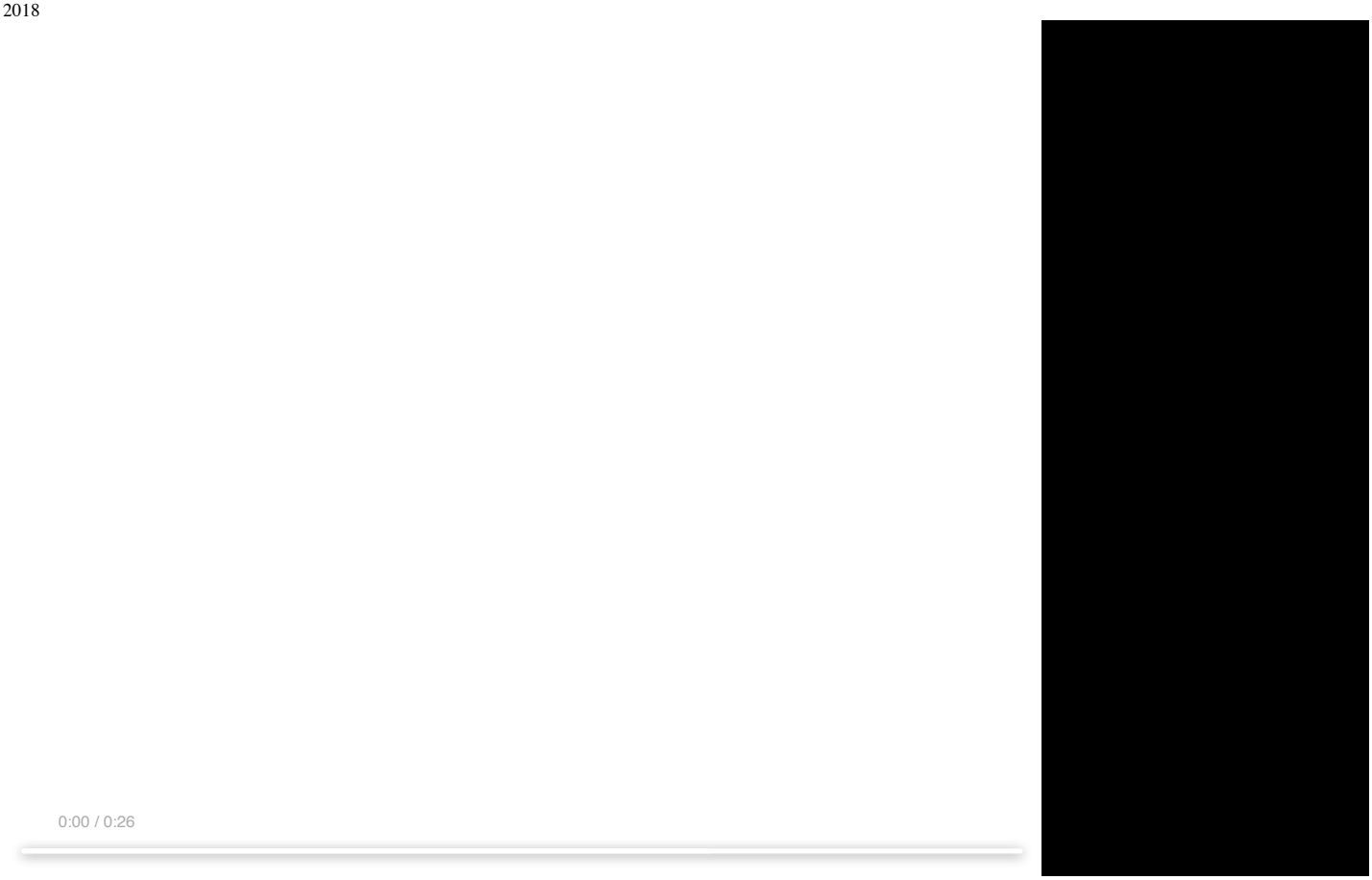
Ford and Virginia Tech disguises a man as a seat, in a fake self-driving car, to evaluate how passers-by, other drivers on the road and cyclists reacted to sharing the road with an autonomous vehicle.



Expansify's “smart” scanning technology was secretly aided by humans, as revealed on twitter by a mechanical turk, Rochelle LaPlante. She wrotes: *"I wonder if Expensify SmartScan users know MTurk workers enter their receipts. I'm looking at someone's Uber receipt with their full name, pick up, and drop off addresses."*



Phantom Auto, an israeli stratup that provides remote human drivers for 'self driving cars' announces a partnership with the city of Sacramento
2018



Scale, a startup raised 18M USD on the market for its army of 10,000 human computers and works with a plethora of businesses that are developing autonomous vehicle systems such as General Motors' Cruise, Lyft Zoox, Nuro, Voyage, nuTonomy and Embark. Autonomous Vehicles companies are not its only customers, though. Scale also works with several non-automotive companies like Airbnb and Pinterest, to help build their AI-based visual search and recommendation systems.
an article reveals that Google works with several third-party services for price-comparison are travel itinirary applications for Gmail. Most of those third-party contractors, such as Edison Tech, are based on humans computing force.
HUMAN COMPUTERS | RYBN.ORG 2018