

History of Psychology

Session 3: The birth of Psychology

Rui Mata, Center for Cognitive and Decision Sciences
October 7, 2024

Session information

Sessions take place Mondays, 8.15-9.45, Chemie, Organische, Grosser Hörsaal OC.

#	Date	Topic	Instructor	Slides	Reading
1	23.09.2024	Session 1: Introduction	Tisdall	pdf	Ball (2012)
2	30.09.2024	Session 2: Pre-psychology	Mata	pdf	Markie & Folescu (2023)
3	7.10.2024	Session 3: The birth of psychology	Mata		
4	14.10.2024	Session 4: Psychoanalysis	Mata		
5	21.10.2024	Session 5: Behaviorism	Mata		
6	28.10.2024	Session 6: Gestalt psychology	Mata		
7	4.11.2024	Session 7: Cognitive psychology	Mata		
8	11.11.2024	Session 8: Psychology today	Tisdall		
9	18.11.2024	Session 9: Psychotherapy research	Tisdall		
10	25.11.2024	Session 10: Psychological testing	Tisdall		
11	2.12.2024	Session 11: Decision science	Tisdall		
12	9.12.2024	Session 12: What kind of science is psychology?	Mata		
13	16.12.2024	Exam (Bernoullianum, Grosser Hörsaal 148)			

Learning Objectives for Today

- Identify key cultural/scientific movements of the 19th century and their influence on psychology, in particular 1) evolutionary theory, 2) neuropsychology, and 3) the social sciences
- Identify the 19th century as the “birth” and institutionalisation of scientific Psychology, involving a series of innovations in the study of the mind
- Identify the first “schools” in Psychology - structuralism and functionalism - and their main divergence

“You care for nothing but shooting, dogs, and rat-catching, and you will be a disgrace to yourself and all your family.”

Darwin's father writing about a 16-year-old Charles Darwin

The Origins of Evolutionary Theory: Beagle Voyage

The Voyage of the HMS Beagle (Dec 1831-Oct 1836)



In 1831 the HMS Beagle sailed off from England towards South America. The commander wanted to have a naturalist with expertise in geology on board. Darwin spent three years and three months on land, 18 months at sea. During the voyage Darwin found gigantic fossils of extinct mammals, collected and made detailed observations of plants and animals, which provided the basis for his theory of evolution by natural selection.

BBC Documentary: The Genius of Charles Darwin

<https://www.youtube.com/watch?v=ZtkZMAMgHaU>

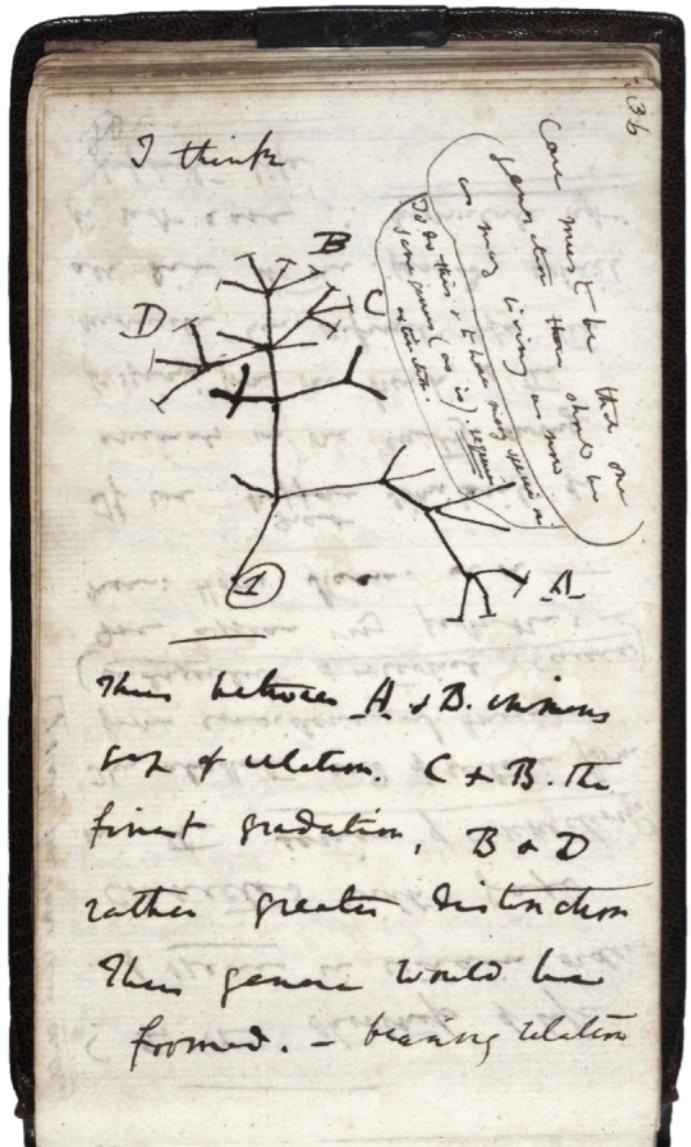


Charles Darwin (1809-1882)

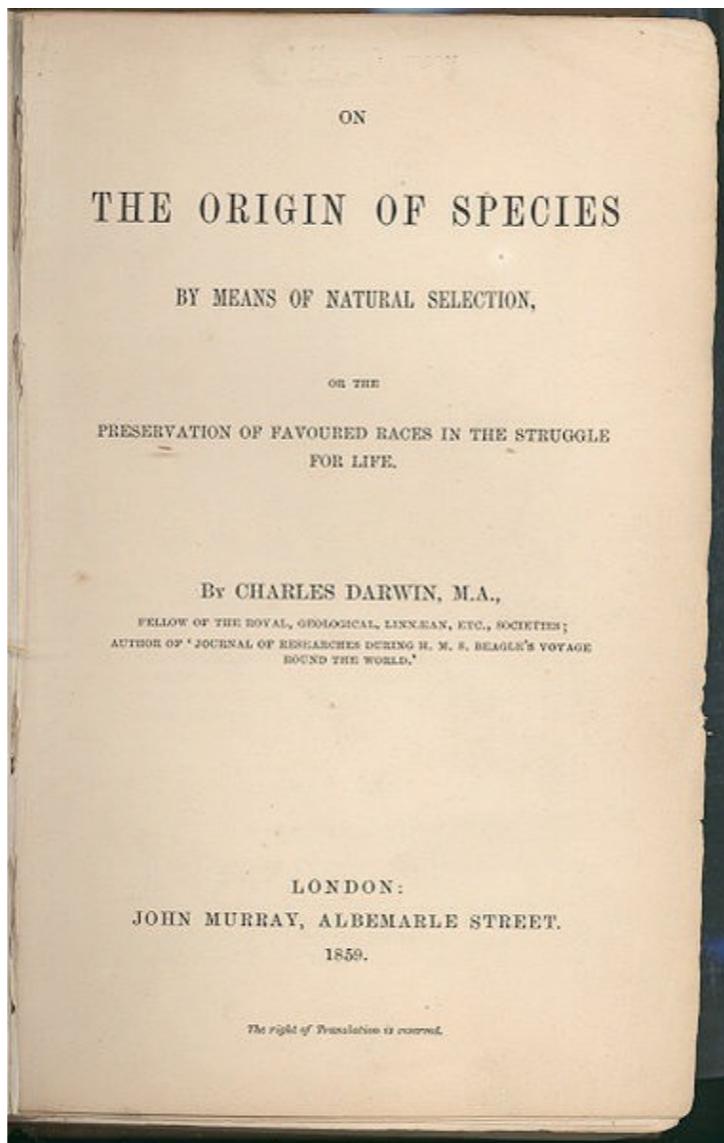
English naturalist and geologist, known for his contributions to evolutionary theory, established that all species of life have descended over time from common ancestors. In 1858, Darwin introduced his theory that this branching pattern of evolution resulted from natural selection.

https://en.wikipedia.org/wiki/Charles_Darwin

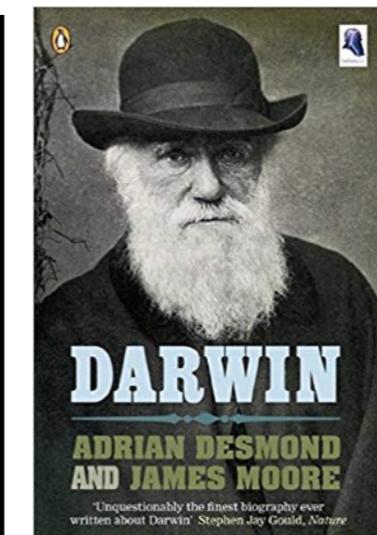
The Origins of Evolutionary Theory



(1837)



(1859)



Darwin started his work on natural selection shortly after his Beagle voyage but it took him 20 years to actually publish his ideas. Desmond and Moore aim to explain this by portraying Darwin as a “closet evolutionist” that is torn between science and religion. According to Desmond and Moore, Darwin is conflicted and anxious, fearful of losing his standing in his Anglican conservative society, and hurting his deeply religious wife. The book also makes clear how Darwin’s “discovery” of natural selection is not the product of the work of an isolated genius—Darwin himself points out how **a**) Malthusian ideas about scarcity and competition (that pervaded the political discourse of the time), **b**) the concept of long periods of time having shaped the geological record (advocated by Charles Lyell), and **c**) the accumulation of facts concerning variation and similarities between species, combined to create “natural selection”.

The Principles of Evolutionary Theory

Natural Selection

The differential survival and reproduction of individuals due to differences in phenotype (i.e., the composite of an organism's observable characteristics or traits, such as its morphology, but also behaviour, or products of behavior)

Necessary conditions for natural selection:

- **Variation.** Individuals in the population differ from each other concerning some genotype/phenotype.
- **Differential Reproduction/Selection.** The average number of offspring produced by individuals with a certain genotype/phenotype differs relative to the numbers produced by individuals with other genotypes/phenotypes.
- **Heredity.** The traits of the "fittest" genotypes/phenotypes that survive are inherited by the successful progeny.

The Principles of Evolutionary Theory

Evolution leads to optimal designs, right!?

WRONG!

Evolution through natural selection has no intentionality or goals, it rather works like a sieve!

For example: Nature did not “decide” that giraffes should develop a long neck. Rather, giraffes with longer necks (**Variation**), had adaptive advantages compared to giraffes with shorter necks (**Differential Reproduction/Selection**), and their trait (long necks) was passed on to future generations (**Heredity**).

Importantly, variants that are less adaptive will go extinct! More than 99 percent of all species, amounting to over five billion species, that ever lived on Earth are estimated to be extinct.

WHAT DO YOU THINK?

**Strengths and dangers of using
evolutionary theory to understand
human behavior**



Evolutionary Theory in Society: Eugenics

“The aid we feel impelled to give to the helpless is mainly an incidental result of the instinct of sympathy, which was originally acquired as part of the social instincts, but subsequently rendered, in the manner previously indicated, more tender and more widely diffused. Nor could we check our sympathy, even at the urging of hard reason, without deterioration in the noblest part of our nature. The surgeon may harden himself whilst performing an operation, for he knows that he is acting for the good of his patient; but if **we were intentionally to neglect the weak and helpless, it could only be for a contingent benefit, with an overwhelming present evil.** We must therefore bear the undoubtedly bad effects of the weak surviving and propagating their kind; but there appears to be at least one check in steady action, namely that the weaker and inferior members of society do not marry so freely as the sound; and this check might be indefinitely increased by the weak in body or mind refraining from marriage, though this is more to be hoped for than expected.”

Charles Darwin, *The Descent of Man*

Evolutionary Theory in Society: Eugenics

Social Darwinism

A set of theories which claim to apply biological concepts of natural selection to sociology and politics. Economically, social Darwinists would argue that the strong should see their wealth and power increase while the weak should see their wealth and power decrease as this is the natural order of things.

Eugenics

A set of beliefs aimed at improving the genetic quality of the human population; a social philosophy advocating the improvement of human traits through the promotion of higher rates of sexual reproduction for people with desired traits (positive eugenics), or reduced rates of sexual reproduction and sterilization of people with less-desired or undesired traits (negative eugenics), or both.



Qualitativer Bevölkerungsabstieg bei zu schwacher Fortpflanzung der Höherwertigen. So wird es kommen, wenn Minderwertige 4 Kinder und Höherwertige 2 Kinder haben.
(Exhibition "Das Wunder des Lebens", Berlin, 1935)

Evolutionary Theory in Society: Eugenics



“Entire clans have a long tradition of inbreeding and correspondingly many disabilities. It is well known that the proportion of congenital disabilities among Turkish and Kurdish migrants is well above average. But the issue is often hushed up. One could get the idea that **hereditary factors** are also responsible for the failure of parts of the Turkish population in the German school system.”

Translated with deepl.com

<http://www.faz.net/aktuell/feuilleton/sarrazin/die-thesen/intelligenz-von-menschen-und-ethnien-was-ist-dran-an-sarrazins-thesen-11041641.html>

“Some psychologists claim “new evidence” that genes, not racism, are primarily responsible for racial differences in education, income, and incarceration, a claim that is taken up by those promoting racial inequality and White nationalism. This “new evidence” does not meet established scientific and ethical standards of genetics and evolutionary biology. By adopting the standards of genetics and evolutionary biology, psychologists can help eliminate the harm caused by scientific racism while preserving academic freedom.”

Bird, K. A., Jackson, J. P., & Winston, A. S. (2024). Confronting scientific racism in psychology: Lessons from evolutionary biology and genetics. *American Psychologist*, 79(4), 497–508.
<https://doi.org/10.1037/amp0001228>

From Phrenology to Neuropsychology



Franz Josef Gall (1758-1828). German neuroanatomist, physiologist, and pioneer in the study of the localization of mental functions in the brain. Claimed as the founder of phrenology. Gall's contributions to the field of neuropsychology were controversial at the time and now widely referred to as pseudoscience. However, Gall's study of phrenology contributed to the emergence of the naturalistic approach to the study of man, and fostered scientific inquiry into brain functions.



Pierre Paul Broca (1824-1880). French physician, anatomist and anthropologist. In 1861, Broca heard of a patient, named Louis Victor Leborgne, who had a progressive loss of speech but no other cognitive impairment. When Leborgne died just a few days later, Broca performed an autopsy. Broca went on to find autopsy evidence from additional cases in support of the localization of language articulation.

From Phrenology to Neuropsychology

The patient “Tan” (Louis Leborgne) was unable to clearly speak any words other than “tan” - and is often used as a classical example of Broca’s aphasia (expressive or non-fluent aphasia). Broca’s autopsy of Leborgne revealed an extensive lesion that involved the frontal lobe, specifically, inferior frontal gyrus.

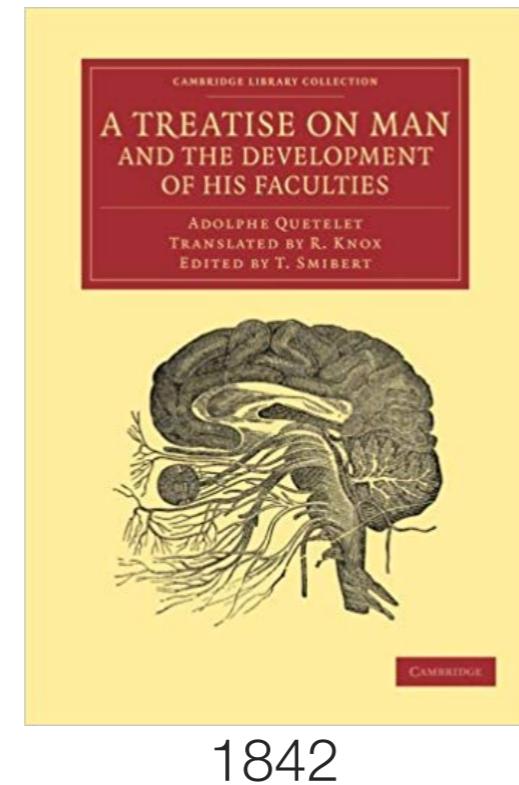


IFG: inferior frontal gyrus



Was Broca a maverick who single-handedly changed the scientific methods of the day? Hardly. Broca’s contribution is more likely a good example of the zeitgeist that prevailed in the field at that time. The association between speech disorders and frontal lobe lesions had been already advanced by Jean-Baptiste Bouillaud in 1825. In turn, the hypothesis of left hemisphere dominance for language was first proposed by Marc Dax in 1836, also based on the observation of brain lesion patients. Broca’s methods and claims had been anticipated by over 30 years! Two conclusions can be drawn from Broca’s example. First, this episode reminds us that historical accounts often forget the contribution of separate individuals and, instead, focus on a single prominent person who can be used as a placeholder for a particular advancement or event in a field. Indeed, the naming of a brain area and aphasic type after Broca can be seen as an example of [Stigler’s law of eponymy](#), which states that no scientific discovery is named after its original discoverer, and which emphasizes the perils of attributing any discovery to a single individual.

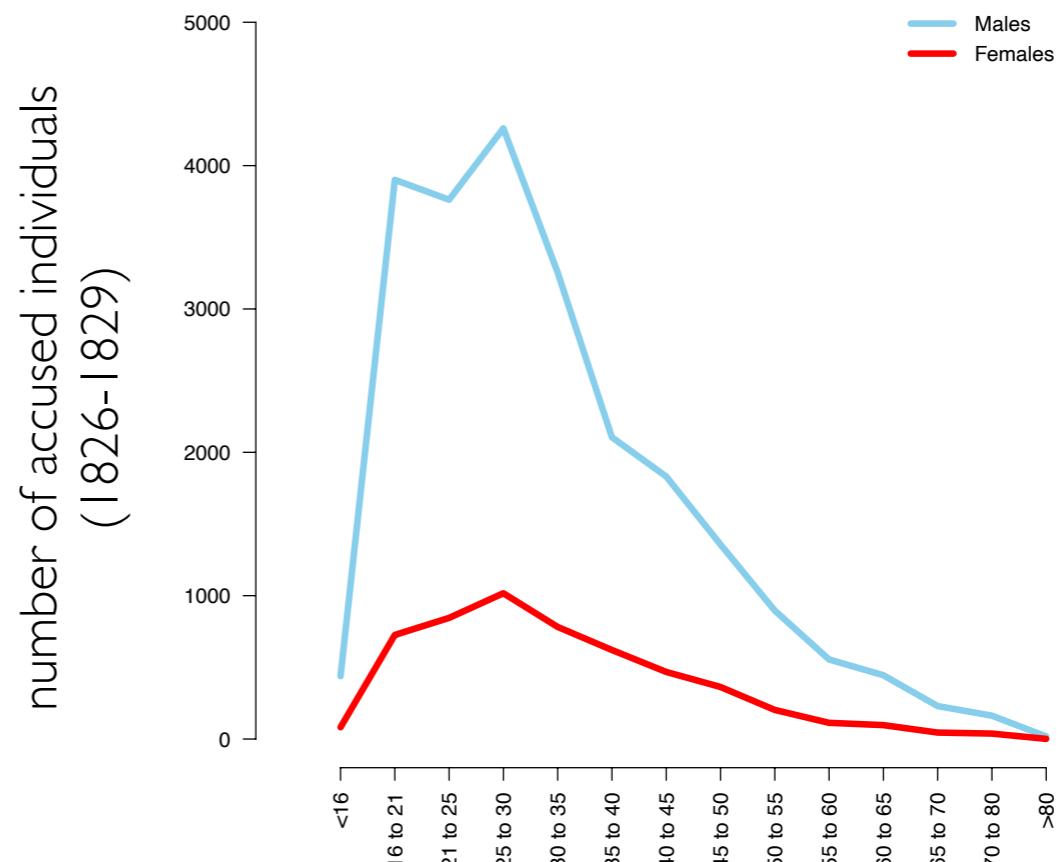
“Social physics”: Adolphe Quetelet



Adolphe Quetelet
(1796-1874)

“Among all the causes which have an influence for developing or halting the propensity for crime, the most vigorous is, without contradiction, age. It is, in fact, with age that man’s **physical strength** and **passions** develop and that their energy afterwards diminishes ... This propensity must be practically nil at both extremes of life since, on the one hand, strength and passions, those two powerful instruments of crime, have scarcely been born, and when, on the other hand, their energy (pretty nearly extinguished) is found weakened by **reason** ... It is about the age of 25 years when the propensity for crime attains its maximum.”

The Age-crime Curve



1879



Convict Building University of Leipzig, initial location of the Institute for Experimental Psychology, established by Wilhelm Wundt

Wilhelm Wundt



Wilhelm Wundt (1832-1920)

- 1832 Birth in Neckarau/Mannheim
- 1851-5 Study Medicine in Tübingen, Heidelberg, Karlsruhe
- 1856 Doctoral Degree in Heidelberg (Dr. med.)
 - Research Semester in Berlin (with Du Bois-Reymond)
- 1857 Habilitation and Privatdozentur in Heidelberg [25 years-old]
- 1858-65 Assistant to Hermann von Helmholtz in Heidelberg
- 1868(?) Prof. for Anthropology and Medical Psychology in Heidelberg
 - Member of the Badischen Fortschrittspartei (liberal)
 - Parliamentarian of the Badischen Landtags
- 1874 Professor of (Inductive) Philosophy in Zürich
- 1875 Professor of Philosophy in Leipzig
 - 1879 Founding of the 1st. experimental Psychology Lab
- 1917 Retirement [85 years-old!]
- 1920 Death in Großbothen, near Leipzig

Wilhelm Wundt

Could the first experimental Psychology laboratory have been in Zurich?

Wundt taught for 2 semesters in Zurich in 1874 (Professor for Inductive Philosophy). He brought equipment from Heidelberg and negotiated a room to store it at the University of Zurich. Wundt was supposed to teach pedagogics to teachers but he wrote of this task „zu der ich aber weder Neigung noch Zeit hatte“. Instead he taught them Völkerpsychologie, a version of psychology that would use historical and comparative methods (as opposed to laboratory experiments) to understand social phenomena. Wundt wrote of Swiss students:

„Ein Vorzug der Schweizer Studenten war, ganz im Sinne des allgemeinen Charakters der Bevölkerung, der regelmässige Fleiss, der besonders auch in dem Kollegienbesuch wohltuend hervortrat.... Der Schweizer will unter allen Umständen auf der Universität etwas lernen, und es würde schon seiner ererbten Sparsamkeit widerstreiten, wenn er einmal eine belegte Vorlesung ungenützt vorübergehen liesse...“

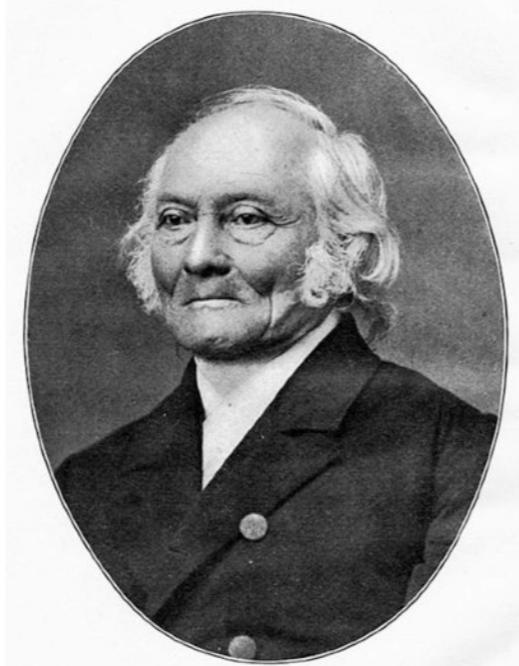
Ernst Meumann (who studied under Wundt in Leipzig) started an experimental laboratory at the University of Zurich in 1896.

Wilhelm Wundt

„If one considers psychology as a natural science, it should be quite clear that the great revolutions that completely reshaped the physical sciences since the time of *Bacon* and *Galileo* did not have any effect upon it. For one can say with still more reason of psychology what *Kant* once remarked of logic: that it has not progressed a single step forward since *Aristotle*. (...) Those issues [e.g., nature, origin, and mortality of the soul], however, mostly do not belong to scientific psychology, but to metaphysics, because the latter, not being a natural science, has been just as unable to take any advantage of the methodological improvements of the natural sciences.”

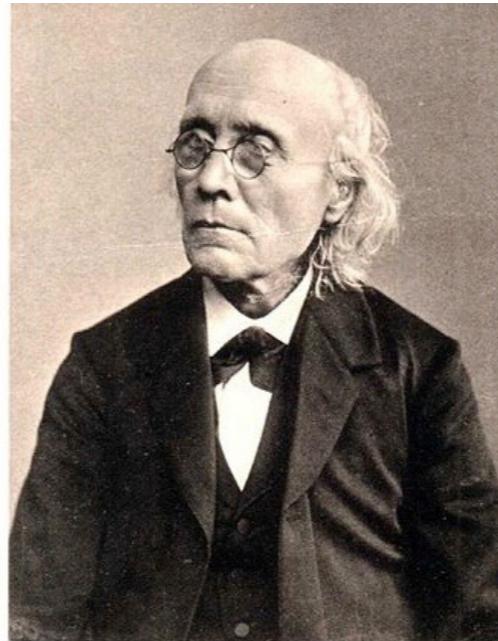
Wilhelm Wundt, *Beiträge zur Theorie der Sinneswahrnehmung*, 1862

Weber and Fechner



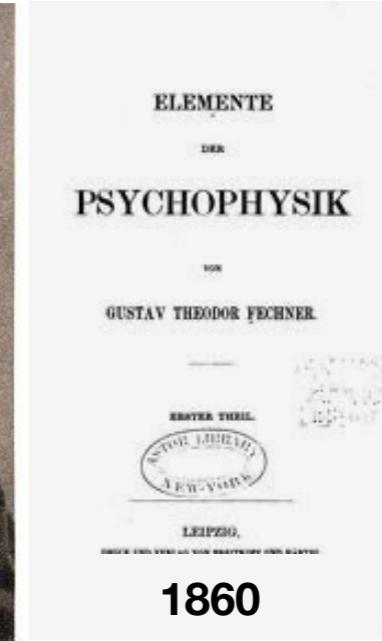
Ernst-Heinrich Weber (1795-1878)

German physician who is considered one of the founders of experimental psychology. An influential figure in the areas of physiology and psychology during his lifetime and beyond. His studies on sensation and touch, along with his emphasis on good experimental techniques gave way to new directions and areas of study for future psychologists, physiologists, and anatomists.



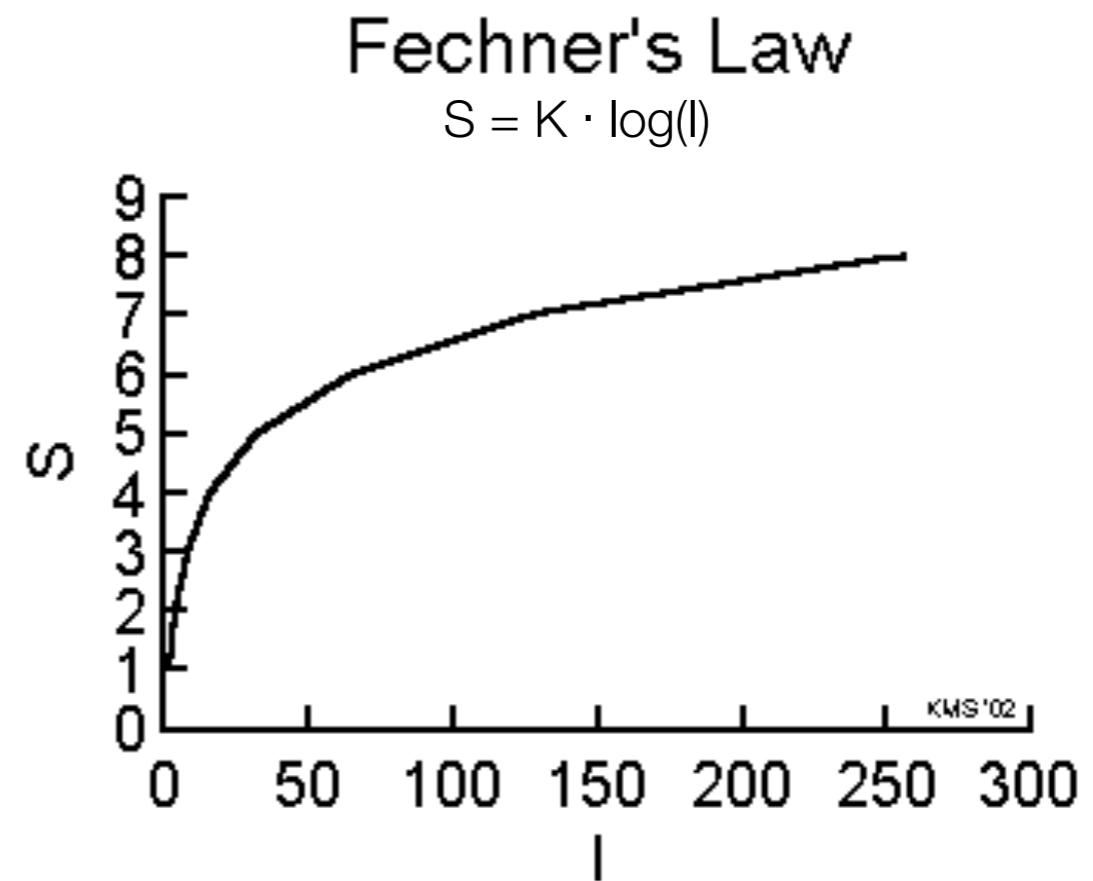
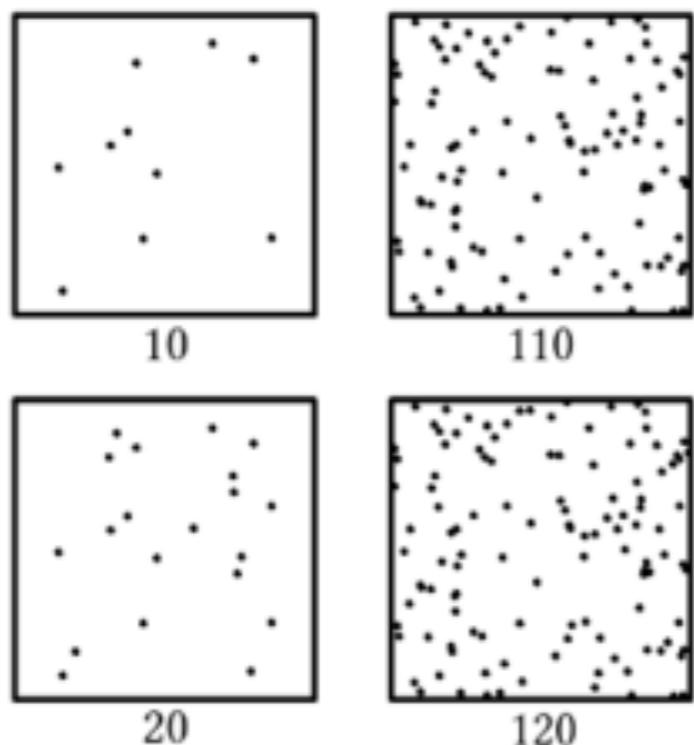
Gustav Theodor Fechner (1801-1887)

A German philosopher, physicist and experimental psychologist. An early pioneer in experimental psychology and founder of psychophysics. He is also credited with demonstrating the non-linear relationship between psychological sensation and the physical intensity of a stimulus that can be described by the formula known as the Weber-Fechner law: $\text{Sensation} = K \cdot \log(\text{Intensity})$.



1860

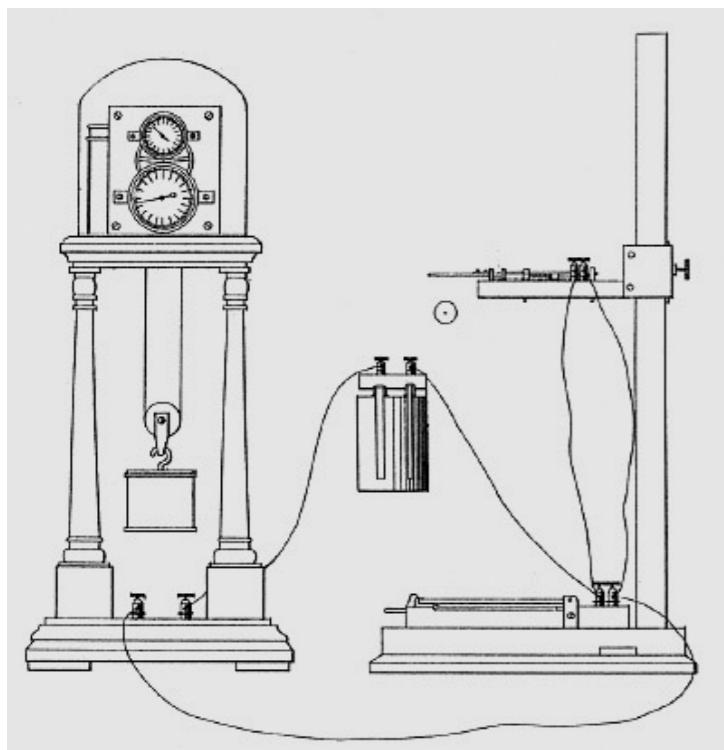
Psychophysics



The figure on the left provides an illustration of the Weber–Fechner law. On each side, the lower square contains 10 more dots than the upper one. However the perception is different: On the left side, the difference between upper and lower square is clearly visible. On the right side, the two squares look almost the same. The figure on the right depicts the relation between intensity (I) of a stimulus and the subjective experience or sensation (S).

Instrumentation: The brass-and-glass era

Brass “instrumentation came to symbolize this stage of development, for the new psychologists were self-consciously concerned with translating perennial problems of sensation and perception into terms amenable to experimentation and measurement”



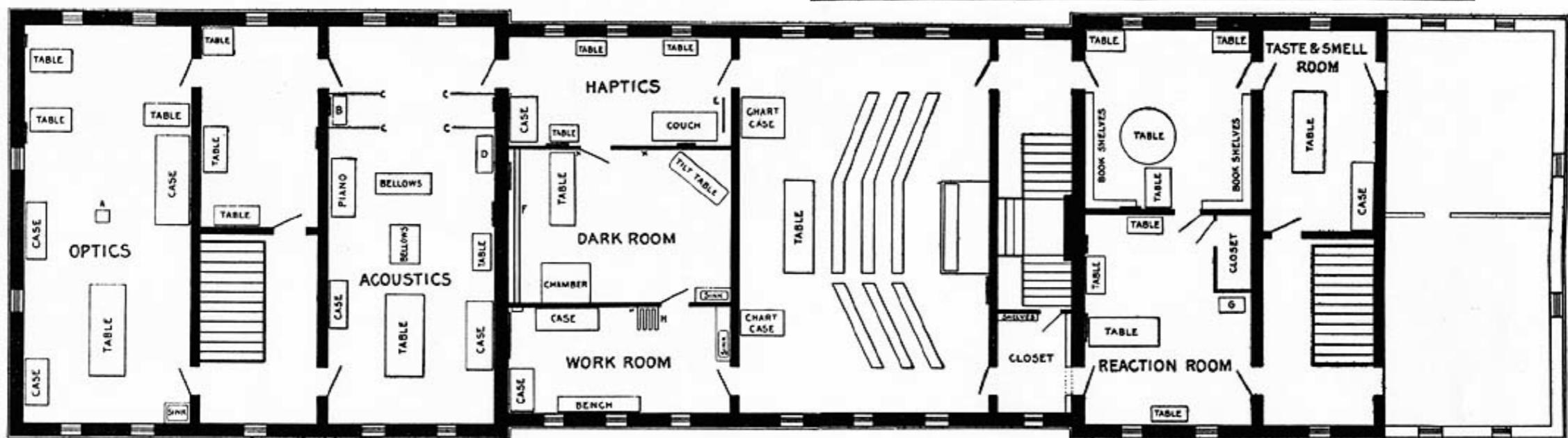
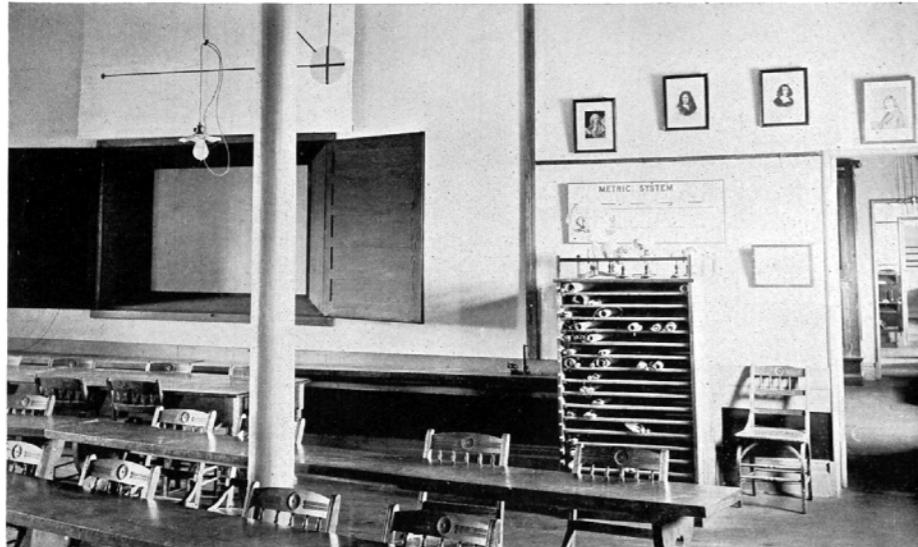
Hipp Chronoscope

A stopwatch instrument, driven by clock-work regulated by a vibrating tongue, started and stopped by a clutch activated by electro-magnets; two dials recorded duration in units down to 1,000th of a second; commonly used in reaction-time experiments. Following similar devices constructed by the English physicist Charles Wheatstone (1802 - 1875), the German clockmaker and mechanic Matthäus Hipp (1813 - 1893) developed his version in 1848. Hipp lived and worked most of his life in Bern and Neuchâtel, Switzerland. After Wilhelm Wundt (1832 - 1920) recommended the application of Hipp's chronoscope in the first edition of *Grundzüge der physiologischen Psychologie* in 1874, the "time viewer" was widely used in the emerging community of experimental psychologists.

Davis, R. C. (1970). The brass age of psychology. [Exhibit review]. *Technology and Culture*, 11, 604–612.

Instrumentation: The brass-and-glass era

Psychological Laboratory, Cornell University, 1900



Titchener, Edward B. (1898). A psychological laboratory. *Mind*, 7, 311-331

<http://vlp.mpiwg-berlin.mpg.de/sites/data?id=sit415>

Wilhelm Wundt: Methodological eclecticism

Pluralistic Use of Methods

- **Experimental Studies:** psychophysical methods to study the connection between physical stimuli and subjective experience, reaction time measurements, accuracy of reproduction in memory tasks.
- **Introspection:** self reports of sensations, feelings, and thoughts by trained individuals under controlled experimental situations.
- **Historical and Comparative Analysis:** analysis of the products of human thought and culture through examination of different societies and their development.

Wilhelm Wundt's laboratory as a “factory”

- Published about 7 publications per year for 68 years (490 publications)!
 - Started new journals: „Philosophische Studien“ (1881-1902), „Psychologische Studien“ (1905-1917) and wrote several books on psychological topics, „Lehrbuch der Physiologie des Menschen“ (1865), „Grundzüge der physiologischen Psychologie“ (1874), „Grundriss der Psychologie“ (1896), „Völkerpsychologie“ (1900-1920)
 - Advised 184 doctoral students (60 from abroad, including G. Stanley Hall, who started the 1st psych lab in USA in 1882, Emil Kraepelin, founder of modern psychiatry, James McKeen Cattell, first Psychology Professor in USA in 1888 and editor/publisher of *Science*, Hugo Münsterberg, a pioneer in applied psychology, and Edward **Titchener**, staunch defender of the introspective method).

Battell
Kinokarte

Sommer-Semester 1885

Belegbogen

für die Privat-Vorlesung des Herrn das psychophysische Seminar
des Herrn Prof. Dr. W. Wundt.

Honorar: — Mark — Pf.

Stuhlgeld: — Mark — Pf.

Auditorien-
geld: — Mark 50-Pf.

Diese Liste liegt im Hörsaal

aus bis zum

Sa.: 2 Mark — Pf. für den Lektor

Familus.

Lau- fende No.	Name.	Vorname.	Studium.	Geburtsort.	Wohnung.	Ob repetendo bei demselben Docenten.
X 1	Carell	James McLean	stud. phil.	Easton	Humboldtstr. 19	rep.
2	Wolfe	H. K.	stud. phil.	Bloomington	25. Norobergerstr.	"
3	Bechtow	W. K.	o. med.	Kastanien	Zwölftrichterstr.	"
4	Pajoni	Paul	philos.	Ungarn	Königgrätzstr. 25.	"
5	Thor.	Igwardi.	psychol.	Norge.	Sophienstrasse 52	rep.
6	Lorenz	Carl	math.	Leipzig	Neukirchhof 18	✓)
7	Püttner	Eugen	math.	Leipzig	Wintergartenstr. H.C.I.	
X 8	Stiller	Paul	math.	Freiberg	Frankfurter Str. 4. A.	rep.
9	Kirschberg.	Hugo.	med.	Darm.	Reichenstr. 21	rep.
10	Lufty	Ernest	math.	Ulm	Gelehrtenstr. 22	✓)
	<u>Princeton</u>					
	*) zu erneut spät & mitteilt von der Regierung bei.					

Abb. 5: Belegbogen für das im Sommersemester 1885 abgehaltene psychophysische Seminar von Wilhelm Wundt. Unter den eingetragenen Studenten finden sich unter 1. James McKeen Cattell und unter 9. Hugo Münsterberg.

In the United States of America...

Titchener and Structuralism

EXPERIMENTAL PSYCHOLOGY

A Manual of Laboratory Practice

BY

EDWARD BRADFORD TITCHENER

VOLUME I

QUALITATIVE EXPERIMENTS:
PART I. STUDENT'S MANUAL

As an experimentalist, I feel bound to let experiment guide me into any train of thought which it may justify.
—FARADAY.

New York
THE MACMILLAN COMPANY
LONDON: MACMILLAN & CO. LTD.
1922

Titchener held that psychology is the science of consciousness and that the only method which could adequately deal with the contents of consciousness is introspection. Extensive training was required to become an investigator and subjective data had to be obtained in response to controlled stimuli. Titchener emphasized rigour in experimentation and became "the paragon of laboratory meticulousness in American psychology".

§ 12. Auditory Sensation

33

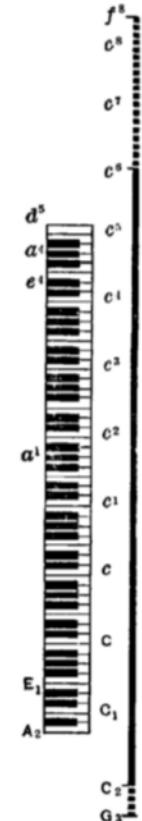
of tones: all musical instruments furnish compound tones, or clangs, not simple tones. And ordinary noises — hiss, crash, buzz, clatter, etc. — are made up of a number of simple noises given together and in succession.

PRELIMINARY EXERCISES. —

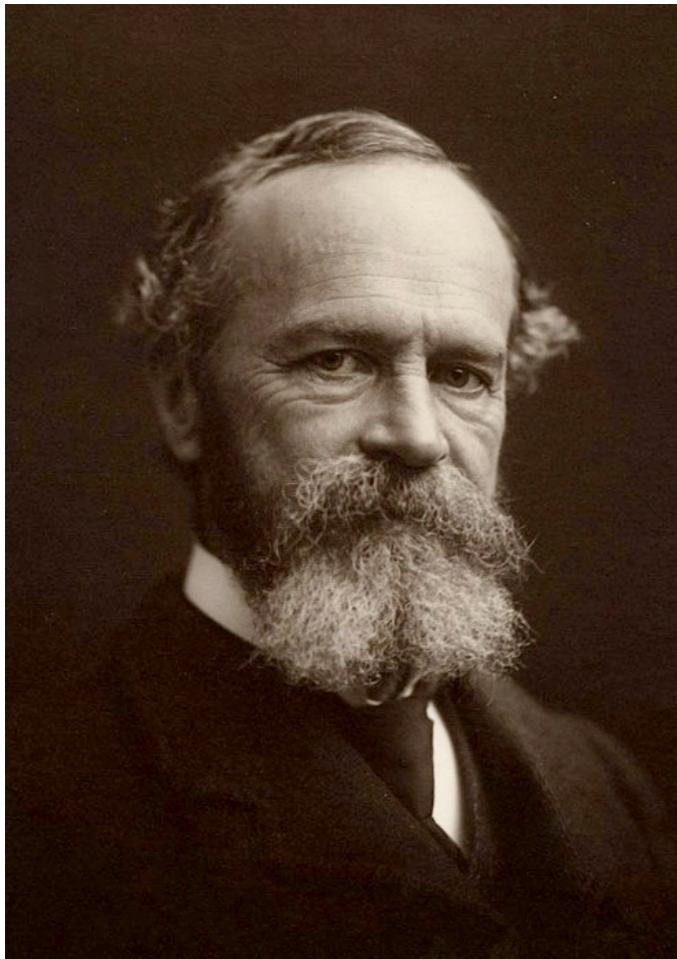
The following exercises will serve to make clear the relation of the tone-stimulus to the noise-stimulus, and the introspective difference between the two sensation classes. They should be performed by both *O* and *E*.

(1) Take a book with a ribbed-cloth binding. Tap the cover with the finger-nail; or pass the nail slowly across two or three ridges. You hear a tapping or plucking or snapping noise. Draw the nail more quickly over a number of ridges. The noise is replaced by a harsh scroop which is distinctly tonal. The pitch (quality) of the tonal element rises as the movement becomes quicker. Notice that the pluck and the scroop are entirely different sense-experiences, although from the physical standpoint the latter is only a series of plucks.

(2) The 'imperfection' of the system of wave-motions which characterises the noise-stimulus may be produced by the *interference* of a number of complete wave-motions (tonal stimuli).



William James and Functionalism



William James (1842-1910)

American philosopher and psychologist who was trained as a physician. Growing up, William James attended schools in the United States, England, France, Switzerland, and Germany. He also spent time abroad in France and Germany (Dresden) before getting his doctorate. James was the first educator to offer a psychology course in the United States at Harvard in 1875. Considered to be one of the founders of functional psychology. James gained widespread recognition with his *The Principles of Psychology* (1890), totaling twelve hundred pages in two volumes, which took twelve years to complete.

"I originally studied medicine in order to be a physiologist, but I drifted into psychology and philosophy from a sort of fatality. I never had any philosophic instruction, the first lecture on psychology I ever heard being the first I ever gave".

The First Schools: Structuralism vs. Functionalism

“We have to consider (1) functionalism conceived as the psychology of mental operations in contrast to the psychology of mental elements; or, expressed otherwise, the psychology of the how and why of consciousness as distinguished from the psychology of the what of consciousness. We have (2) the functionalism which deals with the problem of mind conceived as primarily engaged in mediating between the environment and the needs of the organism. This is the psychology of the fundamental utilities of consciousness; (3) and lastly we have functionalism described as psychophysical psychology, that is the psychology which constantly recognizes and insists upon the essential significance of the mind-body relationship for any just and comprehensive appreciation of mental life itself.”

Angell, J. R. (1907). The province of functional psychology. *Psychological Review*, 14 (2). 61-91.

[https://en.wikipedia.org/wiki/Structuralism_\(psychology\)](https://en.wikipedia.org/wiki/Structuralism_(psychology))

https://en.wikipedia.org/wiki/Functional_psychology

WHAT DO YOU THINK?

**How to operationalize the birth of
psychology as a science**



Institutionalization:

Laboratories

Eröffnung	Ort	Erste Fachvertreter
1879	Leipzig	Wilhelm Wundt
1883	Baltimore, USA	G. Stanley Hall
1886	Kasan, Rußland	Wladimir M. Bechterew
	Kopenhagen, Dänemark	Carl Georg Lange
1887	University of Pennsylvania, Philadelphia	James McKeen Cattell
1888	Göttingen	Georg Elias Müller
	Tokio, Japan	Yujiro Motora
1889	Paris, Frankreich	Henri-Étienne Beaunis, Alfred Binet
	Rom, Italien	G. Sergi
	Clark University, Worcester MA., USA	Edmund C. Sanford
1890	Rennes, Frankreich	Benjamin Bourdon
	Toronto, Kanada	James M. Baldwin
1891	Bonn	G. Martius
	Genf, Schweiz	Théodore Flournoy
	Löwen, Belgien	Armand Thiery und Desire Mercier
	Cambridge, England	James Ward
	Harvard University, Boston, USA	Hugo Münsterberg
1892	Yale University, New Haven, USA	Eduard W. Scripture
	Kansas University, Lawrence, USA	O. Templin
	Chicago, USA	C. A. Strong
1893	Friedrich-Wilhelms-Universität Berlin	Carl Stumpf
	Groningen, Niederlande	J. F. Heymans
	Princeton University, New Jersey, USA	James M. Baldwin
	Stanford University, Palo Alto, USA	Frank Angell
	Minnesota, USA	J. R. Angell
1894	Breslau	Hermann Ebbinghaus
	Graz, Österreich	Alexius Meinong
	City University, New York, USA	C. B. Bliss

Institutionalization:

Conferences, Organizations, Publications

International Conferences in Psychology

- 1889, Paris (Themen: Hypnose und Telepathie)
- 1892, London
- 1896, München

Professional Organisations

- 1892, USA, American Psychological Association
- 1901, France, Société de Psychologie
- 1902, England, Psychological Science
- 1904, Germany, Gesellschaft für experimentelle Psychologie
- 1910, Italy, Società Italiana Psicologica

Psychological Publications

- 1881, Philosophische Studien
- 1887, American Journal of Psychology
- 1890, Zeitschrift für Psychologie
- 1894, Psychological Review
- ...

Textbook: *Principles of Psychology* (Vol 1, 1890)

CONTENTS.

CHAPTER I.	PAGE
THE SCOPE OF PSYCHOLOGY, Mental Manifestations depend on Cerebral Conditions, 1. Pursuit of ends and choice are the marks of Mind's presence, 6.	1
CHAPTER II.	
THE FUNCTIONS OF THE BRAIN, Reflex, semi-reflex, and voluntary acts, 12. The Frog's nerve-centres, 14. General notion of the hemispheres, 20. Their Education—the Meynert scheme, 24. The phrenological contrasted with the physiological conception, 27. The localization of function in the hemispheres, 30. The motor zone, 31. Motor Aphasia, 37. The sight-centre, 41. Mental blindness, 48. The hearing-centre, 52. Sensory Aphasia, 54. Centres for smell and taste, 57. The touch-centre, 58. Man's Consciousness limited to the hemispheres, 65. The restitution of function, 67. Final correction of the Meynert scheme, 72. Conclusions, 78.	12
CHAPTER III.	
ON SOME GENERAL CONDITIONS OF BRAIN-ACTIVITY, The summation of Stimuli, 82. Reaction-time, 85. Cerebral blood-supply, 97. Cerebral Thermometry, 99. Phosphorus and Thought, 101.	81
CHAPTER IV.	
HABIT, Due to plasticity of neural matter, 105. Produces ease of action, 112. Diminishes attention, 115. Concatenated performances, 116. Ethical implications and pedagogic maxims, 120.	104
CHAPTER V.	
THE AUTOMATON-THEORY, The theory described, 128. Reasons for it, 133. Reasons against it, 138.	128
ix	

x	CONTENTS.	xi
	CHAPTER VI.	
	THE MIND-STUFF THEORY, Evolutionary Psychology demands a Mind-dust, 146. Some alleged proofs that it exists, 150. Refutation of these proofs, 154. Self-compounding of mental facts is inadmissible, 158. Can states of mind be unconscious? 162. Refutation of alleged proofs of unconscious thought, 164. Difficulty of stating the connection between mind and brain, 176. 'The Soul' is logically the least objectionable hypothesis, 180. Conclusion, 182.	145
	CHAPTER VII.	
	THE METHODS AND SNARES OF PSYCHOLOGY, Psychology is a natural Science, 183. Introspection, 185. Experiment, 192. Sources of error, 194. The 'Psychologist's fallacy,' 196.	183
	CHAPTER VIII.	
	THE RELATIONS OF MINDS TO OTHER THINGS, Time relations: lapses of Consciousness—Locke v. Descartes, 200. The 'unconsciousness' of hysterics not genuine, 202. Minds may split into dissociated parts, 206. Space-relations: the Seat of the Soul, 214. Cognitive relations, 216. The Psychologist's point of view, 218. Two kinds of knowledge, acquaintance and knowledge about, 221.	199
	CHAPTER IX.	
	THE STREAM OF THOUGHT, Consciousness tends to the personal form, 225. It is in constant change, 229. It is sensibly continuous, 237. 'Substantive' and 'transitive' parts of Consciousness, 243. Feelings of relation, 245. Feelings of tendency, 249. The 'fringe' of the object, 258. The feeling of rational sequence, 261. Thought possible in any kind of mental material, 265. Thought and language, 267. Consciousness is cognitive, 271. The word Object, 275. Every cognition is due to one integral pulse of thought, 276. Diagrams of Thought's stream, 279. Thought is always selective, 284.	224
	CHAPTER X.	
	THE CONSCIOUSNESS OF SELF, The Empirical Self or Me, 291. Its constituents, 292. The material self, 292. The Social Self, 293. The Spiritual Self, 296. Difficulty of apprehending Thought as a purely spiritual activity,	291

PAGE	CONTENTS.	PAGE
	CHAPTER XI.	
	ATTENTION, Its neglect by English psychologists, 402. Description of it, 404. To how many things can we attend at once? 405. Wundt's experiments on displacement of date of impressions simultaneously attended to, 410. Personal equation, 413. The varieties of attention, 416. Passive attention, 418. Voluntary attention, 420. Attention's effects on sensation, 425;—on discrimination, 426;—on recollection, 427;—on reaction-time, 427. The neural process in attention: 1) Accommodation of sense-organ, 434. 2) Preperception, 438. Is voluntary attention a resultant or a force? 447. The effort to attend can be conceived as a resultant, 450. Conclusion, 453. Acquired Inattention, 455.	402
	CHAPTER XII.	
	CONCEPTION, The sense of sameness, 459. Conception defined, 461. Conceptions are unchangeable, 464. Abstract ideas, 468. Universals, 473. The conception 'of the same' is not the 'same state' of mind, 480.	459
	CHAPTER XIII.	
	DISCRIMINATION AND COMPARISON, Locke on discrimination, 483. Martineau <i>ditto</i> , 484. Simultaneous sensations originally fuse into one object, 488. The principle of mediate comparison, 489. Not all differences are differences of composition, 490. The conditions of discrimination, 494. The sensation of difference, 495. The transcendentalist theory of the perception of differences uncalled for, 498. The process of analysis, 502. The process of abstraction, 505. The improvement of discrimination by practice, 508. Its two causes, 510. Practical interests limit our discrimination, 515. Reaction-time after discrimination, 523. The perception of likeness, 528. The magnitude of differences, 530. The measurement of dis-	483
PAGE	CONTENTS.	PAGE
	CHAPTER XIV.	
	ASSOCIATION, The problem of the connection of our thoughts, 550. It depends on mechanical conditions, 553. Association is of objects thought-of, not of 'ideas,' 554. The rapidity of association, 557. The 'law of contiguity,' 561. The elementary law of association, 566. Impartial reintegration, 569. Ordinary or mixed association, 571. The law of interest, 572. Association by similarity, 578. Elementary expression of the difference between the three kinds of association, 581. Association in voluntary thought, 583. Similarity no elementary law, 590. History of the doctrine of association, 594.	550
	CHAPTER XV.	
	THE PERCEPTION OF TIME, The sensible present, 606. Its duration is the primitive time-perception, 608. Accuracy of our estimate of short durations, 611. We have no sense for empty time, 619. Variations of our time-estimate, 624. The feeling of past time is a present feeling, 627. Its cerebral process, 632.	605
PAGE	CONTENTS.	PAGE
	CHAPTER XVI.	
	MEMORY, Primary memory, 643. Analysis of the phenomenon of memory, 648. Retention and reproduction are both caused by paths of association in the brain, 653. The conditions of goodness in memory, 659. Native retentiveness is unchangeable, 668. All improvement of memory consists in better thinking, 667. Other conditions of good memory, 669. Recognition, or the sense of familiarity, 673. Exact measurements of memory, 676. Forgetting, 679. Pathological cases, 681. Professor Ladd criticised, 687.	643

Summary

- The 19th century saw a number of developments with important implications for psychology: 1) **evolutionary theory**: principle of natural selection explains origin of species that can provide a functional explanation of human psychology and behavior; 2) **neuropsychology**: subtraction logic of ablation/lesion studies helps link brain localisation/function to psychological phenomena (e.g., language); **social sciences**: systematic collection/analysis of demographic data (e.g., weight/height, crime, marriage, cultural productions) with the goal of describing social “laws” that may result from psychological mechanisms (e.g., passion, reason)
- **Wundt and his laboratory**: Wundt as a symbolic figure in the birth of psychology, professor of philosophy, but background in physiology, influenced by the psychophysics of Weber and Fechner, and social physics of Quetelet; methodological pluralism (instrumentation/measurement, introspection, cultural/historical analysis); Wundt’s Leipzig laboratory of experimental psychology as a “scientific factory”
- The formation of **schools**: **Structuralism**: advanced by Edward Titchener (inspired partly by Wilhelm Wundt) as an approach to understanding the elements of consciousness; emphasised instrumentation and experimental rigour when eliciting structured introspective reports; **Functionalism**: advanced by James Angell (inspired by William James and evolutionary views) as an approach to understanding the why of conscious experience; in practice, some methods and experimental approach was similar between schools (e.g., reaction time measurement)
- **Institutionalization**: the first several laboratories, societies, journals, textbooks, and other institutions of academic/scientific psychology emerged at the end of 19th century