

The History of Psychology

Part Four: The 1900's

Dr. C. George Boeree
Psychology Department
Shippensburg University

E-Text Source:

[<http://www.ship.edu/%7Ecgboree/historyofpsych.html>]

Index

❖ Index	2
Timeline: The 1900s	3
Map: Europe 1914	8
❖ Sigmund Freud and Psychoanalysis	9
[<i>Precursors of Psychoanalysis</i> <i>Mesmer</i> <i>Pinel</i> <i>Charcot</i> <i>The Unconscious</i> <i>Freud</i> <i>Jung</i> <i>Adler</i>]	
Sigmund Freud Selection: <i>The Structure of the Unconscious</i>	29
❖ Behaviorism	33
[<i>Pavlov</i> <i>Thorndike</i> <i>Watson</i> <i>McDougall</i> <i>Hull</i> <i>Tolman</i> <i>Skinner</i>]	
B. F. Skinner Selection	46
Walt Whitman <i>There Was a Child Went Forth</i>	53
❖ Gestalt Psychology	55
[<i>Wertheimer</i> <i>Köhler</i> <i>Koffka</i> <i>The Theory</i> <i>Lewin</i> <i>Goldstein</i>]	
Kurt Köhler Selection: <i>Gestalt Psychology Today</i>	62
Carl Rogers Selection: <i>The Organization of Personality</i>	66
❖ Phenomenological Existentialism	71
[<i>Brentano</i> <i>Stumpf</i> <i>Husserl</i> <i>Phenomenology</i> <i>Heidegger</i> <i>Sartre</i>]	
James Joyce Selection: <i>Portrait of the Artist as a Young Man</i>	79
Romance: A Partial Analysis	80
❖ Modern Medicine and Physiology	82
[<i>Technology and the brain</i> <i>The psychopharmacological explosion</i> <i>Genetics and the human genome</i>]	
A Brief History of the Lobotomy	87
❖ The Cognitive Movement	89
[<i>Wiener</i> <i>Turing</i> <i>von Bertalanffy</i> <i>Chomsky</i> <i>Piaget</i> <i>Hebb</i> <i>Miller</i> <i>Neisser</i>]	
A Computer Timeline	99
❖ Conclusions: Psychology Today and Tomorrow	110
[<i>From Logical Positivism to Postmodernism</i> <i>The Situation for Psychology</i>]	

Timeline: 1900s

Psychiatry and Psychoanalysis	Behaviorism	Phenomenology, Gestalt, Humanism, and Existentialism	Cognitive Psychology/ Artificial Intelligence	Modern Medicine and Physiology
	1863 Sekhenov <i>Reflexes of the Brain</i>			
				1866 Gregor Mendel discovers the principles of heredity
1869 von Hartmann: <i>Philosophy of the Unconscious</i>				
		1874 Brentano: <i>Psychology from an Empirical Standpoint</i>		
1882 Charcot opens clinic at Salpetriere				
1883 Kraepelin publishes list of disorders		1883 Nietzsche publishes <i>Thus Spake Zarathustra</i>		
1885-6 Freud studies hypnosis with Charcot			1885 Hermann Ebbinghaus: <i>On Memory</i>	
		1890 Ehrenfels: <i>About the Qualities of the Gestalt</i>		
1895 Breuer and Freud: <i>Studies in Hysteria</i>				1895 Roentgen invents the X-ray
1900 Freud: Interpretation of Dreams		1900 Husserl: <i>Logical Investigations</i>		
	1906 Pavlov publishes first conditioning studies			1906 Golgi and Ramon y Cajal win the Nobel for discovering the synapse
1907 Jung meets Freud; Adler invited to join Freud's circle	1907 Bekhterev: <i>Objective Psychology</i>			
1909 Freud, Jung, et al speak at Clark University				

Psychiatry and Psychoanalysis	Behaviorism	Phenomenology, Gestalt, Humanism, and Existentialism	Cognitive Psychology/ Artificial Intelligence	Modern Medicine and Physiology
				1910 Thomas Morgan discovers chromosomes
1911 Adler forms his own Individual Psychology society				
	1911 Thorndike: <i>Animal Intelligence</i>			
	1912 McDougall: <i>Psychology: The Study of Behavior</i>	1912 Wertheimer publishes paper on perception of movement		
	1913 Watson: <i>Psychology as the Behaviorist Views It</i>	1913 Köhler does chimpanzee studies		
1914 Jung splits from Freud, begins his " dark years "				
(1914 to 1917 – WW I)				
		1921 The Gestalt journal <i>Psychologische Forschung</i> first published		1921 Loewi discovers the first neurotransmitter, acetylcholine
	1922 Tolman presents "a new formula for behaviorism"			
		1923 Wertheimer: <i>Laws of Organization</i>		
		1924 Koffka: <i>The Growth of Mind</i>		
				1926 Hermann J. Muller creates mutations in fruit flies with X-rays
1927 Alfred Adler: <i>Understanding Human Nature</i>		1927 Köhler: <i>The Mentality of Apes</i>		
		1927 Heidegger: <i>Being and Time</i>		

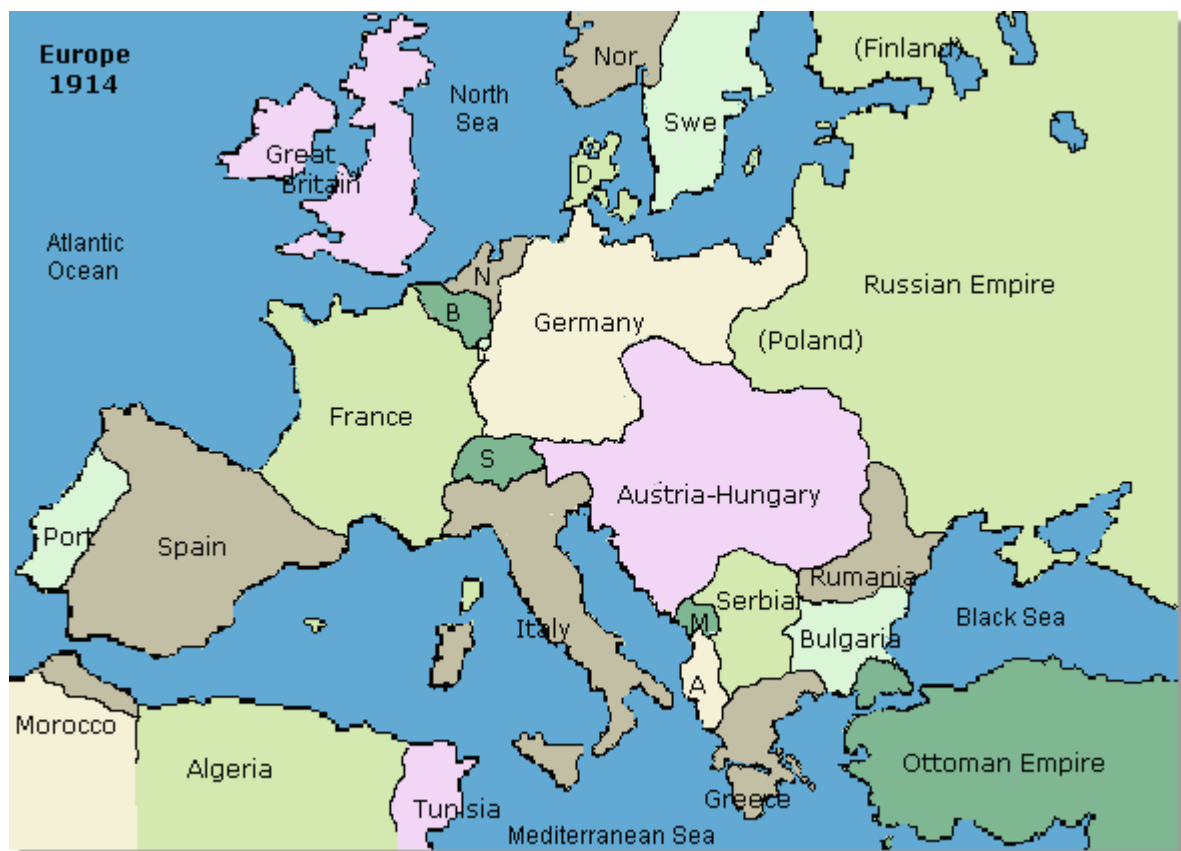
Psychiatry and Psychoanalysis	Behaviorism	Phenomenology, Gestalt, Humanism, and Existentialism	Cognitive Psychology/ Artificial Intelligence	Modern Medicine and Physiology
				1929 Berger invents the EEG
	1930 Skinner publishes his first paper on conditioning			
	1932 Tolman: <i>Purposive Behavior in Men and Animals</i>		1932 Jean Piaget: <i>The Moral Judgement of the Child</i>	
		1935 Lewin: <i>A Dynamic Theory of Personality</i>		1935 Moniz performs the first lobotomy
1936 Anna Freud: <i>The Ego and the Mechanisms of Defense</i>			1936 Alan M. Turing, of Cambridge publishes a paper which introduces the Turing machine .	
1937 Karen Horney: <i>The Neurotic Personality of our Time</i>		1937 Allport: Personality		
	1938 Skinner: <i>The Behavior of Organisms</i>			1938 The first use of electroshock
(1939 to 1945 – WW II)				
			1940 Ludwig von Bertalanffy: <i>Problems of Life</i>	
		1941 Fromm: <i>Escape from Freedom</i>		
			1942 Jean Piaget: <i>Psychology of Intelligence</i> .	
	1943 Hull: <i>Principles of Behavior</i>	1943 Binswanger: <i>Grundformen und Erkenntnis menschlichen Daseins</i>		

Psychiatry and Psychoanalysis	Behaviorism	Phenomenology, Gestalt, Humanism, and Existentialism	Cognitive Psychology/ Artificial Intelligence	Modern Medicine and Physiology
			1944 Turing: <i>Machine Intelligence</i>	
			1945 John W. Mauchly and J. Presper Eckert and their team at the University of Pennsylvania, complete ENIAC	
		1947 Goldstein: <i>The Organism</i>		
	1948 Skinner: <i>Walden II</i>	1948 Frankl: <i>Experiences in a Concentration Camp</i>	1948 Norbert Wiener: <i>Cybernetics</i>	
			1949 Donald Hebb: <i>The Organization of Behavior</i>	1949 John Cade discovers the beneficial effects of lithium
1950 Erik Erikson: <i>Childhood and Society</i>		1950 Rollo May: <i>The Meaning of Anxiety</i>		
		1951 Rogers: <i>Client-Centered Therapy</i>		
				1952 Laborit discovers the first antipsychotic drug, chlorpromazine (Thorazine)
				1953 Watson and Crick discover the structure of the DNA molecule
1954 Carl Jung: <i>Von den Wurzeln des Bewusstseins</i>		1954 Gordon Allport: <i>The Nature of Prejudice</i>		1954 Olds discovers the " pleasure center " of rats
		1954 Abraham Maslow: <i>Motivation and Personality</i>		
		1955 George Kelly: <i>Psychology of Personal Constructs</i>		
			1956 George A. Miller publishes 7 +/- 2 paper.	
		1957 Albert Ellis: <i>How to Live with a Neurotic</i>	1957 Noam Chomsky: <i>Syntactic Structures</i>	

Psychiatry and Psychoanalysis	Behaviorism	Phenomenology, Gestalt, Humanism, and Existentialism	Cognitive Psychology/ Artificial Intelligence	Modern Medicine and Physiology
			1960 Miller: <i>Plans and the Structure of Behavior</i>	
		1961 May, et al edit <i>Existential Psychology</i>		
				1963 Sernbach discovers the antianxiety drug diasepam (Valium)
	1967 Hans Eysenck: <i>The Biological Basis of Personality</i>		1967 Ulric Neisser: <i>Cognitive Psychology</i>	
			1969 ARPANET (future Internet) links first two computers at UCLA and Stanford Research Institute.	
				1972 Hounsfield invents the CAT scan
	1973 Albert Bandura: <i>Aggression: A Social Learning Analysis</i>			1973 Snyder and Pert discover endorphin
				1974 D. T. Wong discovers fluoxetine (Prozac)
				1977 Damadian's first MRI
				1977 a virus is the first creature to have its complete genome revealed
			1976 Neisser: <i>Cognition and Reality</i>	
			1980 First AAAI conference at Stanford	

Psychiatry and Psychoanalysis	Behaviorism	Phenomenology, Gestalt, Humanism, and Existentialism	Cognitive Psychology/ Artificial Intelligence	Modern Medicine and Physiology
				1981 the PET scan invented
			1997 " Deep Blue " beats Kasparov, the best chess player in the world.	
				2000 HGP and Celera announce that they have completed working drafts of the human genome
(The New Millennium Begins!)				

Map: Europe 1914



Freud and Psychoanalysis

Precursors of Psychoanalysis

It often surprises students that **psychiatry** – meaning the doctoring of the mind – was not invented by Sigmund Freud. Psychoanalysis – a particular (and very significant) brand of psychiatry – was his baby. Psychiatrists existed before Freud, and most, psychiatrists today are not Freudian.

The term psychiatry was coined by the German physician **Johann Reil** in 1808, and would slowly replace the older term "alienist." The new respect signalled by the new name was based on some significant improvements in the care of the mentally ill in the second half of the 1700's.

There are three people I would like to pay my respects to as important precursors to psychoanalysis: **Franz Anton Mesmer**, who discovered hypnotism; **Philippe Pinel**, who changed the way we thought of and treated the mentally ill; and **Jean-Martin Charcot**, who is often considered the father of neurology.

Franz Anton Mesmer

Franz Anton Mesmer was born May 23, 1734 in Iznang, Germany, near Lake Constance. He received his MD from the University of Vienna in 1766. His dissertation concerned the idea that the planets influenced the health of those of us on earth. He suggested that their gravitational forces could change the distribution of our animal spirits. Later, he changed his theory to emphasize magnetism rather than gravity – hence the term "**animal magnetism**." It would soon, however, come to be known as **mesmerism**.

He was, in fact, able to put people into trance states, even convulsions, by waving magnetized bars over them. His dramatic performances were quite popular for a while, although he believed that anyone could achieve the same results. In point of fact, some of his patients did in fact get relief from their symptoms – a point that would later be investigated by others.

When accused of fraud by other physicians in Vienna, he went to Paris. In 1784, the King of France, Louis XVI, appointed a commission including Benjamin Franklin to look into Mesmer and his practices. They concluded that his results were due to nothing more than **suggestion**.

Despite condemnation by many of the educated elite, mesmerism became a popular fad in the salons of Europe. In order to serve the many poor people who came to him for help, he designed a sort of bathtub in which they could sit while holding the magnetic rods themselves. He eventually created an organization to train other mesmerists.

Mesmer died March 5, 1815 in Meersburg, also near Lake Constance, Germany.

An English physician, **James Braid** (1795-1860), a much more careful researcher of Mesmer's phenomenon, termed it **hypnotism**. Disassociated from Mesmer, hypnotism would go on to have a long, if controversial, life into the twentieth century.

Philippe Pinel

Philippe Pinel was born on April 20, 1745, in the small town of Saint André. His father was both a barber and a surgeon, a common combination in those days, as both vocations required a steady hand with the razor. His mother was also from a long line of physicians.



Philippe began his studies more interested in literature – especially Jean-Jacques Rousseau – than in medicine. But, after a few years studying theology, he began the study of medicine, and he received his MD from university at Toulouse in 1773.

Pinel moved to Montpellier in 1774 where he tutored wealthy students in anatomy and mathematics. He was admitted into the Montpellier Société Royale des Sciences after presenting two papers on the use of mathematics in anatomical studies. He moved to Paris in 1778, where he came into contact with a number of the renowned scientists and philosophers of the day (including Ben Franklin), as well as becoming familiar with the radical new ideas of John Locke and the French sensualists. Although he could not practice in

Paris, he became a well respected medical writer, particularly known for his careful and exhaustive **case studies**.

A turning point in Pinel's life came in 1785, when a friend of his developed a mental illness ending in his death. He became devoted to the study of mental illness, and became the head of the Paris asylum for insane men at Bicêtre in 1792. In that year, he also married Jeanne Vincent, with whom he had three sons.

It was at Bicêtre that he made his place in history: Prior to his coming to Bicêtre, the men were kept in chains, treated abominably, and put on daily display to the public as curiosities. In 1793, Pinel instituted a new program of human care, which he referred to as **moral therapy**. The men were given clean, comfortable accommodations, and were instructed in simple but productive work.

In 1795, he was appointed the head physician at the world famous hospital at Salpêtrière. Here, too, he provided his enlightened treatment conditions to the mentally ill. In that same year, he was made professor of medical pathology at Paris. In 1801, Philippe Pinel introduced the first textbook on moral therapy to the world.

Pinel is also remembered for dismissing the demonic possession theory of mental illness for once and for all, and for eliminating treatments such as bleeding from his hospital. He also introduced other novelties to his hospital, such as vaccinations and the use of the stethoscope. He was a physician to Napoleon and was made a knight of the Legion d'Honneur in 1804. He died in Paris on October 25, 1826.

Pinel's innovations were soon imitated in other countries, by such notable as **William Tuke** in England, **Vincenzo Chiarugi** in Florence, and **Dorothea Dix** in the U.S.

Jean-Martin Charcot

Jean-Martin Charcot was born in Paris on November 29, 1825. He received his MD at the University of Paris in 1853. In 1860 he became a professor at his alma mater. Two years later, he began to work at Salpêtrière Hospital as well. In 1882, he opened a neurological clinic at Salpêtrière Hospital. It, and he, became known throughout Europe, and students came from everywhere to study the new field. Among them were Alfred Binet and a young Sigmund Freud.



Charcot is well known in medical circles for his studies of the neurology of motor disorders, resulting diseases, aneurysms, and localization of brain functions. He is considered the father of modern neurology as well as the person who first diagnosed of Multiple Sclerosis

In psychology, he is best known for his use of hypnosis to successfully treating women suffering from the psychological disorder then known as **hysteria**. Now called **conversion disorder**, hysteria involved a loss of some physiological function such as vision, speech, tactile sensations, movement,

etc., that was nonetheless not based in actual neurological damage.

Charcot believed that hysteria was due to a congenitally weak nervous system, combined with the effects of some traumatic experience. Hypnotizing these patients brought on a state similar to hysteria itself. He found that, in some cases, the symptoms would actually lessen after hypnosis – although he was only interested in studying hysteria, not in curing it! Others would later use hypnosis as a part of curing the problem.

Charcot died in Morvan, France, on August 16, 1893. The stamp bearing his image is from the web site of Michael Jacobson, MD, at <http://www.journalclub.org/stamps/>.

The Unconscious

Before we turn to the really big names, let's take a peek at the concept of the unconscious, so strongly associated with psychoanalysis. Most historians agree that the first mention of such a concept was Leibniz's discussion of "**petite perceptions**" or little perceptions. By this he meant certain very low-level stimuli that could enter the mind without the person's awareness – what today we would call subliminal messages. The reality of such things is very much in doubt.

Johann Friedrich Herbart (1776-1841) was the author of a textbook on psychology, published in 1816. But, following Kant, he did not believe psychology could ever be a science. He took the concepts of the associationists and blended them with the dynamics of Leibniz's monads. Ideas had an energy of their own, he said, and could actually force themselves on the person's conscious mind by exceeding a certain threshold. When ideas were incompatible, one or the other would be **repressed**, he said – meaning forced below the threshold into the unconscious. This should remind you of Freud's ideas – except that Herbart had them nearly a century earlier!

Schopenhauer is often seen as the originator of the unconscious, and he spoke at great lengths about instincts and the irrational nature of man, and freely made use of words like repression, resistance, and sublimation! **Nietzsche** also spoke of the unconscious: One of his most famous statements is "My memory says I did it. My pride says I could not have done that. In the end, my memory yields."

One more pre-Freudian should be mentioned: **Karl Eduard von Hartmann** (1842-1906). He blended the ideas of Schopenhauer with Jewish mysticism (the kaballah) and wrote **Philosophy of the Unconscious** in 1869, just in time to influence a young neurologist name Sigmund Freud.

The reader should understand that there are many theorists with little or no use for the concept of the unconscious. Brentano, forefather of phenomenology and existentialism, did not believe in it. Neither did William James. Neither did the Gestalt psychologists. Memories, for example, can be understood as stored in some physical state, perhaps as traces in the brain. When activated, we remember – but they aren't in the mind – conscious or unconscious – until so activated.

In addition to the concept of the unconscious, another early landmark of psychiatry was the introduction of

careful diagnosis of mental illness, beginning with **Emil Kraepelin's** work (1856-1926). The first differentiated classification was of what he labelled **dementia praecox**, which meant the insanity of adolescence. Kraepelin also invented the terms **neurosis** and **psychosis**, and named **Alzheimer's disease** after **Alois Alzheimer**, who first described it. I should also mention **Eugen Bleuler**, who coined the term **schizophrenia** to replace dementia praecox in 1911.

Now, on to Freud....

Sigmund Freud

Freud's story, like most people's stories, begins with others. In his case those others were his mentor and friend, Dr. Joseph Breuer, and Breuer's patient, called Anna O.

Anna O. was Joseph Breuer's patient from 1880 through 1882. Twenty one years old, Anna spent most of her time nursing her ailing father. She developed a bad cough that proved to have no physical basis. She developed some speech difficulties, then became mute, and then began speaking only in English, rather than her usual German.

When her father died she began to refuse food, and developed an unusual set of problems. She lost the feeling in her hands and feet, developed some paralysis, and began to have involuntary spasms. She also had visual hallucinations and tunnel vision. But when specialists were consulted, no physical causes for these problems could be found.

If all this weren't enough, she had fairy-tale fantasies, dramatic mood swings, and made several suicide attempts. Breuer's diagnosis was that she was suffering from what was then called **hysteria** (now called conversion disorder), which meant she had symptoms that appeared to be physical, but were not.



In the evenings, Anna would sink into states of what Breuer called "spontaneous hypnosis," or what Anna herself called "clouds." Breuer found that, during these trance-like states, she could explain her day-time fantasies and other experiences, and she felt better afterwards. Anna called these episodes "chimney sweeping" and "the talking cure."

Sometimes during "chimney sweeping," some emotional event was recalled that gave meaning to some particular symptom. The first example came soon after she had refused to drink for a while: She recalled seeing a woman drink from a glass that a dog had just drunk from. While recalling this, she experienced strong feelings of disgust...and then had a drink of water! In other words, her symptom – an avoidance of water – disappeared as soon as she remembered its root event, and experienced the strong emotion that would be appropriate to that event. Breuer called this catharsis, from the Greek word for cleansing.

It was eleven years later that Breuer and his assistant, Sigmund Freud, wrote a book on hysteria. In it they explained their theory: Every hysteria is the result of a traumatic experience, one that cannot be integrated into the person's understanding of the world. The emotions appropriate to the trauma are not expressed in any direct fashion, but do not simply evaporate: They express themselves in behaviors that in a weak, vague way offer a response to the trauma. These symptoms are, in other words, meaningful. When the client can be made aware of the meanings of his or her symptoms (through hypnosis, for example) then the unexpressed emotions are released and so no longer need to express themselves as symptoms. It is analogous to lancing a boil or draining an infection.

In this way, Anna got rid of symptom after symptom. But it must be noted that she needed Breuer to do this:

Whenever she was in one of her hypnotic states, she had to feel his hands to make sure it was him before talking! And sadly, new problems continued to arise.

According to Freud, Breuer recognized that she had fallen in love with him, and that he was falling in love with her. Plus, she was telling everyone she was pregnant with his child. You might say she wanted it so badly that her mind told her body it was true, and she developed an hysterical pregnancy. Breuer, a married man in a Victorian era, abruptly ended their sessions together, and lost all interest in hysteria. Please understand that recent research suggests that many of these events, including the hysterical pregnancy and Breuer's quick retreat, were probably Freud's "elaborations" on reality!

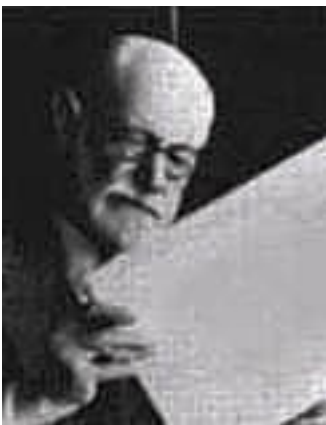
It was Freud who would later add what Breuer did not acknowledge publicly – that secret sexual desires lay at the bottom of all these hysterical neuroses.

To finish her story, Anna spent time in a sanatorium. Later, she became a well-respected and active figure – the first social worker in Germany – under her true name, Bertha Pappenheim. She died in 1936. She will be remembered, not only for her own accomplishments, but as the inspiration for the most influential personality theory we have ever had.

Biography

Sigmund Freud was born May 6, 1856, in a small town – Freiberg – in Moravia. His father was a wool merchant with a keen mind and a good sense of humor. His mother was a lively woman, her husband's second wife and 20 years younger. She was 21 years old when she gave birth to her first son, her darling, Sigmund. Sigmund had two older half-brothers and six younger siblings. When he was four or five – he wasn't sure – the family moved to Vienna, where he lived most of his life.

A brilliant child, always at the head of his class, he went to medical school, one of the few viable options for a bright Jewish boy in Vienna those days. There, he became involved in research under the direction of a physiology professor named Ernst Brücke. Brücke believed in what was then a popular, if radical, notion, which we now call reductionism: "No other forces than the common physical-chemical ones are active within the organism." Freud would spend many years trying to "reduce" personality to neurology, a cause he later gave up on.



Freud was very good at his research, concentrating on neurophysiology, even inventing a special cell-staining technique. But only a limited number of positions were available, and there were others ahead of him. Brücke helped him to get a grant to study, first with the great psychiatrist Charcot in Paris, then with his rival Bernheim in Nancy. Both these gentlemen were investigating the use of hypnosis with hysterics.

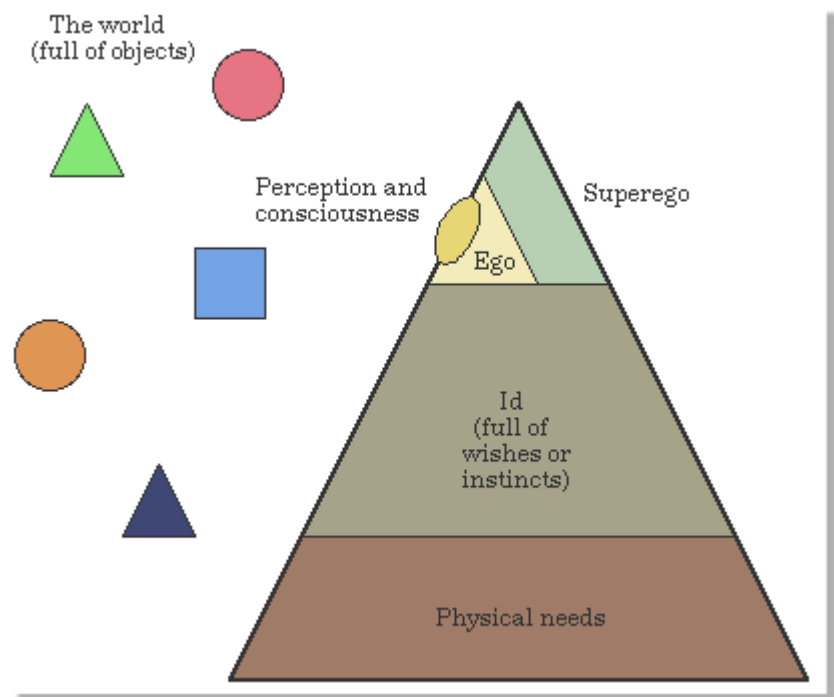
After spending a short time as a resident in neurology and director of a children's ward in Berlin, he came back to Vienna, married his patient fiancée Martha Bernays, and set up a practice in neuropsychiatry, with the help of Joseph Breuer.

Freud's books and lectures brought him both fame and ostracism from the mainstream of the medical community. He drew around him a number of very bright sympathizers who became the core of the psychoanalytic movement. Unfortunately, Freud had a penchant for rejecting people who did not totally agree with him. Some separated from him on friendly terms; others did not, and went on to found competing schools of thought.

Freud emigrated to England just before World War II when Vienna became an increasingly dangerous place for Jews, especially ones as famous as Freud. Not long afterward, he died of the cancer of the mouth and jaw that he had suffered from for the last 20 years of his life.

Theory

Freud didn't exactly invent the idea of the conscious versus unconscious mind, but he certainly was responsible for making it popular. The **conscious mind** is what you are aware of at any particular moment, your present perceptions, memories, thoughts, fantasies, feelings, what have you. Working closely with the conscious mind is what Freud called the **preconscious**, what we might today call "available memory:" anything that can easily be made conscious, the memories you are not at the moment thinking about but can readily bring to mind. Now no-one has a problem with these two layers of mind. But Freud suggested that these are the smallest parts!



The largest part by far is the **unconscious**. It includes all the things that are not easily available to awareness, including many things that have their origins there, such as our drives or instincts, and things that are put there because we can't bear to look at them, such as the memories and emotions associated with trauma.

According to Freud, the unconscious is the source of our motivations, whether they be simple desires for food or sex, neurotic compulsions, or the motives of an artist or scientist. And yet, we are often driven to deny or resist becoming conscious of these motives, and they are often available to us only in disguised form. We will come back to this.

The id, the ego, and the superego

Freudian psychological reality begins with the world, full of objects. Among them is a very special object, the organism. The organism is special in that it acts to survive and reproduce, and it is guided toward those ends by its needs – hunger, thirst, the avoidance of pain, and sex.

A part – a very important part – of the organism is the nervous system, which has as one its characteristics a sensitivity to the organism's needs. At birth, that nervous system is little more than that of any other animal, an "it" or **id**. The nervous system, as id, translates the organism's needs into motivational forces called, in German, **Trieben**, which has been translated as **instincts** or **drives**. Freud also called them **wishes**. This translation from need to wish is called the **primary process**.

The id works in keeping with the **pleasure principle**, which can be understood as a demand to take care of needs immediately. Just picture the hungry infant, screaming itself blue. It doesn't "know" what it wants in any adult sense; it just knows that it wants it and it wants it now. The infant, in the Freudian view, is pure, or nearly pure id. And the id is nothing if not the psychic representative of biology.

Unfortunately, although a wish for food, such as the image of a juicy steak, might be enough to satisfy the id, it isn't enough to satisfy the organism. The need only gets stronger, and the wishes just keep coming. You may have noticed that, when you haven't satisfied some need, such as the need for food, it begins to demand more and more of your attention, until there comes a point where you can't think of anything else. This is the

wish or drive breaking into consciousness.

Luckily for the organism, there is that small portion of the mind we discussed before, the conscious, that is hooked up to the world through the senses. Around this little bit of consciousness, during the first year of a child's life, some of the "it" becomes "I," some of the id becomes **ego**. The ego relates the organism to reality by means of its consciousness, and it searches for objects to satisfy the wishes that id creates to represent the organisms needs. This problem-solving activity is called the **secondary process**.

The ego, unlike the id, functions according to the **reality principle**, which says "take care of a need as soon as an appropriate object is found." It represents reality and, to a considerable extent, reason.

However, as the ego struggles to keep the id (and, ultimately, the organism) happy, it meets with obstacles in the world. It occasionally meets with objects that actually assist it in attaining its goals. And it keeps a record of these obstacles and aides. In particular, it keeps track of the rewards and punishments meted out by two of the most influential objects in the world of the child – mom and dad. This record of things to avoid and strategies to take becomes the **superego**. It is not completed until about seven years of age. In some people, it never is completed.

There are two aspects to the superego: One is the **conscience**, which is an internalization of punishments and warnings. The other is called the **ego ideal**. It derives from rewards and positive models presented to the child. The conscience and ego ideal communicate their requirements to the ego with feelings like pride, shame, and guilt.

It is as if we acquired, in childhood, a new set of needs and accompanying wishes, this time of social rather than biological origins. Unfortunately, these new wishes can easily conflict with the ones from the id. You see, the superego represents society, and society often wants nothing better than to have you never satisfy your needs at all!

The stages

Freud noted that, at different times in our lives, different parts of our skin give us greatest pleasure. Later theorists would call these areas **erogenous zones**. It appeared to Freud that the infant found its greatest pleasure in sucking, especially at the breast. In fact, babies have a penchant for bringing nearly everything in their environment into contact with their mouths. A bit later in life, the child focuses on the anal pleasures of holding it in and letting go. By three or four, the child may have discovered the pleasure of touching or rubbing against his or her genitalia. Only later, in our sexual maturity, do we find our greatest pleasure in sexual intercourse. In these observations, Freud had the makings of a psychosexual stage theory.

The **oral stage** lasts from birth to about 18 months. The focus of pleasure is, of course, the mouth. Sucking and biting are favorite activities.

The **anal stage** lasts from about 18 months to three or four years old. The focus of pleasure is the anus. Holding it in and letting it go are greatly enjoyed.

The **phallic stage** lasts from three or four to five, six, or seven years old. The focus of pleasure is the genitalia. Masturbation is common.

The **latent stage** lasts from five, six, or seven to puberty, that is, somewhere around 12 years old. During this stage, Freud believed that the sexual impulse was suppressed in the service of learning. I must note that, while most children seem to be fairly calm, sexually, during their grammar school years, perhaps up to a quarter of them are quite busy masturbating and playing "doctor." In Freud's repressive era, these children were, at least, quieter than their modern counterparts.

The **genital stage** begins at puberty, and represents the resurgence of the sex drive in adolescence, and the more specific focusing of pleasure in sexual intercourse. Freud felt that masturbation, oral sex, homosexuality, and many other things we find acceptable in adulthood today, were immature.

This is a true stage theory, meaning that Freudians believe that we all go through these stages, in this order, and pretty close to these ages.

The Oedipal crisis

Each stage has certain difficult tasks associated with it where problems are more likely to arise. For the oral stage, this is weaning. For the anal stage, it's potty training. For the phallic stage, it is the Oedipal crisis, named after the ancient Greek story of king Oedipus, who inadvertently killed his father and married his mother.

Here's how the Oedipal crisis works: The first love-object for all of us is our mother. We want her attention, we want her affection, we want her caresses, we want her, in a broadly sexual way. The young boy, however, has a rival for his mother's charms: his father! His father is bigger, stronger, smarter, and he gets to sleep with mother, while junior pines away in his lonely little bed. Dad is the enemy.

About the time the little boy recognizes this archetypal situation, he has become aware of some of the more subtle differences between boys and girls, the ones other than hair length and clothing styles. From his naive perspective, the difference is that he has a penis, and girls do not. At this point in life, it seems to the child that having something is infinitely better than not having something, and so he is pleased with this state of affairs.

But the question arises: where is the girl's penis? Perhaps she has lost it somehow. Perhaps it was cut off. Perhaps this could happen to him! This is the beginning of **castration anxiety**, a slight misnomer for the fear of losing one's penis.

To return to the story, the boy, recognizing his father's superiority and fearing for his penis, engages some of his ego defenses: He displaces his sexual impulses from his mother to girls and, later, women; And he identifies with the aggressor, dad, and attempts to become more and more like him, that is to say, a man. After a few years of latency, he enters adolescence and the world of mature heterosexuality.

The girl also begins her life in love with her mother, so we have the problem of getting her to switch her affections to her father before the Oedipal process can take place. Freud accomplishes this with the idea of **penis envy**: The young girl, too, has noticed the difference between boys and girls and feels that she, somehow, doesn't measure up. She would like to have one, too, and all the power associated with it. At very least, she would like a penis substitute, such as a baby. As every child knows, you need a father as well as a mother to have a baby, so the young girl sets her sights on dad.

Dad, of course, is already taken. The young girl displaces from him to boys and men, and identifies with mom, the woman who got the man she really wanted. Note that one thing is missing here: The girl does not suffer from the powerful motivation of castration anxiety, since she cannot lose what she doesn't have. Freud felt that the lack of this great fear accounts for fact (as he saw it) that women were both less firmly heterosexual than men and somewhat less morally-inclined.

Before you get too upset by this less-than-flattering account of women's sexuality, rest assured that many people have responded to it. I will discuss it in the discussion section.

Therapy

Freud's therapy has been more influential than any other, and more influential than any other part of his theory. Here are some of the major points:

Relaxed atmosphere. The client must feel free to express anything. The therapy situation is in fact a unique social situation, one where you do not have to be afraid of social judgment or ostracism. In fact, in Freudian therapy, the therapist practically disappears. Add to that the physically relaxing couch, dim lights, sound-proof walls, and the stage is set.

Free association. The client may talk about anything at all. The theory is that, with relaxation, the unconscious conflicts will inevitably drift to the fore. It isn't far off to see a similarity between Freudian therapy and dreaming! However, in therapy, there is the therapist, who is trained to recognize certain clues to problems and their solutions that the client would overlook.

Resistance. One of these clues is resistance. When a client tries to change the topic, draws a complete blank, falls asleep, comes in late, or skips an appointment altogether, the therapist says "aha!" These resistances suggest that the client is nearing something in his free associations that he – unconsciously, of course – finds threatening.

Dream analysis. In sleep, we are somewhat less resistant to our unconscious and we will allow a few things, in symbolic form, of course, to come to awareness. These wishes from the id provide the therapist and client with more clues. Many forms of therapy make use of the client's dreams, but Freudian interpretation is distinct in the tendency to find sexual meanings.

Parapraxes. A parapraxis is a slip of the tongue, often called a Freudian slip. Freud felt that they were also clues to unconscious conflicts. Freud was also interested in the jokes his clients told. In fact, Freud felt that almost everything meant something almost all the time – dialing a wrong number, making a wrong turn, misspelling a word, were serious objects of study for Freud. However, he himself noted, in response to a student who asked what his cigar might be a symbol for, that "sometimes a cigar is just a cigar." Or is it?

Other Freudians became interested in **projective tests**, such as the famous Rorschach or inkblot tests. The theory behind these test is that, when the stimulus is vague, the client fills it with his or her own unconscious themes. Again, these could provide the therapist with clues.

Transference, catharsis, and insight

Transference occurs when a client projects feelings toward the therapist that more legitimately belong with certain important others. Freud felt that transference was necessary in therapy in order to bring the repressed emotions that have been plaguing the client for so long, to the surface. You can't feel really angry, for example, without a real person to be angry at. The relationship between the client and the therapist, contrary to popular images, is very close in Freudian therapy, although it is understood that it can't get out of hand.

Catharsis is the sudden and dramatic outpouring of emotion that occurs when the trauma is resurrected. The box of tissues on the end table is not there for decoration.

Insight is being aware of the source of the emotion, of the original traumatic event. The major portion of the therapy is completed when catharsis and insight are experienced. What should have happened many years ago – because you were too little to deal with it, or under too many conflicting pressures – has now happened, and you are on your way to becoming a happier person.

Freud said that the goal of therapy is simply "to make the unconscious conscious."

Discussion

The only thing more common than a blind admiration for Freud seems to be an equally blind hatred for him. Certainly, the proper attitude lies somewhere in between. Let's start by exploring some of the apparent flaws in his theory.

The least popular part of Freud's theory is the Oedipal complex and the associated ideas of castration anxiety and penis envy. What is the reality behind these concepts? It is true that some children are very attached to their opposite sex parent, and very competitive with their same-sex parent. It is true that some boys worry about the differences between boys and girls, and fear that someone may cut their penis off. It is true that some girls likewise are concerned, and wish they had a penis. And it is true that some of these children retain these affections, fears, and aspirations into adulthood.

Most personality theorists, however, consider these examples aberrations rather than universals, exceptions rather than rules. They occur in families that aren't working as well as they should, where parents are unhappy with each other, use their children against each other. They occur in families where parents literally denigrate girls for their supposed lack, and talk about cutting off the penises of unruly boys. They occur especially in neighborhoods where correct information on even the simplest sexual facts is not forthcoming, and children learn mistaken ideas from other children.

If we view the Oedipal crisis, castration anxiety, and penis envy in a more metaphoric and less literal fashion, they are useful concepts: We do love our mothers and fathers as well as compete with them. Children probably do learn the standard heterosexual behavior patterns by imitating the same-sex parent and practicing on the opposite-sex parent. In a male-dominated society, having a penis – being male – is better than not, and losing one's status as a male is scary. And wanting the privileges of the male, rather than the male organ, is a reasonable thing to expect in a girl with aspirations. But Freud did not mean for us to take these concepts metaphorically. Some of his followers, however, did.

Sexuality

A more general criticism of Freud's theory is its emphasis on sexuality. Everything, both good and bad, seems to stem from the expression or repression of the sex drive. Many people question that, and wonder if there are any other forces at work. Freud himself later added the death instinct, but that proved to be another one of his less popular ideas.

First let me point out that, in fact, a great deal of our activities are in some fashion motivated by sex. If you take a good hard look at our modern society, you will find that most advertising uses sexual images, that movies and television programs often don't sell well if they don't include some titillation, that the fashion industry is based on a continual game of sexual hide-and-seek, and that we all spend a considerable portion of every day playing "the mating game." Yet we still don't feel that all life is sexual.

But Freud's emphasis on sexuality was not based on the great amount of obvious sexuality in his society – it was based on the intense avoidance of sexuality, especially among the middle and upper classes, and most especially among women. What we too easily forget is that the world has changed rather dramatically over the last hundred years. We forget that doctors and ministers recommended strong punishment for masturbation, that "leg" was a dirty word, that a woman who felt sexual desire was automatically considered a potential prostitute, that a bride was often taken completely by surprise by the events of the wedding night, and could well faint at the thought.

It is to Freud's credit that he managed to rise above his culture's sexual attitudes. Even his mentor Breuer and the brilliant Charcot couldn't fully acknowledge the sexual nature of their clients' problems. Freud's mistake was more a matter of generalizing too far, and not taking cultural change into account. It is ironic that much of the cultural change in sexual attitudes was in fact due to Freud's work!

The unconscious

One last concept that is often criticized is the unconscious. It is not argued that something like the unconscious accounts for some of our behavior, but rather how much and the exact nature of the beast.

Behaviorists, humanists, and existentialists all believe that (a) the motivations and problems that can be attributed to the unconscious are much fewer than Freud thought, and (b) the unconscious is not the great churning cauldron of activity he made it out to be. Most psychologists today see the unconscious as whatever we don't need or don't want to see. Some theorists don't use the concept at all.

On the other hand, at least one theorist, Carl Jung, proposed an unconscious that makes Freud's look puny! But we will leave all these views for the appropriate chapters.

Positive aspects

People have the unfortunate tendency to "throw the baby out with the bath water." If they don't agree with ideas a, b, and c, they figure x, y, and z must be wrong as well. But Freud had quite a few good ideas, so good that they have been incorporated into many other theories, to the point where we forget to give him credit.

First, Freud made us aware of two powerful forces and their demands on us. Back when everyone believed people were basically rational, he showed how much of our behavior was based on biology. When everyone conceived of people as individually responsible for their actions, he showed the impact of society. When everyone thought of male and female as roles determined by nature or God, he showed how much they depended on family dynamics. The id and the superego – the psychic manifestations of biology and society – will always be with us in some form or another.

Second is the basic theory, going back to Breuer, of certain neurotic symptoms as caused by psychological traumas. Although most theorists no longer believe that all neurosis can be so explained, or that it is necessary to relive the trauma to get better, it has become a common understanding that a childhood full of neglect, abuse, and tragedy tends to lead to an unhappy adult.

Third is the idea of ego defenses. Even if you are uncomfortable with Freud's idea of the unconscious, it is clear that we engage in little manipulations of reality and our memories of that reality to suit our own needs, especially when those needs are strong. I would recommend that you learn to recognize these defenses: You will find that having names for them will help you to notice them in yourself and others!

Finally, the basic form of therapy has been largely set by Freud. Except for some behaviorist therapies, most therapy is still "the talking cure," and still involves a physically and socially relaxed atmosphere. And, even if other theorists do not care for the idea of transference, the highly personal nature of the therapeutic relationship is generally accepted as important to success.

Some of Freud's ideas are clearly tied to his culture and era. Other ideas are not easily testable. Some may even be a matter of Freud's own personality and experiences. But Freud was an excellent observer of the human condition, and enough of what he said has relevance today that he will be a part of personality textbooks for years to come. Even when theorists come up with dramatically different ideas about how we work, they compare their ideas with Freud's.

Carl Jung

Freud said that the goal of therapy was to make the unconscious conscious. He certainly made that the goal of his work as a theorist. And yet he makes the unconscious sound very unpleasant, to say the least: It is a cauldron of seething desires, a bottomless pit of perverse and incestuous cravings, a burial ground for frightening experiences which nevertheless come back to haunt us. Frankly, it doesn't sound like anything I'd like to make conscious!

A younger colleague of his, Carl Jung, was to make the exploration of this "inner space" his life's work. He went equipped with a background in Freudian theory, of course, and with an apparently inexhaustible knowledge of mythology, religion, and philosophy. Jung was especially knowledgeable in the symbolism of complex mystical traditions such as Gnosticism, Alchemy, Kabala, and similar traditions in Hinduism and Buddhism. If anyone could make sense of the unconscious and its habit of revealing itself only in symbolic form, it would be Carl Jung.

He had, in addition, a capacity for very lucid dreaming and occasional visions. In the fall of 1913, he had a vision of a "monstrous flood" engulfing most of Europe and lapping at the mountains of his native Switzerland. He saw thousands of people drowning and civilization crumbling. Then, the waters turned into

blood. This vision was followed, in the next few weeks, by dreams of eternal winters and rivers of blood. He was afraid that he was becoming psychotic.

But on August 1 of that year, World War I began. Jung felt that there had been a connection, somehow, between himself as an individual and humanity in general that could not be explained away. From then until 1928, he was to go through a rather painful process of self-exploration that formed the basis of all of his later theorizing.

He carefully recorded his dreams, fantasies, and visions, and drew, painted, and sculpted them as well. He found that his experiences tended to form themselves into persons, beginning with a wise old man and his companion, a little girl. The wise old man evolved, over a number of dreams, into a sort of spiritual guru. The little girl became "anima," the feminine soul, who served as his main medium of communication with the deeper aspects of his unconscious.

A leathery brown dwarf would show up guarding the entrance to the unconscious. He was "the shadow," a primitive companion for Jung's ego. Jung dreamt that he and the dwarf killed a beautiful blond youth, whom he called Siegfried. For Jung, this represented a warning about the dangers of the worship of glory and heroism which would soon cause so much sorrow all over Europe – and a warning about the dangers of some of his own tendencies towards hero-worship, of Sigmund Freud!

Jung dreamt a great deal about the dead, the land of the dead, and the rising of the dead. These represented the unconscious itself – not the "little" personal unconscious that Freud made such a big deal out of, but a new **collective unconscious** of humanity itself, an unconscious that could contain all the dead, not just our personal ghosts. Jung began to see the mentally ill as people who are haunted by these ghosts, in an age where no-one is supposed to even believe in them. If we could only recapture our mythologies, we would understand these ghosts, become comfortable with the dead, and heal our mental illnesses.

Critics have suggested that Jung was, very simply, ill himself when all this happened. But Jung felt that, if you want to understand the jungle, you can't be content just to sail back and forth near the shore. You've got to get into it, no matter how strange and frightening it might seem.

Biography

Carl Gustav Jung was born July 26, 1875, in the small Swiss village of Kessewil. His father was Paul Jung, a country parson, and his mother was Emilie Preiswerk Jung. He was surrounded by a fairly well educated extended family, including quite a few clergymen and some eccentrics as well.

The elder Jung started Carl on Latin when he was six years old, beginning a long interest in language and literature – especially ancient literature. Besides most modern western European languages, Jung could read several ancient ones, including Sanskrit, the language of the original Hindu holy books.

Carl was a rather solitary adolescent, who didn't care much for school, and especially couldn't take competition. He went to boarding school in Basel, Switzerland, where he found himself the object of a lot of jealous harassment. He began to use sickness as an excuse, developing an embarrassing tendency to faint under pressure.

Although his first career choice was archeology, he went on to study medicine at the University of Basel. While working under the famous neurologist Krafft-Ebing, he settled on psychiatry as his career.

After graduating, he took a position at the Burghoeltzli Mental Hospital in Zurich under Eugene Bleuler, an expert on (and the namer of) schizophrenia. In 1903, he married Emma Rauschenbach. He also taught classes at the University of Zurich, had a private practice, and invented word



association at this time!

Long an admirer of Freud, he met him in Vienna in 1907. The story goes that after they met, Freud canceled all his appointments for the day, and they talked for 13 hours straight, such was the impact of the meeting of these two great minds! Freud eventually came to see Jung as the crown prince of psychoanalysis and his heir apparent.

But Jung had never been entirely sold on Freud's theory. Their relationship began to cool in 1909, during a trip to America. They were entertaining themselves by analyzing each others' dreams (more fun, apparently, than shuffleboard), when Freud seemed to show an excess of resistance to Jung's efforts at analysis. Freud finally said that they'd have to stop because he was afraid he would lose his authority! Jung felt rather insulted.

World War I was a painful period of self-examination for Jung. It was, however, also the beginning of one of the most interesting theories of personality the world has ever seen.

After the war, Jung traveled widely, visiting, for example, tribal people in Africa, America, and India. He retired in 1946, and began to retreat from public attention after his wife died in 1955. He died on June 6, 1961, in Zurich.

Ego, personal unconscious, and collective unconscious

Jung's theory divides the psyche into three parts. The first is the **ego**, which Jung identifies with the conscious mind. Closely related is the **personal unconscious**, which includes anything which is not presently conscious, but can be. The personal unconscious is like most people's understanding of the unconscious in that it includes both memories that are easily brought to mind and those that have been suppressed for some reason. But it does not include the instincts that Freud would have it include.

But then Jung adds the part of the psyche that makes his theory stand out from all others: the **collective unconscious**. You could call it your "psychic inheritance." It is the reservoir of our experiences as a species, a kind of knowledge we are all born with. And yet we can never be directly conscious of it. It influences all of our experiences and behaviors, most especially the emotional ones, but we only know about it indirectly, by looking at those influences.

There are some experiences that show the effects of the collective unconscious more clearly than others: The experiences of love at first sight, of *deja vu* (the feeling that you've been here before), and the immediate recognition of certain symbols and the meanings of certain myths, could all be understood as the sudden conjunction of our outer reality and the inner reality of the collective unconscious. Grander examples are the creative experiences shared by artists and musicians all over the world and in all times, or the spiritual experiences of mystics of all religions, or the parallels in dreams, fantasies, mythologies, fairy tales, and literature.

A nice example that has been greatly discussed recently is the near-death experience. It seems that many people, of many different cultural backgrounds, find that they have very similar recollections when they are brought back from a close encounter with death. They speak of leaving their bodies, seeing their bodies and the events surrounding them clearly, of being pulled through a long tunnel towards a bright light, of seeing deceased relatives or religious figures waiting for them, and of their disappointment at having to leave this happy scene to return to their bodies. Perhaps we are all "built" to experience death in this fashion.

Archetypes

The contents of the collective unconscious are called **archetypes**. Jung also called them dominants, imagos, mythological or primordial images, and a few other names, but archetypes seems to have won out over these. An archetype is an unlearned tendency to experience things in a certain way.

The archetype has no form of its own, but it acts as an "organizing principle" on the things we see or do. It works the way that instincts work in Freud's theory: At first, the baby just wants something to eat, without knowing what it wants. It has a rather indefinite yearning which, nevertheless, can be satisfied by some things and not by others. Later, with experience, the child begins to yearn for something more specific when it is hungry – a bottle, a cookie, a broiled lobster, a slice of New York style pizza.

The archetype is like a black hole in space: You only know its there by how it draws matter and light to itself.

The mother archetype

The **mother archetype** is a particularly good example. All of our ancestors had mothers. We have evolved in an environment that included a mother or mother-substitute. We would never have survived without our connection with a nurturing-one during our times as helpless infants. It stands to reason that we are "built" in a way that reflects that evolutionary environment: We come into this world ready to want mother, to seek her, to recognize her, to deal with her.

So the mother archetype is our built-in ability to recognize a certain relationship, that of "mothering." Jung says that this is rather abstract, and we are likely to project the archetype out into the world and onto a particular person, usually our own mothers. Even when an archetype doesn't have a particular real person available, we tend to personify the archetype, that is, turn it into a mythological "story-book" character. This character symbolizes the archetype.

The mother archetype is symbolized by the primordial mother or "earth mother" of mythology, by Eve and Mary in western traditions, and by less personal symbols such as the church, the nation, a forest, or the ocean. According to Jung, someone whose own mother failed to satisfy the demands of the archetype may well be one that spends his or her life seeking comfort in the church, or in identification with "the motherland," or in meditating upon the figure of Mary, or in a life at sea.

Of the more important archetypes, we have the **shadow**, which represents our animal ancestry and is often the locus of our concerns with evil and our own "dark side;" there's the **anima**, representing the female side of men, and the **animus**, representing the male side of women; and the **persona**, which is the surface self, that part of us we allow others to see.

Other archetypes include father, child, family, hero, maiden, animal, wise old man, the hermaphrodite, God, and the first man.

The self

The goal of life is to realize the **self**. The self is an archetype that represents the transcendence of all opposites, so that every aspect of your personality is expressed equally. You are then neither and both male and female, neither and both ego and shadow, neither and both good and bad, neither and both conscious and unconscious, neither and both an individual and the whole of creation. And yet, with no oppositions, there is no energy, and you cease to act. Of course, you no longer need to act.

To keep it from getting too mystical, think of it as a new center, a more balanced position, for your psyche. When you are young, you focus on the ego and worry about the trivialities of the persona. When you are older (assuming you have been developing as you should), you focus a little deeper, on the self, and become closer to all people, all life, even the universe itself. The self-realized person is actually less selfish.

The Myers-Briggs test

Katharine Briggs and her daughter Isabel Briggs Myers found Jung's ideas about people's personalities so compelling that they decided to develop a paper-and-pencil test. It came to be called the **Myers-Briggs Type**

Indicator, and is one of the most popular, and most studied, tests around.

On the basis of your answers on about 125 questions, you are placed in one of sixteen types, with the understanding that some people might find themselves somewhere between two or three types. What type you are says quite a bit about you – your likes and dislikes, your likely career choices, your compatibility with others, and so on. People tend to like it quite a bit. It has the unusual quality among personality tests of not being too judgmental: None of the types is terribly negative, nor are any overly positive. Rather than assessing how "crazy" you are, the "Myers-Briggs" simply opens up your personality for exploration.

The test has four scales. **Extroversion - Introversion** (E-I) is the most important. Test researchers have found that about 75 % of the population is extroverted.

The next one is **Sensing - Intuiting** (S-N), with about 75 % of the population sensing.

The next is **Thinking - Feeling** (T-F). Although these are distributed evenly through the population, researchers have found that two-thirds of men are thinkers, while two-thirds of women are feelers. This might seem like stereotyping, but keep in mind that feeling and thinking are both valued equally by Jungians, and that one-third of men are feelers and one-third of women are thinkers. Note, though, that society does value thinking and feeling differently, and that feeling men and thinking women often have difficulties dealing with people's stereotyped expectations.

The last is **Judging - Perceiving** (J-P), not one of Jung's original dimensions. Myers and Briggs included this one in order to help determine which of a person's functions is superior. Generally, judging people are more careful, perhaps inhibited, in their lives. Perceiving people tend to be more spontaneous, sometimes careless. If you are an extrovert and a "J," you are a thinker or feeler, whichever is stronger. Extroverted and "P" means you are a senser or intuiter. On the other hand, an introvert with a high "J" score will be a senser or intuiter, while an introvert with a high "P" score will be a thinker or feeler. J and P are equally distributed in the population.

Discussion

Quite a few people find that Jung has a great deal to say to them. They include writers, artists, musicians, film makers, theologians, clergy of all denominations, students of mythology, and, of course, some psychologists. Examples that come to mind are the mythologist Joseph Campbell, the film maker George Lucas, and the science fiction author Ursula K. Le Guin. Anyone interested in creativity, spirituality, psychic phenomena, the universal, and so on will find in Jung a kindred spirit.

But scientists, including most psychologists, have a lot of trouble with Jung. Not only does he fully support the teleological view (as do most personality theorists), but he goes a step further and talks about the mystical interconnectedness of synchronicity. Not only does he postulate an unconscious, where things are not easily available to the empirical eye, but he postulates a collective unconscious that never has been and never will be conscious.

In fact, Jung takes an approach that is essentially the reverse of the mainstream's reductionism: Jung begins with the highest levels – even spiritualism – and derives the lower levels of psychology and physiology from them.

Even psychologists who applaud his teleology and antireductionist position may not be comfortable with him. Like Freud, Jung tries to bring everything into his system. He has little room for chance, accident, or circumstances. Personality – and life in general – seems "over-explained" in Jung's theory.

I have found that his theory sometimes attracts students who have difficulty dealing with reality. When the world, especially the social world, becomes too difficult, some people retreat into fantasy. Some, for example, become couch potatoes. But others turn to complex ideologies that pretend to explain everything. Some get involved in Gnostic or Tantric religions, the kind that present intricate rosters of angels and demons and heavens and hells, and endlessly discuss symbols. Some go to Jung. There is nothing

intrinsically wrong with this; but for someone who is out of touch with reality, this is hardly going to help.

These criticisms do not cut the foundation out from under Jung's theory. But they do suggest that some careful consideration is in order.

Alfred Adler



Alfred Adler was born in the suburbs of Vienna on February 7, 1870, the third child, second son, of a Jewish grain merchant and his wife. As a child, Alfred developed rickets, which kept him from walking until he was four years old. At five, he nearly died of pneumonia. It was at this age that he decided to be a physician.

Alfred was an average student and preferred playing outdoors to being cooped up in school. He was quite outgoing, popular, and active, and was known for his efforts at outdoing his older brother, Sigmund.

He received a medical degree from the University of Vienna in 1895. During his college years, he became attached to a group of socialist students, among which he found his wife-to-be, Raissa Timofeyewna Epstein. She was an intellectual and social activist who had come from Russia to study in Vienna. They married in 1897 and eventually had four children, two of whom became psychiatrists.

He began his medical career as an ophthalmologist, but he soon switched to general practice, and established his office in a lower-class part of Vienna, across from the Prater, a combination amusement park and circus. His clients included circus people, and it has been suggested (Furtmuller, 1964) that the unusual strengths and weaknesses of the performers led to his insights into **organ inferiorities** and **compensation**.

He then turned to psychiatry, and in 1907 was invited to join Freud's discussion group. After writing papers on organic inferiority, which were quite compatible with Freud's views, he wrote, first, a paper concerning an **aggression instinct**, which Freud did not approve of, and then a paper on children's feelings of inferiority, which suggested that Freud's sexual notions be taken more metaphorically than literally.

Although Freud named Adler the president of the Viennese Analytic Society and the co-editor of the organization's newsletter, Adler didn't stop his criticism. A debate between Adler's supporters and Freud's was arranged, but it resulted in Adler, with nine other members of the organization, resigning to form the Society for Free Psychoanalysis in 1911. This organization became The Society for Individual Psychology in the following year.

During World War I, Adler served as a physician in the Austrian Army, first on the Russian front, and later in a children's hospital. He saw first hand the damage that war does, and his thought turned increasingly to the concept of **social interest**. He felt that if humanity was to survive, it had to change its ways!

After the war, he was involved in various projects, including clinics attached to state schools and the training of teachers. In 1926, he went to the United States to lecture, and he eventually accepted a visiting position at the Long Island College of Medicine. In 1934, he and his family left Vienna forever. On May 28, 1937, during a series of lectures at Aberdeen University, he died of a heart attack.

Striving

Alfred Adler postulates a single "drive" or motivating force behind all our behavior and experience. By the time his theory had gelled into its most mature form, he called that motivating force the **striving for perfection**. It is the desire we all have to fulfill our potentials, to come closer and closer to our ideal. It is, as many of you will already see, very similar to the more popular idea of self-actualization.

"Perfection" and "ideal" are troublesome words, though. On the one hand, they are very positive goals. Shouldn't we all be striving for the ideal? And yet, in psychology, they are often given a rather negative connotation. Perfection and ideals are, practically by definition, things you can't reach. Many people, in fact, live very sad and painful lives trying to be perfect! As you will see, other theorists, like Karen Horney and Carl Rogers, emphasize this problem. Adler talks about it, too. But he sees this negative kind of idealism as a perversion of the more positive understanding. We will return to this in a little while.

Striving for perfection was not the first phrase Adler used to refer to his single motivating force. His earliest phrase was the **aggression drive**, referring to the reaction we have when other drives, such as our need to eat, be sexually satisfied, get things done, or be loved, are frustrated. It might be better called the assertiveness drive, since we tend to think of aggression as physical and negative. But it was Adler's idea of the aggression drive that first caused friction between him and Freud. Freud was afraid that it would detract from the crucial position of the sex drive in psychoanalytic theory. Despite Freud's dislike for the idea, he himself introduced something very similar much later in his life: the death instinct.

Another word Adler used to refer to basic motivation was **compensation**, or striving to overcome. Since we all have problems, short-comings, inferiorities of one sort or another, Adler felt, earlier in his writing, that our personalities could be accounted for by the ways in which we do – or don't – compensate or overcome those problems. The idea still plays an important role in his theory, as you will see, but he rejected it as a label for the basic motive because it makes it sound as if it is your problems that cause you to be what you are.

One of Adler's earliest phrases was **masculine protest**. He noted something pretty obvious in his culture (and by no means absent from our own): Boys were held in higher esteem than girls. Boys wanted, often desperately, to be thought of as strong, aggressive, in control – i.e. "masculine" – and not weak, passive, or dependent – i.e. "feminine." The point, of course, was that men are somehow basically better than women. They do, after all, have the power, the education, and apparently the talent and motivation needed to do "great things," and women don't.

You can still hear this in the kinds of comments older people make about little boys and girls: If a baby boy fusses or demands to have his own way (masculine protest!), they will say he's a natural boy; If a little girl is quiet and shy, she is praised for her femininity; If, on the other hand, the boy is quiet and shy, they worry that he might grow up to be a sissy; Or if a girl is assertive and gets her way, they call her a "tomboy" and will try to reassure you that she'll grow out of it!

But Adler did not see men's assertiveness and success in the world as due to some innate superiority. He saw it as a reflection of the fact that boys are encouraged to be assertive in life, and girls are discouraged. Both boys and girls, however, begin life with the capacity for "protest!" Because so many people misunderstood him to mean that men are, innately, more assertive, lead him to limit his use of the phrase.

The last phrase he used, before switching to striving for perfection, was **striving for superiority**. His use of this phrase reflects one of the philosophical roots of his ideas: Friederich Nietzsche developed a philosophy that considered the will to power the basic motive of human life. Although striving for superiority does refer to the desire to be better, it also contains the idea that we want to be better than others, rather than better in our own right. Adler later tended to use striving for superiority more in reference to unhealthy or neurotic striving.

Life style

A lot of this playing with words reflects Adler's groping towards a really different kind of personality theory than that represented by Freud's. Freud's theory was what we nowadays would call a reductionistic one: He tried most of his life to get the concepts down to the physiological level. Although he admitted failure in the end, life is nevertheless explained in terms of basic physiological needs. In addition, Freud tended to "carve up" the person into smaller theoretical concepts – the id, ego, and superego – as well.

Adler was influenced by the writings of Jan Smuts, the South African philosopher and statesman. Smuts felt that, in order to understand people, we have to understand them more as unified wholes than as a collection of bits and pieces, and we have to understand them in the context of their environment, both physical and social. This approach is called **holism**, and Adler took it very much to heart.

First, to reflect the idea that we should see people as wholes rather than parts, he decided to label his approach to psychology **individual psychology**. The word individual means literally "un-divided."

Second, instead of talking about a person's personality, with the traditional sense of internal traits, structures, dynamics, conflicts, and so on, he preferred to talk about **style of life** (nowadays, "lifestyle"). Life style refers to how you live your life, how you handle problems and interpersonal relations. Here's what he himself had to say about it: "The style of life of a tree is the individuality of a tree expressing itself and molding itself in an environment. We recognize a style when we see it against a background of an environment different from what we expect, for then we realize that every tree has a life pattern and is not merely a mechanical reaction to the environment."

Teleology

The last point – that lifestyle is "not merely a mechanical reaction" – is a second way in which Adler differs dramatically from Freud. For Freud, the things that happened in the past, such as early childhood trauma, determine what you are like in the present. Adler sees motivation as a matter of moving towards the future, rather than being driven, mechanistically, by the past. We are drawn towards our goals, our purposes, our ideals. This is called **teleology**.

Moving things from the past into the future has some dramatic effects. Since the future is not here yet, a teleological approach to motivation takes the necessity out of things. In a traditional mechanistic approach, cause leads to effect: If a, b, and c happen, then x, y, and z must, of necessity, happen. But you don't have to reach your goals or meet your ideals, and they can change along the way. Teleology acknowledges that life is hard and uncertain, but it always has room for change!

Another major influence on Adler's thinking was the philosopher Hans Vaihinger, who wrote a book called **The Philosophy of "As If."** Vaihinger believed that ultimate truth would always be beyond us, but that, for practical purposes, we need to create partial truths. His main interest was science, so he gave as examples such partial truths as protons and electrons, waves of light, gravity as distortion of space, and so on. Contrary to what many of us non-scientists tend to assume, these are not things that anyone has seen or proven to exist: They are useful constructs. They work for the moment, let us do science, and hopefully will lead to better, more useful constructs. We use them "as if" they were true. He called these partial truths **fictions**.

Vaihinger, and Adler, pointed out that we use these fictions in day to day living as well. We behave as if we knew the world would be here tomorrow, as if we were sure what good and bad are all about, as if everything we see is as we see it, and so on. Adler called this **fictional finalism**. You can understand the phrase most easily if you think about an example: Many people behave as if there were a heaven or a hell in their personal future. Of course, there may be a heaven or a hell, but most of us don't think of this as a proven fact. That makes it a "fiction" in Vaihinger's and Adler's sense of the word. And finalism refers to the teleology of it: The fiction lies in the future, and yet influences our behavior today.

Adler added that, at the center of each of our lifestyles, there sits one of these fictions, an important one about who we are and where we are going.

Discussion

Criticisms of Adler tend to involve the issue of whether or not, or to what degree, his theory is scientific. The mainstream of psychology today is experimentally oriented, which means, among other things, that the concepts a theory uses must be measurable and manipulable. This in turn means that an experimental orientation prefers physical or behavioral variables. Adler, as you saw, uses basic concepts that are far from physical and behavioral: Striving for perfection? How do you measure that? Or compensation? Or feelings of inferiority? Or social interest? The experimental method also makes a basic assumption: That all things operate in terms of cause and effect. Adler would certainly agree that physical things do so, but he would adamantly deny that people do! Instead, he takes the teleological route, that people are "determined" by their ideals, goals, values, "final fictions." Teleology takes the necessity out of things: A person doesn't have to respond a certain way to a certain circumstance; A person has choices to make; A person creates his or her own personality or lifestyle. From the experimental perspective, these things are illusions that a scientist, even a personality theorist, dare not give in to.

There would be many more psychiatrists and psychoanalysts and other therapists going by other titles. It is impossible to overemphasize the impact that these gentlemen, especially Freud himself, would have on psychology, and in particular on clinical psychology. Following and offering their own slants on the issues would be Anna Freud, Heinz Hartman, Erik Erikson, Otto Rank, Sandor Ferenczi, Karen Horney, Erich Fromm, Harry Stack Sullivan, Henry Murray, Gordon Allport, Gardner Murphy, George Kelly, Carl Rogers, Ludwig Binswanger, and many, many more.

Sigmund Freud Selection: "The Structure of the Unconscious"*

Conscious, Unconscious, Preconscious

The starting point for this investigation is provided by a fact without parallel, which defies all explanation or description—the fact of consciousness. Nevertheless, if anyone speaks of consciousness, we know immediately and from our own most personal experience what is meant by it. Many people, both inside and outside the science of psychology, are satisfied with the assumption that consciousness alone is mental, and nothing then remains for psychology but to discriminate in the phenomenology of the mind between perceptions, feelings, intellectual processes and volitions. It is generally agreed, however, that these conscious processes do not form unbroken series which are complete in themselves; so that there is no alternative to assuming that there are physical or somatic processes which accompany the mental ones and which must admittedly be more complete than the mental series, since some of them have conscious processes parallel to them but others have not. It thus seems natural to lay the stress in psychology upon these somatic processes, to see in them the true essence of what is mental and to try to arrive at some other assessment of the conscious processes. The majority of philosophers, however, as well as many other people, dispute this position and declare that the notion of a mental thing being unconscious is self-contradictory.

But it is precisely this that psychoanalysis is obliged to assert, and this is its second fundamental hypothesis. It explains the supposed somatic accessory processes as being what is essentially mental and disregards for the moment the quality of consciousness....

We are soon led to make an important division in this unconscious. Some processes become conscious easily; they may then cease to be conscious, but can become conscious once more without any trouble: as people say, they can be reproduced or remembered. This reminds us that consciousness is in general a very highly fugitive condition. What is conscious is conscious only for a moment. If our perceptions do not confirm this, the contradiction is merely an apparent one. It is explained by the fact that the stimuli of perception can persist for some time so that in the course of it the perception of them can be repeated. The whole position can be clearly seen from the conscious perception of our intellectual processes; it is true that these may persist, but they may just as easily pass in a flash. Everything unconscious that behaves in this way, that can easily exchange the unconscious condition for the conscious one, is therefore better described as "capable of entering consciousness," or as preconscious. Experience has taught us that there are hardly any mental processes, even of the most complicated kind, which cannot on occasion remain preconscious, although as a rule they press forward, as we say, into consciousness. There are other mental processes or mental material which have no such easy access to consciousness, but which must be inferred, discovered, and translated into conscious form in the manner that has been described. It is for such material that we reserve the name of the unconscious proper.

Thus we have attributed three qualities to mental processes: they are either conscious, preconscious, or unconscious. The division between the three classes of material which have these qualities is neither absolute nor permanent. What is preconscious becomes conscious, as we have seen, without any activity on our part; what is unconscious can, as a result of our efforts, be made conscious, though in the process we may have an impression that we are overcoming what are often very strong resistances. When we make an attempt of this kind upon someone else, we ought not to forget that the conscious filling up of the breaks in his perceptions—the construction which we are offering him—does not so far mean that we have made conscious in him the unconscious material in question. All that is so far true is that the material is present in his mind in two versions, first in the conscious reconstruction that he has just received and secondly in its original unconscious condition.

* From **An Outline of Psychoanalysis** [1940], translated by James Strachey. N.Y.: Norton.
And from **New Introductory Lectures on Psychoanalysis** [1933], translated by W. J. H. Sprott. N.Y.: Norton.

Id, Ego, Super-ego

[The id is] . . . a chaos, a cauldron of seething excitement. We suppose that it is somewhere in direct contact with somatic processes, and takes over from them instinctual needs and gives them mental expression, but we cannot say in what substratum this contact is made. These instincts fill it with energy, but it has no organisation and no unified will, only an impulsion to obtain satisfaction for the instinctual needs, in accordance With the pleasure-principle. The laws of logic— above all, the law of contradiction—do not hold for processes in the id. Contradictory impulses exist side by side without neutralising each other or drawing apart; at most they combine in compromise formations under the overpowering economic pressure towards discharging their energy. There is nothing in the id which can be compared to negation, and we are astonished to find in it an exception to the philosophers' assertion that space and time are necessary forms of our mental acts. In the id there is nothing corresponding to the idea of time, no recognition of the passage of time, and (a thing which is very remarkable and awaits adequate attention in philosophic thought) no alteration of mental processes by the passage of time. Conative impulses which have never got beyond the id, and even impressions which have been pushed down into the id by repression, are virtually immortal and are preserved for whole decades as though they had only recently occurred. They can only be recognised as belonging to the past, deprived of their significance, and robbed of their charge of energy, after they have been made conscious by the work of analysis, and no small part of the therapeutic effect of analytic treatment rests upon this fact.

It is constantly being borne in upon me that we have made far too little use of our theory of the indubitable fact that the repressed remains unaltered by the passage of time. This seems to offers us the possibility of an approach to some really profound truths. But I myself have made no further progress here.

Naturally, the id knows no values, no good and evil, no morality. The economic, or, if you prefer, the quantitative factor, which is so closely bound up with the pleasure- principle, dominates all its processes. Instinctual cathexes seeking discharge,—that, in our view, is all that the id contains. It seems, indeed, as if the energy of these instinctual impulses is in a different condition from that in which it is found in the other regions of the mind. It must be far more fluid and more capable of being discharged, for otherwise we should not have those displacements and condensations, which are so characteristic of the id and which are so completely independent of the qualities of what is cathected....

As regards a characterization of the ego, in so far as it is to be distinguished from the id and the super-ego, we shall get on better if we turn our attention to the relation between it and the most superficial portion of the mental apparatus; which we call the Pcpt-cs (perceptual-conscious) system. This system is directed on to the external world, it mediates perceptions of it, and in it is generated, while it is functioning, the phenomenon of consciousness. It is the sense-organ of the whole apparatus, receptive, moreover, not only of excitations from without but also of such as proceed from the interior of the mind. One can hardly go wrong in regarding the ego as that part of the id which has been modified by its proximity to the external world and the influence that the latter has had on it, and which serves the purpose of receiving stimuli and protecting the organism from them, like the cortical layer with which a particle of living substance surrounds itself. This relation to the external world is decisive for the ego. The ego has taken over the task of representing the external world for the id, and so of saving it; for the id, blindly striving to gratify its instincts in complete disregard of the superior strength of outside forces, could not otherwise escape annihilation. In the fulfilment of this function, the ego has to observe the external world and preserve a true picture of it in the memory traces left by its perceptions, and, by means of the reality-test, it has to eliminate any element in this picture of the external world which is a contribution from internal sources of excitation. On behalf of the id, the ego controls the path of access to motility, but it interpolates between desire and action the procrastinating factor of thought, during which it makes use of the residues of experience stored up in memory. In this way it dethrones the pleasure- principle, which exerts undisputed sway over the processes in the id, and substitutes for it the reality-principle, which promises greater security and greater success.

The relation to time, too, which is so hard to describe, is communicated to the ego by the perceptual system;

indeed it can hardly be doubted that the mode in which this system works is the source of the idea of time. What, however, especially marks the ego out in contradistinction to the id, is a tendency to synthesise its contents, to bring together and unify its mental processes which is entirely absent from the id. When we come to deal presently with the instincts in mental life, I hope we shall succeed in tracing this fundamental characteristic of the ego to its source. It is this alone that produces that high degree of organisation which the ego needs for its highest achievements. The ego advances from the function of perceiving instincts to that of controlling them, but the latter is only achieved through the mental representative of the instinct becoming subordinated to a larger organisation, and finding its place in a coherent unity. In popular language, we may say that the ego stands for reason and circumspection, while the id stands for the untamed passions....

The proverb tells us that one cannot serve two masters at once. The poor ego has a still harder time of it; it has to serve three harsh masters, and has to do its best to reconcile the claims and demands of all three. These demands are always divergent and often seem quite incompatible; no wonder that the ego so frequently gives way under its task. The three tyrants are the external world, the super-ego and the id. When one watches the efforts of the ego to satisfy them all, or rather, to obey them all simultaneously, one cannot regret having personified the ego, and established it as a separate being. It feels itself hemmed in on three sides and threatened by three kinds of danger, towards which it reacts by developing anxiety when it is too hard pressed. Having originated in the experiences of the perceptual system, it is designed to represent the demands of the external world, but it also wishes to be a loyal servant of the id, to remain upon good terms with the id, to recommend itself to the id as an object, and to draw the id's libido on to itself. In its attempt to mediate between the id and reality, it is often forced to clothe the Ucs. commands of the id with its own Pcs. rationalisations, to gloss over the conflicts between the id and reality, and with diplomatic dishonesty to display a pretended regard for reality, even when the id persists in being stubborn and uncompromising. On the other hand, its every movement is watched by the severe super-ego, which holds up certain norms of behaviour, without regard to any difficulties coming from the id and the external world; and if these norms are not acted up to, it punishes the ego with the feelings of tension which manifest themselves as a sense of inferiority and guilt. In this way, goaded on by the id, hemmed in by the super-ego, and rebuffed by reality, the ego struggles to cope with its economic task of reducing the forces and influences which work in it and upon it to some kind of harmony; and we may well understand how it is that we so often cannot repress the cry: "Life is not easy." When the ego is forced to acknowledge its weakness, it breaks out into anxiety: reality anxiety in face of the external world, normal anxiety in face of the super-ego, and neurotic anxiety in face of the strength of the passions in the id.

I have represented the structural relations within the mental personality, as I have explained them to you, in a simple diagram, which I here reproduce.

You will observe how the super-ego goes down into the id; as the heir to the Oedipus complex it has, after all, intimate connections with the id. It lies further from the perceptual system than the ego. The id only deals with the external world through the medium of the ego, at least in this diagram. It is certainly still too early to say how far the drawing is correct; in one respect I know it is not. The space taken up by the unconscious id ought to be incomparably greater than that given to the ego or to the preconscious. You must, if you please, correct that in your imagination.

And now, in concluding this certainly rather exhausting and perhaps not very illuminating account, I must add a warning. When you think of this dividing up of the personality into ego, super-ego and id, you must not imagine sharp dividing lines such as are artificially drawn in the field of political geography. We cannot do justice to the characteristics of the mind by means of linear contours, such as occur in a drawing or in a primitive painting, but we need rather the areas of colour shading off into one another that are to be found in modern pictures. After we have made our separations, we must allow what we have separated to merge again. Do not judge too harshly of a first attempt at picturing a thing so elusive as the human mind. It is very probable that the extent of these differentiations varies very greatly from person to person; it is possible that their function itself may vary, and that they may at times undergo a process of involution. This seems to be particularly true of the most insecure and, from the phylogenetic point of view, the most recent of them, the differentiation between the ego and the superego. It is also incontestable that the same thing can come about

as a result of mental disease. It can easily be imagined, too, that certain practices of mystics may succeed in upsetting the normal relations between the different regions of the mind, so that, for example, the perceptual system becomes able to grasp relations in the deeper layers of the ego and in the id which would otherwise be inaccessible to it. Whether such a procedure can put one in possession of ultimate truths, from which all good will flow, may be safely doubted. All the same, we must admit that the therapeutic efforts of psychoanalysis have chosen much the same method of approach. For their object is to strengthen the ego, to make it more independent of the super-ego, to widen its field of vision, and so to extend its organisation that it can take over new portions of the id. Where id was, there shall ego be.

It is reclamation work, like the draining of the Zuyder Zee.

Behaviorism

Behaviorism is the philosophical position that says that psychology, to be a science, must focus its attentions on what is observable – the environment and behavior – rather than what is only available to the individual – perceptions, thoughts, images, feelings.... The latter are subjective and immune to measurement, and therefore can never lead to an objective science.

The first behaviorists were Russian. The very first was **Ivan M. Sechenov** (1829 to 1905). He was a physiologist who had studied at the University of Berlin with famous people like Müller, DuBois-Reymond, and Helmholtz. Devoted to a rigorous blend of associationism and materialism, he concluded that all behavior is caused by stimulation.

In 1863, he wrote **Reflexes of the Brain**. In this landmark book, he introduced the idea that there are not only **excitatory** processes in the central nervous system, but **inhibitory** ones as well.

Vladimir M. Bekhterev (1857 to 1927) is another early Russian behaviorist. He graduated in 1878 from the Military Medical Academy in St. Petersburg, one year before Pavlov arrived there. He received his MD in 1881 at the tender age of 24, then went to study with the likes of DuBois-Reymond and Wundt in Berlin, and Charcot in France.

He established the first psychology lab in Russia at the university of Kazan in 1885, then returned to the Military Medical Academy in 1893. In 1904, he published a paper entitled "Objective Psychology," which he later expanded into three volumes.

He called his field **reflexology**, and defined it as the objective study of stimulus-response connections. Only the environment and behavior were to be discussed! And he discovered what he called the **association reflex** – what Pavlov would call the conditioned reflex.

Ivan Pavlov

Which brings us to the most famous of the Russian researchers, Ivan Petrovich Pavlov (1849-1936). After studying for the priesthood, as had his father, he switched to medicine in 1870 at the Military Medical Academy in St. Petersburg. It should be noted that he walked from his home in Ryazan near Moscow hundreds of miles to St. Petersburg!



In 1879, he received his degree in natural science, and in 1883, his MD. He then went to study at the university of Leipzig in Germany. In 1890, he was offered a position as professor of physiology at his alma mater, the Military Medical Academy, which is where he spent the rest of his life. It was in 1900 that he began studying reflexes, especially the salivary response.

In 1904, he was awarded the Nobel Prize in physiology for his work on digestion, and in 1921, he received the Hero of the Revolution Award from Lenin himself.

Pavlovian (or classical) conditioning builds on reflexes: We begin with an **unconditioned stimulus** and an **unconditioned response** – a reflex! We then associate a **neutral stimulus** with the reflex by presenting it with the unconditioned stimulus. Over a number of repetitions, the neutral stimulus by itself will elicit the response! At this point, the neutral stimulus is renamed the **conditioned stimulus**, and the response is called the **conditioned response**.

Or, to put it in the form that Pavlov observed in his dogs, some meat powder on the tongue makes a dog salivate. Ring a bell at the same time, and after a few repetitions, the dog will salivate upon hearing the bell alone – without being given the meat powder!

Pavlov agreed with Sechenov that there was inhibition as well as excitation. When the bell is rung many

times with no meat forthcoming, the dog eventually stops salivating at the sound of the bell. That's extinction. But, just give him a little meat powder once, and it is as if he had never had the behavior extinguished: He is right back to salivating to the bell. This **spontaneous recovery** strongly suggests that the habit has been there all along. The dog had simply learned to inhibit his response.

Pavlov, of course, could therefore condition not only excitation but inhibition. You can teach a dog that he is NOT getting meat just as easily as you can teach him that he IS getting meat. For example, one bell could mean dinner, and another could mean dinner is over. If the bells, however, were too similar, or were rung simultaneously, many dogs would have something akin to a nervous breakdown, which Pavlov called an **experimental neurosis**.

In fact, Pavlov classified his dogs into four different personalities, ala the ancient Greeks: Dogs that got angry were choleric, ones that fell asleep were phlegmatic, ones that whined were melancholy, and the few that kept their spirits up were sanguine! The relative strengths of the dogs' abilities to activate their nervous system and calm it back down (excitation and inhibition) were the explanations. These explanations would be used later by Hans Eysenck to understand the differences between introverts and extraverts!

Another set of terms that comes from Pavlov are the first and second signal systems. The **first signal system** is where the conditioned stimulus (a bell) acts as a "signal" that an important event is to occur – i.e. the unconditioned stimulus (the meat). The **second signal system** is when arbitrary symbols come to stand for stimuli, as they do in human language.

Edward Lee Thorndike

Over in America, things were happening as well. Edward Lee Thorndike, although technically a functionalist, was setting the stage for an American version of Russian behaviorism. Thorndike (1874-1949) got his bachelor's degree from Wesleyan University in Connecticut in 1895 and his master's from Harvard in 1897. While there he took a class from William James and they became fast friends. He received a fellowship at Columbia, and got his PhD in 1898. He stayed to teach at Columbia until he retired in 1940.

He will always be remembered for his cats and his poorly constructed "puzzleboxes." These boxes had escape mechanisms of various complexities that required that the cats do several behaviors in sequence. From this research, he concluded that there were two laws of learning:

1. **The law of exercise**, which is basically the same as Aristotle's law of frequency. The more often an association (or neural connection) is used, the stronger the connection. Naturally, the less it is used, the weaker the connection. These two were referred to as the law of use and disuse respectively.
2. **The law of effect**. When an association is followed by a "satisfying state of affairs," the connection is strengthened. And, likewise, when an association is followed by an unsatisfying state of affairs, it is weakened. Except for the mentalistic language ("satisfying" is not behavioral!), it is the same thing as Skinner's operant conditioning.

In 1929, his research led him to abandon all of the above except what we would now call reinforcement (the first half of law 2).

He is also known for his study of **transfer of training**. It was believed back then (and is still often believed) that studying difficult subjects – even if you would never use them – was good for you because it "strengthened" your mind, sort of like exercise strengthens your muscles. It was used back then to justify making kids learn Latin, just like it is used today to justify making kids learn calculus. He found, however,



that it was only the similarity of the second subject to the first that leads to improved learning in the second subject. So Latin may help you learn Italian, or algebra may help you learn calculus, but Latin won't help you learn calculus, or the other way around.

John Broadus Watson



John Watson was born January 9, 1878 in a small town outside Greenville, South Carolina. He was brought up on a farm by a fundamentalist mother and a carousing father. When John was 12, they moved into the town of Greenville, but a year later his father left the family. John became a troublemaker and barely passed in school.

At 16, he began attending Furman University, also in Greenville, and he graduated at 22 with a Masters degree. He then went on to the University of Chicago to study under John Dewey. He found Dewey "incomprehensible" and switched his interests from philosophy to psychology and neurophysiology. Dirt poor, he worked his way through graduate school by waiting tables, sweeping the psych lab, and feeding the rats.

In 1902 he suffered from a "nervous breakdown" which had been a long time coming. He had suffered from an intense fear of the dark since childhood – due to stories he had heard in childhood about the devil doing his work in the night – and this exacerbated into depression.

Nevertheless, after some rest, he finished his PhD the following year, got an assistantship with his professor, the respected functionalist James Angell, and married a student in his intro psych class, Mary Ickes. They would go on to have two children. (The actress Mariette Hartley is his granddaughter.)

The following year, he was made an instructor. He developed a well-run animal lab where he worked with rats, monkeys, and terns. Johns Hopkins offered him a full professorship and a laboratory in 1908, when the previous professor was caught in a brothel.

In 1913, he wrote an article called "Psychology as a Behaviorist Views It" for **Psychological Review**. Here, he outlined the behaviorist program. This was followed in the following year by the book **Behaviorism: An Introduction to comparative Psychology**. In this book, he pushed the study of rats as a useful model for human behavior. Until then, rat research was not thought of as significant for understanding human beings. And, by 1915, he had absorbed Pavlov and Bekhterev's work on conditioned reflexes, and incorporated that into his behaviorist package.

In 1917, he was drafted into the army, where he served until 1919. In that year, he came out with the book **Psychology from the Standpoint of a Behaviorist** – basically an expansion of his original article.

At this time, he expanded his lab work to include human infants. His best known experiment was conducted in 1920 with the help of his lab assistant Rosalie Rayner. "**Little Albert**," a 9 month old child, was conditioned to fear a white rat by pairing it seven times with a loud noise made by hitting a steel bar with a hammer. His fear quickly generalized to a rabbit, a fur coat, a Santa Clause mask, and even cotton. Albert was never "deconditioned" because his mother and he moved away. It was clear, however, that the conditioning tended to disappear (extinguish) rather quickly, so we assume that Albert was soon over his fear. This suggests that conditioned fear is not really the same as a phobia. Later, another child, three year old Peter, was conditioned and then "de-conditioned" by pairing his fear of a rabbit with milk and cookies and other positive things gradually.

In that year, his affair with his lab assistant was revealed and his wife sued for divorce. The administration at

Johns Hopkins asked him for his resignation. He immediately married Rosalie Rayner and began looking for business opportunities.

He soon found himself working for the V. Walter Thompson advertising agency. He worked in a great variety of positions within the company, and was made vice president in 1924. By all standards of the time, he was very successful and quite rich! He increased sales of such items as Pond's cold cream, Maxwell House coffee, and Johnson's baby powder, and is thought to have invented the slogan "LSMFT – Lucky Strikes Means Fine Tobacco."

He published his book **Behaviorism**, designed for the average reader, in 1925, and revised it in 1930. This was his final statement of his position.

Psychology according to Watson is essentially the science of stimuli and responses. We begin with reflexes and, by means of conditioning, acquire learned responses. Brain processes are unimportant (he called the brain a "mystery box"). Emotions are bodily responses to stimuli. Thought is subvocal speech. Consciousness is nothing at all.

Most importantly, he denied the existence of any human instincts, inherited capacities or talents, and temperaments. This **radical environmentalism** is reflected in what is perhaps his best known quote:

Give me a dozen healthy infants, well-formed, and my own specified world to bring them up in and I'll guarantee to take any one at random and train him to become any type of specialist I might select – doctor, lawyer, artist, merchant-chief and, yes, even beggar-man and thief, regardless of his talents, penchants, tendencies, abilities, vocations, and race of his ancestors. (In **Behaviorism**, 1930)

In addition to writing popular articles for McCall's, Harper's, Collier's and other magazines, he published **Psychological Care of the Infant and Child** in 1928. Among other things, he saw parents as more likely than not to ruin their child's healthy development, and argued particularly against too much hugging and other demonstrations of affection!

In 1936, he was hired as vice-president of another agency, William Esty and Company. He devoted himself to business until he retired ten years later. He died in New York City on September 25, 1958.

William McDougall

William McDougall doesn't belong in this chapter, really. But his dislike for Watson's brand of behaviorism and his efforts against it warrant his inclusion. He was born June 22, 1871 in Lancashire, England. He entered the University of Manchester at 15, and received his medical degree from St. Thomas's Hospital in London, in 1897. He usually referred to himself as an anthropologist, especially after a one-year Cambridge University expedition to visit the tribes of central Borneo.

From 1898, McDougall held lectureships in Cambridge and Oxford. His reputation developed in England with the publication of several texts, including **Introduction to Social Psychology** in 1908 and **Body and Mind** in 1911. In 1912, he was made a Fellow of the Royal Society.

During WWI, he served in the medical corps, treating soldiers suffering from "shell shock," what we now call post-traumatic stress syndrome. After the war, he himself received therapy from Carl Jung!

He was offered a position as Professor of Psychology at Harvard in 1920. He considered himself a follower of William James, so he took this as a great honor. In that same year, he published **The Group Mind**, followed in 1923



by the **Outline of Psychology**

In 1924, he participated in **The Battle of Behaviorism** (published in 1929). This was a debate with John Watson at the Psychology Club meeting in Washington DC that year. The audience narrowly voted McDougall the winner, but it would be Watson who would win the favor of American psychology for years to come!

McDougall resigned from his position as chair of Psychology at Harvard in 1926, and began teaching at Duke University in 1927. It should be noted that he had a particular strong relationship with his wife, and in 1927 dedicated his book **Character and the Conduct of Life** to her with these words: "To my wife, to whose intuitive insight I owe whatever understanding of human nature I have acquired." He died in 1938.

McDougall was an hereditarian to the end, promoting a psychology based on **instincts**. He himself referred to his position as **evolutionary psychology**. Further, he was the leading critic of the behaviourism of his day. He particularly hated Watson's simplistic materialism.

McDougall was not well liked by his students or by his colleagues. The American press (notably the New York Times) was particularly antagonistic towards him. The reasons were clear: McDougall took his hereditarian position at a time when the environmental position ruled American psychology and popular opinion. He called himself a "democratic elitist" and considered a nation's intellectual aristocracy a treasure which should be protected. Further, he believed in the hereditary nature of group differences, both national and racial, and proposed the institution of eugenic programs. In his defense, however, he had no sympathy with Nazism and its version of eugenics!

McDougall has been largely forgotten – until recently, with genetics and evolutionary psychology on the rise.

McDougall saw Instincts as having three components:

- **perception** – we pay attention to stimuli relevant to our instinctual purposes
- **behavior** – we perform actions that satisfy our instinctual purposes
- **emotion** – instincts have associated negative and positive emotions

Notice that instincts are **purposive**, i.e. goal-directed! This is not stimulus-response behaviorism!

Here is a list of instincts and accompanying emotions:

- escape – fear
- combat – anger
- repulsion – disgust
- parental (protective) – love, tenderness
- appeal for help – distress
- mating – lust
- curiosity – feeling of mystery
- submission – inferiority
- assertion – superiority
- gregariousness – loneliness
- food-seeking – appetite
- hoarding – greed
- construction – productivity
- laughter – amusement

Clark Hull

Clark Leonard Hull was born May 24, 1884 near Akron, New York, to a poor, rural family. He was educated in a one-room school house and even taught there one year, when he was only 17. While a student, he had a brush with death from typhoid fever.



He went on to Alma College in Michigan to study mining engineering. He worked for a mining company for two months when he developed polio. This forced him to look for a less strenuous career. For two years, he was principal of the same school he had gone to as a child – now consisting of two rooms! He read William James and saved up his money to go to the University of Michigan.

After graduating, he taught for a while, then went on to the University of Wisconsin. He got his PhD there in 1918, and stayed to teach until 1929. This was where his ideas on a behavioristic psychology were formed.

In 1929, he became a professor of psychology at Yale. In 1936, he was elected president of the APA. He published his masterwork, **Principles of Behavior**, in 1943. In 1948, he had a massive heart attack. Nevertheless, he managed to finish a second book, *A Behavior System*, in that same year. He died of a second heart attack May 10, 1952.

Hull's theory is characterized by very strict operationalization of variables and a notoriously mathematical presentation. Here are the variables Hull looked at when conditioning rats:

Independent variables:

- S**, the physical stimulus.
- Time of deprivation or the period and intensity of painful stimuli.
- G**, the size and quality of the reinforcer.
- The time delay between the response and the reinforcer.
- The time between the conditioned and unconditioned stimulus.
- N**, the number of trials.
- The amount of time the rat had been active.

The intervening variables:

- s**, the stimulus trace.
- V**, the stimulus intensity dynamism.
- D**, the drive or primary motivation or need (dependent on deprivation, etc.).
- K**, incentive motivation (dependent on the amount or quality of reinforcer).
- J**, the incentive based on delay of reinforcement.
- sHr**, habit strength, based on **N**, **G** (or **K**), **J**, and time between conditioned and unconditioned stimulus.
- Ir**, reactive inhibition (e.g. exhaustion because the rat had been active for some time).
- sIr**, conditioned inhibition (due to other training).
- sLr**, the reaction threshold (minimum reinforcement required for any learning).
- sOr**, momentary behavioral oscillation – i.e. random variables not otherwise accounted for.
- And the main intervening variable, **sEr**, excitatory potential, which is the result of all the above...

$$\mathbf{sEr} = \mathbf{V} \times \mathbf{D} \times \mathbf{K} \times \mathbf{J} \times \mathbf{sHr} - \mathbf{sIr} - \mathbf{Ir} - \mathbf{sOr} - \mathbf{sLr}.$$

The dependent variables:

- Latency (speed of the response).
- Amplitude (the strength of the response).
- Resistance to extinction.
- Frequency (the probability of the response).

All of which are measures of **R**, the response, which is a function of **sEr**.

Whew!

The essence of the theory can be summarized by saying that the response is a function of the strength of the habit times the strength of the drive. It is for this reason that Hull's theory is often referred to as **drive theory**.

Hull was the most influential behaviorist of the the 1940's and 50's. His student, Kenneth W. Spence, maintained that popularity through much of the 1960's. But the theory, acceptable in its abbreviated form, was too unwieldy in the opinion of other behaviorists, and could not easily generalize from carefully controlled rat experiments to the complexities of human life. It is now a matter of historical interest only.

E. C. Tolman

A very different theory would also have some popularity before the behaviorism left the experimental scene to the cognitivists: The cognitive behaviorism of Edward Chase Tolman. E. C. was born April 14, 1886 in Newton, Mass. His father was a businessman, his mother a housewife and fervent Quaker. He and his older brother attended MIT. His brother went on to become a famous physicist.



E. C. was strongly influenced by reading William James, so in 1911 he went to graduate school at Harvard. While there, he spent a summer in Germany studying with the Kurt Koffka, the Gestalt psychologist. He received his PhD in 1915.

He went off to teach at Northwestern University. But he was a shy teacher, and an avowed pacifist during World War I, and the University dismissed him in 1918. He went to teach at the University of California at Berkeley. He also served in the OSS (Office of Strategic Services) for two years during World War II.

The University of California required loyalty oaths of the professors there (inspired by Joseph McCarthy and the "red scare"). Tolman led protests and was summarily suspended. The courts found in his favor and he was reinstated. In 1959 he retired, and received an honorary doctorate from the same University of California at Berkeley! Unfortunately, he died the same year, on November 19.

Although he appreciated the behaviorist agenda for making psychology into a true objective science, he felt Watson and others had gone too far.

1. Watson's behaviorism was the study of "twitches" – stimulus-response is too **molecular** a level. We should study whole, meaningful behaviors: the **molar level**.
2. Watson saw only simple cause and effect in his animals. Tolman saw **purposeful**, goal-directed behavior.
3. Watson saw his animals as "dumb" mechanisms. Tolman saw them as forming and testing **hypotheses** based on prior experience.
4. Watson had no use for internal, "mentalist" processes. Tolman demonstrated that his rats were capable of a variety of **cognitive processes**.

An animal, in the process of exploring its environment, develops a **cognitive map** of the environment. The process is called **latent learning**, which is learning in the absence of rewards or punishments. The animal develops **expectancies** (hypotheses) which are **confirmed** or not by further experience. Rewards (and punishments) come into play only as motivators for **performance** of a learned behavior, not as the causes of

learning itself.

He himself acknowledged that his behaviorism was more like Gestalt psychology than like Watson's brand of behaviorism. From our perspective today, he can be considered one of the precursors of the cognitive movement.

B. F. Skinner

Burrhus Frederic Skinner was born March 20, 1904, in the small Pennsylvania town of Susquehanna. His father was a lawyer, and his mother a strong and intelligent housewife. His upbringing was old-fashioned and hard-working.



Burrhus was an active, out-going boy who loved the outdoors and building things, and actually enjoyed school. His life was not without its tragedies, however. In particular, his brother died at the age of 16 of a cerebral aneurysm.

Burrhus received his BA in English from Hamilton College in upstate New York. He didn't fit in very well, not enjoying the fraternity parties or the football games. He wrote for school paper, including articles critical of the school, the faculty, and even Phi Beta Kappa! To top it off, he was an atheist – in a school that required daily chapel attendance.

He wanted to be a writer and did try, sending off poetry and short stories. When he graduated, he built a study in his parents' attic to concentrate, but it just wasn't working for him.

Ultimately, he resigned himself to writing newspaper articles on labor problems, and lived for a while in Greenwich Village in New York City as a "bohemian." After some traveling, he decided to go back to school, this time at Harvard. He got his masters in psychology in 1930 and his doctorate in 1931, and stayed there to do research until 1936.

Also in that year, he moved to Minneapolis to teach at the University of Minnesota. There he met and soon married Yvonne Blue. They had two daughters, the second of which became famous as the first infant to be raised in one of Skinner's inventions, the air crib. Although it was nothing more than a combination crib and playpen with glass sides and air conditioning, it looked too much like keeping a baby in an aquarium to catch on.

In 1945, he became the chairman of the psychology department at Indiana University. In 1948, he was invited to come to Harvard, where he remained for the rest of his life. He was a very active man, doing research and guiding hundreds of doctoral candidates as well as writing many books. While not successful as a writer of fiction and poetry, he became one of our best psychology writers, including the book *Walden II*, which is a fictional account of a community run by his behaviorist principles.

August 18, 1990, B. F. Skinner died of leukemia after becoming perhaps the most celebrated psychologist since Sigmund Freud.

Theory

B. F. Skinner's entire system is based on **operant conditioning**. The organism is in the process of "operating" on the environment, which in ordinary terms means it is bouncing around it world, doing what it does. During this "operating," the organism encounters a special kind of stimulus, called a **reinforcing stimulus**, or simply a reinforcer. This special stimulus has the effect of increasing the **operant** – that is, the

behavior occurring just before the reinforcer. This is operant conditioning: "the behavior is followed by a consequence, and the nature of the consequence modifies the organisms tendency to repeat the behavior in the future."

Imagine a rat in a cage. This is a special cage (called, in fact, a "Skinner box") that has a bar or pedal on one wall that, when pressed, causes a little mechanism to release a food pellet into the cage. The rat is bouncing around the cage, doing whatever it is rats do, when he accidentally presses the bar and – hey, presto! – a food pellet falls into the cage! The operant is the behavior just prior to the reinforcer, which is the food pellet, of course. In no time at all, the rat is furiously peddling away at the bar, hoarding his pile of pellets in the corner of the cage.

A behavior followed by a reinforcing stimulus results in an increased probability of that behavior occurring in the future.

What if you don't give the rat any more pellets? Apparently, he's no fool, and after a few futile attempts, he stops his bar-pressing behavior. This is called **extinction** of the operant behavior.

A behavior no longer followed by the reinforcing stimulus results in a decreased probability of that behavior occurring in the future.

Now, if you were to turn the pellet machine back on, so that pressing the bar again provides the rat with pellets, the behavior of bar-pushing will "pop" right back into existence, much more quickly than it took for the rat to learn the behavior the first time. This is because the return of the reinforcer takes place in the context of a reinforcement history that goes all the way back to the very first time the rat was reinforced for pushing on the bar!

Schedules of reinforcement

Skinner likes to tell about how he "accidentally – i.e. operantly – came across his various discoveries. For example, he talks about running low on food pellets in the middle of a study. Now, these were the days before "Purina rat chow" and the like, so Skinner had to make his own rat pellets, a slow and tedious task. So he decided to reduce the number of reinforcements he gave his rats for whatever behavior he was trying to condition, and, lo and behold, the rats kept up their operant behaviors, and at a stable rate, no less. This is how Skinner discovered **schedules of reinforcement**!

Continuous reinforcement is the original scenario: Every time that the rat does the behavior (such as pedal-pushing), he gets a rat goodie.

The **fixed ratio schedule** was the first one Skinner discovered: If the rat presses the pedal three times, say, he gets a goodie. Or five times. Or twenty times. Or "x" times. There is a fixed ratio between behaviors and reinforcers: 3 to 1, 5 to 1, 20 to 1, etc. This is a little like "piece rate" in the clothing manufacturing industry: You get paid so much for so many shirts.

The **fixed interval schedule** uses a timing device of some sort. If the rat presses the bar at least once during a particular stretch of time (say 20 seconds), then he gets a goodie. If he fails to do so, he doesn't get a goodie. But even if he hits that bar a hundred times during that 20 seconds, he still only gets one goodie! One strange thing that happens is that the rats tend to "pace" themselves: They slow down the rate of their behavior right after the reinforcer, and speed up when the time for it gets close.

Skinner also looked at **variable schedules**. Variable ratio means you change the "x" each time – first it takes 3 presses to get a goodie, then 10, then 1, then 7 and so on. Variable interval means you keep changing the time period – first 20 seconds, then 5, then 35, then 10 and so on.

In both cases, it keeps the rats on their rat toes. With the variable interval schedule, they no longer "pace" themselves, because they can no longer establish a "rhythm" between behavior and reward. Most importantly, these schedules are very resistant to extinction. It makes sense, if you think about it. If you haven't gotten a reinforcer for a while, well, it could just be that you are at a particularly "bad" ratio or

interval! Just one more bar press, maybe this'll be the one!

This, according to Skinner, is the mechanism of gambling. You may not win very often, but you never know whether and when you'll win again. It could be the very next time, and if you don't roll them dice, or play that hand, or bet on that number this once, you'll miss on the score of the century!

Shaping

A question Skinner had to deal with was how we get to more complex sorts of behaviors. He responded with the idea of **shaping**, or "the method of successive approximations." Basically, it involves first reinforcing a behavior only vaguely similar to the one desired. Once that is established, you look out for variations that come a little closer to what you want, and so on, until you have the animal performing a behavior that would never show up in ordinary life. Skinner and his students have been quite successful in teaching simple animals to do some quite extraordinary things. My favorite is teaching pigeons to bowl!

I used shaping on one of my daughters once. She was about three or four years old, and was afraid to go down a particular slide. So I picked her up, put her at the end of the slide, asked if she was okay and if she could jump down. She did, of course, and I showered her with praise. I then picked her up and put her a foot or so up the slide, asked her if she was okay, and asked her to slide down and jump off. So far so good. I repeated this again and again, each time moving her a little up the slide, and backing off if she got nervous. Eventually, I could put her at the top of the slide and she could slide all the way down and jump off. Unfortunately, she still couldn't climb up the ladder, so I was a very busy father for a while.

Beyond these fairly simple examples, shaping also accounts for the most complex of behaviors. You don't, for example, become a brain surgeon by stumbling into an operating theater, cutting open someone's head, successfully removing a tumor, and being rewarded with prestige and a hefty paycheck, along the lines of the rat in the Skinner box. Instead, you are gently shaped by your environment to enjoy certain things, do well in school, take a certain bio class, see a doctor movie perhaps, have a good hospital visit, enter med school, be encouraged to drift towards brain surgery as a speciality, and so on. This could be something your parents were carefully doing to you, ala a rat in a cage. But much more likely, this is something that was more or less unintentional.

Aversive stimuli

An **aversive stimulus** is the opposite of a reinforcing stimulus, something we might find unpleasant or painful.

A behavior followed by an aversive stimulus results in a decreased probability of the behavior occurring in the future.

This both defines an aversive stimulus and describes the form of conditioning known as **punishment**. If you shock a rat for doing x, it'll do a lot less of x. If you spank Johnny for throwing his toys he will throw his toys less and less (maybe).

On the other hand, if you remove an already active aversive stimulus after a rat or Johnny performs a certain behavior, you are doing **negative reinforcement**. If you turn off the electricity when the rat stands on his hind legs, he'll do a lot more standing. If you stop your perpetually nagging when I finally take out the garbage, I'll be more likely to take out the garbage (perhaps). You could say it "feels so good" when the aversive stimulus stops, that this serves as a reinforcer!

Behavior followed by the removal of an aversive stimulus results in an increased probability of that behavior occurring in the future.

Notice how difficult it can be to distinguish some forms of negative reinforcement from positive reinforcement: If I starve you, is the food I give you when you do what I want a positive – i.e. a reinforcer?

Or is it the removal of a negative – i.e. the aversive stimulus of hunger?

Skinner (contrary to some stereotypes that have arisen about behaviorists) doesn't "approve" of the use of aversive stimuli – not because of ethics, but because they don't work well! Notice that I said earlier that Johnny will maybe stop throwing his toys, and that I perhaps will take out the garbage? That's because whatever was reinforcing the bad behaviors hasn't been removed, as it would've been in the case of extinction. This hidden reinforcer has just been "covered up" with a conflicting aversive stimulus. So, sure, sometimes the child (or me) will behave – but it still feels good to throw those toys. All Johnny needs to do is wait till you're out of the room, or find a way to blame it on his brother, or in some way escape the consequences, and he's back to his old ways. In fact, because Johnny now only gets to enjoy his reinforcer occasionally, he's gone into a variable schedule of reinforcement, and he'll be even more resistant to extinction than ever!

Behavior modification

Behavior modification – often referred to as **b-mod** – is the therapy technique based on Skinner's work. It is very straight-forward: Extinguish an undesirable behavior (by removing the reinforcer) and replace it with a desirable behavior by reinforcement. It has been used on all sorts of psychological problems – addictions, neuroses, shyness, autism, even schizophrenia – and works particularly well with children. There are examples of back-ward psychotics who haven't communicated with others for years who have been conditioning to behave themselves in fairly normal ways, such as eating with a knife and fork, taking care of their own hygiene needs, dressing themselves, and so on.

There is an offshoot of b-mod called the **token economy**. This is used primarily in institutions such as psychiatric hospitals, juvenile halls, and prisons. Certain rules are made explicit in the institution, and behaving yourself appropriately is rewarded with tokens – poker chips, tickets, funny money, recorded notes, etc. Certain poor behavior is also often followed by a withdrawal of these tokens. The tokens can be traded in for desirable things such as candy, cigarettes, games, movies, time out of the institution, and so on. This has been found to be very effective in maintaining order in these often difficult institutions.

There is a drawback to token economy: When an "inmate" of one of these institutions leaves, they return to an environment that reinforces the kinds of behaviors that got them into the institution in the first place. The psychotic's family may be thoroughly dysfunctional. The juvenile offender may go right back to "the 'hood." No one is giving them tokens for eating politely. The only reinforcements may be attention for "acting out," or some gang glory for robbing a Seven-Eleven. In other words, the environment doesn't travel well!

Walden II

Skinner started his career as an English major, writing poems and short stories. He has, of course, written a large number of papers and books on behaviorism. But he will probably be most remembered by the general run of readers for his book *Walden II*, wherein he describes a utopia-like commune run on his operant principles.

People, especially the religious right, came down hard on his book. They said that his ideas take away our freedom and dignity as human beings. He responded to the sea of criticism with another book (one of his best) called *Beyond Freedom and Dignity*. He asked: What do we mean when we say we want to be free? Usually we mean we don't want to be in a society that punishes us for doing what we want to do. Okay – aversive stimuli don't work well anyway, so out with them! Instead, we'll only use reinforcers to "control" society. And if we pick the right reinforcers, we will feel free, because we will be doing what we feel we want!

Likewise for dignity. When we say "she died with dignity," what do we mean? We mean she kept up her "good" behaviors without any apparent ulterior motives. In fact, she kept her dignity because her reinforcement history has led her to see behaving in that "dignified" manner as more reinforcing than making

a scene.

The bad do bad because the bad is rewarded. The good do good because the good is rewarded. There is no true freedom or dignity. Right now, our reinforcers for good and bad behavior are chaotic and out of our control – it's a matter of having good or bad luck with your "choice" of parents, teachers, peers, and other influences. Let's instead take control, as a society, and design our culture in such a way that good gets rewarded and bad gets extinguished! With the right **behavioral technology**, we can **design culture**.

Both freedom and dignity are examples of what Skinner calls **mentalistic constructs** – unobservable and so useless for a scientific psychology. Other examples include defense mechanisms, the unconscious, archetypes, fictional finalisms, coping strategies, self-actualization, consciousness, even things like hunger and thirst. The most important example is what he refers to as the **homunculus** – Latin for "the little man" – that supposedly resides inside us and is used to explain our behavior, ideas like soul, mind, ego, will, self, and, of course, personality.

Instead, Skinner recommends that psychologists concentrate on observables, that is, the environment and our behavior in it.

Skinner was to enjoy considerable popularity during the 1960's and even into the 70's. But both the humanistic movement in the clinical world, and the cognitive movement in the experimental world, were quickly moving in on his beloved behaviorism. Before his death, he publicly lamented the fact that the world had failed to learn from him.

B. F. Skinner Selection: Walden Two

Chapter 13

The quarters for children from one to I three consisted of several small playrooms with Lilliputian furniture, a child's lavatory, and a dressing and locker room. Several small sleeping rooms were operated on the same principle as the baby cubicles. The temperature and the humidity were controlled so that clothes or bedclothing were not needed. The cots were double-decker arrangements of the plastic mattresses we had seen in the cubicles. The children slept unclothed, except for diapers. There were more beds than necessary, so that the children could be grouped according to developmental age or exposure to contagious diseases or need for supervision, or for educational purposes.

We followed Mrs. Nash to a large screened porch on the south side of the building, where several children were playing in sandboxes and on swings and climbing apparatuses. A few wore "training pants"; the rest were naked. Beyond the porch was a grassy play yard enclosed by closely trimmed hedges, where other children, similarly undressed, were at play. Some kind of marching game was in progress.

As we returned, we met two women carrying food hampers. They spoke to Mrs. Nash and followed her to the porch. In a moment five or six children came running into the playrooms and were soon using the lavatory and dressing themselves. Mrs. Nash explained that they were being taken on a picnic.

"What about the children who don't go?" said Castle. "What do you do about the green-eyed monster?"

Mrs. Nash was puzzled.

"Jealousy. Envy," Castle elaborated. "Don't the children who stay home ever feel unhappy about it?"

"I don't understand," said Mrs. Nash.

"And I hope you won't try," said Frazier with a smile. "I'm afraid we must be moving along."

We said good-bye, and I made an effort to thank Mrs. Nash, but she seemed to be puzzled by that too, and Frazier frowned as if I had committed some breach of good taste.

"I think Mrs. Nash's puzzlement?" said Frazier, as we left the building, "is proof enough that our children are seldom envious or jealous. Mrs. Nash was twelve years old when Walden Two was founded. It was a little late to undo her early training, but I think we were successful. She's a good example of the Walden Two product. She could probably recall the experience of jealousy, but it's not part of her present life."

"Surely that's going too far!" said Castle. "You can't be so godlike as all that! You must be assailed by emotions just as much as the rest of us!"

"We can discuss the question of godlikeness later, if you wish," replied Frazier. "As to emotions—we aren't free of them all, nor should we like to be. But the meaner and more annoying—the emotions which breed unhappiness—are almost unknown here, like unhappiness itself. We don't need them any longer in our struggle for existence, and it's easier on our circulatory system, and certainly pleasanter, to dispense with them."

"If you've discovered how to do that, you are indeed a genius," said Castle. He seemed almost stunned as Frazier nodded assent. "We all know that emotions are useless and bad for our peace of mind and our blood pressure," he went on. "But how arrange things otherwise?"

"We arrange them otherwise here," said Frazier. He was showing a mildness of manner which I was coming to recognize as a sign of confidence.

"But emotions are—fun!" said Barbara. "Life wouldn't be worth living without them."

"Some of them, yes" said Frazier. "The productive and strengthening emotions—joy and love. But sorrow and hate—and the high-voltage excitements of anger, fear, and rage are out of proportion with the needs of

modern life, and they're wasteful and dangerous. Mr. Castle has mentioned jealousy, a minor form of anger, I think we may call it. Naturally we avoid it. It has served its purpose in the evolution of man; we've no further use for it. If we allowed it to persist, it would only sap the life out of us. In a cooperative society there's no jealousy because there's no need for jealousy."

"That implies that you all get everything you want," said Castle. "But what about social possessions? Last night you mentioned the young man who chose a particular girl or profession. There's still a chance for jealousy there, isn't there?"

"It doesn't imply that we get everything we want," said Frazier. "Of course we don't. But jealousy wouldn't help. In a competitive world there's some point to it. It energizes one to attack a frustrating condition. The impulse and the added energy are an advantage. Indeed, in a competitive world emotions work all too well. Look at the singular lack of success of the complacent man. He enjoys a more serene life, but it's less likely to be a fruitful one. The world isn't ready for simple pacifism or Christian humility, to cite two cases in point. Before you can safely turn out the destructive and wasteful emotions, you must make sure they're no longer needed."

"How do you make sure that jealousy isn't needed in Walden Two?" I said.

"In Walden Two problems can't be solved by attacking others" said Frazier with marked finality.

"That's not the same as eliminating jealousy, though" I said.

"Of course it's not. But when a particular emotion is no longer a useful part of a behavioral repertoire, we proceed to eliminate it."

"Yes, but how?"

"It's simply a matter of behavioral engineering," said Frazier.

"Behavioral engineering?"

"You're baiting me, Burris. You know perfectly well what I mean. The techniques have been available for centuries. We use them in education and in the psychological management of the community. But you're forcing my hand" he added. "I was saving that for this evening. But let's strike while the iron is hot."

We had stopped at the door of the large children's building. Frazier shrugged his shoulders, walked to the shade of a large tree, and threw himself on the ground. We arranged ourselves about him and waited.

Chapter 14

Each of us," Frazier began, "is engaged in a pitched battle with the rest of mankind."

"A curious premise for a Utopia," said Castle. "Even a pessimist like myself takes a more hopeful view than that."

"You do, you do," said Frazier. "But let's be realistic. Each of us has interests which conflict with the interests of everybody else. That's our original sin, and it can't be helped. Now, 'everybody else' we call 'society.' It's a powerful opponent, and it always wins. Oh, here and there an individual prevails for a while and gets what he wants. Sometimes he storms the culture of a society and changes it slightly to his own advantage. But society wins in the long run, for it has the advantage of numbers and of age. Many prevail against one, and men against a baby. Society attacks early, when the individual is helpless. It enslaves him almost before he has tasted freedom. The 'ologies' will tell you how it's done. Theology calls it building a conscience or developing a spirit of selfless. Psychology calls it the growth of the super ego."

"Considering how long society has been at it, you'd expect a better job. But the campaigns have been badly planned and the victory has never been secure. The behavior of the individual has been shaped according to revelations of 'good conduct,' never as the result of experimental study. But why not experiment? The questions are simple enough. What's the best behavior for the individual so far as the group is concerned?"

And how can the individual be induced to behave in that way? Why not explore these questions in a scientific spirit?

"We could do just that in Walden Two. We had already worked out a code of conduct—subject, of course, to experimental modification. The code would keep things running smoothly if everybody lived up to it. Our job was to see that everybody did. Now, you can't get people to follow a useful code by making them into so many jack-in-the-boxes. You can't foresee all future circumstances, and you can't specify adequate future conduct. You don't know what will be required. Instead you have to set up certain behavioral processes which lead the individual to design his own 'good' conduct when the time comes. We call that sort of thing 'self-control.' But don't be misled, the control always rests in the last analysis in the hands of society.

"One of our Planners, a young man named Simmons, worked with me. It was the first time in history that the matter was approached in an experimental way. Do you question that statement, Mr. Castle?"

"I'm not sure I know what you are talking about," said Castle.

"Then let me go on. Simmons and I began by studying the great works on morals and ethics—Plato, Aristotle, Confucius, the New Testament, the Puritan divines, Machiavelli, Chesterfield, Freud—there were scores of them. We were looking for any and every method of shaping human behavior by imparting techniques of self-control. Some techniques were obvious enough, for they had marked turning points in human history. 'Love your enemies' is an example—a psychological invention for easing the lot of an oppressed people. The severest trial of oppression is the constant rage which one suffers at the thought of the oppressor. What Jesus discovered was how to avoid these inner devastations. His technique was to practice the opposite emotion. If a man can succeed in loving his enemies and 'taking no thought for the morrow,' he will no longer be assailed by hatred of the oppressor or rage at the loss of his freedom or possessions. He may not get his freedom or possessions back, but he's less miserable. It's a difficult lesson. It comes late in our program."

"I thought you were opposed to modifying emotions and instinct until the world was ready for it," said Castle. "According to you, the principle of love your enemies' should have been suicidal."

"It would have been suicidal, except for an entirely unforeseen consequence. Jesus must have been quite astonished at the effect of his discovery. We are only just beginning to understand the power of love because we are just beginning to understand the weakness of force and aggression. But the science of behavior is clear about all that now. Recent discoveries in the analysis of punishment—but I am falling into one digression after another. Let me save my explanation of why the Christian virtues—and I mean merely the Christian techniques of self-control—have not disappeared from the face of the earth, with due recognition of the fact that they suffered a narrow squeak within recent memory.

"When Simmons and I had collected our techniques of control, we had to discover how to teach them. That was more difficult. Current educational practices were of little value, and religious practices scarcely any better. Promising paradise or threatening hell-fire is, we assumed, generally admitted to be unproductive. It is based upon a fundamental fraud which, when discovered, turns the individual against society and nourishes the very thing it tries to stamp out. What Jesus offered in return for loving one's enemies was heaven on earth, better known as peace of mind.

"We found a few suggestions worth following in the practices of the clinical psychologist. We undertook to build a tolerance for annoying experiences. The sun shine of midday is extremely painful if you come from a dark room, but take it in easy stages and you can avoid pain altogether. The analogy can be misleading, but in much the same way it's possible to build a tolerance to painful or distasteful stimuli, or to frustration, or to situations which arouse fear, anger or rage. Society and nature throw these annoyances at the individual with no regard for the development of tolerances. Some achieve tolerances, most fail. Where would the science of immunization be if it followed a schedule of accidental dosages?

"Take the principle of 'Get thee behind me, Satan,' for example," Frazier continued. "It's a special case of self-control by altering the environment. Subclass A 3, I believe. We give each child a lollipop which has been dipped in powdered sugar so that a single touch of the tongue can be detected. We tell him he may eat

the lollipop later in the day, provided it hasn't already been licked. Since the child is only three or four, it is a fairly diff— "

"Three or four!" Castle exclaimed.

"All our ethical training is completed by the age of six," said Frazier quietly. "A simple principle like putting temptation out of sight would be acquired before four. But at such an early age the problem of not licking the lollipop isn't easy. Now, what would you do, Mr. Castle, in a similar situation?"

"Put the lollipop out of sight as quickly as possible."

"Exactly. I can see you've been well trained. Or perhaps you discovered the principle for yourself. We're in favor of original inquiry wherever possible, but in this case we have a more important goal and we don't hesitate to give verbal help. First of all, the children are urged to examine their own behavior while looking at the lollipops. This helps them to recognize the need for self-control. Then the lollipops are concealed, and the children are asked to notice any gain in happiness or any reduction in tension. Then a strong distraction is arranged—say, an interesting game. Later the children are reminded of the candy and encouraged to examine their reaction. The value of the distraction is generally obvious. Well, need I go on? When the experiment is repeated a day or so later, the children all run with the lollipops to their lockers and do exactly what Mr. Castle would do—a sufficient indication of the success of our training."

"I wish to report an objective observation of my reaction to your story," said Castle, controlling his voice with great precision. "I find myself revolted by this display of sadistic tyranny."

"I don't wish to deny you the exercise of an emotion which you seem to find enjoyable," said Frazier. "So let me go on. Concealing a tempting but forbidden object is a crude solution. For one thing, it's not always feasible. We want a sort of psychological concealment—covering up the candy by paying no attention. In a later experiment the children wear their lollipops like crucifixes for a few hours."

" 'Instead of the cross, the lollipop,
About my neck was hung,' "
said Castle.

"I wish somebody had taught me that, though," said Rodge, with a glance at Barbara.

"Don't we all?" said Frazier. "Some of us learn control, more or less by accident. The rest of us go all our lives not even understanding how it is possible, and blaming our failure on being born the wrong way."

"How do you build up a tolerance to an annoying situation?" I said.

"Oh, for example, by having the children 'take' a more and more painful shock, or drink cocoa with less and less sugar in it until a bitter concoction can be savored without a bitter face."

"But jealousy or envy—you can't administer them in graded doses," I said.

"And why not? Remember, we control the social environment, too, at this age. That's why we get our ethical training in early. Take this case. A group of children arrive home after a long walk tired and hungry. They're expecting supper; they find, instead, that it's time for a lesson in self-control: they must stand for five minutes in front of steaming bowls of soup.

"The assignment is accepted like a problem in arithmetic. Any groaning or complaining is a wrong answer. Instead, the children begin at once to work upon themselves to avoid any unhappiness during the delay. One of them may make a joke of it. We encourage a sense of humor as a good way of not taking an annoyance seriously. The joke won't be much, according to adult standards—perhaps the child will simply pretend to empty the bowl of soup into his upturned mouth. Another may start a song with many verses. The rest join in at once, for they've learned that it's a good way to make time pass."

Frazier glanced uneasily at Castle, who was not to be appeased.

"That also strikes you as a form of torture, Mr. Castle?" he asked.

"I'd rather be put on the rack," said Castle.

"Then you have by no means had the thorough training I supposed. You can't imagine how lightly the children take such an experience. It's a rather severe biological frustration, for the children are tired and hungry and they must stand and look at food; but it's passed off as lightly as a five-minute delay at curtain time. We regard it as a fairly elementary test. Much more difficult problems follow."

"I suspected as much," muttered Castle.

"In a later stage we forbid all social devices. No songs, no jokes—merely silence. Each child is forced back upon his own resources—a very important step."

"I should think so," I said. "And how do you know it's successful? You might produce a lot of silently resentful children. It's certainly a dangerous stage."

"It is, and we follow each child carefully. If he hasn't picked up the necessary techniques, we start back a little. A still more advanced stage"—Frazier glanced again at Castle, who stirred uneasily—"brings me to my point. When it's time to sit down to the soup, the children count off—heads and tails. Then a coin is tossed and if it comes up heads, the 'heads' sit down and eat. The 'tails' remain standing for another five minutes."

Castle groaned.

"And you call that envy?" I asked.

"Perhaps not exactly," said Frazier. "At least there's seldom any aggression against the lucky ones. The emotion, if any, is directed against Lady Luck herself, against the toss of the coin. That, in itself, is a lesson worth learning, for it's the only direction in which emotion has a surviving chance to be useful. And resentment toward things in general, while perhaps just as silly as personal aggression, is more easily controlled. Its expression is not socially objectionable."

Frazier looked nervously from one of us to the other. He seemed to be trying to discover whether we shared Castle's prejudice. I began to realize, also, that he had not really wanted to tell this story. He was vulnerable. He was treading on sanctified ground, and I was pretty sure he had not established the value of most of these practices in an experimental fashion. He could scarcely have done so in the short space of ten years. He was working on faith, and it bothered him.

I tried to bolster his confidence by reminding him that he had a professional colleague among his listeners. "May you not inadvertently teach your children some of the very emotions you're trying to eliminate?" I said. "What's the effect, for example, of finding the anticipation of a warm supper suddenly thwarted? Doesn't that eventually lead to feelings of uncertainty, or even anxiety?"

"It might. We had to discover how often our lessons could be safely administered. But all our schedules are worked out experimentally. We watch for undesired consequences just as any scientist watches for disrupting factors in his experiments.

"After all, it's a simple and sensible program," he went on in a tone of appeasement. "We set up a system of gradually increasing annoyances and frustrations against a background of complete serenity. An easy environment is made more and more difficult as the children acquire the capacity to adjust."

"But why?" said Castle. "Why these deliberate unpleasantnesses—to put it mildly? I must say I think you and your friend Simmons are really very subtle sadists."

"You've reversed your position, Mr. Castle," said Frazier in a sudden flash of anger with which I rather sympathized. Castle was calling names, and he was also being unaccountably and perhaps intentionally obtuse. "A while ago you accused me of breeding a race of softies," Frazier continued. "Now you object to toughening them up. But what you don't understand is that these potentially unhappy situations are never very annoying. Our schedules make sure of that. You wouldn't understand, however, because you're not so far advanced as our children."

Castle grew black.

"But what do your children get out of it?" he insisted, apparently trying to press some vague advantage in Frazier's anger.

"What do they get out of it!" exclaimed Frazier, his eyes flashing with a sort of helpless contempt. His lips curled and he dropped his head to look at his fingers, which were crushing a few blades of grass.

"They must get happiness and freedom and strength," I said, putting myself in a ridiculous position in attempting to make peace.

"They don't sound happy or free to me, standing in front of bowls of Forbidden Soup," said Castle, answering me parenthetically while continuing to stare at Frazier.

"If I must spell it out," Frazier began with a deep sigh, "what they get is escape from the petty emotions which eat the heart out of the unprepared. They get the satisfaction of pleasant and profitable social relations on a scale almost undreamed of in the world at large. They get immeasurably increased efficiency, because they can stick to a job without suffering the aches and pains which soon beset most of us. They get new horizons, for they are spared the emotions characteristic of frustration and failure. They get—"His eyes searched the branches of the trees. "Is that enough?," he said at last.

"And the community must gain their loyalty," I said, "when they discover the fears and jealousies and diffidences in the world at large."

"I'm glad you put it that way," said Frazier. "You might have said that they must feel superior to the miserable products of our public schools. But we're at pains to keep any feeling of superiority or contempt under control, too. Having suffered most acutely from it myself, I put the subject first on our agenda. We carefully avoid any joy in a personal triumph which means the personal failure of somebody else. We take no pleasure in the sophistical, the disputative, the dialectical." He threw a vicious glance at Castle. "We don't use the motive of domination, because we are always thinking of the whole group. We could motivate a few geniuses that way—it was certainly my own motivation—but we'd sacrifice some of the happiness of everyone else. Triumph over nature and over oneself, yes. But over others, never."

"You've taken the mainspring out of the watch," said Castle flatly.

"That's an experimental question, Mr. Castle, and you have the wrong answer."

Frazier was making no effort to conceal his feeling. If he had been riding Castle, he was now using his spurs. Perhaps he sensed that the rest of us had come round and that he could change his tactics with a single holdout. But it was more than strategy, it was genuine feeling. Castle's undeviating skepticism was a growing frustration.

"Are your techniques really so very new?" I said hurriedly. "What about the primitive practice of submitting a boy to various tortures before granting him a place among adults? What about the disciplinary techniques of Puritanism? Or of the modern school, for that matter?"

"In one sense you're right," said Frazier. "And I think you've nicely answered Mr. Castle's tender concern for our little ones. The unhappinesses we deliberately impose are far milder than the normal unhappinesses from which we offer protection. Even at the height of our ethical training, the unhappiness is ridiculously trivial—to the well-trained child.

"But there's a world of difference in the way we use these annoyances," he continued. "For one thing, we don't punish. We never administer an unpleasantness in the hope of repressing or eliminating undesirable behavior. But there's another difference. In most cultures the child meets up with annoyances and reverses of uncontrolled magnitude. Some are imposed in the name of discipline by persons in authority. Some, like hazings, are condoned though not authorized. Others are merely accidental. No one cares to, or is able to, prevent them.

"We all know what happens. A few hardy children emerge, particularly those who have got their unhappiness in doses that could be swallowed. They become brave men. Others become sadists or masochists of varying degrees of pathology. Not having conquered a painful environment, they become

preoccupied with pain and make a devious art of it. Others submit—and hope to inherit the earth. The rest—the cravens, the cowards—live in fear for the rest of their lives. And that's only a single field—the reaction to pain. I could cite a dozen parallel cases. The optimist and the pessimist, the contented and the disgruntled, the loved and the unloved, the ambitious and the discouraged—these are only the extreme products of a miserable system.

"Traditional practices are admittedly better than nothing," Frazier went on. "Spartan or Puritan—no one can question the occasional happy result. But the whole system rests upon the wasteful principle of selection. The English public school of the nineteenth century produced brave men—by setting up almost insurmountable barriers and making the most of the few who came over. But selection isn't education. Its crops of brave men will always be small, and the waste enormous. Like all primitive principles, selection serves in place of education only through a profligate use of material. Multiply extravagantly and select with rigor. It's the philosophy of the 'big litter' as an alternative to good child hygiene.

"In Walden two we have a different objective. We make every man a brave man. They all come over the barriers. Some require more preparation than others, but they all come over. The traditional use of adversity is to select the strong. We control adversity to build strength. And we do it deliberately, no matter how sadistic Mr. Castle may think us, in order to prepare for adversities which are beyond control. Our children eventually experience the 'heartache and the thousand natural shocks that flesh is heir to.' It would be the cruelest possible practice to protect them as long as possible, especially when we could protect them so well."

Frazier held out his hands in an exaggerated gesture of appeal.

"What alternative had we?" he said, as if he were in pain. "What else could we do? For four or five years we could provide a life in which no important need would go unsatisfied, a life practically free of anxiety or frustration or annoyance. What would you do? Would you let the child enjoy this paradise with no thought for the future—like an idolatrous and pampering mother? Or would you relax control of the environment and let the child meet accidental frustrations? But what is the virtue of accident? No, there was only one course open to us. We had to design a series of adversities, so that the child would develop the greatest possible self-control. Call it deliberate, if you like, and accuse us of sadism; there was no other course." Frazier turned to Castle, but he was scarcely challenging him. He seemed to be waiting, anxiously, for his capitulation. But Castle merely shifted his ground.

"I find it difficult to classify these practices," he said. Frazier emitted a disgruntled "Ha!" and sat back. "Your system seems to have usurped the place as well as the techniques of religion."

"Of religion and family culture," said Frazier wearily. "But I don't call it usurpation. Ethical training belongs to the community. As for techniques, we took every suggestion we could find without prejudice as to the source. But not on faith. We disregarded all claims of revealed truth and put every principle to an experimental test. And by the way, I've very much misrepresented the whole system if you suppose that any of the practices I've described are fixed. We try out many different techniques. Gradually we work toward the best possible set. And we don't pay much attention to the apparent success of a principle in the course of history. History is honored in Walden Two only as entertainment. It isn't taken seriously as food for thought. Which reminds me, very rudely, of our original plan for the morning. Have you had enough of emotion? Shall we turn to intellect?"

Frazier addressed these questions to Castle in a very friendly way and I was glad to see that Castle responded in kind. It was perfectly clear, however, that neither of them had ever worn a lollipop about the neck or faced a bowl of Forbidden Soup.

Walt Whitman: There Was a Child Went Forth*

[Here's an example of a poet's understanding of how a person learns and grows. Truth be told, I think "Uncle Walt" is far more insightful than any behaviorist – perhaps more than any psychologist of any orientation!]

THERE was a child went forth every day,
And the first object he look'd upon, that object he became,
And that object became part of him for the day
 or a certain part of the day,
Or for many years or stretching cycles of years.

The early lilacs became part of this child,
And grass and white and red morning-glories,
 and white and red clover, and the song of the phoebe-bird,
And the Third-month lambs and the sow's pink-faint litter,
 and the mare's foal and the cow's calf,
And the noisy brood of the barnyard or by the mire of the pond-side,
And the fish suspending themselves so curiously below there,
 and the beautiful curious liquid,
And the water-plants with their graceful flat heads,
 all became part of him.

The field-sprouts of Fourth-month and Fifth-month became part of him,
Winter-grain sprouts and those of the light-yellow corn,
 and the esculent roots of the garden,
And the apple-trees cover'd with blossoms and the fruit afterward,
 and wood-berries, and the commonest weeds by the road,
And the old drunkard staggering home from the outhouse
 of the tavern whence he had lately risen,
And the schoolmistress that pass'd on her way to the school,
And the friendly boys that pass'd, and the quarrelsome boys,
And the tidy and fresh-cheek'd girls,
 and the barefoot negro boy and girl,
And all the changes of city and country wherever he went.

His own parents, he that had father'd him
 and she that had conceiv'd him in her womb and birth'd him,
They gave this child more of themselves than that,
They gave him afterward every day, they became part of him.

The mother at home quietly placing the dishes on the supper-table,
The mother with mild words, clean her cap and gown,
 a wholesome odor falling off her person and clothes as she walks by,
The father, strong, self-sufficient, manly, mean, anger'd, unjust,
The blow, the quick loud word, the tight bargain, the crafty lure,
The family usages, the language, the company,

* From http://www.princeton.edu/~batke/logr/log_190.html

the furniture, the yearning and swelling heart,
Affection that will not be gainsay'd, the sense of what is real,
the thought if after all it should prove unreal,
The doubts of day-time and the doubts of night-time,
the curious whether and how,
Whether that which appears so is so, or is it all flashes and specks?
Men and women crowding fast in the streets,
if they are not flashes and specks what are they?
The streets themselves and the facades of houses,
and goods in the windows,
Vehicles, teams, the heavy-plank'd wharves,
the huge crossing at the ferries,
The village on the highland seen from afar at sunset,
the river between,
Shadows, aureola and mist, the light falling on roofs
and gables of white or brown two miles off,
The schooner near by sleepily dropping down the tide,
the little boat slack-tow'd astern,
The hurrying tumbling waves, quick-broken crests, slapping,
The strata of color'd clouds, the long bar of maroon-tint away solitary by itself,
the spread of purity it lies motionless in,
The horizon's edge, the flying sea-crow,
the fragrance of salt marsh and shore mud,
These became part of that child who went forth every day,
and who now goes, and will always go forth every day.

Gestalt Psychology

Gestalt Psychology, founded by Max Wertheimer, was to some extent a rebellion against the molecularism of Wundt's program for psychology, in sympathy with many others at the time, including William James. In fact, the word Gestalt means a unified or meaningful whole, which was to be the focus of psychological study instead.

It had its roots in a number of older philosophers and psychologists:

Ernst Mach (1838-1916) introduced the concepts of **space forms** and **time forms**. We see a square as a square, whether it is large or small, red or blue, in outline or technicolor... This is space form. Likewise, we hear a melody as recognizable, even if we alter the key in such a way that none of the notes are the same.

Christian von Ehrenfels (1859-1932), who studied with Brentano in Vienna, is the actual originator of the term **Gestalt** as the Gestalt psychologists were to use it. In 1890, in fact, he wrote a book called **On Gestalt Qualities**. One of his students was none other than Max Wertheimer.

Oswald Külpe (1862-1915) was a student of G. E. Müller at Göttingen and received his doctorate at Leipzig. He studied as well with Wundt, and served as Wundt's assistant for many years. He did most of his work while at the University of Würzburg, between 1894 and 1909.

He is best known for the idea of **imageless thoughts**. Contrary to Wundtians, he showed that some mental activities, such as judgments and doubts, could occur without images. The "pieces" of the psyche that Wundt postulated – sensations, images, and feelings – were apparently not enough to explain all of what went on.

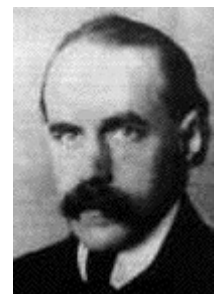
He oversaw the doctoral dissertation of one Max Wertheimer.

Max Wertheimer

So who was this Max Wertheimer? He was born in Prague on April 15, 1880. His father was a teacher and the director at a commercial school. Max studied law for more than two years, but decided he preferred philosophy. He left to study in Berlin, where he took classes from Stumpf, then got his doctoral degree (summa cum laude) from Külpe and the University of Würzburg in 1904.

In 1910, he went to the University of Frankfurt's Psychological Institute. While on vacation that same year, he became interested in the perceptions he experienced on a train. While stopped at the station, he bought a toy stroboscope – a spinning drum with slots to look through and pictures on the inside, sort of a primitive movie machine or sophisticated flip book.

At Frankfurt, his former teacher Friedrich Schumann, now there as well, gave him the use of a tachistoscope to study the effect. His first subjects were two younger assistants, Wolfgang Köhler and Kurt Koffka. They would become his lifelong partners.



He published his seminal paper in 1912: "Experimental Studies of the Perception of Movement." That year, he was offered a lectureship at the University of Frankfurt. In 1916, he moved to Berlin, and in 1922 was made an assistant professor there. In 1925, he came back to Frankfurt, this time as a professor.

In 1933, he moved to the United States to escape the troubles in Germany. The next year, he began teaching at the New School for Social Research in New York City. While there, he wrote his best known book, **Productive Thinking**, which was published posthumously by his son, Michael Wertheimer, a successful psychologist in his own right. He died October 12, 1943 of a coronary embolism at his home in New York.

Wolfgang Köhler

Wolfgang Köhler was born January 21, 1887, in Reval, Estonia. He received his PhD in 1908 from the University of Berlin. He then became an assistant at the Psychological Institute in Frankfurt, where he met and worked with Max Wertheimer.

In 1913, he took advantage of an assignment to study at the Anthropoid Station at Tenerife in the Canary Islands, and stayed there till 1920. In 1917, he wrote his most famous book, **Mentality of Apes**.

In 1922, he became the chair and director of the psychology lab at the University of Berlin, where he stayed until 1935. During that time, in 1929, he wrote **Gestalt Psychology**. In 1935, he moved to the U.S., where he taught at Swarthmore until he retired. He died June 11, 1967 in New Hampshire.



Kurt Koffka



Kurt Koffka was born March 18, 1886, in Berlin. He received his PhD from the University of Berlin in 1909, and, just like Köhler, became an assistant at Frankfurt.

In 1911, he moved to the University of Giessen, where he taught till 1927. While there, he wrote **Growth of the Mind: An Introduction to Child Psychology** (1921). In 1922, he wrote an article for Psychological Bulletin which introduced the Gestalt program to readers in the U.S.

In 1927, he left for the U.S. to teach at Smith College. He published Principles of Gestalt Psychology in 1935. He died in 1941.

The Theory

Gestalt psychology is based on the observation that we often experience things that are not a part of our simple sensations. The original observation was Wertheimer's, when he noted that we perceive motion where there is nothing more than a rapid sequence of individual sensory events. This is what he saw in the toy stroboscope he bought at the Frankfurt train station, and what he saw in his laboratory when he experimented with lights flashing in rapid succession (like the Christmas lights that appear to course around the tree, or the fancy neon signs in Los Vegas that seem to move). The effect is called the **phi phenomenon**, and it is actually the basic principle of motion pictures!

If we see what is not there, what is it that we are seeing? You could call it an illusion, but it's not an hallucination. Wertheimer explained that you are seeing an effect of the whole event, not contained in the sum of the parts. We see a coursing string of lights, even though only one light lights at a time, because the whole event contains relationships among the individual lights that we experience as well.

Furthermore, say the Gestalt psychologists, we are built to experience the structured whole as well as the individual sensations. And not only do we have the ability to do so, we have a strong tendency to do so. We

even add structure to events which do not have gestalt structural qualities.

In perception, there are many organizing principles called **gestalt laws**. The most general version is called the **law of prägnanz**. Prägnanz is German for pregnant, but in the sense of pregnant with meaning, rather than pregnant with child. This law says that we are innately driven to experience things in as good a gestalt as possible. "Good" can mean many things here, such as regular, orderly, simplicity, symmetry, and so on, which then refer to specific gestalt laws.

For example, a set of dots outlining the shape of a star is likely to be perceived as a star, not as a set of dots. We tend to complete the figure, make it the way it "should" be, finish it. Like we somehow manage to see this as a "B"...



The **law of closure** says that, if something is missing in an otherwise complete figure, we will tend to add it. A triangle, for example, with a small part of its edge missing, will still be seen as a triangle. We will "close" the gap.

The **law of similarity** says that we will tend to group similar items together, to see them as forming a gestalt, within a larger form. Here is a simple typographic example:

```

OXXXXXXXXXX
XOXXXXXXXXX
XXOXXXXXXXX
XXXOXXXXXXXX
XXXXOXXXXXX
XXXXXOXXXXX
XXXXXXOXXXX
XXXXXXXXOXXX
XXXXXXXXXXOX
XXXXXXXXXXOX
XXXXXXXXXXOX
XXXXXXXXXXO

```

It is just natural for us to see the o's as a line within a field of x's.

Another law is the law of proximity. Things that are close together are seen as belonging together. For example...

```

*****
*****
*****

```

You are much more likely to see three lines of close-together *'s than 14 vertical collections of 3 *'s each.

Next, there's the law of symmetry. Take a look at this example:

```
[ ][ ][ ][ ]
```

Despite the pressure of proximity to group the brackets nearest each other together, symmetry overwhelms our perception and makes us see them as pairs of symmetrical brackets.

Another law is the law of continuity. When we can see a line, for example, as continuing through another line, rather than stopping and starting, we will do so, as in this example, which we see as composed of two lines, not as a combination of two angles...:

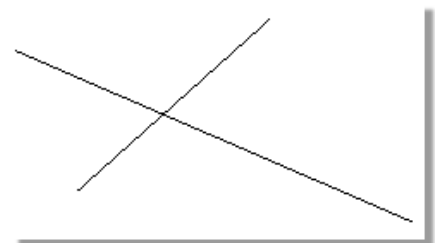
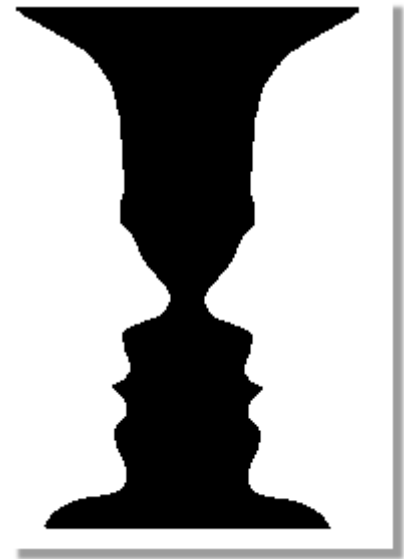


Figure-ground is another Gestalt psychology principle. It was first introduced by the Danish phenomenologist Edgar Rubin (1886-1951). The classic example is this one...

Basically, we seem to have an innate tendency to perceive one aspect of an event as the figure or fore-ground and the other as the ground or back-ground. There is only one image here, and yet, by changing nothing but our attitude, we can see two different things. It doesn't even seem to be possible to see them both at the same time!

But the gestalt principles are by no means restricted to perception – that's just where they were first noticed. Take, for example, **memory**. That too seems to work by these laws. If you see an irregular saw-tooth figure, it is likely that your memory will straighten it out for you a bit. Or, if you experience something that doesn't quite make sense to you, you will tend to remember it as having meaning that may not have been there. A good example is dreams: Watch yourself the next time you tell someone a dream and see if you don't notice yourself modifying the dream a little to force it to make sense!

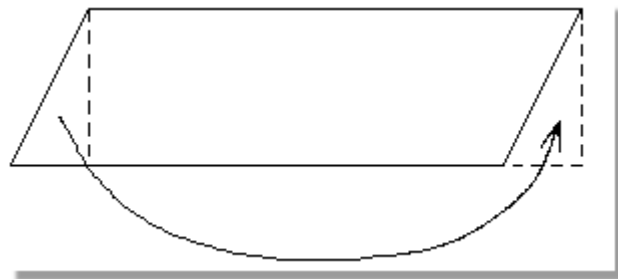


Learning was something the Gestalt psychologists were particularly interested in. One thing they noticed right away is that we often learn, not the literal things in front of us, but the **relations** between them. For example, chickens can be made to peck at the lighter of two gray swatches. When they are then presented with another two swatches, one of which is the lighter of the two preceding swatches, and the other a swatch that is even lighter, they will peck not at the one they pecked at before, but at the lighter one! Even something as stupid as a chicken "understands" the idea of relative lightness and darkness.

Gestalt theory is well known for its concept of **insight learning**. People tend to misunderstand what is being suggested here: They are not so much talking about flashes of intuition, but rather solving a problem by means of the recognition of a gestalt or organizing principle.

The most famous example of insight learning involved a chimp named Sultan. He was presented with many different practical problems (most involving getting a hard-to-reach banana). When, for example, he had been allowed to play with sticks that could be put together like a fishing pole, he appeared to consider in a very human fashion the situation of the out-of-reach banana thoughtfully – and then rather suddenly jump up, assemble the poles, and reach the banana.

A similar example involved a five year old girl, presented with a geometry problem way over her head: How do you figure the area of a parallelogram? She considered, then excitedly asked for a pair of scissors. She cut off a triangle from one end, and moved it around to the other side, turning the parallelogram into a simple rectangle. Wertheimer called this **productive thinking**.



The idea behind both of these examples, and much of the gestalt explanation of things, is that the world of our experiencing is meaningfully organized, to one degree or another. When we learn or solve problems, we are essentially recognizing meaning that is there, in the experience, for the "dis-covering."

Most of what we've just looked at has been absorbed into "mainstream" psychology – to such a degree that

many people forget to give credit to the people who discovered these principles! There is one more part of their theory that has had less acceptance: **Isomorphism**.

Isomorphism suggests that there is some clear similarity in the gestalt patterning of stimuli and of the activity in the brain while we are perceiving the stimuli. There is a "map" of the experience with the same structural order as the experience itself, albeit "constructed" of very different materials! We are still waiting to see what an experience "looks" like in an experiencing brain. It may take a while.

Kurt Lewin

Gestalt Psychology, even though it no longer survives as a separate entity, has had an enormous impact. Two people in particular lead the way in introducing it into other aspects of psychology: Kurt Goldstein and Kurt Lewin.



Kurt Lewin was born September 9, 1890, in Mogilno, Germany. He received his PhD from the University of Berlin under Stumpf. After military service, he returned to Berlin where he worked with Wertheimer, Koffka, and Köhler.

He went to the U.S. as a guest lecturer at Stanford and Cornell, and took a position at the University of Iowa in 1935. In 1944, he created and directed the Research Center for Group Dynamics at MIT. He died in 1947, just beginning his work there.

Lewin created a **topological** theory that expressed human dynamics in the form of a **map** representing a person's **life space**. The map is patterned with one's needs, desires, and goal, and **vectors** or arrows indicated the directions and strengths of these forces – all operating as a Gestalt.

This theory inspired any number of psychologists in the U.S., most particularly those in social psychology. Among the people he influenced were Muzafer Sherif, Solomon Asch, and Leon Festinger.

Kurt Goldstein



The other person was Kurt Goldstein. Born in 1878, he received his MD from the University of Breslau in 1903. He went to teach at the Neurological Institute of the University of Frankfurt, where he met the founders of Gestalt psychology.

He went to Berlin to be a professor there, and then went on to New York City in 1935. There, he wrote **The Organism** in 1939, and later **Human Nature in the Light of Pathology** in 1963. He died in 1965.

Goldstein developed a holistic view of brain function, based on research that showed that people with brain damage learned to use other parts of their brains in compensation. He extended his holism to the entire organism, and postulated that there was only one drive in human functioning, and coined the term **self-actualization**. Self-preservation, the usual postulated central motive, he said, is actually pathological!

Goldstein and his idea of self-actualization influence quite a few young personality theorists and therapists. Among them would be Gordon Allport, Carl Rogers, and Abraham Maslow, founders of the American humanistic psychology movement.

Kurt Köhler Selection: Gestalt Psychology Today(1959)*

...

I should like to begin with a few remarks about the history of Gestalt psychology – because not all chapters of this history are generally known. In the eighties of the past century, psychologists in Europe were greatly disturbed by von Ehrenfels' claim that thousands of percepts have characteristics which cannot be derived from the characteristics of their ultimate components, the so-called sensations. Chords and melodies in hearing, the shape characteristics of visual objects, the roughness or the smoothness of tactual impressions, and so forth were used as examples. All these "Gestalt qualities" have one thing in common. When the physical stimuli in question are considerably changed, while their relations are kept constant, the Gestalt qualities remain about the same. But, At the time, it was generally assumed that the sensations involved are individually determined by their individual stimuli and must therefore change when these are greatly changed. How, then, could any characteristics of the perceptual situation remain constant under these conditions? Where did the Gestalt qualities come from? Ehrenfels' qualities are not fancy ingredients of this or that particular situation which we might safely ignore. Both positive and negative esthetic characteristics of the world around us, not only of ornaments, paintings, sculptures, tunes, and so forth, but also of trees, landscapes, houses, cars – and other persons – belong to this class. That relations between the sexes largely depend on specimens of the same class need hardly be emphasized. It is, therefore, not safe to deal with problems of psychology as though there were no such qualities. And yet, beginning with Ehrenfels himself, psychologists have not been able to explain their nature.

This holds also for the men who were later called Gestalt psychologists, including the present speaker. Wertheimer's ideas and investigations developed in a different direction. His thinking was also more radical than that of Ehrenfels. He did not ask: How are Gestalt qualities possible when, basically, the perceptual scene consists of separate elements? Rather, he objected to this premise, the thesis that the psychologist's thinking must begin with a consideration of such elements. From a subjective point of view, he felt, it may be tempting to assume that all perceptual situations consist of independent, very small components. For, on this assumption, we obtain a maximally clear picture of what lies behind the observed facts. But, how do we know that a subjective clarity of this kind agrees with the nature of what we have before us? Perhaps we pay for the subjective clearness of the customary picture by ignoring all processes, all functional interrelations, which may have operated before there is a perceptual scene and which thus influence the characteristics of this scene. Are we allowed to impose on perception an extreme simplicity which, objectively, it may not possess?

Wertheimer, we remember, began to reason in this fashion when experimenting not with perceptual situations which were stationary, and therefore comparatively silent, but with visual objects in motion when corresponding stimuli did not move. Such "apparent movements," we would now say, occur when several visual objects appear or disappear in certain temporal relations. Again in our present language, under these circumstances an interaction takes place which, for instance, makes a second object appear too near, or coincident with, a first object which is just disappearing, so that only when the first object, and therefore the interaction, really fades, the second object can move toward its normal position. If this is interaction, it does not, as such, occur on the perceptual scene. On this scene, we merely observe a movement. That movements of this kind do not correspond to real movements of the stimulus objects and must therefore be brought about by the sequence of the two objects, we can discover only by examining the physical situation. It follows that, if the seen movement is the perceptual result of an interaction, this interaction itself takes place outside the

* Address of the President at the sixty-seventh Annual Convention of the American Psychological Association, Cincinnati, Ohio, September 6, 1959

First published in *American Psychologist*, 14, 727-734. Abridged from *Classics in the History of Psychology*. An internet resource developed by Christopher D. Green, York University, Toronto, Ontario
<http://psychclassics.yorku.ca>

perceptual field. Thus, the apparent movement confirmed Wertheimer's more general suspicion: we cannot assume that the perceptual scene is an aggregate of unrelated elements because underlying processes are already functionally interrelated when that scene emerges, and now exhibits corresponding effects.

Wertheimer did not offer a more specific physiological explanation. At the time, this would have been impossible. He next turned to the problem of whether the characteristics of stationary perceptual fields are also influenced by interactions. I need not repeat how he investigated the formation of molar perceptual units, and more particularly of groups of such objects. Patterns which he used for this purpose are now reproduced in many textbooks. They clearly demonstrate that it is *relations* among visual objects which decide what objects become group members, and what others do not, and where, therefore, one group separates itself from another. This fact strongly suggests that perceptual groups are established by interactions; and, since a naive observer is merely aware of the result, the perceived groups, but not of their dependence upon particular relations, such interactions would again occur among the underlying processes rather than within the perceptual field.

Let me add a further remark about this early stage of the development. Surely, in those years, Gestalt psychologists were not satisfied with a quiet consideration of available facts. It seems that no major new trend in a science ever is. We were excited by what we found, and even more by the prospect of finding further revealing facts. Moreover, it was not only the stimulating newness of our enterprise which inspired us. There was also a great wave of relief – as though we were escaping, from a prison. The prison was psychology as taught at the universities when we still were students. At the time, we had been shocked by the thesis that all psychological facts (not only those in perception) consist of unrelated inert atoms and that almost the only factors which combine these atoms and thus introduce action are associations formed under the influence of mere contiguity. What had disturbed us was the utter senselessness of this picture, and the implication that human life, apparently so colorful and so intensely dynamic, is actually a frightful bore. This was not true of our new picture, and we felt that further discoveries were bound to destroy, what was left of the old picture.

Soon further investigations, not all of them done by Gestalt psychologists, reinforced the new trend. Rubin called attention to the difference between figure and ground. David Katz found ample evidence for the role of Gestalt factors in the field of touch as well as in color vision, and so forth. Why so much interest just in perception? Simply because in no other part of psychology are facts so readily accessible to observation. It was the hope of everybody that, once some major functional principles had been revealed in this part of psychology, similar principles would prove to be relevant to other parts, such as memory, learning, thinking, and motivation. In fact, Wertheimer and I undertook our early studies of intellectual processes precisely from this point of view; somewhat later, Kurt Lewin began his investigations of motivation which, in part, followed the same line; and we also applied the concept of *Gestaltung* or 'organization to memory, to learning, and to recall. With developments in America, Wertheimer's further analysis of thinking, Asch's and Heider's investigations in social psychology, our work on figural aftereffects, and eventually on currents Of the brain, we are probably all familiar.

...

But I intended to discuss some trends in American psychology. May I confess that I do not fully approve of all these trends?

First, I doubt whether it is advisable to regard caution and a critical spirit as the virtues of a scientist, as though little else counted. They are necessary in research, just as the brakes in our cars must be kept in order and their windshields clean. But it is not because of the brakes or of the windshields that we drive. Similarly, caution and a critical spirit are like tools. They ought to be kept ready during a scientific enterprise; however, the main business of a science is gaining more and more new knowledge. I wonder why great men in physics do not call caution and a critical spirit the most important characteristics of their behavior. They seem to regard the testing of brakes and the cleaning of windshields as mere precautions, but to look forward to the next trip as the business for which they have cars. Why is it only in psychology that we hear the slightly discouraging, story of mere caution over and over again? Why are just psychologists so inclined to greet the

announcement of a new fact (or a new working hypothesis) almost with scorn? This is caution that has gone sour and has almost become negativism – which, of course, is no less an emotional attitude than is enthusiasm. The enthusiasm of the early Gestalt psychologists was a virtue, because it led to new observations. But virtues, it has been said, tend to breed little accompanying vices. In their enthusiasm, the Gestalt psychologists were not always sufficiently careful.

In American psychology, it is rightly regarded as a virtue if a man feels great respect for method and for caution. But, if this virtue becomes too strong, it may bring forth a spirit of skepticism and thus prevent new work. Too many young psychologists, it seems to me, either work only against something done by others or merely vary slightly what others have done before; in other words, preoccupation with method may tend to limit the range of our research. We are, of course, after clear evidence. But not in all parts of psychology can evidence immediately be clear. In some, we cannot yet use our most exact methods. Where this happens, we hesitate to proceed. Experimentalists in particular tend to avoid work on new materials resistant to approved methods and to the immediate application of perfectly clear concepts. But concepts in a new field can only be clarified by work in this field. Should we limit our studies to areas already familiar from previous research? Obviously, would mean a kind of conservatism in psychology. When I was his student, Max Planck repeated this warning over and over again in his lectures.

Our wish to use only perfect methods and clear concepts has led to Methodological Behaviorism. Human experience in the phenomenological sense cannot yet be treated with our most reliable methods; and, when dealing with it, we may be forced to form new concepts which, at first, will often be a bit vague. Most experimentalists, therefore, refrain from observing, or even from referring to, the phenomenal scene. And yet, this is the scene on which, so far as the actors are concerned, the drama of ordinary human living is being played all the time. If we never study this scene, but insist on methods and concepts developed in research "from the outside," our results are likely to look strange to those who intensely live "inside."

To be sure, in many respects, the graphs and tables obtained "from the outside" constitute a most satisfactory material; and, in animal psychology, we have no other material. But this material as such contains no direct evidence as to the processes by which it is brought about. In this respect it is a slightly defective, I am tempted to say, a meager, material. For it owes its particular clearness to the fact that the data from which the graphs and tables are derived are severely selected data. When subjects are told to say no more than "louder," "softer," and perhaps "equal" in certain experiments, or when we merely count how many items they recall in others, then we can surely apply its precise statistical techniques to what they do. But, as a less attractive consequence, we never hear under these circumstances how they do the comparing in the first case and what happens when they try to recall in the second case.

Are such questions now to be ignored? After all, not all phenomenal experiences are entirely vague; this Scheerer has rightly emphasized. And, if many are not yet accessible to quantitative procedures, what of it? One of the most fascinating disciplines, developmental physiology, the science investigating the growth of an organism from one cell, seldom uses quantitative techniques. And yet, nobody can deny that its merely qualitative description of morphogenesis has extraordinary scientific value. In new fields, not only quantitative data are relevant. As to the initial vagueness of Concepts in a new field, I should like to add an historical remark. When the concept of energy was first introduced in physics, it was far from being a clear concept. For decades, its meaning could not be sharply distinguished from that of the term "force." And what did the physicists do? They worked and worked on it, until at last it did become perfectly clear. There is no other way of dealing with new, and therefore not yet perfect, concepts. Hence, if we refuse to study the phenomenal scene, because, here, few concepts are so far entirely clear, we thereby decide that this scene will never be investigated – at least not by us, the psychologists.

...

You will ask me whether my suggestions lead to any consequences in actual research. Most surely, they do. But, since I have lived so long in America, and have therefore gradually become a most cautious scientist, I am now preparing myself for the study of motivation by investigating, first of all, the action of dynamic vectors in simpler fields, such as cognition and perception. It is a most interesting occupation to compare

motivational action with dynamic events in those other parts of psychology. When you do so, everything looks different, not only in perception but also in certain forms of learning. Specific work? There is, and will be more of it than I alone can possibly manage. Consequently, I need help. And where do I expect to find this help? I will tell you where.

The Behaviorist's premises, we remember, lead to certain expectations and experiments. What I have just said invites us to proceed in another direction. I suggest that, in this situation, we forget about schools. The Behaviorist is convinced that his functional concepts are those which we all ought to use. The Gestalt psychologist, who deals with a greater variety of both phenomenal and physical concepts, expects more from work based on such premises. Both parties feel that their procedures are scientifically sound. Why should we fight? Many experiments done by Behaviorists seem to me to be very good experiments. May I now ask the Behaviorists to regard the use of some phenomenal facts, and also of field physics, as perfectly permissible? If we were to agree on these points, we could, I am sure, do excellent work together. It would be an extraordinary experience – and good for psychology.

Carl Rogers Selection: The Organization of Personality*

The Relation of the Organized Perceptual Field to Behavior

One simple observation, which is repeated over and over again in each successful therapeutic case, seems to have rather deep theoretical implications. It is that as changes occur in the perception of self and in the perception of reality, changes occur in behavior. In therapy, these perceptual changes are more often concerned with the self than with the external world. Hence we find in therapy that as the perception of self alters, behavior alters. Perhaps an illustration will indicate the type of observation upon which this statement is based.

A young woman, a graduate student whom we shall call Miss Vib, came in for nine interviews. If we compare the first interview with the last, striking changes are evident. Perhaps some features of this change may be conveyed by taking from the first and last interviews all the major statements regarding self, and all the major statements regarding current behavior. In the first interview, for example, her perception of herself may be crudely indicated by taking all her own statements about herself, grouping those which seem similar, but otherwise doing a minimum of editing, and retaining so far as possible, her own words. We then come out with this as the conscious perception of self which was hers at the outset of counseling.

I feel disorganized, muddled; I've lost all direction; my personal life has disintegrated.

I sorta experience things from the forefront of my consciousness, but nothing sinks in very deep; things don't seem real to me; I feel nothing matters; I don't have any emotional response to situations; I'm worried about myself.

I haven't been acting like myself; it doesn't seem like me; I'm a different person altogether from what I used to be in the past.

I don't understand myself; I haven't known what was happening to me.

I have withdrawn from everything, and feel all right only when I'm all alone and no one can expect me to do things.

I don't care about my personal appearance.

I don't know *anything* anymore.

I feel guilty about the things I have left undone.

I don't think I could ever assume responsibility for anything.

If we attempt to evaluate this picture of self from an external frame of reference various diagnostic labels may come to mind. Trying to perceive it solely from the client's frame of reference we observe that to the young woman herself she appears disorganized, and not herself. She is perplexed and almost unacquainted with what is going on in herself. She feels unable and unwilling to function in any responsible or social way. This is at least a sampling of the way she experiences or perceives herself.

Her behavior is entirely consistent with this picture of self. If we abstract all her statements describing her behavior, in the same fashion as we abstracted her statements about self, the following pattern emerges – a

* Excerpted from Carl R. Rogers (1947) Some Observations on the Organization of Personality. Address of the retiring President of the American Psychological Association at the September 1947 Annual Meeting. First published in **American Psychologist**, 2, 358-368. Represented in **Classics in the History of Psychology**, an internet resource developed by Christopher D. Green of York University, Toronto, Ontario. Posted March 2000 at

<http://www.yorku.ca/dept/psych/classics/Rogers/personality.htm>.

pattern which in this case was corroborated by outside observation.

I couldn't get up nerve to come in before; I haven't availed myself of help.

Everything I should do or want to do, I don't do.

I haven't kept in touch with friends; I avoid making the effort to go with them; I stopped writing letters home; I don't answer letters or telephone calls; I avoid contacts that would be professionally helpful; I didn't go home though I said I would.

I failed to hand in my work in a course though I had it all done: I didn't even buy clothing that I needed; I haven't even kept my nails manicured.

I didn't listen to material we were studying; I waste hours reading the funny papers; I can spend the whole afternoon doing absolutely nothing.

The picture of behavior is very much in keeping with the picture of self, and is summed up in the statement that "Everything I should do or want to do, I don't do." The behavior goes on, in ways that seem to the individual beyond understanding and beyond control.

If we contrast this picture of self and behavior with the picture as it exists in the ninth interview, thirty-eight days later, we find both the perception of self and the ways of behaving deeply altered. Her statements about self are as follows:

I'm feeling much better; I'm taking more interest in myself.

I do have some individuality, some interests.

I seem to be getting a newer understanding of myself. I can look at myself a little better.

I realize I'm just one person, with so much ability, but I'm not worried about it; I can accept the fact that I'm not always right.

I feel more motivation, have more of a desire to go ahead.

I still occasionally regret the past, though I feel less unhappy about it; I still have a long ways to go; I don't know whether I can keep the picture of myself I'm beginning to evolve.

I can go on learning – in school or out.

I do feel more like a normal person now; I feel more I can handle my life myself; I think I'm at the point where I can go along on my own.

Outstanding in this perception of herself are three things – that she knows herself, that she can view with comfort her assets and liabilities, and finally that she has drive and control of that drive.

In this ninth interview the behavioral picture is again consistent with the perception of self. It may be abstracted in these terms.

I've been making plans about school and about a job; I've been working hard on a term paper; I've been going to the library to trace down a topic of special interest and finding it exciting.

I've cleaned out my closets; washed my clothes.

I finally wrote my parents; I'm going home for the holidays.

I'm getting out and mixing with people: I am reacting sensibly to a fellow who is interested in me – seeing both his good and bad points.

I will work toward my degree; I'll start looking for a job this week.

Her behavior, in contrast to the first interview, is now organized, forward-moving, effective, realistic and planful. It is in accord with the realistic and organized view she has achieved of her self.

It is this type of observation, in case after case, that leads us to say with some assurance that as perceptions

of self and reality change, behavior changes. Likewise, in cases we might term failures, there appears to be no appreciable change in perceptual organization or in behavior.

What type of explanation might account for these concomitant changes in the perceptual field and the behavioral pattern? Let us examine some of the logical possibilities.

In the first place, it is possible that factors unrelated to therapy may have brought about the altered perception and behavior. There may have been physiological processes occurring which produced the change. There may have been alterations in the family relationships, or in the social forces, or in the educational picture or in some other area of cultural influence, which might account for the rather drastic shift in the concept of self and in the behavior.

There are difficulties in this type of explanation. Not only were there no known gross changes in the physical or cultural situation as far as Miss Vib was concerned, but the explanation gradually becomes inadequate when one tries to apply it to the many cases in which such change occurs. To postulate that some external factor brings the change and that only by chance does this period of change coincide with the period of therapy, becomes an untenable hypothesis.

Let us then look at another explanation, namely that the therapist exerted, during the nine hours of contact, a peculiarly potent cultural influence which brought about the change. Here again we are faced with several problems. It seems that nine hours scattered over five and one-half weeks is a very minute portion of time in which to bring about alteration of patterns which have been building for thirty years. We would have to postulate an influence so potent as to be classed as traumatic. This theory is particularly difficult to maintain when we find, on examining the recorded interviews, that not once in the nine hours did the therapist express any evaluation, positive or negative, of the client's initial or final perception of self, or her initial or final mode of behavior. There was not only no evaluation, but no standards expressed by which evaluation might be inferred.

There was, on the part of the therapist, evidence of warm interest in the individual, and thoroughgoing acceptance of the self and of the behavior as they existed initially, in the intermediate stages, and at the conclusion of therapy. It appears reasonable to say that the therapist established certain definite conditions of interpersonal relations, but since the very essence of this relationship is respect for the person as he is at that moment, the therapist can hardly be regarded as a cultural force making for change.

We find ourselves forced to a third type of explanation, a type of explanation which is not new to psychology, but which has had only partial acceptance. Briefly it may be put that the observed phenomena of changes seem most adequately explained by the hypothesis that *given certain psychological conditions, the individual has the capacity to reorganize his field of perception, including the way he perceives himself, and that a concomitant or a resultant of this perceptual reorganization is an appropriate alteration of behavior.* This puts into formal and objective terminology a clinical hypothesis which experience forces upon the therapist using a client-centered approach. One is compelled through clinical observation to develop a high degree of respect for the ego-integrative forces residing within each individual. One comes to recognize that under proper conditions the self is a basic factor in the formation of personality and in the determination of behavior. Clinical experience would strongly suggest that the self is, to some extent, an architect of self, and the above hypothesis simply puts this observation into psychological terms.

In support of this hypothesis it is noted in some cases that one of the concomitants of success in therapy is the realization on the part of the client that the self has the capacity for reorganization. Thus a student says:

You know I spoke of the fact that a person's background retards one. Like the fact that my family life wasn't good for me, and my mother certainly didn't give me any of the kind of bringing up that I should have had. Well, I've been thinking that over. It's true up to a point. But when you get so that you can see the situation, then it's really up to you.

Following this statement of the relation of the self to experience many changes occurred in this young man's behavior. In this, as in other cases, it appears that when the person comes to see himself as the perceiving, organizing agent, then reorganization of perception and consequent change in patterns of reaction take place.

On the other side of the picture we have frequently observed that when the individual has been authoritatively told that he is governed by certain factors or conditions beyond his control, it makes therapy more difficult, and it is only when the individual discovers for himself that he can organize his perceptions that change is possible. In veterans who have been given their own psychiatric diagnosis, the effect is often that of making the individual feel that he is under an unalterable doom, that he is unable to control the organization of his life. When however the self sees itself as capable of reorganizing its own perceptual field, a marked change in basic confidence occurs. Miss Nam, a student, illustrates this phenomenon when she says, after having made progress in therapy:

I think I do feel better about the future, too, because it's as if I won't be acting in darkness. It's sort of, well, knowing somewhat why I act the way I do ... and at least it isn't the feeling that you're simply out of your own control and the fates are driving you to act that way. If you realize it, I think you can do something more about it.

A veteran at the conclusion of counseling puts it more briefly and more positively: "My attitude toward myself is changed now to where I feel I can do something with my self and life." He has come to view himself as the instrument by which some reorganization can take place.

There is another clinical observation which may be cited in support Of the general hypothesis that there is a close relationship between behavior and the way in which reality is viewed by the individual. It has many cases that behavior changes come about for the most part Imperceptibly and almost automatically, once the perceptual reorganization has taken place. A young wife who has been reacting violently to her maid, and has been quite disorganized in her behavior as a result of this antipathy says:

After I ... discovered it was nothing more than that she resembled my mother, she didn't bother me any more. Isn't that interesting? She's still the same.

Here is a clear statement indicating that though the basic perceptions have not changed, they have been differently organized, have acquired a new meaning, and that behavior changes then occur. Similar evidence is given by a client, a trained psychologist, who after completing a brief series of client-centered interviews, writes:

Another interesting aspect of the situation was in connection with the changes in some of my attitudes. When the change occurred, it was as if earlier attitudes were wiped out as completely as if erased from a blackboard.... When a situation which would formerly have provoked a given type of response occurred, it was not as if I was tempted to act in the way I formerly had but in some way found it easier to control my behavior. Rather the new type of behavior came quite spontaneously, and it was only through a deliberate analysis that I became aware that I was acting in a new and different way.

Here again it is of interest that the imagery is put in terms of visual perception and that as attitudes are "erased from the blackboard" behavioral changes take place automatically and without conscious effort.

Thus we have observed that appropriate changes in behavior occur when the individual acquires a different view of his world of experience, including himself; that this changed perception does not need to be dependent upon a change in the "reality," but may be a product of internal reorganization; that in some instances the awareness of the capacity for re-perceiving experience accompanies this process of reorganization; that the altered behavioral responses occur automatically and without conscious effort as soon as the perceptual reorganization has taken place, apparently as a result of this.

In view of these observations a second hypothesis may be stated, which is closely related to the first. It is that *behavior is not directly influenced or determined by organic or cultural factors, but primarily (and perhaps only), by the perception of these elements.* In other words the crucial element in the determination of behavior is the perceptual field of the individual. While this perceptual field is, to be sure, deeply influenced and largely shaped by cultural and physiological forces, it is nevertheless important that it appears to be only the field as it is perceived, which exercises a specific determining influence upon behavior. This is not a new idea in psychology, but its implications have not always been fully recognized.

It might mean, first of all, that if it is the perceptual field which determines behavior, then the primary object of study for psychologists would be the person and his world *as viewed by the person himself*. It could mean that the internal frame of reference of the person might well constitute the field of psychology, an idea set forth persuasively by Snygg and Combs in a significant manuscript as yet unpublished. It might mean that the laws which govern behavior would be discovered more deeply by turning our attention to the laws which govern perception.

Now if our speculations contain a measure of truth, if the specific determinant of behavior is the perceptual field, and if the self can reorganize that perceptual field, then what are the limits of this process? Is the reorganization of perception capricious, or does it follow certain laws? Are there limits to the degree of reorganization? If so, what are they? In this connection we have observed with some care the perception of one portion of the field of experience, the portion we call the self.

Phenomenological Existentialism

Phenomenology is a research technique that involves the careful description of aspects of human life as they are lived; Existentialism, deriving its insights from phenomenology, is the philosophical attitude that views human life from the inside rather than pretending to understand it from an outside, "objective" point-of-view. Phenomenological existentialism, as a philosophy or a psychology, is not a tightly defined system by any means. And yet its adherents are relatively easily identified by their emphasis on the importance of individuals and their freedom to participate in their own creation. It is a psychology that emphasizes our creative processes far more than our adherence to laws, be they human, natural, or divine.

Franz Brentano

Franz Brentano was born January 16, 1838 in Marienberg, Germany. He became a priest in 1864 and began teaching two years later at the University of Wurzburg. Religious doubts led him to leave the priesthood and resign from his teaching position in 1873.



The following year, he wrote **Psychology from an Empirical Standpoint**. It was in this book that he introduced the concept that is most associated with him: **intentionality** or immanent objectivity. This is the idea that what makes mind different from things is that mental acts are always directed at something beyond themselves: Seeing implies something seen, willing means something willed, imagining implies something imagined, judging points at something judged. Intentionality links the subject and the object in a very powerful way. He was given a position as professor at the University of Vienna soon after.

In 1880, he tried to marry, but his marriage was forbidden by the Austrian government, who still considered him a priest. He left his professorship and moved to Leipzig to get married. The next year, he was permitted to come back to the University of Vienna, as a lecturer.

He was quite popular with students. Among them were Carl Stumpf and Edmund Husserl, the founders of phenomenology, and Sigmund Freud himself. Brentano retired in 1895, but continued to write until his death on March 17, 1917, in Zurich.

Carl Stumpf

Carl Stumpf was born April 21, 1884 in Wiesentheid in Bavaria. He was strongly influenced by Brentano. As lecturer at the University of Gottingen, he published **The Psychological Origins of Space Perception** in 1870. In 1873, he became a professor at the University of Wurzburg. His masterwork, *Tone Psychology*, was completed during a series of professorships at Prague, Halle, and Munich.

He became a professor and the director of the institute of experimental psychology at the Friedrich-Wilhelm University in Berlin in 1894, where he continued his work on the psychology of music, started a journal on the subject, and began an archive of primitive music.

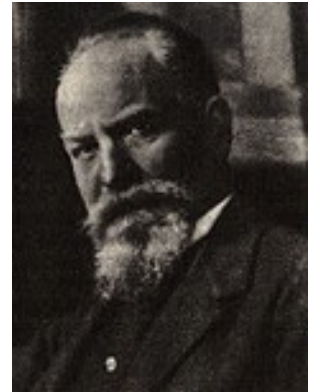
Stumpf retired in 1921, continuing his work until his death on December 15, 1936, in Berlin. With Husserl, he is considered a cofounder of phenomenology and in particular an inspiration to the Gestalt psychologists.

Edmund Husserl

Edmund Husserl was born on April 8, 1859 in Prossnitz, Moravia. He studied philosophy, math, and physics at Leipzig, Berlin, and Vienna and received his doctorate from the University of Vienna in 1882 in mathematics. The next year, he moved to Vienna to study under Franz Brentano.

Husserl, born into a Jewish family, converted to Lutheranism in 1886, and married Malvine Steinschneider in 1887, also a convert. They had three children. In these same years, he went to study with Carl Stumpf at the University of Halle and became a lecturer there. They became good friends and exchanged ideas.

While at Halle, he agonized over the connection between mathematics and the nature of the mind. He recognized that his original ideas, which involved mathematics as coming out of psychology, were misguided. So he began the development of his brand of phenomenology as a way of investigating the nature of experience itself. This led to the publication of **Logical Investigations** in 1900.



He was invited to a professorship at the University of Gottingen in 1901, where students began to form a circle around him and his work. He also developed a friendship with Wilhelm Dilthey, and was influenced by Dilthey's ideas concerning the historical context of science.

In 1916, he went to the University of Freiburg. Here he wrote **First Philosophy** (1923-4), which outline his belief that phenomenology offered a means towards moral development and a better world. He received many honors and gave guest lectures at the University of London, the University of Amsterdam, and the Sorbonne, making his ideas available to a new, wider audience.

He retired in 1928. Martin Heidegger, with Husserl's strong approval, was appointed his successor. As Heidegger's work developed into the basis of existentialism, Husserl distanced himself from the new movement.

When the Nazis took over in 1933, Husserl, born a Jew, was banned from the university. He nevertheless continued providing support to friends in the resistance. He spoke on the European crisis in Vienna in 1935 despite being under a rule of silence. He also spoke at the University of Prague that year, where his unpublished manuscripts were being collected and cataloged.

His last work, **The Crisis of European Sciences and Transcendental Phenomenology** (1936), introduced the concept of **Lebenswelt**. The next year, he became ill and, on April 27, 1938, he died.

Phenomenology

Phenomenology is an effort at improving our understanding of ourselves and our world by means of careful description of experience. On the surface, this seems like little more than naturalistic observation and introspection. Examined a little more closely, you can see that the basic assumptions are quite different from those of the mainstream experimentally-oriented human sciences: In doing phenomenology, we try to describe phenomena without reducing those phenomena to supposedly objective non-phenomena. Instead of appealing to objectivity for validation, we appeal instead to inter-subjective agreement.

Phenomenology begins with **phenomena** – appearances, that which we experience, that which is given – and stays with them. It doesn't prejudge an experience as to its qualifications to be an experience. Instead, by taking up a phenomenological attitude, we ask the experience to tell us what it is.

The most basic kind of phenomenology is the description of a particular phenomenon such as a momentary happening, a thing, or even a person, i.e. something full of its uniqueness. Herbert Spiegelberg (1965) outlines three "steps:"

1. **Intuiting** – Experience or recall the phenomenon. "Hold" it in your awareness, or live in it, be involved in it; dwell in it or on it.
2. **Analyzing** – Examine the phenomenon. Look for...
 - the pieces, parts, in the spatial sense;
 - the episodes and sequences, in the temporal sense;
 - the qualities and dimensions of the phenomenon.
 - settings, environments, surroundings;
 - the prerequisites and consequences in time;
 - the perspectives or approaches one can take.
 - cores or foci and fringes or horizons;
 - the appearing and disappearing of the phenomena;
 - the clarity of the phenomenon.

And investigate these many aspects both in their outward forms – objects, actions, others – and in their inward forms – thoughts, images, feelings.

3. **Describing** – Write down your description. Write it as if the reader had never had the experience. Guide them through your intuiting and analyzing.

What makes these three simple steps so difficult is the attitude you must maintain as you perform them. First, you must have a certain respect for the phenomenon. You must take care that you are intuiting it fully, from all possible "angles," physically and mentally, and leaving nothing out of the analysis that belongs there. Herbert Spiegelberg said "The genuine will to know calls for the spirit of generosity rather than for that of economy...."*

Included in this "generosity" is a respect for both public and private events, the "objective" and the "subjective." A basic point in phenomenology is called **intentionality**, which refers to the mutuality of the subject and the object in experience: All phenomena involve both an intending act and an intended object. Traditionally, we have emphasized the value of the object-pole and denigrated that of the subject-pole. In fact, we have gone so far as to dismiss even the object-pole if it doesn't correspond to some physical entity! But, to quote Spiegelberg again, "Even merely private phenomena are facts which we have no business to ignore. A science which refuses to take account of them as such is guilty of suppressing evidence and will end with a truncated universe."*

On the other hand, we must also be on guard against including things in our descriptions that don't belong there. This is the function of **bracketing**: We must put aside all biases we may have about the phenomenon. When you have a prejudice against a person, you will see what you expect, rather than what is there. The same applies to phenomena in general: You must approach them without theories, hypotheses, metaphysical assumptions, religious beliefs, or even common sense conceptions. Ultimately, bracketing means suspending judgement about the "true nature" or "ultimate reality" of the experience – even whether or not it exists!

Although the description of individual phenomena is interesting in its own right – and when it involves people or cultures, a massive undertaking as well – we usually come to a point where we want to say something about the class the phenomenon is a part of. In phenomenology, we talk about seeking the **essence** or structure of something. So we might investigate the essence of triangularity, or of pizza, or of anger, or of being male or female. We might even, as the phenomenological existentialists have attempted, seek the essence of being human!

Husserl suggested a method called **free imaginative variation**: When you feel you have a description of the essential characteristics of a category of phenomena, ask yourself, "What can I change or leave out without

* Spiegelberg, Herbert (1965). **The Phenomenological Movement**. The Hague: Martinus Nijhoff.

losing the phenomenon? If I color the triangle blue, or construct it out of Brazilian rosewood, do I still have a triangle? If I leave out an angle, or curve the sides, do I still have a triangle?" This may seem trivial and easy, but now try it regarding "being human:" Is a corpse human? A disembodied spirit? A person in a permanent coma? A porpoise with intelligence and personality? A just-fertilized egg? A six-month old fetus?

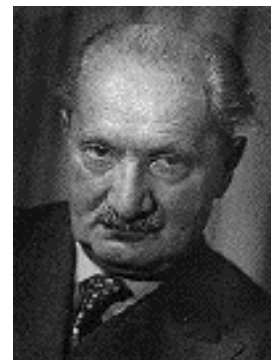
With phenomenology, the world regains some of its solidity, the mind is again permitted a reality of its own, and a rather paranoid skepticism is replaced with a more generous, and ultimately more satisfying, curiosity. By returning, as Husserl (1965, 1970) put it, to "the things themselves," or, to use another of his terms, to **the lived world** (Lebenswelt), we stand a better chance at developing a true understanding of our human existence.

Martin Heidegger

Martin Heidegger was born on September 26, 1889, in Messkirch, Germany. His father was the sexton of the local church, and Heidegger followed suit by joining the Jesuits. He studied the theology and philosophy of the Middle Ages, as well as the more recent work of Franz Brentano.

He studied with Heinrich Rickert, a well known Kantian, and with Husserl. He received his doctorate in 1914, and began teaching at the University of Freiburg the following year. Although he was strongly influenced by Husserl's phenomenology, his interests lay more in the meaning of existence itself.

In 1923, he became a professor at the University of Marburg, and in 1927, he published his masterwork, **Being and Time (Sein und Zeit)**. Influenced by the ancient Greeks as well as Kierkegaard, Nietzsche, and Dilthey, as well as Husserl, it was an exploration of the verb "to be," particularly from the standpoint of a human being in time. Densely and obscurely written, it was nevertheless well received all over Europe, though not in the English-speaking world.



In 1928, he returned to Freiburg as Husserl's successor. In the 1930's, the Nazi's began pressuring German universities to fire their Jewish professors. The rector at Freiburg resigned in protest and Heidegger was elected to take his place. Although he strongly encouraged students and professors to be true to their search for truth, he nevertheless also encouraged loyalty to Hitler. He even joined the Nazi party. Many people, otherwise admirers of his thinking, have never forgiven him for that.

To be fair, he did resign from his position as rector in 1934, and after the war talked about Naziism as a symptom of the sickness of modern society. He stopped teaching in 1944, and after the war, the allied forces prevented him from further teaching. But they later restored his right to teach in light of the fact that his support of Hitler was of a passive rather than active nature. He died in Messkirch on May 26, 1976.

Heidegger spent his entire life asking one question: What is it "to be?" Behind all our day-to-day living, for that matter, behind all our philosophical and scientific investigations of that life, how is it that we "are" at all?

Phenomenology reveals the ways in which we are. The first hurdle is our traditional contrast between subject and object, which splits man as knower from his environment as the known. But in the phenomenological attitude, experience doesn't show this split. Knower and known are both inextricably bound together. Instead, it appears that the subject-object split is something we developed late in history, especially with the advent of modern science.

The problems of the modern world come from the "**falling**" of western thought: Instead of a concern with the development of ourselves as human beings, we have allowed technology and technique to rule our lives and

lead us to a false way of being. This alienation from our true nature is called **inauthenticity**.

Much of what is difficult about reading Heidegger is that he tries to recover the kind of being that was before the subject-object split by looking at the origins of words, especially Greek words. In as much as the ancient Greeks were less alienated from themselves and their world, their language should offer us a clue to their relation to being.

Heidegger says that we have a special relationship to the world, which he refers to by calling human existence **Dasein**. Dasein means "being there," and emphasizes that we are totally immersed in the world, and yet we stand-out (ex-sist) as well. We are a little off-center, you might say, never quite stable, always becoming.

A big part of our peculiar nature is that we have **freedom**. We create ourselves by choosing. We are our own **projects**. This freedom, however, is painful, and we experience life as filled with **anxiety** (Angst, dread). Our potential for freedom calls to us to authentic being by means of anxiety.

One of the central sources of anxiety is the recognition that we all have to die. Our limited time here on earth makes our choices far more meaningful, and the need to choose to be authentic urgent. We are, he says, **being-towards-death** (Sein-zum-Tode).

All too often, we surrender in the face of anxiety and death, a condition Heidegger calls fallenness. We become "**das Man**" – "the everybody" – nobody in particular, the anonymous man, one of the crowd or the mob.

Two characteristics of "das Man" are **idle talk** and **curiosity**. Idle talk is small talk, chatter, gossip, shallow interaction, as opposed to true openness to each other. Curiosity refers to our need for distraction, novelty-seeking, busy-body-ness, as opposed to a true capacity for wonder.

We become **authentic** by thinking about being, by facing anxiety and death head-on. Here, he says, lies joy.

Jean-Paul Sartre

"Man is a useless passion."



Sartre is probably the best known of the existentialists, and clearly straddles the line between philosopher and psychologist (and social activist as well!). Jean-Paul Sartre was born on June 21, 1905, in Paris, France, the only child of Jean-Baptiste Sartre and his wife Anne-Marie. His father died one year later of colitis, so his mother took him to live with her grandfather, Carl Schweitzer, a German professor at the Sorbonne and the uncle of the famous missionary-philosopher Albert Schweitzer.

Rather lost in the disciplined household of her grandfather, Anne-Marie and her small but highly intelligent son grew very close. A childhood illness left Sartre blind in one eye, which drifted outward and up, so he forever seemed to be looking elsewhere. Lonely, he began to write stories and plays as an escape.

Anne-Marie escaped her grandfather's house by getting remarried when Jean-Paul was twelve. Jean-Paul became rebellious and unmanageable, so he was sent to a boarding school. There, he continued his trouble-making ways, and frequently spent time in detention.

After lycée (roughly, high school), Sartre attended the Ecole Normale Supérieure at the Sorbonne. Brilliant but disorganized and inattentive, he placed last out of 50 students on his exit exams. The following year, he

studied with a young woman named Simone de Beauvoir, and graduated in 1929. He placed first this time, and she second. They would have a strong but open love relationship until their deaths.

After graduation, Sartre taught at a series of lycées for many years. He spent one year in Berlin attending lectures by Edmund Husserl, the founder of phenomenology. This approach would figure prominently in several of his philosophical works, including **Imagination** (1936), **Sketch for a Theory of Emotions** (1939), and **The Psychology of Imagination** (1940)

In 1938, Sartre published his first novel, **Nausea**. In this novel, he writes about the feeling of nausea that his character feels when he contemplates the "thickness" of the material world, including other people and his own body. The novel is strange, but the descriptions are compelling, and Sartre began to make a name for himself.

In 1939, Sartre was drafted into the army. He was taken prisoner in 1940 and released a year later. His experiences as a participant in the resistance would color many of his later works. In June of 1943, his play **The Flies** opened in Paris. Even though it was blatantly anti-Nazi, the play was sometimes attended by Nazi officers!

Also in 1943, he published his masterpiece, **L'être et le néant (Being and Nothingness)**. In this large and difficult work, he outlined his theory that human consciousness was a sort of no-thing-ness surrounded by the thickness of being. As a "nothingness," human consciousness is free from determinism, resulting in the difficult situation of our being ultimately responsible for our own lives. "Man is condemned to be free." On the other hand, without an "essence" to provide direction, human consciousness is also ultimately meaningless.

"All existing things are born for no reason, continue through weakness and die by accident.... It is meaningless that we are born; it is meaningless that we die."

Perhaps his best known philosophical point is "**existence precedes essence.**" In the case of non-human entities, an essence is something that is prior to something's actual existence. A table's essence is the intention that its creator, builder, or user has for it, such as its general shape, components, and function. A woodchuck's essence is in its genetic inheritance, its instincts, and the conditions of its environment – and its entire life is sort of the playing out of a program. But a human being, according to Sartre, doesn't have a true essence. Oh, sure, we have our general shape, our genetics, our upbringings and the like. But they do not determine our lives, they only set the stage. It is we ourselves who shape our lives. We are the ones who choose what to do with the raw materials nature has provided us. We create ourselves. And our "essence" is only clear when our whole life is done. Another way to put it is that our "essence" is our lack of essence; our "essence" is our freedom.

In 1944, he produced one of his most famous plays, **Huis-clos** or **No Exit**. This play, and several others, present the problem of living with one's fellow man, and are quite pessimistic. "Hell is other people" is the famous quote from **No Exit**.

After World War II, Sartre became increasingly concerned with the issue of social responsibility. He postulated that being free meant not only being responsible for your own life, but being responsible for the lives of all human beings. He outlined this idea in **Existentialism and Humanism** (1946) and a novel called **Les Chemins de la Liberté** (Paths of Liberty, 1945, never completed).

"But if existence really does precede essence, man is responsible for what he is. Thus, existentialism's first move is to make every man aware of what he is and to make the full responsibility of his existence rest on him. And when we say that a man is responsible for himself, we do not only mean that he is responsible for his own individuality, but that he is responsible for all men."

Sartre also wrote deep psychological examinations of famous French writers: Baudelaire (1947), Jean Genet (1952), and Flaubert (two of three volumes completed in 1971 and 1972). In these, he looks at these writers from existential, psychoanalytic, and Marxist perspectives, in an effort to create the most complete phenomenological portraits possible. The books are, unfortunately, practically unreadable!

Sartre was an admirer of Karl Marx's writings, and of the Soviet Union. His support of Russian communism ended in 1956 when the Russian army marched into Budapest to stop the Hungarian efforts at independence. (My own family emigrated to the US from the Netherlands in that year, fearful of a third world war.) Still hopeful, he wrote a critical analysis of Marxism in 1960 supporting the fundamental ideas of Marx, but criticizing the Russian form Marxism had taken.

In 1963, he published his autobiography, **Les Mots (Words)**. He was awarded the Nobel Prize the following year, but he refused it on political grounds. Here is an example of his evocative style:

"I'm a dog. I yawn, the tears roll down my cheeks, I feel them. I'm a tree, the wind gets caught in my branches and shakes them vaguely. I'm a fly, I climb up a window-pane, I fall, I start climbing again. Now and then, I feel the caress of time as it goes by. At other times - most often - I feel it standing still. Trembling minutes drop down, engulf me, and are a long time dying. Wallowing, but still alive, they're swept away. They are replaced by others which are fresher but equally futile. This disgust is called happiness."

Toward the end of the 1970's, Sartre's health began to degenerate. His bad habits included smoking two packs of unfiltered French cigarettes a day, heavy drinking, and the use of amphetamines to help him stay awake while writing. He died on April 15, 1980, of lung cancer. Simone de Beauvoir tried to stay with his body and had to be taken away by attendants. His funeral procession was attended by over 50,000 mourners.

This philosophy of existentialism, as difficult as it is to express and live, had a great impact on any number of thinkers in this century. Among them are philosophers such as Simone de Beauvoir, Albert Camus, Martin Buber, Ortega y Gasset, Gabriel Marcel, Paul Tillich, Merleau-Ponty, psychologists such as Ludwig Binswanger, Medard Boss, Erich Fromm, Rollo May, and Viktor Frankl, and even the post-modernist movement's Foucault and Derrida. Less directly, existentialism has influenced American psychologists such as Carl Rogers. The influence continues to this day.

James Joyce Selection: *Portrait of the Artist as a Young Man**

[Have you ever noticed how some writers seem to understand the human mind (and heart) far better than any psychologist or psychiatrist? Here's an incredible example of literary phenomenology by the amazing James Joyce.]

He was alone. He was unheeded, happy and near to the wild heart of life. He was alone and young and wilful and wildhearted, alone amid a waste of wild air and brackish waters and the sea-harvest of shells and tangle and veiled grey sunlight and gayclad lightclad figures of children and girls and voices childish and girlish in the air.

A girl stood before him in midstream, alone and still, gazing out to sea. She seemed like one whom magic had changed into the likeness of a strange and beautiful seabird. Her long slender bare legs were delicate as a crane's and pure save where an emerald trail of seaweed had fashioned itself as a sign upon the flesh. Her thighs, fuller and soft-hued as ivory, were bared almost to the hips, where the white fringes of her drawers were like feathering of soft white down. Her slate-blue skirts were kilted boldly about her waist and dovetailed behind her. Her bosom was as a bird's, soft and slight, slight and soft as the breast of some dark-plumaged dove. But her long fair hair was girlish: and girlish, and touched with the wonder of mortal beauty, her face.

She was alone and still, gazing out to sea; and when she felt his presence and the worship of his eyes her eyes turned to him in quiet sufferance of his gaze, without shame or wantonness. Long, long she suffered his gaze and then quietly withdrew her eyes from his and bent them towards the stream, gently stirring the water with her foot hither and thither. The first faint noise of gently moving water broke the silence, low and faint and whispering, faint as the bells of sleep; hither and thither, hither and thither; and a faint flame trembled on her cheek.

– Heavenly God! cried Stephen's soul, in an outburst of profane joy.

He turned away from her suddenly and set off across the strand. His cheeks were aflame; his body was aglow; his limbs were trembling. On and on and on and on he strode, far out over the sands, singing wildly to the sea, crying to greet the advent of the life that had cried to him.



* From <http://www.bibliomania.com/Fiction/joyce/artist/index.html>
Image: Renoir's "Girl Braiding Hair"

Romance: A Partial Analysis*

Romance is a mood or state of mind akin to several others, including love, friendship, sexual interest, contentment, self-assuredness, and so on.

It is normally experienced in the context of an actual relationship, although it may be experienced in other ways, such as in fantasy, expectation, or possibility. It may also be experienced vicariously, such as when watching a romantic movie or real couples in romantic situations. It is even experienced occasionally with friends or relations.

It is, more specifically, associated with courtship and with the intimations of sexuality that go with it. It is itself, however, not primarily sexual. In fact, it often has an innocent feel to it, and is associated with "puppy" love, first love, early flirtations, and the like.

Romance often involves courtship symbols, traditions, and stereotypes, such as flowers, gifts, hand-holding, candle-lit dinners, "romantic" music, These, however, are not essential, but rather seem to derive from certain natural ways of expressing romantic feelings. Once upon a time, they were probably original! These symbols, etc., are now often used to "set the stage" for romance.

The romantic state of mind often seems to come on suddenly, a matter of rather abruptly becoming aware of being in a romantic moment. It very often involves surprise. This is where many of the aforementioned symbols come into play: Romance often involves being surprised by signs of someone's affection, whether it be in the form of a gift, a helping hand, an appreciative glance, a confidence shared, or what have you.

Associated with surprise is the sense of great motion, lightness, being swept up in the moment, or swept off your feet! On the other hand, some people instead focus on a feeling of steadiness and solidity, reflecting the firmness of a commitment or the solidity of a relationship, especially in adversity. The lightness in oneself and the steadiness of the other are by no means incompatible.

There is often a degree of gender stereotyping involved in romance: "He made me feel pretty, feminine.... He is my knight in shining armor.... He swept me off my feet.... I found comfort in his broad shoulders...." These comments are used to good advantage in romance novels, but have their sources in ordinary experience. In men, we find similar statements, in reverse: "She made me feel strong, like a real man...." Please note that this is not to be understood as a "power thing," but rather an awareness of the need to care for a woman, to "nurture." The connection with courtship seems quite strong, despite the many exceptions.

The mood may come upon both people naturally, but it is often "arranged for" by one or the other. The structure of the romantic episode seems best left simple and it is greatly enhanced by at least the appearance of spontaneity.

Circumstances can be very important. A small gesture or sign of support in adverse circumstances can be far more valuable than great generosity in good circumstances. Romance seems, in fact, to thrive on adversity, as in our common recollections of our "poor days."

This introduces as well the symbolism of the hero and the fair maiden in fairy tales. Selfless help in adversity, revealing deep affection, is a theme common to most fairy tales, many movies, and many real-life romantic moments as well.

The key feeling would seem to be one of a heightened self-worth seen as coming from the other person. Examples would include feeling especially attractive, important, strong, interesting, intelligent, and so on. Even the sense that one has been involved in something important can bring on a sense of romance. The increase in self-worth, curiously, results in an increase in one's valuing of or affection for the other.

Paradoxically, these feelings can also occur in reverse, so that coming upon the other person in

* Based on a class exercise

circumstances that lead you to particularly value him or her may lead to feelings of strength, security, confidence, etc., and this too is felt as romantic! Common to both is the sense of being fortunate or lucky to be you, to be there, to be with this person.

Other aspects of a romantic mental state include (a) lightness, airiness, giddiness, a glow, excitement, enchantment, joking and laughing; (b) coziness, cuddling, contentment, comfort, closeness; and (c) riskiness, danger, and naughtiness. Set (a) seems most common, with the others being variation, and (c) being the least common, but certainly not rare.

The essence of romance seems to me to be the sudden discovery or bringing to awareness (whether by accident or by arrangement) of your importance or value to another, along with an awareness of their value to you. It is a confirmation that one is "lovable" or worthy of affection, whether in the eyes of a desirable young man or woman or in the context of a long, comfortable marriage. This confirmation comes with many of the qualities associated with other kinds of "ego-transcendence" or "ego-expansion," such as love itself: By losing yourself in your affection for another, you become stronger as an individual. As is often mentioned, it is just one of those things that defies logic!

Modern Medicine and Physiology

Technology and the brain

In the 1800's, anatomy had reached a point of sophistication that allowed medical artists to make such intricate drawings that modern surgeons could still benefit from them. But there was always a limitation involved: It was one thing to carve up a dead brain – quite another to actually see a living brain at work. In the late 1800's and throughout the 1900's, we see some remarkable efforts at exploring the brain without removing it from its owner: First, **Wilhelm Konrad Roentgen** invents the **x-ray** in 1895. A remarkable tool for physicians and researchers, it proves less useful when it comes to the soft tissues of the brain. In 1972, **Godfrey Hounsfield** added the computer to the x-ray and developed **computerized (axial) tomography** – the **CT** (or **CAT**) scan – which sums multiple extras into a far more detailed three-dimensional image.

In a very different approach, **Hans Berger** developed the first **electroencephalogram (EEG)** in 1929. In 1932, **Jan Friedrich Tonnes** created the first modern version, with its moving paper and vibrating pens. The EEG records the minute electrical coordinated pulses of large number of neurons on the surface of the cortex. It was only a matter of time before researchers added the computer to the equation.

In 1981, the team of **Phelps, Hoffman, and TerPogossian** develop the first **PET** scan. The PET scan (**positron emission tomography**) works like this: The doctor injects radioactive glucose (that's sugar water) into the patient's bloodstream. The device then detects the relative activity level – that is, the use of glucose – of different areas of the brain. The computer generates an image that allows the researcher to tell which parts of the brain are most active when we perform various mental operations, whether it's looking at something, counting in our heads, imagining something, or listening to music!

In 1937, **Isidor I. Rabi**, a professor at Columbia University, noticed that atoms reveal themselves by emitting radio waves after first having been subjected to a powerful magnetic field. He called this **nuclear magnetic resonance** or **NMR**. This was soon used by scientists to identify chemical substances in the lab. It would be many years later that a Dr. **Raymond Damadian** would recognize the potential of NMR's for medicine.

Damadian is an interesting and controversial person. He was born in New York City in 1936. When he was only eight years old, he was accepted by the Juilliard School of Music. He was awarded a scholarship to the University of Wisconsin at Madison, and then went on to medical school at the Albert Einstein College of Medicine of the Yeshiva University in the Bronx. He received his MD in 1960 at the tender age of 24. From there, he began medical research at Brooklyn's Downstate Medical Center.

Investigating tumors in rats, he noted that the NMR signals from cancerous tumors were significantly different from the signal from healthy rats. He hypothesized that the reason was the larger number of water molecules (and therefore hydrogen atoms) in these tumors. His findings were published in *Science* in 1971.

Realizing that this was the basis for a non-surgical way to detect cancer, he got the idea for a large-scale NMR device that could record the radio waves coming from all the atoms in a human being. You only had to create a magnetic field big enough!

In 1977, he and his students built a temperamental prototype of the modern **MRI – magnetic resonance imaging** – which they called the **Indomitable**. He tried it, unsuccessfully, on himself first, then on a graduate student named Larry Minkoff. The result was a mere 106 data points (recorded first in colored pencils!) describing the tissues of Minkoff's chest. The Indomitable is now in the Smithsonian.

Damadian's story continues with his recording of a patent and years of litigation trying to fight off companies like Hitachi and General Electric who disputed his patent. He has also stirred up controversy by supporting the work of so-called "creation scientists."

There have been a number of other scientists studying NMR who were in fact heading in the same direction as Damadian. One person in particular with a legitimate claim to co-discovery is **Paul Lautenbur**. He developed the idea of using small NMR gradients to map the body while at SUNY Stony Brook. In 1973, he

used his technique on a test tube of water, and then used it on a clam. His work was published in *Nature*, and it is his technique that is favored today. Lautenbur and British MRI researcher **Peter Mansfield** were awarded the Nobel Prize in 2003.

The MRI works like this: You create a strong magnetic field which runs through the person from head to toe. This causes the spinning hydrogen atoms in the person's body to line up with the magnetic field. Then you send a radio pulse at a special frequency that causes the hydrogen protons to spin in a different direction. When you turn off the radio pulse, the protons will return to their alignment with the magnetic field, and release the extra energy they took in from the radio pulse. That energy is picked up by the same coil that produced the energy, now acting like a three dimensional antenna. Since different tissues have different relative amounts of hydrogen in them, they give a different density of energy signals, which the computer organizes into a detailed three-dimensional image. This image is nearly as detailed as an anatomical photograph!

On the more active side, direct electrical stimulation of the brain of a living person became a fine art in the 1900's. In 1909, **Harvey Cushing** mapped the somatosensory cortex. In 1954, **James Olds** produced a media sensation by discovering the so-called 'pleasure center' of the hypothalamus. By the end of the century, the specialized areas of the brain were pretty well mapped.

Brain surgery also became more effective. In the process of looking for surgical relief for extreme epilepsy, it was discovered that cutting the corpus callosum which joins the two hemispheres of the cerebral cortex, greatly improved the patients' condition. **Roger Sperry** was then able to discover the various differences between the left and right hemisphere in some of the most interesting studies in history. He was awarded the Nobel Prize for his work in 1981.

The other aspect of technology is its use in attempting to heal people with mental illness. Although extremely controversial to this day, the evidence strongly suggests that **electroshock therapy**, first used by **Ugo Cerletti** and **Lucino Bini** in 1938, can be effective in the care of very depressed patients. Electroshock (also known as electro-convulsive therapy or ECT) involves sending a strong electrical current through an anesthetized patient's brain. When they awake, they cannot seem to recall several hours of time before the procedure, but also feel much less depressed. We aren't sure why it works.

Less effective and much more radical is the lobotomy, first used on human beings by **Antonio Egaz Moniz** of the University of Lisbon Medical School, who won the Nobel Prize for his work in 1949. The lobotomy was turned into a mass-production technique by **Walter Freeman**, who performed the first lobotomy in the U.S. in 1936.

The psychopharmacological explosion

In the 1800's, the basic principles of the nervous system were slowly being unraveled by people such as Galvani in Italy and Helmholtz in Germany. Toward the end of the 1800s, biologists were approaching an understanding of the details. In particular, **Camillo Golgi** (who believed that the nervous system was a single entity) invented a staining technique that allowed **Santiago Ramon y Cajal** to prove that the nervous system was actually composed of individual neurons. Together, they won the Nobel Prize in 1906.

The British biologist Sir **Charles Sherrington** had already named what Ramon y Cajal saw: the **synapse**. He, too, would win a Nobel Prize for his work on neurons with **Edgar Douglas Adrian**.

In 1921, the German biologist **Otto Leowi** completed the picture by discovering **acetylcholine** and the idea of the **neurotransmitter**. For this work, he received the Nobel Prize, shared with **Henry Hallett Dale**. Interestingly, acetylcholine is a relative of **muscarine** – the active ingredient of some of those mushrooms

that some of our ancient ancestors liked so much. In 1946, another biologist, **von Euler**, discovered **norepinephrine**. And, in 1950, **Eugene Roberts** and **J. Awapara** discover **GABA**.

In the early part of the 1900's, we see the beginnings of psychopharmacology as a medical science, with the use of **bromide** and **chloralhydrate** as sedatives. **Phenobarbital** enters the picture in 1912 as the first barbituate. In the second half of the 1900s, with the basic mechanisms of the synapse understood, progress in the development of psychoactive drugs truly got underway. For example...

In 1949, **John Cade**, an Australian psychiatrist, found that **lithium**, a light metal, could lessen the manic aspect of manic-depression.

In 1952, a French Navy Doctor, **Henri Laborit**, came up with a calming medication which included **chlorpromazine**, which was promoted as the antipsychotic **Thorazine** a few years later.

Imipramine, the first **tricyclic** antidepressant, was developed at Geigy Labs by **R. Kuhn** in the early 1950's, while he was trying to find a better antihistamine!

In the late 1950's, **Nathan Klein** studied the use of **reserpine** in 1700s India, and found it reduced the symptoms of many of his psychiatric patients. Unfortunately, the side effects were debilitating.

In 1954, the drug **meprobamate**, better known as **Miltown**, became available on the market. Its chemical foundation was discovered a decade earlier by **Frank Berger**, while he was trying to discover a new antibiotic. He found a tranquilizer instead!

Iproniazid (an **MAOI** antidepressant) was developed in 1956 by the Hoffman-LaRoche pharmaceutical company for tuberculosis patients. It appeared to cheer them up a bit! Although it was banned because of side effects, it was the first in a long series of antidepressants.

Leo Sternbach also worked for Hoffman-LaRoche, and discovered the drug **Valium (diazepam)** in 1959, and **Librium** the following year – two of the most useful and used psychoactive drugs ever.

The progress of psychopharmacology was greatly aided by increased knowledge of the activities at the level of the synapse. **John Eccles**, **Alan Lloyd Hodgkin** and **Andrew Fielding Huxley** shared the Nobel Prize in 1963 for their work on the neuron's membrane. And in 1973, **Solomon Snyder** and **Candace Pert** of Johns Hopkins discovered "internal morphine" or **endorphin**, and the "lock-and-key" theory – the basic mechanism of psychoactive drugs – was confirmed.

In 1974, **D. T. Wong** at Eli Lilly labs discovered **fluoxetine** – **Prozac** – and its antidepressant effects. It was approved by the FDA in 1987. This substance and others like it – known as the serotonin selective re-uptake inhibitors or **SSRIs** – would dramatically change the care of people with depression, obsessive-compulsive disorder, social anxiety, and other problems.

In the 1990's, new neuroleptics (antipsychotic drugs) such as **clozapine** were developed which addressed the problems of schizophrenia more completely than the older drugs such as chlorpromazine, and with fewer side effects.

What is the future going to be like, in regards to psychopharmacology? Some say the major breakthroughs are over, and it is just a matter of producing better variations. But that has been said many times before. Biochemistry is still progressing, and every year brings something new. The rest of us can only hope that many more and better medications with psychiatric applications will be found.



Genetics and the human genome

The science of genetics begins in the garden of an Austrian Monk named **Gregor Mendel**. In 1866, he published the results of his work suggesting the existence of "factors" – which would later be called **genes** – that are responsible for the physical characteristics of organisms.

A Columbia University professor, Dr. **Thomas Morgan** provided the next step in 1910 by discovering that these genes are in fact carried within the structures called **chromosomes**. And in 1926, **Hermann J. Muller** discovers that he can create **mutations** in fruit flies by irradiating them with X-rays.



Finally, in 1953, Dr. **James D. Watson** and Dr. **Francis Crick** outline the structure of the **DNA** molecule. And Dr. **Sydney Brenner** completes the picture by discovering **RNA** and the basic processes of protein construction.

The next phase of genetics involves the mapping of the DNA: What is the sequence of bases (A, T, G, and C) that make up DNA, and how do those sequences relate to proteins and ultimately to the traits of living organisms? Two researchers, **Frederick Sanger** and **Walter Gilbert**, independently discover a technique to efficiently "read" the bases, and in 1977, a bacteriophage virus is the first creature to have its genome revealed.

In the 1980's, the Department of Energy reveals a plan to bring together researchers world-wide to learn the entire genome – of human beings! The NIH (National Institute of Health) joins in, and makes Dr. James Watson the director of the Office of Human Genome Research.

In 1995, Dr. **Hamilton Smith** and Dr. **J. Craig Venter** read the genome of a bacterium. In 1998, researchers publish the genome of the first animal, a roundworm. In 2000, they have the genome of the fruit fly. And in the same year, researchers have the genome sequence of the first plant.

In June of 2000, at a White House ceremony hosted by President Clinton, two research groups – the **Human Genome Project** consortium and the private company **Celera Genomics** – announce that they have nearly completed working drafts of the human genome. In February of 2001, the HGP consortium publishes its draft in *Nature* and Celera publishes its draft in *Science*. The drafts describe some 90% of the human genome, although scientists know the function of less than 50% of the genes discovered.

There were a few surprises: Although the human genome is comprised of more than three billion bases, this is only a third as large as scientists had predicted. And it is only twice as large as that of the roundworm. It is also discovered that 99.9% of the sequences are exactly the same for all human beings. We are not as special as we like to think!

The human genome project is not just an intellectual exercise: Knowing our genetic makeup will allow us to treat genetic illnesses, custom design medicines, correct mutations, more effectively treat and even cure cancer, and more. It is an accomplishment that surpasses even the landing on the moon.

A Brief History of the Lobotomy

The idea of brain surgery as a means of improving mental health got started around 1890, when Friederich Golz, a German researcher, removed portions of his dogs' temporal lobes, and found them to be calmer, less aggressive. It was swiftly followed by Gottlieb Burkhardt, the head of a Swiss mental institution, who attempted similar surgeries on six of his schizophrenic patients. Some were indeed calmer. Two died.

One would think that that would be the end of the idea. But in 1935, Carlyle Jacobsen of Yale University tried frontal and prefrontal lobotomies on chimps, and found them to be calmer afterwards. His colleague at Yale, John Fulton, attempted to induce "experimental neurosis" in his lobotomized chimps by presenting them with contradictory signals. He found that they were pretty much immune to the process.

It took a certain Antonio Egaz Moniz of the University of Lisbon Medical School to really put lobotomy on the map. A very productive medical researcher, he invented several significant improvements to brain x-ray techniques prior to his work with lobotomy. He also served as the Minister of Foreign Affairs and the Ambassador to Spain. He was even one of the signers of the Treaty of Versailles, which marked the end of World War I.

He found that cutting the nerves that run from the frontal cortex to the thalamus in psychotic patients who suffered from repetitive thoughts "short-circuited" the problem. Together with his colleague Almeida Lima, he devised a technique involving drilling two small holes on either side of the forehead, inserting a special surgical knife, and severing the prefrontal cortex from the rest of the brain. He called it leukotomy, but it would come to be known as lobotomy.

Some of his patients became calmer, some did not. Moniz advised extreme caution in using lobotomy, and felt it should only be used in cases where everything else had been tried. He was awarded the Nobel Prize for his work on lobotomy in 1949. He retired early after a former patient paralyzed him by shooting him in the back.

Walter Freeman, an American physician, with his colleague James Watts, performed his first lobotomy operation in 1936. He was so satisfied with the results that he went on to do many thousands more, and in fact began a propaganda campaign to promote its use. He is also famous for inventing what is called ice pick lobotomy. Impatient with the difficult surgical methods pioneered by Moniz, he found he could insert an ice pick above each eye of a patient with only local anesthetic, drive it through the thin bone with a light tap of a mallet, swish the pick back and forth like a windshield wiper and – voilà – a formerly difficult patient is now passive.

Freeman recommended the procedure for everything from psychosis to depression to neurosis to criminality. He developed what others called assembly line lobotomies, going from one patient to the next with his gold-plated ice pick, even having his assistants time him to see if he could break lobotomy speed records. It is said that even some seasoned surgeons fainted at the site. Even Watts thought he had gone too far.

Between 1939 and 1951, over 18,000 lobotomies were performed in the US, and many more in other countries. It was often used on convicts, and in Japan it was recommended for use on "difficult" children. There are still western countries that permit the use of the lobotomy, although its use has decreased dramatically worldwide. Curiously, the old USSR banned it back in the 1940s on moral grounds!

In the 1950s, people began getting upset about the prevalence of lobotomies. Protests began, and serious research supported the protesters. The general statistics showed roughly a third of lobotomy patients improved, a third stayed the same, and the last third actually got worse!

There have been a few famous cases over the years. For example, Rosemary Kennedy, sister to John, Robert, and Edward Kennedy, was given a lobotomy when her father complained to doctors about the mildly retarded girl's embarrassing new interest in boys. Her father never informed the rest of the family about what he had done. She lived out her life in a Wisconsin institution and died January 7, 2005, at the age of 86. Her

sister, Eunice Kennedy Shriver, founded the Special Olympics in her honor in 1968.

To learn more about lobotomy, try these sources:

Jack Pressman, **Last Resort** (1998).

Elliot Valenstein, **Great and Desperate Cures** (1986).

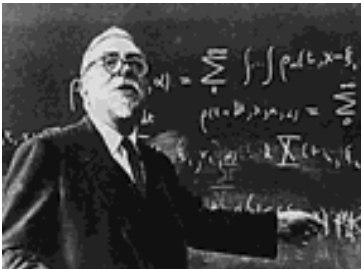
Renato Sabbatini, "The History of Psychosurgery" (**Brain and Mind**, June 1997). A selection from this article is available at <http://www.epub.org.br/cm/n02/historia/lobotomy.htm>.

The Cognitive Movement

In the latter half of the twentieth century, the advent of the computer and the way of thinking associated with it led to a new approach or orientation to psychology called **the cognitive movement**. Many are hoping that it will prove to be the paradigm – the unifying theory – we have been waiting for. It is still way too early to tell, but the significance of cognitive psychology is impossible to deny.

The roots of the cognitive movement are extremely varied: It includes gestalt psychology, behaviorism, even humanism; it has absorbed the ideas of E. C. Tolman, Albert Bandura, and George Kelly; it includes thinkers from linguistics, neuroscience, philosophy, and engineering; and it especially involves specialists in computer technology and the field of artificial intelligence. Let's start by looking at three of the greatest information processing theorists: Norbert Wiener, Alan Turing, and Ludwig von Bertalanffy.

Norbert Wiener



Norbert Wiener was born November 26, 1894 in Columbia, Missouri. His father was a professor of Slavic languages who wanted more than anything for his son to be a genius. Fortunately, Norbert was up to the task. He was reading by age three, started high school at nine, graduated at 11, got his bachelors at 14, and his masters – from Harvard! – at 17. He received his PhD a year later, in 1913, with a dissertation on mathematical logic.

(If it is any consolation, Norbert was near-sighted, very nervous, clumsy, insecure, and socially inept. However, people liked him anyway!)

After graduation, he went to Cambridge to study under Bertrand Russell, and then to the University of Gottingen to study under the famous mathematician David Hilbert. When he returned, he taught at Columbia, Harvard, and Maine University, spent a year as a staff writer for the **Encyclopedia Americana**, another year as a journalist for the Boston Herald, and (though a pacifist) worked as a mathematician for the army.

Finally, in 1919, he became a professor of mathematics at MIT, where he would stay put until 1960. He married Margaret Engemann in 1926, and they had two daughters.

He began by studying the movement of particles and quantum physics, which led him to develop an interest in information transmission and control mechanisms. While working on the latter, he coined the term **cybernetics**, from the Greek word for steersman, to refer to any system that has built-in correction mechanisms, i.e. is self-steering. Appropriately, he worked on control mechanisms for the military during World War II.

In 1948, he published **Cybernetics: or Control and Communication in the Animal and the Machine**. In this book, he popularized such terms as **input**, **output**, and **feedback**!

Later, in 1964, he published the book **God and Golem, Inc.**, which he subtitled "a comment on certain points where cybernetics impinges on religion." He was concerned that someday machines may overtake us, their creators. That same year, he won the National Medal of Science. A few weeks later, March 18, he died in Stockholm, Sweden.

The idea of **feedback** is very old, and is hinted at in the works of Aristotle. It began to gain some notoriety in the 1700's, in the form of "the invisible hand," an idea introduced in Adam Smith's **The Wealth of Nations**, which some see as the roots of both control theory and game theory. Feedback is a simple idea: Take the output of some system, and feed it back as an input, in order to in some way alter the process. For example, homeostasis or the thermostat principle is a form of **negative** feedback: It gets cold in the house, which triggers the thermostat, which turns on the furnace. It gets warmer, which triggers the thermostat, this time to

turn off the furnace. Then, it gets colder, and the cycle begins again. The goal of such a system is equilibrium (say, 70° F in the house), but it is actually an oscillating or "hunting" process.

Positive feedback occurs when the output tells the system to produce even more of something. Although the "positive" in positive feedback makes it sound like a good thing, if it isn't backed up with negative feedback, it tends to run out of control. A common example of positive feedback are economic bubbles, where something increases in value (such as tulips in 17th century Holland, or "dot-coms" in the recent past), everyone buys into the product, driving up the prices, leading to more investors, until finally the whole thing collapses.

What Wiener did was recognize the larger significance of this feedback idea!

Alan M. Turing

Alan Turing was born June 23, 1912 in Paddington, London, the second child of Julius Mathison Turing and Ethel Sara Stoney. His parents met while his father and his mother's father were serving in Madras, India, as part of the Civil Service. He and his brother were raised in other people's homes while his parents continued their life in India.

A turning point in his life came when his best friend at Sherborne School, Christopher Marcom, died in 1930. This led him to think about the nature of existence and whether or not it ends at death.

He went to King's College of Cambridge in 1931, where he read books by von Neumann, Russell and Whitehead, Goedel, and so on. He also became involved in the pacifist movement at Cambridge, as well as coming to terms with his homosexuality. He received his degree in 1934, and stayed on for a fellowship in 1935.



The **Turing Machine** – the first description of what would become the modern computer – was introduced in a 1936 paper, after which he left for Princeton in the US. There, he received his PhD in 1938, and returned to King's College, living on his fellowship.

He began working with British Intelligence on breaking the famous Enigma Code by constructing code-breaking machines. In 1944, he made his first mention of "building a brain."

It should be noted that Turing was also an amateur cross-country runner, and just missed representing the UK in the 1948 Olympics!

In 1944, he became the deputy director of the computing lab at Manchester University, where they were attempting to build the first true computer. In 1950, he published a paper, "Computing Machinery and Intelligence," in **Mind**. Turing saw the human brain as an "unorganized machine" that learned through experience.

Unfortunately, he was arrested and tried in 1952 – for homosexuality! He made no defense, but took an offer to stay out of jail if he would take estrogen injections to lower his supposedly overactive libido. He lost security clearance because of his homosexuality as well.

He began working on pattern formation in biology – what we would now call the mathematics of fractals – and on quantum mechanics. But on June 7, 1954, he committed suicide by ingesting cyanide – making it look like an accident to spare his mother's feelings. He was 41.

Today, he is considered the father of Computer Science. Let me let his biographer, Andrew Hodges, describe the famous Turing Machine:

His work introduced a concept of immense practical significance: the idea of the Universal Turing Machine. The concept of 'the Turing machine' is like that of 'the formula' or 'the equation'; there is an infinity of possible Turing machines, each corresponding to a different 'definite method' or algorithm. But imagine, as Turing did, each particular algorithm written out as a set of instructions in a standard form. Then the work of interpreting the instructions and carrying them out is itself a mechanical process, and so can itself be embodied in a particular Turing machine, namely the Universal Turing machine. A Universal Turing machine can be made do what any other particular Turing machine would do, by supplying it with the standard form describing that Turing machine. One machine, for all possible tasks.

It is hard now not to think of a Turing machine as a computer program, and the mechanical task of interpreting and obeying the program as what the computer itself does. Thus, the Universal Turing Machine embodies the essential principle of the computer: a single machine which can be turned to any well-defined task by being supplied with the appropriate program.

Additionally, the abstract Universal Turing Machine naturally exploits what was later seen as the 'stored program' concept essential to the modern computer: it embodies the crucial twentieth-century insight that symbols representing instructions are no different in kind from symbols representing numbers. But computers, in this modern sense, did not exist in 1936. Turing created these concepts out of his mathematical imagination. Only nine years later would electronic technology be tried and tested sufficiently to make it practical to transfer the logic of his ideas into actual engineering. In the meanwhile the idea lived only in his mind.*

For much more on Turing, see the Turing Archive at
http://www.cs.usfca.edu/www.AlanTuring.net/turing_archive/index.html

Ludwig von Bertalanffy

Ludwig was born near Vienna on September 19, 1901. In 1918, he went to the University of Innsbruck, and later transferred to the University of Vienna, where he studied the history of art, philosophy, and biology. He received his doctorate in 1926, with a PhD dissertation on Gustav Fechner.



In 1928, he published **Modern Theories of Development**, where he introduced the question of whether we could explain biology in purely physical terms. He suggested we could, if we see living things as endowed with self-organizational dynamics.

In 1937, he went to the University of Chicago, where he gave his first lecture on **General Systems Theory**, which he saw as a methodology for all sciences. In 1939, he became a professor at the University of Vienna and continued his research on the comparative physiology of growth. He summarized his work in **Problems of Life**, published in 1940.

In 1949, he emigrated to Canada, where he began research on cancer. Soon, he branched into cognitive psychology, where he introduced a holistic epistemology that he contrasted with behaviorism.

In 1960, he became professor of theoretical biology in the department of zoology and psychology at the University of Alberta. In 1967, he wrote **Robots, Men, and Minds**, and in 1968, he wrote **General Systems Theory**.

* Quoted from Andrew Hodges: "Alan Turing – a short biography," at <http://www.turing.org.uk/turing/bio/part3.html>

Ludwig von Bertalanffy died of a heart attack on June 12, 1972.

Once upon a time, it was possible for one bright individual – say an Aristotle or a da Vinci – to know everything that his or her culture had to offer. We still sometimes refer to people who have a particularly broad knowledge base as a renaissance man or woman. But this isn't really possible anymore, because there is simply too much information in the world. Everyone winds up a specialist. That isn't, of course, entirely bad; but it does mean that the various sciences (and arts and humanities as well) tend to become isolated. A new idea in one field stays in that field, even when it might mean a revolution for another field. The last time we saw a truly significant transfer of ideas from one science to others was when Darwin introduced the theory of evolution!

General Systems Theory was a proposal for a mathematical and logical means of expressing ideas in what we nowadays comfortably call systems. Bertalanffy believed that this was the way we could unify the sciences, including biology, history, sociology, and even psychology, and open the door to a new kind of scientist who is a generalist rather than a specialist. These generalists, by making use of these common systems models, would be able to transfer insights from one field to another.

Bertalanffy took concepts from cybernetics, information theory, game theory, decision theory, topology, factor analysis, systems engineering, operations research, and human engineering, and perfected the "flow diagram" idea that we all take for granted today. His most significant innovation, however, was the idea of the open system – a system in the context of a larger system. This allowed systems theory to be applied to animals within ecosystems, for example, or to people within their socio-cultural contexts. In particular, the idea of the open system gave the age-old metaphor of societies-as-organisms scientific legitimacy and a new lease-on-life.

Noam Chomsky

In addition to the input (no pun intended) from the "artificial intelligence" people, there was the input from a group of scientists in a variety of fields who thought of themselves as structuralists – not allying themselves with Wundt, but interested in the structure of their various topics. I'll call them neo-structuralists, just to keep them straight. For example, there's Claude Levi-Strauss, the famous French anthropologist. But the one everyone knows about is the linguist Noam Chomsky.

Avram Noam Chomsky was born December 7, 1928, in Philadelphia, the son of William Chomsky and Elsie Simonofsky. His father was a Hebrew scholar, and young Noam became so good that he was proof-reading his father's manuscripts by the time he was in high school. Noam was also passionate about politics, especially when it concerned the potential for a state of Israel.

He received his BA from the University of Pennsylvania in 1949, whereupon he married a fellow linguist, Carol Schatz. They would go on to have three children. He received his PhD in 1955, also from the U of Penn.

That same year, he started teaching at MIT and began his work on **generative grammar**. Generative grammar was based on the question "how can we create new sentences which have never been spoken before?" How, in other words, do we get so creative, so generative? While considering this question, he familiarized himself with mathematical logic, the psychology of thought, and theories about thinking machines. He found himself, on the other hand, very



critical of traditional linguistics and behavioristic psychology.

In 1957, he published his first book, **Syntactic Structures**. Besides introducing his generative grammar, he also introduced the idea of an innate ability to learn languages. We have born into us a "universal grammar" ready to absorb the details of whatever language is presented to us at an early age.

His book spoke about **surface structure** and **deep structure** and the **rules of transformation** that governed the relations between them. Surface structure is essentially language as we know it, particular languages with particular rules of phonetics and basic grammar. Deep structure is more abstract, at the level of meanings and the universal grammar.

In the 1960's, Chomsky became one of the most vocal critics of the Vietnam War, and wrote *American Power and the New Mandarins*, a critique of government decision making. He is still at MIT today and continues to produce articles and books on linguistics – and politics!

Jean Piaget

Another neo-structuralist is Jean Piaget. Originally a biologist, he is now best remembered for his work on the development of cognition. Many would argue that he, more than anyone else, is responsible for the creation of cognitive psychology. If the English-speaking world had only learned to read a little French, this would be true without a doubt. Unfortunately, his work was only introduced in English after 1950, and only became widely known in the 1960's – just on time to be a part of the cognitive movement, but not of its creation.



Jean Piaget was born in Neuchâtel, Switzerland, on August 9, 1896. His father, Arthur Piaget, was a professor of medieval literature with an interest in local history. His mother, Rebecca Jackson, was intelligent and energetic, but Jean found her a bit neurotic – an impression that he said led to his interest in psychology, but away from pathology! The oldest child, he was quite independent and took an early interest in nature, especially the collecting of shells. He published his first "paper" when he was ten – a one page account of his sighting of an albino sparrow.

He began publishing in earnest in high school on his favorite subject, mollusks. He was particularly pleased to get a part time job with the director of Neuchâtel's Museum of Natural History, Mr. Godel. His work became well

known among European students of mollusks, who assumed he was an adult! All this early experience with science kept him away, he says, from "the demon of philosophy."

Later in adolescence, he faced a bit a crisis of faith: Encouraged by his mother to attend religious instruction, he found religious argument childish. Studying various philosophers and the application of logic, he dedicated himself to finding a "biological explanation of knowledge." Ultimately, philosophy failed to assist him in his search, so he turned to psychology.

After high school, he went on to the University of Neuchâtel. Constantly studying and writing, he became sickly, and had to retire to the mountains for a year to recuperate. When he returned to Neuchâtel, he decided he would write down his philosophy. A fundamental point became a centerpiece for his entire life's work: "In all fields of life (organic, mental, social) there exist 'totalities' qualitatively distinct from their parts and imposing on them an organization." This principle forms the basis of his structuralist philosophy, as it would for the Gestaltists, Systems Theorists, and many others.

In 1918, Piaget received his Doctorate in Science from the University of Neuchâtel. He worked for a year at

psychology labs in Zurich and at Bleuler's famous psychiatric clinic. During this period, he was introduced to the works of Freud, Jung, and others. In 1919, he taught psychology and philosophy at the Sorbonne in Paris. Here he met Simon (of Simon-Binet fame) and did research on intelligence testing. He didn't care for the "right-or-wrong" style of the intelligent tests and started interviewing his subjects at a boys school instead, using the psychiatric interviewing techniques he had learned the year before. In other words, he began asking how children reasoned.

In 1921, his first article on the psychology of intelligence was published in the **Journal de Psychologie**. In the same year, he accepted a position at the Institut J. J. Rousseau in Geneva. Here he began with his students to research the reasoning of elementary school children. This research became his first five books on child psychology. Although he considered this work highly preliminary, he was surprised by the strong positive public reaction to his work.

In 1923, he married one of his student coworkers, Valentine Châtenay. In 1925, their first daughter was born; in 1927, their second daughter was born; and in 1931, their only son was born. They immediately became the focus of intense observation by Piaget and his wife. This research became three more books!

In 1929, Piaget began work as the director of the Bureau International Office de l'Education, in collaboration with UNESCO. He also began large scale research with A. Szeminska, E. Meyer, and especially Bärbel Inhelder, who would become his major collaborator. Piaget, it should be noted, was particularly influential in bringing women into experimental psychology. Some of this work, however, wouldn't reach the world outside of Switzerland until World War II was over.

In 1940, He became chair of Experimental Psychology, the Director of the psychology laboratory, and the president of the Swiss Society of Psychology. In 1942, he gave a series of lectures at the Collège de France, during the Nazi occupation of France. These lectures became **The Psychology of Intelligence**. At the end of the war, he was named President of the Swiss Commission of UNESCO.

Also during this period, he received a number of honorary degrees. He received one from the Sorbonne in 1946, the University of Brussels and the University of Brazil in 1949, on top of an earlier one from Harvard in 1936. And, in 1949 and 1950, he published his synthesis, **Introduction to Genetic Epistemology**.

In 1952, he became a professor at the Sorbonne. In 1955, he created the International Center for Genetic Epistemology, of which he served as director the rest of his life. And, in 1956, he created the School of Sciences at the University of Geneva.

He continued working on a general theory of structures and tying his psychological work to biology for many more years. Likewise, he continued his public service through UNESCO as a Swiss delegate. By the end of his career, he had written over 60 books and many hundreds of articles. He died in Geneva, September 16, 1980, one of the most significant psychologists of the twentieth century.

Jean Piaget began his career as a biologist – specifically, a malacologist! But his interest in science and the history of science soon overtook his interest in snails and clams. As he delved deeper into the thought-processes of doing science, he became interested in the nature of thought itself, especially in the development of thinking. Finding relatively little work done in the area, he had the opportunity to give it a label. He called it **genetic epistemology**, meaning the study of the development of knowledge.

He noticed, for example, that even infants have certain skills in regard to objects in their environment. These skills were certainly simple ones, sensorimotor skills, but they directed the way in which the infant explored his or her environment and so how they gained more knowledge of the world and more sophisticated exploratory skills. These skills he called **schemas**.

For example, an infant knows how to grab his favorite rattle and thrust it into his mouth. He's got that schema down pat. When he comes across some other object – say daddy's expensive watch, he easily learns to transfer his "grab and thrust" schema to the new object. This Piaget called **assimilation**, specifically assimilating a new object into an old schema.

When our infant comes across another object again – say a beach ball – he will try his old schema of grab

and thrust. This of course works poorly with the new object. So the schema will adapt to the new object: Perhaps, in this example, "squeeze and drool" would be an appropriate title for the new schema. This is called **accommodation**, specifically accommodating an old schema to a new object.

Assimilation and accommodation are the two sides of **adaptation**, Piaget's term for what most of us would call learning. Piaget saw adaptation, however, as a good deal broader than the kind of learning that Behaviorists in the US were talking about. He saw it as a fundamentally biological process. Even one's grip has to accommodate to a stone, while clay is assimilated into our grip. All living things adapt, even without a nervous system or brain.

Assimilation and accommodation work like pendulum swings at advancing our understanding of the world and our competency in it. According to Piaget, they are directed at a balance between the structure of the mind and the environment, at a certain congruency between the two, that would indicate that you have a good (or at least good-enough) model of the universe. This ideal state he calls **equilibrium**.

As he continued his investigation of children, he noted that there were periods where assimilation dominated, periods where accommodation dominated, and periods of relative equilibrium, and that these periods were similar among all the children he looked at in their nature and their timing. And so he developed the idea of stages of cognitive development. These constitute a lasting contribution to psychology.

Donald O. Hebb

There are three psychologists who, in my opinion, are most responsible for the development of cognitive psychology as a movement as well as for its incredible popularity today. They are Donald Hebb, George Miller, and Ulric Neisser. There are no doubt others we could add, but I am sure no one would leave these three out!



Donald Olding Hebb was born in 1904 in Chester, Nova Scotia. He graduated from Dalhousie University in 1925, and tried to begin a career as a novelist. He wound up as a school principle in Quebec.

He began as a part-time graduate student at McGill University in Montreal. Here, he began quickly disillusioned with behaviorism and turned to the work of Kohler and Lashley. Working with Lashley, he received his PhD from Harvard in 1936.

He took on a fellowship with Wilder Penfield at the Montreal Neurological Institute, where his research noted that large lesions in the brain often have little effect on a person's perception, thinking, or behavior.

Moving on to Queens University, he researched intelligence testing of animals and humans. He noted that the environment played a far more significant role in intelligence than generally assumed.

In 1942, he worked with Lashley again, this time at the Yerkes Lab of Primate Biology. He then returned to McGill as a professor of psychology, and became the department chairperson in 1948.

The following year, he published his most famous book, **The Organization of Behavior: A Neuropsychological Theory**. This was very well received and made McGill a center for neuropsychology.

The basics of his theory can be summarized by defining three of his terms: First, there is the **Hebb synapse**. Repeated firing of a neuron causes growth or metabolic changes at the synapse that increase the efficiency of that synapse in the future. This is often called **consolidation theory**, and is the most accepted explanation for neural learning today.

Second, there is the **Hebb cell assembly**. There are groups of neurons so interconnected that, once activity begins, it persists well after the original stimulus is gone. Today, people call these **neural nets**.

And third, there is the **phase sequence**. Thinking is what happens when complex sequences of these cell assemblies are activated.

He humbly suggested that his theory is just a new version of **connectionism** – a neo- or neuro-connectionism. This connectionism is today the basic idea behind most models of neurological functioning. It should be noted that he was president of both the APA and its Canadian cousin, the CPA. Donald Hebb died in 1985.

George A. Miller

George A. Miller, born in 1920, began his career in college as a speech and English major. In 1941, he received his masters in speech from the University of Alabama. In 1946 he received his PhD from Harvard and began to study psycholinguistics.

In 1951, he published his first book, titled **Language and Communication**. In it, he argued that the behaviorist tradition was insufficient to the task of explaining language.

He wrote his most famous paper in 1956: "The Magical Number Seven, Plus or Minus Two: Some Limits on Our Capacity for Processing Information." In it, he argued that short-term memory could only hold about seven pieces – called **chunks** – of information: Seven words, seven numbers, seven faces, whatever. This is still accepted as accurate.

In 1960, Miller founded the Center for Cognitive Studies at Harvard with famous cognitivist developmentalist, Jerome Bruner. In that same year, he published **Plans and the Structure of Behavior** (with Eugene Galanter and Karl Pribram, 1960), which outlined their conception of cognitive psychology. They used the computer as their model of human learning, and used such analogies as information processing, encoding, and retrieval. Miller went so far as to define psychology as the study of the mind, as it had been prior to the behaviorist redefinition of psychology as the study of behavior!

George Miller served as the president of APA 1969, and received the prestigious National Medal of Science in 1991. He is still teaching as professor emeritus at Princeton University.



Ulric Neisser



Ulric Neisser was born in 1928 in Kiel, Germany, and moved with his family to the US at the age of three.

He studied at Harvard as a physics major before switching to psychology. While there, he was influenced by Koffka's work and by George Miller. In 1950, he received his bachelors degree, and in 1956, his PhD. At this point, he was a behaviorist, which was basically what everyone was at the time.

His first teaching position was at Brandeis, where Maslow was department head. Here he was encouraged to pursue his interest in cognition. In 1967, he wrote the book that was to mark the official beginning of the cognitive movement, **Cognitive Psychology**.

Later, in 1976, he wrote **Cognition and Reality**, in which he began to express a dissatisfaction with the linear programming model of cognitive psychology at that time, and the excessive reliance on laboratory work, rather than real-life situations. Over time, he would become a vocal critic of cognitive psychology, and moved towards the environmental psychology of his friend J. J. Gibson.

He is presently at Cornell University where his research interests include memory, especially memory for life events and in natural settings; intelligence, especially individual and group differences in test scores, IQ tests and their social significance; self-concepts, especially as based on self-perception. His latest works include **The Rising Curve: Long-Term Gains in IQ and Related Measures** (1998) and , with L. K. Libby, "Remembering life experiences" (In E. Tulving & F. I .M. Craik's **The Oxford Handbook of Memory**, 2000)

Conclusions?

As I said at the beginning of this chapter, it is impossible to tell whether cognitive psychology will prove to be THE psychology of the future. In fact, as I pointed out with Ulric Neisser, even some of its major proponents have their doubts. Cognitive psychology is far more sophisticated, philosophically, than behaviorism. And yet it lacks in sophistication when compared, for example, to phenomenology and existentialism. It does, of course, have the tremendous advantage of being tied to the most rapidly developing technology we have ever seen – the computer. But few people see the computer as ultimately being a good model for human beings, in some ways not even as good as the old white rat, which at least was alive!

A Computer Timeline*

600's bc?

The abacus is developed in China. It was later adopted by the Japanese and the Russians.

600's ad?

Arabic numbers – including the zero (represented by a dot) – were invented in India. Arabic translations of Indian math texts brought these numbers to the attention of the Europeans. Arabic numbers entered Europe by means of Spain around 1000 ad and first became popular among Italian merchants around 1300. Until then, people used the Roman system in western Europe, and the Greek system in the east. The original numbers were similar to the modern Devanagari numbers used in northern India:

० १ २ ३ ४ ५ ६ ७ ८ ९

1488

The moveable-type printing press is invented by Johann Gutenberg.

1492

Francis Pello of Nice invents the decimal point.

c. 1600

Thomas Harriot invents the symbols used in algebra. He also drew the first maps of the moon and discovered sunspots.

1600

Dr. William Gilbert discovers static electricity, and coins the term in **De Magnete**.

1614

John Napier invents logarithms.

1622

William Oughtred invents the slide rule.

1623

Wilhelm Schickard makes his "Calculating Clock."

1644-5

Blaise Pascal a young French mathematician develops the Pascaline, a simple mechanical device for the addition of numbers. It consists of several toothed wheels arranged side by side, each marked from 0 to 9 at equal intervals around its perimeter. The important innovation is an automatic 'tens-carrying' operation: when a wheel completes a revolution, it is turned past the 9 to 0 and automatically pulls the adjacent wheel on its left, forward one tenth of a revolution, thus adding, or 'carrying'. (Pascal is also a respected philosopher and the inventor of the bus.)

*Major sources:

Chronology of Digital Computing Machines. Mark Brader <http://www.best.com/wilson/faq/chrono.html>
From the Abacus to the Apple. Bobbi A. Kerlin <http://www.irn.pdx.edu/~kerlinb/myresearch/timeline.html>
Global Networking: a Timeline. T. Matthew Ciolek <http://www.ciolek.com/PAPERS/milestones.html>
And a variety of others whose names I no longer recollect. My sincere apologies!

1660

Otto von Güricke builds first "electric machine."

1674

Gottfried Wilhelm von Leibniz designs his "Stepped Reckoner", a machine similar to Pascal's, with the added features of multiplication and division, which is constructed by a man named Olivier, of Paris. (Leibniz is also a respected philosopher and the co-inventor of calculus.)

1752

Ben Franklin captures lightning.

1786

J. H. Mueller, of the Hessian army, conceives the idea of what came to be called a "difference engine". That's a special-purpose calculator for tabulating values of a polynomial. Mueller's attempt to raise funds fails and the project is forgotten.

1790

Galvani discovers electric current, and uses it on frogs' legs.

1800

Alessandro Volta invents the battery.

1801

Joseph-Marie Jacquard develops the punch card system which programs and thereby automates the weaving of patterns on looms.

1809

Sir Humphry Davey invents electric arc lamp.

1820

Charles Xavier Thomas de Colmar of France, makes his "Arithmometer", the first mass-produced calculator. It does multiplication using the same general approach as Leibniz's calculator; with assistance from the user it can also do division. It is also the most reliable calculator yet. Machines of this general design, large enough to occupy most of a desktop, continue to be sold for about 90 years.

1822-23

Charles Babbage begins his government-funded project to build the first of his machines, the "Difference Engine", to mechanize solutions to general algebra problems.

The importance of his work is recognized by Ada Lovelace, Lord Byron's daughter who, gifted in mathematics, devises a form of binary arithmetic which uses only the digits 1 and 0.

1825

The first railway is opened for public use.

1826

Photography is invented by Benoit Fourneyron.

1830

Thomas Davenport of Vermont invents the electric motor – calls it a toy.

1831

Michael Faraday produces electricity with the first generator.

1832-34

Babbage conceives, and begins to design, his "Analytical Engine". Could be considered a programmable calculator, very close to the basic idea of a computer. The machine could do an addition in 3 seconds and a multiplication or division in 2-4 minutes.

1837

Telegraph, Samuel F. B. Morse.

1868

Christopher Latham Sholes (Milwaukee) invents the first commercial typewriter.

1872

One of the first large-scale analog computers is developed by Lord Kelvin to predict the height of tides in English harbors.

1876

Telephone is invented by Alexander Graham Bell.

1877

Gramophone is invented by Thomas Edison.

1881

Charles S. Tainter invents the dictaphone.

1886

Dorr E. Felt of Chicago, makes his "Comptometer". This is the first calculator with keys.

1887

E. J. Marey invents the Motion Picture Camera.

Eastman patents the first box camera, moving photography from the hands of professionals to the general public.

1890

Herman Hollerith of MIT, designs a punch card tabulating machine which is used effectively in the US census of this year. The cards are read electrically.

1891

Thomas Edison develops the Motion Picture Projector. 1896 Guglielmo Marconi develops the Radio Telegraph. 1899 Val Demar Poulsen develops the Magnetic Recorder.

1900

Rene Graphen develops the Photocopying Machine.

1901

Reginald A. Fessenden develops the Radio Telephone.

1906

Henry Babbage, Charles's son, with the help of the firm of R. W. Munro, completes his father's Analytical Engine, just to show that it would have worked.

1913

Thomas Edison invents Talking Motion Pictures.

1919

W. H. Eccles and F. W. Jordan publish the first flip-flop circuit design.

1924

Computing-Tabulating-Recording becomes International Business Machines.

1925

J. P. Maxfield develops the All-electric Phonograph.

1927

Philo T. Farnsworth, inventor of the television, gives first demonstration. See *The Last Lone Inventor* by Evan Schwartz (<http://www.lastloneinventor.com>)

1933

IBM introduces the first commercial electric typewriter.

Edwin H. Armstrong develops FM Radio.

1936

Robert A. Watson-Watt develops Radar.

Benjamin Burack builds the first electric logic machine.

In his thesis, Claude Shannon demonstrates the relationship between electrical circuitry and symbolic logic.

1937

Alan M. Turing, of Cambridge University, England, publishes a paper on "computable numbers" which introduces the theoretical simplified computer known today as a Turing machine.

1938

Claude E. Shannon publishes a paper on the implementation of symbolic logic using relays.

1939

John V. Atanasoff and graduate student Clifford Berry, of Iowa State College completes a prototype 16-bit adder. This is the first machine to calculate using vacuum tubes.

1940s

First electronic computers in US, UK, and Germany

1941

Working with limited backing from the German Aeronautical Research Institute, Zuse completes the "V3", the first operational programmable calculator. Zuse is a friend of Wernher von Braun

1943

Howard H. Aiken and his team at Harvard University, Cambridge, Mass. funded by IBM, complete the "ASCC Mark I" ("Automatic Sequence-Controlled Calculator Mark I"). The machine is 51 feet long, 8 feet high, weighs 5 tons, and incorporates 750,000 parts. It is the first binary computer built in the U.S. that is operated by electricity.

Max Newman, Wynn-Williams, and their team at the secret English Government Code and Cypher School, complete the "Heath Robinson". This is a specialized machine for cipher-breaking. (Heath Robinson was a British cartoonist known for his Rube-Goldberg-style contraptions.)

1945

John von Neumann drafts a report describing a stored-program computer, and gives rise to the term "von Neumann computer".

1945

John W. Mauchly and J. Presper Eckert and their team at the University of Pennsylvania, complete a secret project for the US Army's Ballistics Research Lab: The ENIAC (Electronic Numerical Integrator and Calculator). It weighs 30 tons, is 18 feet high and 80 feet long, covers about 1000 square feet of floor, and consumes 130 or 140 kilowatts of electricity. Containing 17,468 vacuum tubes and over 500,000 soldered connections, it costs \$487,000. While it could perform five thousand additions in one second, the circuitry in ENIAC could now be contained on a panel the size of a playing card. Today's desktop stores millions times more info and is 50,000 times faster. The ENIAC's clock speed is 100 kHz.

Two days before Christmas the transistor is perfected.

1946

Zuse invents Plankalkul, the first programming language, while hiding out in Bavaria.

The ENIAC is revealed to the public. A panel of lights is added to help show reporters how fast the machine is and what it is doing; and apparently Hollywood takes note.

1947

The magnetic drum memory is independently invented by several people, and the first examples are constructed.

1948

Newman, Freddie C. Williams, and their team at Manchester University, complete a prototype machine, the "Manchester Mark I". This is the first machine that everyone would call a computer, because it's the first with a true stored-program capability.

First tape recorder is sold

1949

A quote from Popular Mechanics:

"Where a computer like the ENIAC is equipped with 18,000 vacuum tubes and weighs 30 tons, computers in the future may have only 1,000 vacuum tubes and weigh only 1 1/2 tons."

Jay W. Forrester and his team at MIT construct the "Whirlwind" for the US Navy's Office of Research and Inventions. The Whirlwind is the first computer designed for real-time work; it can do 500,000 additions or 50,000 multiplications per second. This allows the machine to be used for air traffic control.

Forrester conceives the idea of magnetic core memory as it is to become commonly used, with a grid of wires used to address the cores.

1950

Alan Turing "Computing Machinery and Intelligence"

1951

U.S. Census Bureau takes delivery of the first UNIVACS originally developed by Eckert and Mauchly.

An Wang establishes Wang Laboratories

Ferranti Ltd. completes the first commercial computer. It has 256 40-bit words of main memory and 16K words of drum. An eventual total of 8 of these machines are sold.

Grace Murray Hopper, of Remington Rand, invents the modern concept of the compiler.

1952

The EDVAC is finally completed. It has 4000 tubes, 10,000 crystal diodes, and 1024 44-bit words of ultrasonic memory. Its clock speed is 1 MHz.

1953

Minsky and McCarthy get summer jobs at Bell Labs

1955

An Wang is issued Patent Number 2,708,722, including 34 claims for the magnetic memory core.

Shockley Semiconductor is founded in Palo Alto.

John Bardeen, Walter Brattain, and William Shockley share the Nobel Prize in physics for the transistor.

1956

Rockefeller funds Minsky and McCarthy's AI conference at Dartmouth

CIA funds GAT machine-translation project.

Newell, Shaw, and Simon develop Logic Theorist.

1957

USSR launches Sputnik, the first earth satellite.

Newell, Shaw, and Simon develop General Problem Solver.

Fortran, the first popular programming language, hits the streets.

1958

McCarthy creates first LISP.

1959

Minsky and McCarthy establish MIT AI Lab.

Frank Rosenblatt introduces Perceptrons.

COBOL, a programming language for business use, and LISP, the first string processing language, come out.

1960s

Edward Dijkstra suggests that software and data should be created in standard, structured forms, so that people could build on each others' work.

Algol 60, a European programming language and ancestor of many others, including Pascal, is released.

1962

First industrial robots.

1963-64

Doug Englebart invents the computer mouse, first called the X-Y Position Indicator.

1964

Bobrow's "Student" solves math word-problems.

John Kemeny and Thomas Kurtz of Dartmouth College develop the first BASIC programming language. PL1 comes out the same year.

Wang introduces the LOCI (logarithmic calculating instrument), a desktop calculator at the bargain price of \$6700, much less than the cost of a mainframe. In six months, Wang sells about twenty units.

Sabre database system, brought online. It solves the American Airlines' problem of coordinating information about hundreds of flight reservations across the continent every day.

Philips makes public the compact cassette.

1966

Weizenbaum and Colby create ELIZA.

Hewlett-Packard enters the computer market with the HP2116A real-time computer. It is designed to crunch data acquired from electronic test and measurement instruments. It has 8K of memory and costs \$30,000.

Hewlett-Packard announces their HP 9100 series calculator with CRT displays selling for about \$5000 each.

Intel is founded and begins marketing a semiconductor chip that holds 2,000 bits of memory. Wang is the first to buy this chip, using it in their business oriented calculators called the 600 series.

Late 1960s

IBM sells over 30,000 mainframe computers based on the 360 family which uses core memory.

1967

Greenblatt's MacHack defeats Hubert Deyfus at chess.

IBM builds the first floppy disk

1969

Kubrick's "2001" introduces AI to mass audience.

Intel announces a 1 KB RAM chip, which has a significantly larger capacity than any previously produced memory chip

Unix operating system, characterised by multitasking (also called time-sharing), virtual memory, multi-user design and security, designed by Ken Thompson and Dennis Ritchie at AT&T Bell Laboratories, USA

ARPANET (future Internet) links first two computers at UCLA and Stanford Research Institute. Dr. Leonard Kleinrock, a UCLA-based pioneer of Internet technology, and his assistant Charley Kline manage to send successfully, after solving an initial problem with an inadequate memory buffer, a command "login" to a Stanford machine set-up and tuned by Bill Duvall. First email!

(UCLA, UCSB, University of Utah and SRI are the four original members of Arpanet.)

1970s

Commodore, a Canadian electronics company, moves from Toronto to Silicon Valley and begins selling calculators assembled around a Texas Instruments chip.

1970

Doug Englebart patents his X-Y Position Indicator mouse.

Nicklaus Wirth comes out with Pascal.

1971

The price of the Wang Model 300 series calculator drops to \$600. Wang introduces the 1200 Word Processing System.

Stephen Wozniak and Bill Fernandez build their "Cream Soda computer."

Bowmar Instruments Corporation introduces the LSI-based (large scale integration) four function (+, -, *, /) pocket calculator with LED at an initial price of \$250.

Intel markets the first microprocessor. Its speed is 60,000 'additions' per second.

1972

Ray Tomlinson, author of first email software, chooses @ sign for email addresses.

Dennis Ritchie invents C.

Bill Gates and Paul Allen form Traf-O-Data (which eventually becomes Microsoft).

Stephen Wozniak and Steven Jobs begin selling blue boxes.

Electronic mail!

1973

Stephen Wozniak joins Hewlett-Packard.

Radio Electronics publishes an article by Don Lancaster describing a "TV Typewriter."

IBM develops the first true sealed hard disk drive. The drive was called the "Winchester" after the rifle of the same name. It used two 30 Mb platters.

1975

MITS introduces the first personal computer - Altair in form of a kit, initially to be assembled by a buyer. It was based on Intel's 8-bit 8080 processor and included 256 bytes of memory (expandable to a 12 Kb), a set of toggle switches and an LED panel. Keyboard, screen or storage device could be added using extension cards.

The Apple I....

1976

Greenblatt creates first LISP machine.

Queen Elizabeth is first head of state to send email.

Shugart introduces 5.25" floppy.

IBM introduces a total information processing system. The system includes diskette storage, magnetic card reader/recorder, and CRT. The print station contains an ink jet printer, automatic paper and envelope feeder, and optional electronic communication.



Apple Computer opens its first offices in Cupertino and introduces the Apple II. It is the first personal computer with color graphics. It has a 6502 CPU, 4KB RAM, 16KB ROM, keyboard, 8-slot motherboard, game paddles, and built-in BASIC.

Commodore introduces the PET computer.

Tandy/Radio Shack announces its first TRS-80 microcomputer.

Ink-jet printing announced by IBM.

JVC introduces the VHS format to the videorecorders.

1977

The first digital audio disc prototypes are shown by Mitsubishi, Sony, and Hitachi at the Tokyo Audio fair.

1978

Apple introduces and begins shipping disk drives for the Apple II and initiates the LISA research and development project.

BITNET (Because It's Time Network) protocol for electronic mail, listserv servers, file transfer, is established as a cooperative enterprise by the City University of New York and Yale University.

Xerox releases the 8010 Star and 820 computers.

IBM announces its Personal Computer.

DEC announces a line of personal computers.

HP introduces the HP 9000 technical computer with 32-bit "superchip" technology - it is the first "desktop mainframe", as powerful as room-sized computers of the 1960s.

1979

Kevin MacKenzie invents the emoticon :-)

Usenet news groups.

1980

First AAAI conference at Stanford.

Telnet. Remote log-in and long-distance work (telecommuting) are now possible.

1981

Listserv mailing list software. Online knowledge-groups and virtual seminars are formed.

Osborne introduces first portable computer.

MS-DOS introduced.

1982

CD disk (12 cm, 74 mins of playing time) and player released by Sony and Philips Europe and Japan. A year later the CD technology is introduced to the USA

1983

IBM announces the PCjr.

Apple Computer announces Lisa, the first business computer with a graphical user interface launched by Apple Computer Inc., Cupertino, California. The computer has 5MHz 68000 CPU, 860KB 5.25" floppy, 12" B&W screen, detached keyboard, and mouse.

1984

Macintosh personal computer, launched by Apple Computer Inc. The first computer has 128KB of memory and a 3.5" 400KB floppy disk-drive. The OS with astounding graphic interface is bundled with MacWrite (wordprocessor) and MacPaint (free-hand, B&W drawing) software.

Apple introduces 3.5" floppy.

The domain name system is established.

1985

CD-ROM technology (disk and drive) for computers developed by Sony and Philips

File Transfer Protocol.

1987

Microsoft ships Windows 1.01.

1988

The 386 chip brings PC speeds into competition with LISP machines.

1989

Tim Berners-Lee invents the WWW while working at CERN, the European Particle Physics Laboratory in Geneva, Switzerland. He won the Finnish Technology Award Foundation's first Millennium Technology Prize in April of 2004. The \$1.2 million prize was presented by Tarja Halonen, president of Finland.



1990

Archie FTP semi-crawler search engine, built by Peter Deutsch of MacGill University.

1991

CD-recordable (CD-R) technology is released.

WAIS publisher-fed search engine, invented by Brewster Kahle of the Thinking Machines Co.

Gopher, created at University of Minnesota Microcomputer, Workstations & Networks Center.

WWW server combines URL (addressing) syntax, HTML (markup) language for documents, and HTTP (communications protocol). It also offers integration of earlier Internet tools into a seamless whole.

1992

There are about 20 Web servers in existence (Ciolek 1998).

1993

"Universal Multiple-Octet Coded Character Set" (UCS), aka ISO/IEC 10646 is published in 1993 by the International Organization for Standardization (ISO). It is the first officially standardized coded character set with the purpose to eventually include all characters used in all the written languages in the world (and, in addition, all mathematical and other symbols).

Mosaic graphic WWW browser developed by Marc Andreessen (Cailliau 1995). Graphics user interface makes WWW finally a competitor to Gopher. Production of web pages becomes an easy task, even to an amateur. (Mosaic was the first Explorer- or Netscape-like "browser.")

There are 200+ Web servers in existence (Ciolek 1998).

1994

Labyrinth graphic 3-D (vrml) WWW browser is built by Mark Pesce. It provides access to the virtual reality of three-dimensional objects (artifacts, buildings, landscapes).

Netscape WWW browser, developed by Marc Andreessen, Mountain View, California.

1995

RealAudio narrowcasting (Reid 1997:69).

Java programming language, developed by Sun Microsystems, Palo Alto, California. Client-side, on-the-fly supplementary data processing can be performed using safe, downloadable micro-programs (applets).

Metacrawler WWW meta-search engine. The content of WWW is actively and automatically catalogued.

The first online bookstore, Amazon.com, is launched in Seattle by Jeffrey P. Bezos.

Altavista WWW crawler search engine is built by Digital around the Digital Alpha processor. A very fast search of 30-50% of the WWW is made possible).

1996

There are 100,000 Web servers in existence.

1997

There are 650,000 Web servers in existence.

"Deep Blue 2" beats Kasparov, the best chess player in the world. The world as we know it ends.

DVD technology (players and movies) is released. A DVD-recordable standard is created (Alpeda 1998).

Web TV introduced.

1998

Kevin Warwick, Professor of Cybernetics at the University of Reading in the U.K., became the first human to host a microchip. The approximately 23mm-by-3mm glass capsule containing several microprocessors stayed in Warwick's left arm for nine days. It was used to test implant's interaction with computer controlled doors and lights in a futuristic 'intelligent office building'.

There are 3.6 mln Web servers in existence (Zakon 1998).

1999

There are 4.3 mln Web servers in existence (Zakon 1999).

Netomat: The Non-Linear Browser, by the New York artist Maciej Wisniewski, launched. The open-source software uses Java and XML technology to navigate the web in terms of the data (text, images and sounds) it contains, as opposed to traditional browsers (Mosaic, Lynx, Netscape, Explorer) which navigate the web's pages.

1999/2000

A global TV programme '2000Today' reports live for 25 hrs non-stop the New Year celebrations in 68 countries all over the world. It is the first ever show of that duration and geographical coverage. The programme involved a round-the-clock work of over 6000 technical personnel, and used a array of 60 communication satellites to reach 1 billion viewers from all time-zones all over the globe (The Canberra Times, 1 Jan, 2000).

Conclusions:

Psychology Today and Tomorrow



From Logical Positivism to Postmodernism

The philosophy that came to dominate research in psychology in the first half of the 20th century was called **logical positivism**. This philosophy began with meetings of philosophers and physicists in Vienna and Berlin in the 1920's. The names that come up most often in association with logical positivism are Moritz Schlick (the founder) and Rudolph Carnap.

The basic idea of logical positivism is that all knowledge is based on empirical observation, assisted by the rigorous use of logic and mathematics. The ideal method in science, in other words, is hypothesis testing. In fact, any theoretical statement is meaningful only if it can be tested empirically. This is called the **verification principle**.

What this meant in the larger scheme is that all metaphysical (and, of course, theological) statements are meaningless. The only purpose left to philosophy, according to the logical positivists, is the investigation of the meaningfulness of scientific statements. Over time, logical positivism came to dominate the thinking of most people in physics and chemistry, and many in biology and psychology. It was the behaviorists who adopted it most enthusiastically.

But in the second half of the 20th century, a new philosophy called **postmodernism** came in with some powerful criticism of logical positivism and all modern philosophy. The most familiar names associated with postmodernism are Michel Foucault and Jacques Derrida.

Postmodernism started in architecture, when some young architects in the late 1900's rebelled against what their teachers told them about "right" and "wrong" ways to design buildings. Their teachers at the time were mostly modernists, who liked clean lines and pure geometric forms, such as we see in many modern skyscrapers. So the rebels started calling themselves postmodernists. Before, the emphasis was on keeping with one architectural philosophy or another, one style or another. The postmodernists said break the rules! mix up the styles! play with space! defy gravity if you like!

In philosophy, modernism refers to enlightenment philosophy. Back then, philosophers were seeking a single, monolithic Truth. But, beginning with Hume's skepticism and Kant's critical philosophy, philosophers became increasingly aware of the limitations of philosophy. Although often hidden by the popularity of approaches such as Hegel's absolutism and Comte's positivism, this skeptical or critical line of thought continued all the way through the 1800's to Nietzsche's perspectivism and William James' pragmatism.

The fundamental point of postmodernism is that there is no objective reality or ultimate truth that we have direct access to. Truth is a matter of perspective or point-of-view. Each individual constructs his or her own understanding of reality, and no one is capable of rising above their perspectives.

In the course of history, some constructions of reality have been **privileged**, that is, supported by a powerful elite – wealthy European men, to use a common example. Other constructions have been suppressed. Examples of suppressed constructions include the points-of-view of women, the poor, and nonwestern cultures.

Everything is seen through "glasses" – social, cultural, even individual. Even science! Thomas Kuhn, a philosopher of science, pointed out that science is actually a messy business, full of personal, cultural and even political influences. "Truth" is whatever the scientists presently in power say it is – until this status quo is overwhelmed by contradictions. Then a scientific "revolution" – a **paradigm shift** – takes place. And things start all over again.

The major tool of postmodernism is **deconstruction**. Deconstruction is when you show that some system of thought is ultimately incomplete or irrational even by its own internal ideas and reasoning. It's like an extended version of "reduction to absurdity" – criticism from the inside out. Or you can see it as an extension of nominalism: names refer to individuals, but words that pretend to refer to anything more (universals,

ideals, forms, natural laws, Ultimate Truths...) are just empty noises!

By deconstructing some of our traditional philosophies, histories, literatures, and sciences, postmodernism made us aware of the biases we can't easily see because those biases are too close to us, too much a part of us. This has been the task, for example, of **feminism**.

Feminism began as a call to take women seriously. After eons of women's lives being seen as little more than a footnote to men's, it is way past time to pay attention to them both as subjects of serious interest and as thinkers in their own right!

Feminists say that being male unconsciously biases men as philosophers (or historians, scientists...). If we want to improve our understanding of our world, we need to take the female perspective into account. These are very good points!

Another postmodernist movement is **multiculturalism**. It is argued that western thinkers are unconsciously biased by their common cultural assumptions, social structures, and histories. For many years, for example, there has been a tendency to see Europeans and their descendents as somehow "normal," with other peoples and civilizations in some way inferior or deviant.

Today, most social scientists are well aware of other cultural perspectives, and are careful to examine their own biases. Social science generally has welcomed the contributions of a constantly expanding number of scientists from non-western backgrounds.

A bias that interests me is the bias that comes from **class**. Until very recently, the majority of scientists and other scholars have been members of the upper classes, with little sympathy for, much less understanding of, the working class poor. Even today, we have to ask ourselves, who do we as scientists work for? More often than not, it is for establishments, academic or corporate. We do, consciously or not, what our lords demand of us!

Unfortunately, some argue that the view from the lower rungs of society are actually better than those from the top. Similarly, some feminists have argued that the female perspective is intrinsically better than the male perspective. This point of view ignores the possibility that men may overcome their biases, and the possibility that women can be equally biased. We find the same tendency among advocates of other critical philosophies. It is not, for example, necessarily true that if a theory is clearly European it is wrong, or if it is non-western it is right. And even someone who does research for multinational corporations can occasionally be correct! Okay, probably not.

Furthermore, not all perspectives are equally valuable. Astrology and phrenology may be perspectives on personality, but they are, in fact, wrong! The explanations of human behavior given by Siberian shamans, although certainly interesting, are not anymore likely to be accurate than the explanations provided by Europe's own early thinkers.

Deconstructionism and postmodern philosophies in general tend to be negative philosophies. They criticize, but seldom offer alternatives. Their arguments often lack empirical support or even rational thinking: Remember that they are criticizing our very ability to be empirical or rational!

At first, traditionalists were impressed and became interested in recognizing their limitations. Men as well as women became feminists; westerners as well as others embraced multiculturalism. Most welcomed the variety of perspectives!

But eventually, some noticed: If all truth is relative (just as if all morality is relative), then feminism, multiculturalism, etc. are not intrinsically truer or more valuable than "masculinism" or Eurocentrism, etc. If we can't make judgments as to what is or isn't True, then how can we progress? How can we improve ourselves and our societies when "progress" is all in the eyes of the beholder?

If you believe that all perspectives are equally valid, then the only thing that raises one perspective over any other, as Nietzsche pointed out, is power. If philosophy and science are reduced to power struggles among "authorities," we are right back where we were on, say, February 17, 1600, when the church burned

Giordano Bruno at the stake.

So, once we become aware (and stay aware!) of our limitations and biases, aware even of the limitations of empiricism and rationalism themselves, we must nevertheless return to empiricism and rationalism, as the only way we can at least approximate truth, perhaps as the only way we can survive as a species. We must learn our lesson and then get back to work!

The Situation for Psychology

So where are we today, in the first years of the new millennium?

Freudianism is slowly disappearing. Its insights have been absorbed into a general clinical psychology that is dominated by humanistic practices based more on Carl Rogers and Albert Ellis than on Sigmund Freud. The object relations school attempts to hang on to Freud, but is really little more than a belated recognition of humanist ideas, reconstructed into psychoanalytic language. Jungian psychology, too, is disappearing. Jung still lives on in the study of mythology and symbolism and in the amazing popularity of the Myers-Briggs categories. Adler, on the other hand, has been "rediscovered" and his insights thoroughly integrated into humanistic and existential psychology. The same can be said for "neo-Adlerian" theorists such as Karen Horney and Erich Fromm.

Sensation and perception, the concerns of most of the originators of psychology as a science, draw less and less attention over the years. Gestalt psychology has, for the most part, been absorbed into the mainstream and lost its status as a separate approach. Its two offspring, humanistic clinical psychology and the field of social psychology are, of course, alive and well. Humanistic psychology forms the bedrock of modern clinical practice, especially in the form of an eclectic blend of Rogers and Ellis (despite their outward incompatibility!), plus a few behavioristic techniques such as systematic desensitization.

Social psychology has become a blend of humanistic concerns and inventive experimental research. Unfortunately, it has rejected its phenomenological roots, and there is little in the way of coherent theorizing or long-term commitment to research programs. Much of social psychology is a matter of testing disconnected, intuitive hypotheses.

Other disciplines, such as personality and developmental psychology, follow the same pattern as social psychology. Not only is there little in the way of theorizing in personality, but the trend is toward quantitative research, almost all of it devoted to individual differences. The pet paradigm is test creation using factor analysis, despite the fact that factor analysis is a highly suspect methodology that may well relate more to word meanings than to constructs with real psychological referents.

Developmental psychology has become increasingly applied, especially, of course, in relation to education and parenting. One advance is the movement towards consideration of the entire life span. This change also has close ties to applied areas, this time the social problem of an increasingly elderly population.

Phenomenology as a method has become a part of a more general movement usually referred to as qualitative methods. These methods have become popular in certain fields, especially education and nursing, and in certain orientations, such as feminism and multiculturalism. Unfortunately, the methods are often poorly used. They are by nature far more susceptible to bias, and much of the research can only be taken as exploratory at best.

Existentialism has fused with humanism, sometimes contributing its philosophical depth, sometimes merely adding its confusing jargon. Many existentialists and humanists have drifted into the realm of transpersonal psychology, which investigates issues such as altered states of consciousness and spiritual experiences. Although there is legitimate and valuable research here, most of it is a form of new age mysticism in the guise of psychological science.

Behaviorism, much like gestalt psychology, has been absorbed into mainstream psychology. While students continue to memorize Pavlovian and Skinnerian conditioning paradigms, it is increasingly understood that these are not particularly useful for understanding human behavior. It is really Tolman and Bandura that appear to be having the long-term impact. Hard-core behaviorists are moving into the study of physiological processes.

The most disappointing area of psychology for me personally has been cognitive psychology. While it began promisingly with the works of psychologists like Ulric Neisser and the input from the artificial intelligence movement, it seems that both Neisser and AI researchers have abandoned the program! Neisser felt that cognitive psychology was ignoring reality and is becoming a sort of intellectual game. AI researchers found that it simply wasn't necessary to model human cognitive processes in order to outdo human performance. When the Deep Blue computer beat grand master Garry Kasparov, humanity's secure place at the top of creation seems to have ended.

One offshoot of cognitive psychology is a new interest in such traditional philosophical issues as the nature of consciousness. Often considered the "ultimate" psychological question, it has generated a great deal of excitement at conferences. I may be alone in this, but the problem of consciousness is not a problem for me. It is only a problem if you insist, against all reason, on being a materialist!

The most active part of psychology today is physiological psychology. First, the remarkable progress in mapping even the living, working brain with CT scans, PET scans, and MRIs will soon result in a fairly complete picture of brain circuitry. Second, the discovery of effective new drugs operating at the synapse has revolutionized clinical psychology. And third, the completion of the mapping of the human genome heralds the beginning of a far more thorough understanding of the links between genetics and behavior. On the other hand, physiological psychologists are identifying themselves more and more with their biological and medical colleagues, and distancing themselves from the "softer" side of psychology.

Related to the developments in physiological psychology is the impact of sociobiology on psychological theory. Often called evolutionary psychology, this approach has produced a significant number of intriguing hypotheses about the origins of human behavior and the existence of possible instincts that delimit, if not define, our natures. Unfortunately, the approach has offered little in the way of testable hypotheses as yet.

As it stands right now, psychology is fragmented, with a particularly large divide between humanistic applied psychology and a highly reductionistic biological psychology. What is needed is a unifying theory, one that avoids the easy extremes. It has to be informed by postmodern criticism, but must ultimately base itself on a broad empiricism and rigorous rationalism. It has actually been done before: William James did it in the 1890's; so did Gardner Murphy in the 1950's. Apparently, the field was not ready to recognize the full implication of their efforts and others like them. Maybe we will be ready next time.

In the meantime, courses in the history of psychology (however painfully boring they may be!) have an important place in our educations: By looking at things from the big, historical perspective, and from the "aspect of eternity" we get by studying philosophy, perhaps we will have progress in psychology sooner rather than later.

See you in the future!

– George Boeree



The History of Psychology

Part One: The Ancients

Part Two: The Rebirth

Part Three: The 1800's

[<http://www.ship.edu/%7Ecgboree/historyofpsych.html>]