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HANS BERGER (1873–1941)

With a physician father, a much quoted poet grandfather
(Rücker), and a mother who read books on the relationship
of mind and body, Johannes Berger seems to have been or-
ciented by heredity toward the study of that strange alchemy
by which the brain turns physical energy into psychic function. Moreover, there was something metronomic in his circadian rhythm:
both for work and for leisure the synchrony of his days was phased
to the exact minute.

As he was born in Neuses near Coburg (Thuringia), the closest
university was at Jena, and so it was natural that this should be
the geographical center of his life work. In 1900 he joined the psy-
chiatric clinic as assistant to Otto Binswanger (1852–1929), where
Oskar Vogt and Korbinian Brodmann were also assistants. The
ideas of these two men on localization of brain function found an
absorbed listener in Hans Berger. In 1906, he was made Ausserord-
dentlicher Professor to the University, in 1912 physician-in-chief
at the clinic. In spite of the objections raised that he was a “true”
psychiatrist, he was named successor to Binswanger in 1919. He
even served as Rector of the University in 1927–28 and as Prorector from 1935 to 1938, when he became Professor Emeritus.

His publications show how sharply he focused on what he considered the central problem of psychiatry—the physical basis of psychic phenomena. His more important contributions were on intracranial blood circulation,\(^1\) bodily manifestations of psychic states,\(^2\) psychophysiology,\(^3\) and the temperature of the brain,\(^4\) the latter of which had been recorded through the intact and the perforated skull for diagnostic and "psychophysiological" purposes, beginning with Broca and Lombard, and Schiff and Mosso in the 1870's.

But the studies which crowned Berger's career were based on electrical recordings, the electroencephalogram of man. Berger was

Portrait, courtesy of Dr. Frederic A. Gibbs, Chicago, Illinois.
fully aware that Richard Caton (1842–1926), a Liverpool surgeon, had succeeded in 1875 in leading off action potentials from the brains of animals (rabbit and monkey), and that he was thus the discoverer of the electrical activity of the brain. Berger also knew of the further successes along this line achieved by the Polish physiologist Adolf Beck (1833–1939) in 1891, and of the findings of Russian workers. In 1902 Berger noted the “spontaneous” fluctuations in the electrical activity of animal brains which these other workers had reported, but he was unable to detect a change on sensory stimulation. Failure after failure to evoke an electrical response in the animal brain came over the next eight or ten years. In 1912 a paper by the Russian physiologist, Pravdich-Neminsky (1879–1952) for the first time illustrated a photographic record of the electrical activity of the brain. He called it an “electrocerebrogram.” Berger’s reaction to this demonstration was that he should work harder.

During all these years Berger’s experiments were carried on in his spare time in utter secrecy. Never did he mention what he was doing, nor would he ever admit anyone to the laboratory located in a small building on the grounds of the clinic in which he worked. As a diversionary measure he would give public discourses on telepathy, in which he was a firm believer, offering hypotheses of wave propagation to explain it. Increasing inflexibility in his attitude toward his assistants went hand in hand with his increasing isolation, so that people began to shun him.

In 1924 Berger made the first EEG recording in man (he called it an “Elektrenkephalogramm”). He did this not only in normal subjects but also in the brain-injured, thereby laying the foundation for the application of the technique to clinical neurology. In the following year, using a Siemens double-coil galvanometer, he found a decrease in activity on sensory stimulation—thus duplicating the results obtained by Beck and Pravdich-Neminsky in animals and he also found the counterpart of two of Pravdich-Neminsky’s categories of waves, the alpha and beta ranges. Still he kept his discoveries totally in the dark. His paper announcing that variations in voltage could be recorded through the intact cranium appeared in 1929, five years after he had conceived the idea. The others that followed were also epoch-making.
Although at first the importance of his work went generally unrecognized and was even ridiculed, he was reserved but undismayed, and greatly pleased when in 1937 he was invited to preside with Adrian at the symposium on electrical activity in the nervous system at the Congress of Psychology in Paris. They hailed Berger as the most distinguished of all the visitors. Tears came to his eyes as he said: “In Germany I am not so famous.” Plans were made to have him visit the United States to inspect laboratories where electrical studies on the brain were in progress and to lecture on his work. He began to polish his English, and wrote: “I will come as soon as the international situation permits.”

As a front-row witness of the rise of Hitler and World War II, and forced by old age merely to wait and watch, he decided in a fit of melancholia—to which he was subject—that he had seen enough and on June 1, 1941, ended his life. He had entered the hospital on the medical service, and terminated his existence by hanging.

To his psychodynamically oriented fellow-psychiatrists Berger seemed unimaginative and plodding; they were inclined to patronize him. To his students he seemed rather dry and aloof, except on occasions when he would storm and fume if their knowledge of the fundamentals of neuroanatomy was inadequate. Such were the attitudes toward a scholar who was one of the greatest innovators of all time.

Hans Berger is called the father of electroencephalography. He was also a founder of psychophysiology.

CHICAGO, ILLINOIS

FREDERIC A. GIBBS

References


CLAUDÉ 3RD (1813-1878)

Claude Bernard, an old farmhouse in St. Julien (Rhône), a carefully preserved monument. It stands to this day as the retirement house of each summer of his retirement to the experiments in an improvised lab. He looked over the results of the work he had done, the advance for the science of experimental medicine, and its philosophical implications.

When he had had his elementary education in the local schools he went to work for a pharmacist in nearby Lyon. The composition of a romantic drama in his leisure moments led him to try his hand at authorship in Paris; but when he showed his efforts to a prominent literary critic in the capital, he was advised to return to a career more nearly related to his experience as a pharmacist’s assistant. It was not until he was thirty that he obtained the M.D.

The great influence in his life was François Magendie (1783-1855), who may be termed the father of experimental physiology in France. Magendie was Claude Bernard’s sponsor and patron from the younger man’s student days to the older scientist’s death, when he bequeathed his chair of medicine at the Collège de France to his assistant who, by that time, was giving the courses for him. Although Claude Bernard held a professorship of general physiology first at the Sorbonne, and later at the Muséum d'Histoire Naturelle, his heart really belonged to the Collège de France where Magendie and he had worked so long together. In the course of his life he touchéd with an illuminating hand almost every phase of physiology, so that Pasteur characterized him not as a physiologist but as physiology itself.
The FOUNDERS of NEUROLOGY

One Hundred and Forty-Six Biographical Sketches
By Eighty-Eight Authors

Compiled and Edited by

WEBB HAYMAKER
Senior Scientist
National Aeronautics and Space Administration
Ames Research Center
Moffett Field, California

FRANCIS SCHILLER
Associate Clinical Professor of Neurology
Lecturer in History of Health Sciences
University of California Medical Center
San Francisco, California

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