

ON THE HISTORY OF THE C. AND O. VOGT INSTITUTE FOR BRAIN RESEARCH

Ursula Grell

FROM THE C. AND O. VOGT INSTITUTE FOR BRAIN RESEARCH AND THE C.
AND O. VOGT-ARCHIVES, HEINRICH HEINE UNIVERSITY DÜSSELDORF,
GERMANY

The initials C. and O. stand for the husband and wife team Cécile Mugnier (1875-1962) and Oskar Vogt (1870-1959), whose biographies are unseparably linked with the design of the Institute. Their work coined the expression „Hirnforschung“ (Brain Research) which reflects a network of international scientific endeavours and contemporary history of remarkable complexity.

The spectrum extends - over and beyond the classical neuroanatomical and medical issues - from politics via philosophy and literature, from biology and psychology to psychotherapy and psychoanalysis. The growth of the Institute took place during a period of social and political upheaval, beginning with the Wilhelminian Empire and spanning the Republic of Weimar, Nationalsocialism and Allied Occupation to, finally, the two German States in the era of the Cold War. A glossary of central problems of our century could be compiled:

socialism and industrial expansion, population politics dominated by eugenics and racial research, neodarwinism and genetics, experiments as the basis of research and ethics in science, international transfer of scientific findings and interdisciplinary concepts, women's presence as scientists in universities - directly or indirectly, the Brain Research Institute was involved. Looking back upon the development of the Vogts' Institutes one discovers a fascinating example for the establishment of a new rapidly expanding branch of research that excited scientists and politicians throughout the World with its immanent option of "progress". Thus a vivid illustration to the innovative organisation of science is given, a process which began at the turn of the century. Independent of traditional research centers within universities and academies private and state funds were raised to finance research institutions that promised to support relevant social claims with their findings.

In 1898 O. Vogt founded his first institute with private funds in an apartmenthouse in the western part of Berlin, the Neurological Center (Neurologische Zentralstation). As a result of his preoccupation with two at that time vehemently debated issues, the theory of evolution and the question of the body-soul relationship (today one might say mind-brain relationship) he designed an epochal program for the new field of Brain Research. Expanding our knowledge of anatomy and physiology of the brain was seen as one of the

Key words: Science, History, Brain research

most important tasks of the new century. Vogt regarded anatomy, apart from its descriptive approach, as a basis for understanding the brain's functions. These functions manifest themselves in psychic symptoms and he therefore demanded psychological studies parallel to the anatomical ones. He and his wife, Cécile Vogt-Mugnier, dedicated their lives to the pursuit of knowledge on structure-function interrelationships. The future of man depends on the development of his brain they stated. In another citation, O. Vogt stresses that the brain is the organ that makes a human being what he is. Only skilled specialists of different proveniences would be able to analyse such a complex system and they needed institutes newly created and separate from the universities. A central collection of standardised research "material" - complete serial sections of human and animal brains, both normal and pathological of various ages - combined with the availability of the most modern methods was considered as essential. Thus casuistic approaches, the use of techniques which would make comparisons impossible and the probable loss of unique brains should be avoided. With these prerequisites O. Vogt was a step ahead of the demands of the Brain Commission to which he was never elected a member. Initiated by the anatomist and founder of the theory of neurons, Wilhelm His of Leipzig, this international organisation was established in 1901. It existed up to the outbreak of World War I. It was the aim of this commission to convince the respective governments of the necessity of an international network of brain research and to motivate them to set up appropriate laboratories.

Changing its name to Neurobiological Laboratory (Neurobiologisches Laboratorium), the Vogt-Institute was integrated into the Physiological Department of the University of Berlin in 1902. Nevertheless it did not leave the apartmenthouse nor did it alter its original character. Relations to the faculty were tense, research funds limited. The Vogts financed the Institute mainly with their own income from their psycho-neurological practice which was based on the application of hypnotherapy. Introduced to hypnotism by the Swiss psychiatrist and brain researcher Auguste Forel, O. Vogt turned out to be a talented therapist. In the years between 1895 and 1900 several of his theoretical studies were published which made him known as the founder of "scientific" hypnotism. His work laid the cornerstone for autogenous training. Cécile Vogt was concerned with psychological problems as well; her ideas on the causes of neuroses did not always agree with the psychoanalytical theories of the times. She saw neuroses to be a result of "dysamnesia", i.e. the inability to forget, and not solely the result of suppression. The Vogts' success in psychotherapeutic treatment made their home a sought-after address and attracted a financially potent clientele of aristocracy and members of the upper class, of scientists, diplomats and artists. By his medical activities O. Vogt came to know the industrialist couple Friedrich Alfred and Margarethe Krupp. For two generations the House of Krupp was a reliable sponsor and political supporter with far-reaching influence and helped secure the status and development of the Institute. A donation from the Krupps and the awakening interest of the Emperor Wilhelm Society for the Advancement of the Sciences (Kaiser-Wilhelm- Gesellschaft zur Förderung der Wissenschaften) led to the founding of the Emperor Wilhelm Institute for Brain Research (Kaiser-Wilhelm-Institut für Hirnforschung - KWI) in March 1914. Plans for a new building included merging the Brain Research Institute with the Physiological Institute of Emil Abderhalden and the integration Department of Psychiatry. Due to World War I and the following period of financial chaos, the project had to be

postponed for several times. In the old rooms of the Neurobiological Institute that had been incorporated into the KWI to form a double Institute under the directorship of O. Vogt, capable co-workers such as Korbinian Brodmann, Max Bielschowsky, Max Lewandowsky and Maximilian Rose continued research with the Vogts on several basic questions.

Their findings on myelogenesis, that was seen as a criterion with which to assess the differentiation of the cerebral cortex, led to a heated discussion concerning the „fibres doctrine” presented by the psychiatrist Paul Flechsig of Leipzig. The Vogts’ criticism was focused mainly on Flechsig’s classification of his projection and association fields that he based on the chronology of myelinisation. In order to substantiate their arguments, the Vogts studied the fibre systems in the cat cerebral cortex. This work led to the dissertation of Cécile Vogt and to the beginning of architectonics, a topic central to the Vogts’ research from then on. In teamwork with Brodmann they examined the structures of the cerebral cortex and the thalamus, striving to find significant areal differences in arrangement and staining properties of the neurons and nerve fibres. By using low powers of magnification they were able to discriminate a vast number of areas, each with its own characteristic pattern of neurons and fibres. The terms „myeloarchitectonics” and „cytoarchitectonics”, referring to myelin- and Nissl-stained sections were defined. Brodmann titled the publication (1909) of his cytoarchitectonic observations "Comparative Localisation Theory of the Cerebral Cortex" („Vergleichende Lokalisationslehre der Großhirnrinde”). In the same year Cécile Vogt published her monograph on the myeloarchitectonics of the thalamus of cercopithecids. The reports on the myeloarchitectonics of the frontal and parietal lobes by O. Vogt followed in 1910/11. A summary of these findings, which appeared in 1919, discussed the homologies of both the cyto- and the myeloarchitectonical layers. The Vogts were attempting to precisely locate those regions in the cerebral cortex that are activated in connection with specific brain functions. Thus the Vogts belonged to the that part of the scientific community which satisfied the materialistic imperatives of the natural sciences of the times. The idea of analysing a psychophysical entity by splitting it into subunits also motivated their experimental work on cortical electrostimulation during the years 1903 - 1918. They presented their first findings to the public in 1907. The Vogts and their colleagues carried out electrical stimulation experiments on the cortices of 150 monkeys belonging to different species and then correlated the motor effects with data of architectonic analyses. In 1919 they compiled their findings in a physiological-architectonic map of the brain. Other neuroanatomists have noted the astonishing correspondence between O. Vogt’s sketch of a human hemisphere onto which he had transferred the results from the experiments on monkeys and maps of the human cerebral cortex drawn after surgical stimulation noted by the neurosurgeon Otfried Foerster of Breslau. The Vogts discovered the phenomenon of cortical suppression which occurs when two cortical areas are stimulated simultaneously.

Another important field of research was the examination of motor disturbances brought about by lesions in the extrapyramidal system. While studying the cause of infantile pseudo-bulbar paralysis, Cécile Vogt rediscovered the so-called „status marmoratus” already described by Gabriel Anton in 1896. Whereas Anton’s paper had not attracted the attention of his fellow scientists Cécile’s report (1911) on this syndrome, which affects the corpus striatum, aroused a lively discussion on the pathology of basal ganglia,

the functions of which were largely unknown at the time. The Vogts' classical monograph about the diseases of the striatal system appeared in 1920. Among others topics the book contained morphological descriptions of severe disorders such as Huntington's Chorea or Paralysis agitans. The term „striatal system” was chosen because the Vogts had established that the striatum - consisting of the putamen and the nucleus caudatus - is the highest subcortical center of this motor system.

The twenties marked a decade of expansion for the Vogts and their research projects. In 1922 they defined their theory of pathocllisis under the title "Diseases of the Cerebral Cortex in the Light of Topistics, Pathocllisis and Pathoarchitectonics" („Erkrankungen der Großhirnrinde im Lichte der Topistik, Pathokllise und Pathoarchitektonik"). Diseases of the nervous system, like other biological processes, are based on structural entities which they called topistic units. If an organism is exposed to an injurious factor, only certain parts of it respond by pathological alterations. They called this tendency to express pathological effects pathocllisis. The Vogts assumed that specific physico-chemical characteristics of the topistic units are the cause of the phenomenon. Further publications contributed to this idea with more examples of pathoclline diseases of the CNS. They concentrated their efforts on the studies of the cortex and the area of basal ganglia as well as on registering pathological changes in the hippocampus or reactions of the pallidum to intoxication with carbon monoxide. Vogt saw an analogy to the principle of specific chemical structures within the topistic units of the brain in the genetically determined variations in the arrangement of body parts in insects. In an attempt to create a synthesis of medical and biological knowledge, Oskar Vogt thought of diseases as special forms of variation.

In 1925 an exceptional chapter of Russian-German history of science began with Oskar Vogt's appointment to Moscow. There he supervised the examination of Lenin's brain during several visits, completing the project with a preliminary report of his results in 1929. Strongly supported by soviet ministries as well as the Communist party and with the consent of the German Government Vogt founded the State Institute for Brain Research. Until 1930 he was its director, trained Russian researchers in architectonics in Berlin and initiated a collection of sections consisting of the brains of various soviet ethnic groups. The collection was to provide material for registering racial differences by means of morphological methods. This project was undertaken in cooperation with the Department of Racial Research and received German financial support until 1933. The inauguration of the imposing KWI for Brain Research (KWI für Hirnforschung) in 1931 marked a climax in the Vogt's careers. The interdisciplinary research ideas they had proposed at the turn of the century were realised in the creation of several departments. In addition to the large department for architectonic studies consisting of Anatomy (C. Vogt) and Histology (M. Bielschowsky), the departments for Electrophysiology (A. Kornmüller), Electrotechniques (J. F. Tönnies, who constructed the first apparatus for the direct registration of brain waves), Physiology (M. H. Fischer), Chemistry and Pharmacology (Marthe Vogt), Human Genetics (B. Patzig), Experimental Genetics (N. and H. Timoféff-Ressovsky), Experimental Variation Studies (S. and R. Zarapkin, E. Tenebaum), Psychology (W. Hochheimer, I. Leux) and Phonetics (E. Zwirner) were opened. Affiliated to the Institute were clinical wards of 60 beds to exclusively serve the research programme (G. Soeken). The project, which attracted international attention was financed as a joint venture

by the Kaiser-Wilhelm-Gesellschaft and the Rockefeller Foundation as well as by the German Empire, the Prussian State, and the City of Berlin. As early as 1928 Oskar Vogt had arranged a contract of cooperation with the Berlin magistrature in which he was granted the right to examine any psychiatric or neurological patient being treated in a municipal asylum provided the patient consented. This arrangement determined the location of the new Institute in the immediate neighbourhood of the largest clinics situated in the peripheries of Berlin. An additional provision guaranteed that after their death the brains of those patients would be sent to the KWI by the psychiatric hospitals. The fact that these generous options were granted by the public health administration was a novelty that can only be understood in connection with the political motives of the social hygiene programs of the time. Irrespective of ideology or nationality, established scientists and medical doctors had put forth eugenic concepts and promoted their practical application long before national socialism instituted selection and killing programs. It is not incidental that psychiatrists and gynaecologists, and later on geneticists as well, were responsible for the basic and radical impulses on eugenics. In Berlin-Buch as well as in Moscow so-called elite brains were collected in an effort to find the morphological substrate for outstanding talents in the sense of intellectual achievements and psychic endowments. Scientific interest turned necessarily also to the so-called degenerated types, a fact that is documented both in the collections of brain slides and in the publications referring to them. Developing eugenic methods with which biologically prevent mental insanities and crimes on the one hand and the possibility of achieving genetic betterment of the human race ("Höherzüchtung des Menschen", Oskar Vogt) on the other were considered valid research undertakings, also within the KWI. It would be short-sighted to confuse the Vogts' personal disputes concerning the ideology and racial policies of the national socialists, which indeed led to massive intrigues against them and finally to the dissolution of Oskar Vogt's lifelong contract with the Kaiser-Wilhelm-Gesellschaft in 1936, with the scientific discussions of the period.

The establishment of the German Brain Research Company (Deutsche Hirnforschungsgesellschaft), funded by the Krupp family and the Vogts' own capital, enabled them to set up their Institute for Brain Research and General Biology (Institut für Hirnforschung und allgemeine Biologie) in Neustadt 1936/37. The location of the small town was conveniently close to the Swiss border as well as to the universities of Fribourg, Basle, Zurich and Strasbourg. There the Vogts and their co-workers were relatively safe from national socialist interventions or bomb attacks. It was possible for them to help some of their Jewish colleagues before these could emigrate. During the French Military Government and the first decade of the Republic of Germany the Institute was confronted with financial problems. More often than once the Vogts considered relocating the Institute with the collection of brain slides, regarded as unique, to a foreign country. After the failure of extensive negotiations with the ministries of Baden and the Max Planck Society (Max-Planck-Gesellschaft) which functioned as a legal successor to the dissolved Kaiser-Wilhelm-Gesellschaft, the Medical Academy of Düsseldorf acquired the Institute in 1965 with the help of a donation from Thyssen. In 1971 the Institute, under the directorship of Adolf Hopf, moved to the new campus of the University. Today it is still located there and bears the official name C. and O. Vogt Institute for Brain Research (C. und O. Vogt-Institut für Hirnforschung). Since 1991 Karl Zilles is director of the

institute. Both the slide collection and the archives are stored there. The Vogts continued their work on the architectonics of the thalamus in Neustadt during World War II. During the post-war years they employed new histochemical techniques to answer questions on the cytological details of neurons. They examined the nucleolus of nerve cells and its role in regenerating the Nissl substance. They explored the process of ageing in the brain and maintained that activity delays ageing. Their own continuous scientific work spanned their entire lives and seems to prove this assertion. The last project begun by the Vogts and their co-workers was conceived with the aim of gaining insights into the histopathological morphology of schizophrenia, an approach to the problem which is still as controversial as it was then. The Vogts edited the Journal for Hypnotism, suggestive Therapy and Theory and adjoining psychological Studies (Zeitschrift für Hypnotismus, Suggestionstherapie, Suggestionenlehre und verwandte psychologische Forschungen), which in 1902 became the Journal for Psychology and Neurology (Journal für Psychologie und Neurologie), and in 1953 was renamed Journal for Brain Research (Journal für Hirnforschung). Nearly all of their papers were published in these journals. It is beyond the scope of this short overview to deal with all aspects of historical and scientific interest. Cécile and Oskar Vogt as well as their research work deserve an in depth examination from the perspective of the closing century.

REFERENCES

1. Vogt, Cécile and Oskar, Scientific papers, preserved in the C. and O. Vogt Archives, Heinrich Heine Universität, Düsseldorf.
2. Hassler, Rolf, Cécile und Oskar Vogt. In: Kollé, Kurt, Große Nervenärzte (Famous Neurologists), Thieme Verlag, Stuttgart 1959, Vol. 2, pp. 45-65. Hopf, Adolf, Oskar Vogt. 100th Anniversary of his Birthday, J. Hirnforsch. 12, 1-10 (1970) Wahren, Waldemar, Oskar Vogt 6. 4.1870 - 31. 7.1959, Dtsch. Zschr. Nervenheilk. 180, 361-380 (1960).

Photographs: Nos. 94, 205, 217, 257, preserved in the C. and O. Vogt Archives, Heinrich Heine Universität, Düsseldorf.

*Received 29.07.1996.
Accepted 10.08.1996.*

EDITORIAL NOTE

It is a great pleasure to introduce C. and O. Vogt Institute for Brain research in Düsseldorf, Germany, one of the most famous in Europe. The Institute is founded 1898 in Berlin by Oskar Vogt. It is less known that Korbinian Brodmann has performed his fundamental research on cytoarchitecture in this institute. The Institute has changed location twice, first it was 1936 (Neustadt - Schwarzwald). Since 1971 the Institute is located in Düsseldorf as a part of the Heinrich Heine University. The Head of the Institute in period from 1960 to 1988 was Prof. dr A. Hopf.

The Head of C. and O. Vogt Institute for Brain research and Head of the Institute of Anatomy since 1991 is Prof. dr Karl Zilles. Prof. dr Karl Zilles studied Medicine at the Universities of Tübingen and Frankfurt (1963-1971). Postdoctoral studies have accomplished at the School of Medicine in Hanover (1971-1977) with habilitation in studies of spontaneous nerve cell death during brain development. In 1977 he became Postdoctoral and Associate Professor at the University of Kiel. The time from 1981 to 1991 he spent as a Head of the Institute of Anatomy at the University of Cologne. His main scientific interests are mapping of the human brain, transmitter receptors and cortical circuitry in the human cortex.