

# A Psychiatrist's Remarks on the Significance of Basic Research in Neurobiology for Psychiatry

## The Work of Detlev Ploog

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Behavior and experience are the pre-eminent levels of description reflecting the information needed by the psychiatrist for the diagnosis and treatment of his or her patients. This is supplemented by data from the life history, the objectified course of mental disorder, and the stages experienced over a lifetime of development. The psychiatrist, therefore, is continually confronted with very complex data originating in the human existence of his or her patients and in the world of common human experience. Over time, a communicable language of observation has gradually been developed. On the above-mentioned levels of description we are now capable of achieving a reliable inter-subjective understanding – thanks to numerous documentation systems. What we want to say can be operationalised, at least to a certain degree. Nevertheless, the basis for diagnosis and therapy remains complex, and whatever is recorded on these descriptive levels is still ambiguous.

For just this reason, a need has existed ever since Wilhelm Griesinger established psychiatry as a medical science to find a less equivocal basis beneath the complexity of observable events in a disturbed mental life e.g. disrupted cerebral processes. However, although relating the behavior of the living organism to observable brain processes may be one way for psychiatry to use the methods of natural science to close in on the complex findings of mental disorder, the qualitative jump from material brain processes to subjective experience is accessible to this methodology only indirectly, by analogy. But although the subject of behavior and brain activity does indeed involve a perspective that over-simplifies the complex reality of psychiatric syndromes, nevertheless the possibility of manipulating brain processes in animal experiments promises deeper insight into the relationships of the living organism and its systemic organisation or its pathological changes. Detlev Ploog recognised this at the outset of his scientific endeavours, and he has dedicated his life's work to this basic research.

In looking back over these achievements, we must consider the situation of psychiatry in Germany after the last World War. Following the darkness of National Socialism, the first steps taken in this country did not follow the perspective of biological, empirically recordable events. On the contrary, they proceeded from the descriptive levels mentioned above

toward an anthropological understanding of the psychiatric syndromes, under the influence of existentialist philosophy. These first attempts at achieving a new understanding were characterised by a certain arbitrariness of reasoning. Therefore, they could not satisfy a psychiatrist oriented to clinical practice and empiricism.

Even Ploog's earliest efforts betrayed his interest in biological aspects of psychiatry, such as the significance of sleep research for understanding endogenous psychoses or the meaning of motor stereotypes in the disintegration of human behavior. These contributions must be seen in the context of the existentialist and anthropological streams prevailing in German psychiatry at that time in order to appreciate the courage and persistence with which Detlev Ploog moved step by step toward the realisation of a psychiatric laboratory for experimental behavioral research at the German Research Institute for Psychiatry, later supplemented by the establishment and reorientation of the clinical institute. This was preceded by 2 years of work with MacLean in the field of neurophysiology and experimental behavioral research, during which Ploog studied the cerebral organisation of communicative behavior patterns in monkeys for the first time.

The idea of systematically investigating communication processes in the social network of a related animal species and, in a manner of speaking, of illuminating the phylogenetic background of communicative disturbances in the mentally ill was a daring undertaking, requiring not only great foresight and an extraordinary grasp of the problem, but also optimism with regard to possible convergence in the modern scientific landscape with its increasing specialisation. This endeavour also meant forgoing rapidly applicable scientific results.

Today perhaps the greatest benefit for empirical psychiatry is that, in addition to the ever more subtle refinements of quantitative behavioral observation under phylogenetic aspects, an outstanding inter-disciplinary, systematic and quantitative methodology for observing the psychiatric patient was also developed for clinical practice by a group of colleagues who followed the impulses of the initiator, producing practicable and pioneering observational procedures. In the last few decades many reciprocally stimulating impulses have emerged in this context, some of which appear in the following contributions. They can be subsumed under the heading of communication research, and they show how even highly specialised partial results open up a perspective that allows a

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presentiment of the significance inherent in expressive signals in the most varied contexts; not only for communication with another member of the same species, but also for the ontogenetic development and perfection of the human organism. This includes the structure and dynamics of early communication and their relationships to speech development in man as well as the detailed neuropsychological findings on speech disorders.

Since it is a particularly illustrative example of a clarification of brain processes and communicative behavior, I would just like to mention the anatomical and physiological analysis of the system of brain structures involved in the phonation process. They begin with the physical analysis of meaningful vocalisations and their categorisation as signals for other members of the species, and they lead to identification of the functional elements existing on different levels of cerebral structure: from the representation of laryngeal muscles, and the level of the mood- or motivation-related specific production of the signal and the related systems determining the organism's motivation, up to the highest level, represented by the volitional use of the voice and the drive to express oneself vocally. This example reveals the limits for comparing animal and human behavior, as the results of Ploog's research show that "man alone, due to the development of this highest functional level, has direct access to his vocal cords, subject to intention and will." This capability made it possible to develop a communicative system of speech and the related thinking that allows man the presentational and reasoning functions of language.

If we ask ourselves today what significance Detlev Ploog's research approach has for the future of psychiatry, it must be pointed out that so-called biological psychiatry is still in danger of postulating simple, monocausal relationships be-

tween the molecular and biochemical level of brain processes at the synapse and psychopathologically relevant events. This tendency, as testified by the last decades of biological research in our discipline (especially in psychopharmacology), has led to hypotheses being transferred uncritically to pathogenetic events, without acknowledging the complexity of the appearances of psychiatric syndromes and of related disorders in the neurobiological, systemic organisation of brain activity. Wilhelm Griesinger wrote in 1876: "If one conceive the elementary processes in the nerve masses as essentially electrical – as many do today – then they will necessarily be most simple: consisting of plus and minus, and always identical in all people. How could the infinite variety of images, feelings, impulses – not just of one individual, but of whole centuries – possibly be produced directly and solely by these processes?"

In my opinion, complexity like that found on our old psychiatric descriptive levels of behavior and experience is now being discovered at the molecular level of synapses! What links the two is the systemic organisation of the neurophysiological and behaviorally relevant brain structures, creating the logical connections that can lead to reasonable interpretations of findings at various levels. The neurobiological model of such a perspective, as developed by Ploog, cannot be applied directly in clinical practice. But it emits impulses that prevent biological psychiatry from dissolving into something like an array of isolated, trivial neurobiochemical findings and from forgetting that – to use Griesinger's words once again – „the inner story of mental individuality“ and the outer story of society must also be taken into consideration before the psychiatrist can achieve real understanding of his or her patients. And this is the decisive moment for man.