KRAEPELIN ON PSYCHOLOGICAL EXPERIMENTATION IN PSYCHIATRY.

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During the first half of this year an article appeared by Kraepelin, in which this author gives a summary of some of his work in psychiatry, of his efforts to make "the psychological experiment" applicable to psychiatry. Owing to the importance of this subject, a short review may be of interest to the alienists of this country. Perhaps a few preliminary remarks, however, will help to put the work in its proper light, and will show the standpoint from which the author views the study of mental diseases.

It is well known that for many years anatomical studies have taken a prominent place in investigations by those who deal with mental diseases, a fact which, from the history of psychiatry and medicine in general, is easily explained. These studies, with which many illustrious names are intimately associated, have brought forth many brilliant results; at the same time normal anatomy of the nervous system and the study of nervous diseases have derived the greatest benefit from these efforts, while the share which fell to psychiatry is, after all, very small. A knowledge of the anatomical relations of the nervous system, however, and an inquiry into the structural alterations, are absolutely necessary for a scientific study of mental diseases. But it is certainly a mistake to think, as many apparently do, that with this the work could be done; that the task of psychiatry lies solely in a pathology of the brain cortex, for we must certainly admit with Kraepelin that a pathology of the brain cortex, no matter how far advanced it may be, will never give us an insight into abnormal mental phenomena as such. As he says, in the introduction to his excellent text-book: "This would only be possible if the brain secreted ideas and emotions as the kidney secretes urine;" or, in other words, if an exact knowledge of the cerebral mechanism should include also a knowledge of psychical processes. "But nobody will deny," he continues, "that we could have a comprehensive knowledge of the finest molecular processes of the brain without having the remotest idea that we have before us the organ of psychical life. This is fundamentally different from the materialistic views which we find more or less con-

sciously expressed in many text-books and articles, even of the present day, in this and in other countries. In regard to the dependence of the psychical on the physical we know nothing more than that a relation exists, and a correlation of the two parallel lines, the abnormal mental phenomena and the anatomical (or chemical) changes, must, of course, be the final aim of a scientific study of mental diseases. That, in spite of many theories, the actual steps in this direction are very few, nothing shows better than the diversity of these theories. It follows, therefore, that it is necessary to approach the subject from two points of view, *with equally accurate methods*, namely, from the somatic and the psychical; and certainly mental diseases have primarily a psychical side to them, and it is by a study of their psychology that we have, above all, a chance to arrive at an understanding of the relations of mental symptoms among each other, and of their genesis, and to trace back complicated to more fundamental phenomena. But the advance of psychology has been rather neglected by alienists, in spite of the fact that the last decade has brought this study into line with the natural sciences. This circumstance, as well as the scarcity of actual facts, and frequently a leaning to a one-sided anatomical conception, have brought forth innumerable theories, so that no field of medicine is so full of hypotheses as psychiatry. The need of a sound psychological basis, therefore, and the need of having reliable methods, as in the other branches of natural science, which allow us to go deeper than simple observation can go, have led Kraepelin to make use of experiments which, thanks to the work of men like Ernst, Heinrich, Weber, Fechner, and particularly Wundt, have proved so valuable in normal psychology.

It is well in this connection to quote from the last paragraph of the article we are about to review, where Kraepelin says that it is time that, instead of indulging in deep speculations and ingenious inventions, we should go to work at a serious and conscientious investigation, advancing step by step; that we need facts and not theories, which latter have only a right to exist inasmuch as they allow of the formulation of problems, giving thus a starting point for the application of accurate methods to new investigations.

In what manner such work may be begun, what are some of the problems which can be formulated, what has already been achieved, how much preparatory work is necessary, and, finally, from what different aspects experiments may be made valuable for the difficult study of mental diseases — all this forms the contents of

the article which is entitled: "Der psychologische Versuch in der Psychiatrie.*" It forms the introduction to a series of publications to be issued at irregular intervals, in which Kraepelin wishes to put on record the studies done in his laboratory in the field indicated in the above title.

Before Kraepelin others have entered this field of work and have made some experiments of this kind, but nevertheless it is he who must be considered the first one who followed this line of study with a definite aim and with a logical sequence. He not only applied methods which were used in experimental psychology, but devised new ones particularly fitted for the investigation of abnormal conditions; and it is well to say at the beginning of this review that the objections which could be made to a study of this kind—namely, that experimental psychology is itself not enough advanced to be applied, and that it is questionable whether the methods there used are applicable to abnormal individuals—do not hold good, since Kraepelin takes the methods less from physiological psychology than the experimental method in general.

Besides the valuable aid which Kraepelin expects, and has in part already obtained, from the study of normal individuals with reference to pathological conditions, he hopes by experimentally investigating the latter to arrive at an analysis of mental diseases which is more accurate and complete than could be gained by simple observation, and it is significant of the manner in which the work has been done that many years (since 1883) were spent chiefly in studying normal, or artificially produced abnormal, conditions, in order to test the method, and to lay a foundation before investigating pathological conditions. This is, after all, the only proper manner in which to approach such a subject; and it is this same careful spirit, coupled with an exceedingly clear and unbiased objective judgment, which strikes us so forcibly in all the writings of Kraepelin, and in the article before us not less than in his other works.

In a short introduction, Kraepelin, speaking of the rapid development of experimental psychology, expresses his surprise at the fact that, in spite of the importance which this branch certainly has for the psychiatrist, the latter paid comparatively little attention to it. He dwells upon the difficulty of the subject, on the care which has to be taken in experimenting, which not only consists in collect-

* *Psychologische Arbeiten*. Edited by Emil Kraepelin, professor of psychiatry in Heidelberg. Leipzig, 1896, Engelmann.

ing a vast number of observations, but the most difficult part of which is to be found in the interpretation of the results.

A chapter of twenty-one pages on methods follows. Here the question is raised, where shall a study like this begin? The methods most thoroughly investigated in physiological psychology are difficult to apply to patients, and we must endeavor to obtain chiefly such as make less demand upon the person experimented upon, and are more like every-day occurrences; methods, furthermore, which do not require complicated apparatus, and not too long a time for experimentation.

In the field of reaction-time others have worked before Kraepelin, but inasmuch as these observers frequently failed to obviate the well-known faults of the chronoscope as an apparatus working by means of electro-magnets, their results are often doubtful. Nevertheless, studies in this field are by no means unfit for the purpose in view, *if the patients are carefully selected*. By interposing, moreover, between the elements of a simple reaction, other acts, as choice between different movements, associations, and the like, an insight can be obtained into these as well as, to a certain extent, into that particular element of a simple reaction which is altered, as the latter is in itself a complex act. Such studies of association times, together with other studies, have already led to some important results in the interpretation of a common symptom in mania and other affections. It had been thought that the incessant talking of such patients, the linking of superficial associations (or rhymes), which constitutes the "Ideenflucht" of the Germans, was due to a quickened association-time — that associations called up each other more rapidly than normally. The opposite has been shown to be true, and the whole symptom proves to be an outcome of the general motor excitement in which the motor processes of speech take their part.*

Among the methods originated by Kraepelin are the so-called continuous methods, in which in a given time as large a number of simple tasks must be solved as possible; thus, *e. g.*, the adding of units. (Appropriate books with figures have been printed for this purpose.) At a signal made by a clock striking every five minutes, a sign is made in the book. The amount of work done in such periods can be counted and compared. Other tasks can be

* Cf., also, Aschaffenburg: "Ueber Ideenflucht," paper read at the XIX. Wanderversammlung der südwestdeutschen Neurologen und Irrenärzte in Baden-Baden. Arch. f. Psychiatrie und Nervenkrankheit. Vol. XXVI, 1894, 597.

set—reading, memorizing senseless syllables (Ebbinghaus), or columns of figures, etc. In this manner we are able to study not only more or less simple psychical acts with particular reference to their duration, but also, which is of the greatest importance in this connection, the changes which occur during the work, and which are due to fatigue and practice and the like. Reading and writing can be investigated along lines already started. Moreover, studies have been made on the sense of touch by an appropriately arranged method, which allowed an insight into fatigue and centrally produced sensations in this domain. The sense of time, purely motor functions, and the depth of sleep, are other fields which have been looked into, and which promise much interest. All the methods which Kraepelin gives have not been mentioned here. Besides these, new ones can be devised, but yet all need first a thorough study with normal individuals, and a comparison by means of exact measurement in order to be certain of their applicability.*

An experiment in the best sense is one in which we can produce the particular condition which we wish to study, and in which we can not only alter it at will, but control some of the modifying conditions. Applied to the study of mental disease, this would mean the production artificially and intentionally of a mental disturbance. Although the application of this method must needs be very limited, it is nevertheless what the author attempts; indeed, he heads his second chapter: "Artificial Mental Disturbances."

To study the patients experimentally at the height of their disease is usually impossible; in the beginning of it they are, as a rule, not accessible to us, but during convalescence we may be able to obtain information through experimentation; nevertheless the former would be the most important, namely, the study of the first stages. And here it is possible, within certain limits, to produce the conditions under which deviations from the normal develop. In the first place the variations in our psychical state produced by the daily changes of external conditions must, in this connection, be considered and analyzed. They will be within normal limits, but we may fairly expect to be able to recognize by a study of them, the general lines along which pathological conditions become developed. Of these daily alterations there are two factors which first suggest themselves—fatigue and practice—but as soon as we go into the practical investigation of the question we find it

* Cf. former works: "Ueber die Beeinflussung einfacher psychischer Vorgänge durch einige Arzneimittel."—Jena, Fischer, 1892. Also "Geistige Arbeit."—Fischer, Jena, 1894.

complicated, resolving itself into many smaller ones. Thus, with reference to the former, the effects of fatigue should be studied when it is produced in a rested organ, on the one hand; on the other hand, when it is brought on in an already fatigued one. Bodily fatigue and mental fatigue should be investigated separately, and the influence of the one on the other be studied; moreover, the influence of external conditions, like nutrition, sleep, etc.

The rôle which over-exertion of any kind plays in the production of mental diseases is well known. Although we can not produce, experimentally, serious disturbances of this kind, nevertheless, here also, as was said, it may be hoped to get an insight into the direction along which these influences act; and a study of this kind may aid us to analyze, possibly, more complex mental disturbances, and we may be able to separate the essential from the non-essential.

Well aware of the impression which such statements will be apt to make on those who are not familiar with the subject, Kraepelin says that he is prepared to have this looked upon as "a castle in the air," "and certainly," he says, "we are very far from our goal;" but, on the other hand, there are also some results already obtained. Aschaffenburg made studies on the effect of exhaustion. He experimented for a whole night. We all know we feel different after a long night's work. But only by appropriate experiments was it possible to analyze this. There was chiefly a more difficult reception of external impulses. There were centrally produced sensations (hallucinations), a prolonged association-time. The associations were, moreover, more stereotyped, more superficial, as we find in the "Ideenflucht"; and, finally, the central motor excitability was greater.* Kraepelin notes in this the striking resemblance to an exhaustion psychosis, and draws attention to the fact that if we had to analyze a collapse-delirium we would come to the same conclusions. Since, in the latter condition, similar causes act and produce it, there is more than a merely superficial, outside similarity between the two conditions.

Another field for experimentally produced mental disturbances is to be found in some of the intoxications. Kraepelin's studies on the action of alcohol have led him to a better understanding of the mental disturbances ensuing from its use. The chronic intoxications can be better understood, and, moreover, it is just this study

* Cf., also, Aschaffenburg: "Die psychischen Erscheinungen der Erschöpfung," paper read at the Wanderversammlung in Baden-Baden. Arch. f. Psych. Bd. 25, 1893; 595.

which has led him to his present opinion on "Ideenflucht," and to the understanding of mania. The action of ether has been shown to be very similar to that of alcohol. Similarly of cocaine, and yet some differences have been observed, whereas morphine has been found to be quite different in its effects. Other drugs have also been examined. The study of all of them has not only a direct bearing upon our clinical experience with such intoxications, but also it gives us methods to study slight deviations from the normal mental conditions, and will aid in this way our understanding of other abnormal as well as normal conditions.

The drug effects, known up to the present time, as far as they have been measured, can be traced back to two fundamental activities of our psychical life, namely, to the reception and working out of impressions, and to the transmission of will-impulses; and the whole variety of action of the different drugs — alcohol, ether, chloroform, amylnitrite, chloralhydrate, paraldehyde, tea, and morphine — may be attributed to the varied combinations of acceleration or slowing of these two phenomena. Unquestionably the view obtained thus far is one-sided; and we must, by further inquiry, by formulating new questions and devising new methods, gain a more comprehensive view.

There is one consideration of which Kraepelin speaks in this connection which, problematical as it may yet seem, can not be passed over in this review. As we said above, the correlation of psychical alterations and physical ones has made very little progress. And how could it be otherwise? On the one hand there is no sharp observation of clinical facts; on the other no marked anatomical changes have been observed in the nervous tissue. In the latter an improvement is promised by Nissl's method; in the former, by accurate observation helped by experiment. Here the study of artificial abnormalities caused by chemical poisons, on the one hand, and, on the other, the lesions experimentally produced in animals, may lead later to a correlation of the two.

The third chapter is headed: "Personal Fundamental Peculiarities." Here Kraepelin comes to a very important part of his study, namely, the influence which the individuality of a person has upon the development of mental disease. This he estimates to be greater than has been supposed, external influence having a smaller share than was formerly thought. And although the extent of the influence exerted by a factor lately so much discussed, namely, auto-intoxication, can not as yet be estimated, there

unquestionably remain enough mental diseases in which there are no such circumscribed causes to be found at all, but in which the intrinsic peculiarities of the personality are to be made responsible for the pathological development. Degeneration, neuropathic taint, are terms which express these individual conditions. But such terms are vague, and sifting and grouping is necessary. This is the task of individual psychology. It is by no means an easy one, for we are dealing, not with tangible things, but with *processes*, which are changed and crossed by numerous and incalculable conditions in the most varied manner. Particularly interesting in this connection are the two properties of our psycho-physical organization, fatigue and practice. It was found that the latter was apparently different in different functions, while the former seemed to be a more fundamental property of the person. Of course in these studies many other points were found as these lines were followed out. The duration of the influence of practice in different individuals had to be looked into, and is unquestionably of importance. Another property was found which is different from practice itself. It is what we call "getting into the work;" it also increases the amount that can be done, but is of a different nature, in that it is lost very soon, whereas the effect of practice remains for a long time. That practice is nothing else than a special form of memory is further not to be doubted. Fatigue, on the other hand, lessens our faculty for work, and the amount which we can accomplish, but here Kraepelin says a distinction must at once be made between *fatigue* and *sense of fatigue*; they are two factors which need not by any means go hand in hand; on the contrary the two may be quite opposed to each other, a distinction which, in this country, has been insisted upon so strongly by Cowles.* Depressed conditions show frequently a sense of fatigue without fatigue. On the other hand, we find in anxious and maniacal patients an absence of the sense of fatigue; but fatigue itself may progress to profound exhaustion. Finally, Kraepelin thinks we may perhaps partly trace back the baneful influence of emotions to the fact that they rob us of the sense of fatigue, and hence disturb the necessary circle of work and rest. This is the more serious, since probably the sense of fatigue represents a necessary pre-condition for sleep. Both, therefore, should be compared particularly in our studies of psychopathical individuals. Just as in practice the duration of its effects must be studied, so here in fatigue the time for

* Shattuck Lecture, 1891, *Boston Medical and Surgical Journal*.

recovery, and with it possibly the depth of sleep, should be investigated.

Finally, a most important factor is the influence of distraction, or, rather, our power to resist it. This is our power of concentration. The importance of it need not be dwelt upon. To possess means for the measurement of this would be a valuable addition to psychopathological methods, but little has been done in this direction. We see from these points which have been selected, that here quite a number of personal fundamental properties have been found, which not only *may* be studied, but which, as experiments have shown, actually *can* be studied. The study consists in the finding of the rapidity with which different processes occur, be it in the domain of perception of external impression, in the association of ideas, or in the transmission of will impulses.

The *fourth* chapter is headed, "*Psychical Status Praesens*." In these psycho-physical properties, which, as has been seen, include neither feeling nor anything referring to the contents of our thinking, but are directed to the formal portion of our psychical life, to its dynamics, we have to deal with essentially psycho-physical factors. Although only a beginning of these studies has been made, a continuation may lead to a more accurate analysis of personalities and individual peculiarities than has been done before; above all, each step forward is made by experimentation, and reveals facts. In such studies methods will have to be devised, and tried thoroughly on one normal individual. The factors which appear to be the most important must be separated out, and must be studied by as short methods as possible on numbers of individuals. On the other hand, we must strive in the studies of individuals to get as many tests as possible to apply to them, *i. e.*, methods which give us an insight into as many parts of their psychical life as possible, for it is the whole individual which we are dealing with. In accordance with this plan Kraepelin has attempted, within the limits of the methods at his disposal, to establish in a number of persons some of their fundamental peculiarities, to obtain a *status praesens psychicus*, so to speak. This is, of course, as yet incomplete.

The study consisted of a careful arrangement, on five consecutive days—on each of which an hour's work was done—of the better developed methods above mentioned, so as to obtain an insight into as many psycho-physical properties as possible. But in addition to these methods he suggests, finally, others, which in part refer to the contents of our thoughts. He had a person write down

in five minutes as many nouns as possible, or sensory impressions which had a marked color, or things which produced noise, or things which were agreeable or disagreeable, or, finally, abstract ideas. He thinks that in this way we may get an insight (1) into the nature of association, how different associations are connected, what type of association is prevalent; (2) into the relative development of colored or of acoustic memory pictures; (3) into likes and dislikes; (4) into the production of concepts. These methods seem perhaps rudimentary as yet, and Kraepelin has done little with them, but they certainly are very suggestive.

In the last chapter Kraepelin speaks of the possible value which treatment and prophylaxis might draw from experiments as they have been indicated. An insight can be gotten, for example, into the question why maniacal patients are better treated by baths and rest than by leaving them to their constant desire to move about. We can get a knowledge of the psychical action of the drugs we use; and with regard to the prevention of insanity, we have now, through Kraepelin's studies, a better insight into the action of alcohol on mental processes, which it never stimulates, but always paralyzes. That steps can further be made toward a proper psychical hygiene is also evident from what has been said.

This review has taken much space, yet numerous important and interesting points could not be touched at all, from which the reader is recommended to make a careful study of the original. He will find a great number of facts which have been elucidated by the studies of Kraepelin and his pupils, and many valuable suggestions; and on every page he will gain the impression that these latter are not based upon vague speculations, but upon a long experience in practical, well-directed work in the laboratory. But as was said, the original is itself only an outline of the study which Kraepelin inaugurated—a study the details of which are partly published in former articles, and partly are to appear in the *Psychologische Arbeiten*, which, therefore, I also wish to recommend to the interest of the American psychiatrist.