THE LOSS OF THREE GERMAN INVESTIGATORS, ALZHEIMER, BRODMANN, NISSEL.

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of Munich.

The mention of the names of Alzheimer, Brodmann and Nissl brings before us with a deep sense of pain the great loss which the last years have brought to our specialty. Three most highly gifted investigators have gone from us, each one in his way irreplaceable, all three pioneers in the field of work most important for our further knowledge, that which should make clear to us the somatic groundwork for mental disturbances. The scientific life work of these men is a glorious page in German science the like of which no other people can set in comparison with it. It was Nissl, the greatest of the three, who, working comprehensively and constructively and with steadfast aim, established the premises for a pathological anatomy of the brain cortex and endeavored to search out with all the aids of scientific technic the structural plan and the meaning of the most highly developed tissue of the body. Alzheimer, his most loyal pupil and fellow worker, toiled indefatigably with never failing patience and self sacrifice to establish, through an endless number of individual investigations, the cortical changes corresponding to the different forms of mental disturbance. He sought in this way to make possible to the clinician in our territory that testing of his hypotheses which has shown itself everywhere in medicine as the most powerful lever of progress. Brodmann had set himself the task of discovering the cell division in the cortex and so prepared the soil for that future work which should inform us concerning the localized extension of the disease processes in the cortex and also the significance of the individual tissue areas attacked by them.

I cannot undertake to enter into detail in regard to the marvellous achievements of our departed colleagues.* What lies upon my heart is to show emphatically how unfavorable the conditions have been under which those investigators must have had to work. Whoever knows the course of their life will think with deep sorrow what

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[* See among others Spielmeier: Zeitschr. f. d. ges. Neurologie u. Psychiatrie XXXIII, 1 (Alzheimer); Lewandowsky ebenda XXX, 319. (Alzheimer); Vogt: Journal f. Psychologie u. Neurologie XXIV, 5 and 6 (Brodmann); Nissl: Zeitschr. f. d. ges. Neurologie u. Psychologie XLV, 5 Brodmann; Kraepelin. Münch med. Wochenschr. 1919, 1058 (Nissl).]

irreparable values have been lost with them and with what difficulties they had to struggle in their labor to make available for the great problems of our science the powers which were working creatively in them.

Alzheimer's scientific career began in the year 1889, after all sorts of fundamental preparations, when he met Nissl in Frankfurt. He was bound to him from that time on, not only in the most zealous work together toward common ends but by a close personal friendship. We may rejoice in that fate which brought together at that time these two men who seemed to be destined to open for us the way to knowledge of the physical foundations of mental disturbance. It was moreover a particularly fortunate circumstance that they found in Weigert a sympathetic adviser and in Sioli an institutional head who gave support to their scientific efforts. It must not be forgotten, however, that both investigators were naturally institutional physicians of the first rank, that they bore upon their shoulders exceedingly strenuous and responsible medical duties and that they could go to their scientific tasks only after discharging the duties which were theirs. A fair estimate of the value of their incomparable achievements can be made only when one intimately realizes these conditions. It is hardly necessary to explain that under such conditions not only was it necessary to give up the pleasures of life but that very often they played havoc with health and the power for work.

In the year 1895 the exceedingly close and fruitful fellowship in their work came to a temporary termination because of Nissl's removal to Heidelberg. Alzheimer had to take over now more than ever the burden of the superintending physician's busy life and the management of the institution, because of the work of organization, very often claimed his attention. He succeeded, however, through his great power for work and his determined industry in accomplishing the gigantic and fruitful task of an exact research of a large number of brain cortices. It was meanwhile not to be mistaken that an exceptional ability was interfered with most sensitively in its development through the relentless work of every day.

Alzheimer had meanwhile become scientifically independent, a fortunate circumstance, so that he would naturally have had to find the way to academic paths. With the assiduity characteristic of him he could not attach himself long to these but considered much more strongly entry upon the position of institutional head, although I earnestly advised him against this. It was a great good fortune for him that this enterprise fell through. Through this failure he was

accessible to my entreaties that he come to Heidelberg. He came to us to our very great joy in the autumn of 1902 and our hopes revived that we might reap rich fruits from the work together of the two friends who were now free from all pressing responsibilities.

My call to leave Heidelberg in the fall of 1903 put an end to this hope before Alzheimer had yet been able to be received. He now went with me to Munich, where I thought I could create a larger working circle for both investigators. Nissl, however, was soon called to the chair at Heidelberg, so that to Alzheimer alone fell the task of putting in order the beautiful anatomical laboratories of the Munich clinic and filling them with life. It remains in the memory of us all with what devotion and with what brilliant results he performed the task. Here at last his scientific personality could develop freely. It can be readily understood, therefore, that within a short time the laboratories were filled with more or less able students from all leading countries and that a long series of valuable works was produced under his unwearied direction and inspiration. In spite of this wide activity in teaching he still found time to promote vigorously his own fundamental researches to bring to a conclusion his great work upon paresis, and besides many individual researches, gradually to bring together the material for a comprehensive presentation of the pathological anatomy of the mental disturbances. Besides this he was especially occupied with a study of the decomposition processes in the cortical tissue, also the important question of the anatomical groundwork in idiocy, particularly the retardation in development. For this work he had brought together a rich collection of brains.

His new position, of course, was not entirely free from hindrances. In the first place, the clinic afforded only very modest material compared to the greatness of the tasks which Alzheimer had set himself. It throws a bright light upon the personality of this distinguished man that he made the greatest sacrifices with a serene independence in order to pursue his scientific ends. Not only did he renounce every reward for his work but he defrayed also the far greater part of the expenses of the carrying on of the work from his own means, the preparation of drawings and photographs, the fees for technical apparatus, for the objects which came to him from the most varied sources. In spite of all this, he never thought of limiting his activity in the carrying forward of the anatomical work. He gave me his most unselfish support, with the unshakable loyalty and trustworthiness which distinguished him, in the difficult early organization of the clinic and, later, also in the allaying of the friction

that would arise here and there within the work and in the watchfulness which he maintained over the medical service. The implicit confidence which was manifested to him from all sides and his quiet objective manner were of the greatest help in smoothing out affairs and setting aside difficulties so that imperceptibly he came to be the sure support of the activities of the entire clinic. He became quite indispensable after Gaupp was called elsewhere and so in time he was prevailed upon to take over also the office of head physician. He suffered so, however, under this burden that I had to yield to his importunity to as soon as possible to remove it from him.

Alzheimer threw his whole soul into his work and could not be diverted from it. Without doubt his health suffered from this. He succeeded in wresting time for a short walk through the streets in the late evening hours at my pressing remonstrance, otherwise he scarcely knew any recreation. It was as good as impossible to move him to a longer holiday; after a short period he returned because this or that work must not be retarded. He always found excuses to crowd out relaxation. Not until his last years did he secure himself a country home, which afforded him the welcome opportunity to work in the garden and to pursue his botanical tastes. I was also able to entice him occasionally to a mountain trip. This was difficult for him because he thought he had no time for bodily exercise.

In 1912 he was called to Breslau. This was a great gratification to him, because in spite of the consciousness of his inner worth he suffered from the fact that his position did not truly correspond to what he stood for. I was sorry to see him depart. Much as I rejoiced at the deserved recognition which lay for Alzheimer in his call, yet I was assured that the high point of his scientific attainments was passed. I pointed out to him at his departure, that some day he would look upon the time spent in Munich as the happiest of his life. I do not know whether the latter came to pass, but that the former was correct has alas shown itself all too soon.

On his removal to Breslau, Alzheimer became ill with a severe infection which involved his kidneys and affected his heart, which already was weakened in resistance. He gradually recovered and began to take up now with his customary devotion to duty the manifold and heavy burdens of his new position. Alzheimer did not understand how coolly to thrust away pressing demands when he considered them justified. In 1909 the plan for a new psychiatric journal came up and I had to put the question to him whether he might perhaps be ready to take upon himself a share in its direction. I was surprised by his immediate acquiescence. When the affair

seemed a necessary one he did not hesitate to put at its disposal a considerable share of his working time, otherwise arranged with such care and to such advantage.

Thus in his illness he had no mercy upon himself, although he was suffering severely, as for example when the conditions of the war forced him to an ever greater strain upon his already failing strength. He sacrificed his health without consideration up to the last of his powers until on the 19th of December, 1915, at the age of 51, this man who seemed of such unusual vigor, succumbed to this insidious disease, a few years after he had attained the goal of his wishes. The great comprehensive work upon the pathological anatomy of the mental diseases, which should have crowned his life work, was not to be accomplished. The preliminary work was so far advanced when Alzheimer left Munich that we believed ourselves justified in expecting the speedy conclusion. Only a few items were found after his death in regard to the final completed work. Everything else was lost with him.

A few years later we had to mourn the unexpected and premature death of Brodmann. His life also was an unbroken chain of the most energetic labors. These began, after a period of preparation in medical practice and service as physician in mental disease, with his inspiration to brain anatomy first through Oskar Vogt and then in the year 1900 with Alzheimer in Frankfurt. There followed ten years of hard work at the Neurobiological Institute under Oskar Vogt, where he worked with abundant material. Here he was occupied chiefly with research into the cellular structure of the brain cortex. Now he could give his entire strength to his great life task. Though this did not exclude his devoting himself also to some individual researches in the field of experimental psychology. He therefore obtained a mastery in the delimiting of the individual cortical fields which enabled him to pursue the path of the solution of that most difficult question, the relationship between the structural plan of the brain tissue and psychic functions.

It is easy to understand that a man of the self forgetful spirit of Brodmann would be possessed little by little of the idea to seek to try his powers in academic pathways. This path was closed to him in Berlin, so in 1911 at the age of 43 he moved to Tübingen, where with Gaupp's support he attained his goal. Unfortunately the Tübingen clinic, too, could offer him but a very modest position. There very naturally fell to him there a share of the medical service so that he could devote only half his strength to the scientific work for which he was so exceptionally capable and so well equipped. Nissl,

it is true, furnished him with a certain sum, through the Heidelberg Academy, which enabled him to carry forward his costly researches, but it could not be hidden from himself as well as his friends that the duties of his position seriously hindered him in the pursuit of his broadly prescribed goal. His distressing domestic situation also, which cut off every prospect of attaining complete independence and of establishing a family, oppressed him at the same time that he had to recognize that in spite of his self sacrificing industry and his important achievements he must remain behind many of his fellow workers, who without any effort had availed themselves of comfortable positions in life.

The call in 1916 to the office of assistant professor of anatomy at the institution in Nietenleben, came to him as a salvation. Now at last, almost 48 years old, he succeeded to fairly satisfactory domestic conditions, which permitted him to marry. At the same time he was released from the duties of medical practice and might give himself entirely to his research work, which began to assume more and more fruitful prospects through the bringing together comparatively of anatomical viewpoints, and investigations. He welcomed this change in his fortune with touching gratitude.

It was such feelings that made his decision difficult for him when two years later the call came to him to the German Institute of Research. It seemed to him like deserting the colors to leave so soon again the position which had created for him such kindly relationships. Only the quieting reassurances of all concerned were able to dispel these thoughts. So at the beginning of April, 1918, he entered Munich with a joyous heart to find here a field of activity which afforded him in still greater measure complete freedom for research together with abundant material. Within a few days he had arranged his laboratory and set up his collections of material. He went to his work with youthful enthusiasm undertaking the preparation of far-reaching researches, which should turn to account his rich knowledge and ability in psychiatry.

It was perfectly evident from the first that Brodmann's services must be obtained for the German Research Institute. The results of his efforts lay first more in the territory of comparative anatomy, individual and racial anatomy of the cortex. Still these showed the direction in which pathological anatomy of insanity must later be developed. When it has been accomplished that the changes produced through a definite disease process are pointed out trustworthily and from all sides, then the extension of these into the brain can be established, the number and kind of cortical territories invaded. There is no way to this goal except through the cyto—and myelo-

architectonic study of the cortical structure instigated by Vogt and Brodmann. Brodmann's work, together with Nissl and Spielmeier, seemed, therefore, the most important advance in knowledge of the way in which the different disease processes have spread and it seems to promise the opening up of revelations in regard to the connection between cortical changes and disease phenomena. The relations of these investigators, who for a long time had stood close in thought and feeling, were already in these first months of daily intercourse exceptionally satisfactory, so that we confidently looked forward to the further development of this cooperation.

So much the more terribly the blow struck us which suddenly shattered all our hopes. Brodmann died on the 22d of August, 1918, just 50 years old, a few months after he had attained his lifelong wish to be able to devote himself freely to his science. His death was the result of a severe sepsis associated with influenza, which apparently was combined with a toxic infection contracted at an autopsy the year before. The wealth of material in experience and scientific hypothesis, of which up till this time Brodmann had not been able to avail himself, was thus lost forever. There was no one who could take his place. It is very uncertain whether or when another will be found who will tread the toilsome paths which Brodmann followed with the same ability and perseverance. What he had accomplished is of course not lost, but incomparably more could he have given us if it had been permitted him to wish for one or two decades more, devoting his full powers to his great work to which his life had been consecrated.

One year later Nissl left us. He had succeeded in his student days in discovering that staining method which made possible the knowledge of the finer structure of the nerve cells and their pathologic changes. Gudden recognized at that time the exceptional gifts of the young physician and brought him into close relationship with himself. There in the institutional circle at Munich, Nissl found time with his exhausting institutional service to become familiar with the fundamentals of Gudden's degeneration methods, to support his theory by endless hard work and at last to go his own ways, by which he strove to understand the physical basis of insanity. We find him again, a few years after Gudden's tragic death, as head physician in Frankfurt. Here he found an enthusiastic fellow worker in Alzheimer. The extensive and responsible management of the asylum at Frankfurt, which he undertook making at the same time thoroughgoing changes, made the greatest demands upon the powers of the small staff of physicians. It seems almost incredible

under these circumstances what an enormous amount of research work was carried out at this time by the two friends. This was possible only because literally the greater part of the night after the strenuous service of the day was devoted to science, a custom from which Nissl later found great difficulty in breaking off when his position in Heidelberg permitted him greater freedom of movement. There is no doubt, however much we may admire Nissl's self forgetful devotion to his life work, that this persistent disregard of his physical needs left its traces upon him.

Nissl left Frankfurt for Heidelberg in 1895. He gave up his assured position for greater freedom in academic circles for his scientific work. We could offer him at that time only the most modest living conditions and I could not at once release Nissl entirely from medical service, to which he, however, willingly surrendered himself. He felt himself, however, essentially liberated and carried out at once his marvelous researches upon the influence of "the subacute maximal intoxication" upon the nerve cells. He also completed his book on the neuron theory and devoted himself with greatest zeal to the study of pathological cortical pictures, particularly in paralysis and lues of the brain, and further to the employment of the revelation of conditions through lumbar puncture. He was supported in these branches of the work by a series of pupils who little by little sought instruction in the small clinical laboratories.

My call to Munich and Bonhöffer's removal to Breslau soon after resulted in Nissl's appointment in 1904, as professor in ordinary of psychiatry in Heidelberg. My plan to take him with me to Munich was thus shattered. I must acknowledge it would have been doubtful if I could have realized it satisfactorily at that time. The new position burdened Nissl with many duties, the fulfillment of which fell upon him with especial weight because of his conscientiousness and carefulness. The conducting of the clinic, the medical service, the instruction, the examinations and meetings, as well as the unavoidable practise absorbed his time and strength out of all proportion, so that here again only scanty leisure hours were left for scientific work. He succeeded, however, in the course of the year in spite of all hindrances in completing his pioneer researches in regard to the condition of the brain cortex detached from its connections and in taking up the investigation of the relationship of dependence between the different cortical areas and the thalamic nuclei. Naturally all these important tasks proceeded slowly in constant conflict with the excess of duties.

A further undertaking, by which Nissl sought to approach his final goal, the anatomical study of disease processes, was the bringing together of individual cases studied carefully, clinically and anatomically, which he had begun. These thus gradually created was to be a material for observation corresponding to all scientific demands, which should permit the discovery of sure relationship between clinical pictures and definite cortical changes. The very first observations, here presented, showed how valuable for the furthering of our science this form of study could become in Nissl's hand.

Any one who knew Nissl well could not fail to notice that a change gradually took place in him in the course of the last ten years. The powerful ardor of his nature seemed dampened; he had grown less robust and could not longer push his work forward with his earlier disregard of self. An insidious kidney disease, which he tried to combat by a winter in Egypt, warned him to have some regard for his strength. His health was in danger and the possibility had to be considered that his knowledge and ability, which could not be replaced, the entire wealth of his scientific schemes and thoughts might some day be irrecoverably lost. It seemed therefore as a most pressing concern of the German Institute for Psychiatric Research, to arrange for a worker like Nissl freedom from the burden of office and so unhindered freedom for productive activity as long as his health still permitted this.

Nissl without long delay seized the opportunity given him in spite of the no small sacrifice which the giving up of his position laid upon him. In April, 1918, he came to Munich and entered at once upon a busy activity partly in a lively exchange of views with Spielmeier and Brodmann, partly in preparation of a larger work upon his researches in the optic thalamus. He smilingly repulsed the often repeated suggestion that he should now and then permit himself some recreation with the remark, that now all his days were holidays. All sorts of plans stirred him, which he wanted to take hold of after he had completed his work on the thalamus. These were the study of the brain changes in dementia praecox and further the experimental proofs of the attempt to delimit the cortical areas on the ground of the anatomical structure. Here his work would have joined that of Brodmann.

Fate decreed otherwise. On the 11th of August, 1919, Nissl succumbed to his old disease before he had brought to conclusion even his work on the thalamic nuclei. Our loss in him cannot be measured. It is not alone that Nissl possessed an enormous treasure of knowledge and experience as a result of his unwearied industry,

which gave him in his field an exceptional sureness of judgment. He possessed also a severity of self criticism which kept him almost entirely from mistakes and hasty conclusions. It was his superiority over all his fellow workers striving in the same direction and lent a decisive weight to the opinions he expressed. Nissl was besides a master of technic and his was a head uncommonly full of ideas, although he never permitted his secret hopes and expectations to influence his rational appraisal of actual facts. Thus all the gifts which distinguish a student of natural science were united in him; he was born to this calling.

This survey of the here briefly indicated fate of these three distinguished men, whose loss we have to mourn, brings this affecting fact forcibly to us, that our science has only remotely obtained that result from their powers which could have been reached under more favorable conditions. And no matter how rich their life work has been, it was yet most seriously impaired through the circumstance that they were grievously hindered in the free exercise of their peculiar gifts. This was because for many years or decades at the height of their ability to accomplish great things they were burdened with other affairs. The path assigned to the mental physician is such that his professional service demands his best powers and the scientific work can be undertaken at the best only as a side issue and with the sacrifice of the hours of recreation. Entrance into the academic circle makes little difference. Whoever considers becoming a professor of psychiatry in Germany has in every case no time to enter more deeply into auxiliary sciences. His work at the sick bed must remain his chief concern. If, however, he has attained his goal, yet beside this instruction, examinations, administration and always practise as well, put such high demands upon him that the possibility of creative scientific work more and more fades away.

Our three investigators were able only under the greatest personal sacrifices to traverse those paths into which their talents forced them. The best that they had to give us they could wrest for themselves only in continuous struggle with the conditions which demanded from them quite different achievements, those which did not accord with their peculiar gifts. It was a *waste of valuable working force* that Alzheimer and Nissl had to earn their bread for long, long years as physicians in asylums, yes, even that they became professors of psychiatry because in this way their gifts in largest part were made fallow. The same might be said of the fact that Brodmann was compelled to devote a great part of his time in a

poorly paid position to the discharge of duties which many others could have attended to as well or even better.

The way we should enter upon to avoid such loss is clearly marked out. It should no longer be left to the rare talent for research which grants us its kindly skill, to seek in some way or other for itself opportunity for activity with unspeakable trouble and conflict but we must create the conditions for it under which it can grow and fully unfold its powers. The only way to do this is by the establishment of life positions which guarantee freedom and sufficient aid for scientific work. It goes without saying that not every clinic or insane asylum can offer satisfactory conditions to an entire staff of research workers. The suitable persons for placing in such positions would very soon be wanting also. The large schools and communities might well strive, however, to procure little by little, here and there for an exceptional investigator proper means for existence and for work. In this way a division of work would be well brought about in such fashion that in our place this, in another that aid to psychiatry would be especially provided. We can see the beginning of such a development in the position of anatomist founded by Pfeiffer for Nieleben and also in the model arrangements of the Hamburg institute, where beside an anatomist a serologist is also working. Similar positions can be found elsewhere only mostly far too poorly equipped.

The richest result naturally is promised always by the association of a line of distinguished scientific personalities in one institute for research. It is just the daily close intercourse and the mutual working over of the same questions from different points of view which will first make possible the highest use of the forces at hand. It was unfortunate that Brodmann and Nissl succeeded in obtaining such favorable conditions only shortly before their end. It is clear to any one with any penetration what advantage it would have been for our specialty if both workers had been put into the position ten or fifteen years earlier in complete freedom to have devoted their full power to reaching their high goal. We should all be united in striving to be careful that hereafter no truly exceptional talents in our field need be allowed to waste themselves in the duties of the day, but as soon as they have proved themselves to exist, should find a place which would afford them the highest use of their powers.

The unfortunate outcome of the World War has most seriously interfered with the development of such plans. Our people have become poor and in no condition to make further sacrifices. We must take into consideration that the German Research Institute

also is hindered in its development and cannot fulfill the fair hopes which we entertained when it was founded. It is plain in the meantime that we must not at any price lose the impetus in scientific work which German intellect and German industry has won. Here lies still one of the strongest sources of our power. In psychiatry, too, the founding of the first institute for research amid the storms of the World War can assure us that Germany will be able to preserve the place which she had won for herself in the scientific world. It will, of course, be necessary that the work of all those in our profession be brought together. Such an institution can flourish only when it is upheld by the inner participation and the practical support of the widest circle. May the fate of the three workers who have gone from us be thus a reminder to every German mental physician to work toward this end through his own fellowship in work and through zealous research. Thus the first great attempt to open up free paths for psychiatric research may be saved for a better future as a worthy testimonial to German science out of the sorest period in the history of Germany.