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THE LOWELL CASE OF AMNESIA

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INTRODUCTORY NOTE

[I desire to thank Dr. Morton Prince for the opportunity to study this interesting case of Miss Susan N. of Lowell, Mass., for the use of some valuable notes on the case which I have incorporated in the examination, and also for his continued help, suggestions and inspiration. In addition, I feel under grateful obligations to Dr. Charles E. Donlan, superintendent of the Lowell City Hospital, and Mr. Morton J. Courtney, chairman of the Overseers of the Poor, for their many courtesies and their untiring efforts to furnish me with the necessary data in the history of the case. It is true that many of the experimental results are fragmentary and would have been considerably elaborated had the patient been seen earlier. She did not come under observation until August, 1906, about four months after the onset of the memory disorder, yet the phenomena presented by the case as a whole furnishes an interesting contribution to the pathology of memory.]

I. ANAMNESIS

THE family history is absolutely negative, so far as any neuropathic or psychopathic heredity is concerned. The patient, Susan N., was born in Tyngsboro, a small country village near Lowell, in 1855. She received a fair education and for several years taught in one of the district schools. She never showed any peculiarities, was always fond of reading and possessed a good memory. In character she was refined and sincere, and no tendency to day dreaming was ever noticed. In 1876 she did general housework for a Mrs. A.,

and sometime later she moved to Lowell to live with her sister, securing work in the drawing-room of one of the larger mills, where she remained until the spring of 1906. In 1904, however, she left her sister's home, and went to live with a Mrs. P., in order that she might be nearer to her place of work. Although she attended church regularly, yet no abnormal religious tendencies were ever noted. On March 20, 1906, she informed her sister that she was going to North Adams, but she did not state for what purpose. In fact, she had already forwarded her trunk. On that same day, in company with a friend, she attended an ordinary Lenten service at St. Anne's Church, and so far as was observable, as was learned through a later interview with that friend, no religious emotion of any type occurred. In fact, on leaving the church, she appeared to be in a perfectly normal condition.

After leaving her companion, all traces of the patient were lost, until she was later recognized by her relatives and friends at the Lowell City Hospital. At the time of this meeting, however, she had a complete general amnesia, absolutely every memory of her former life being obliterated. Meanwhile, a series of rather dramatic episodes had occurred, for which the patient was subsequently totally amnesic. The various names which she gave herself during her wandering episodes were apparently adopted, for it is well known that the taking of different names is quite common in protracted fugues. Of these names she had no recollection excepting the last, that of "Margaret Kelley," which she assumed. On March 25, 1906, about 6 A.M., five days after the disappearance of Susan N., a woman who later gave the name of "Mrs. Sarah Wilson," was found unconscious on the steps of the Lowell Normal School. She suffered greatly from exposure and was on the verge of collapse. As she was unable to give a satisfactory account of herself, she was taken to the Police Station. On her person were found several memoranda. One note, as published in the newspapers, written during the period of the wanderings for which she was amnesic, read as follows: — "No rest for the wicked; not much for the weary; travelling continuously day and night since the 15th; a bath and a change of clothes

would be luxurious, and I now find that I cannot indulge until I interview a party at Chelmsford Centre; hope I am forced to spend the night there, wherever the little town may be; very strange, but I have a suspicion that I am being followed; wonder if any fool thinks I am carrying much money with me."

The next day, "Mrs. Sarah Wilson" was allowed to leave the Police Station and she boarded a car for Boston. About 5.30 A.M., on March 27, 1906, a woman was found lying against a stone-wall near the car tracks, in a lonely portion of North Saugus. She gave the name of "Mrs. Alice Walker" and claimed that she had been beaten and robbed. In the meantime, the Lowell police had received a letter signed "Sallie Wilson," in which the writer stated that she was the cause of the plight of "Sarah Wilson" last Sunday (March 25), that she was the "double" of "Sarah Wilson," that she had always taken care to dress in the same clothes, was jealous of her brilliant intellectual attainments and had been following her for years to do her harm. Unfortunately, this letter was destroyed, and it was necessary to depend on the outline of its contents from newspaper accounts. Inquiry proved "Mrs. Alice Walker" to be the same woman as the "Sarah Wilson," who had been found on the steps of the Lowell Normal School a few days previously. The police were inclined to look upon her story of being beaten and robbed as a mere fabrication and she was allowed to go. A few days later, on April 3, 1906, a woman was found wading waist-deep in the Merrimac River and was rescued in a semi-comatose condition. Under stimulation, she revived from the collapse due to the cold of the river, but remained in a stuporous condition for a week following. At this time she was taken to the Lowell City Hospital. Although at first there was no clue to her identity, yet later inquiry proved her to be the same woman who was found on the steps of the Lowell Normal School eight days previously on March 25, 1906, and also by the stone-wall in North Saugus on March 27, 1906. In her handbag was found the fragment of a letter addressed to "Margaret Kelley, Fitchburg," but as this letter also was unfortunately later destroyed, it is not known if it were in

the original handwriting of Susan N. The name is, however, significant, as will appear from what transpired later.

During the stupor, which lasted a week, the patient failed to react to any external stimuli and on awakening from this state, it was found that the memory of her whole previous life from the time when she was born was totally obliterated. There was a general amnesia up to about April 11, 1906, with the exception of the preservation of certain memories to be later noted. The period of stupor, which appears to be analogous to the condition for which Sidis coins the word "hypnoleptic state," and to which he attaches great importance in cases of amnesia and multiple personality, is of some interest. He interprets it as a transitional stage from one personality or group of memorial images to another and therefore as representative of the exact point of cleavage or dissociation. A similar condition of stupor has been found in other cases, and in still others, it was entirely lacking. Although the analogy is a striking one, yet the fact that it occurs in only a portion of cases of dissociations of memory or personality, detracts considerably from its importance as an absolute symptomatic factor, and we must therefore look upon it as a pure episode, an epiphenomenon, like the hysterical stupors, trances and lethargic states. In the Hanna case there was a period of unconsciousness following the accident, in the Mary Reynolds case there was a profound sleep from which the patient awoke "to all intents and purposes as a being ushered for the first time into the world." In another case of functional amnesia which came under personal observation, it was stated that the loss of memory followed three attacks of "stuporous sleep," each lasting about ten hours. In the cases reported by Granville and Sharpey, the onset of the amnesia was also with a stuporous state. On the other hand, a number of cases of amnesia could be cited in which this stuporous state was entirely absent.

The awakening from the stupor, with all memory of her previous existence completely obliterated, was quite dramatic in its consequences. When addressed as "Sarah Wilson," the patient paid no attention, but asked, "Why am I called Sarah Wilson? My name's Margaret Kelley." She remained unidentified until the beginning of August.

1906, when she consented to have her photograph taken. It was the reproduction of this photograph in the newspapers, that a few days later, led to her identity as Miss Susan N. of Lowell, by her brother and sister. At first, the patient denied this name, but finally, although somewhat reluctantly; accepted it under the overwhelming pressure of argument by relatives and friends.

II. GENERAL FEATURES OF THE AMNESIA

After coming out of the stupor, the patient failed to recognize her surroundings and immediately gave her name as "Margaret Kelley" a fact of some significance if we remember the letter found on her person, and for which she was amnesic. It needed only a few questions to establish that she had completely forgotten all her previous life, knew nothing of the various happenings during the last month, of "Alice Walker" or "Sarah Wilson," or of the Normal School, North Saugus or Merrimac River episodes. She had absolutely forgotten the names and uses of familiar objects, but later acquired these with a rapidity that would have been manifestly impossible had she learned these for the first time, thus showing that the processes of association were all formed. At the time of the examination in August, 1906, this rapid acquisition of knowledge made it very difficult to distinguish what was learned from what was remembered. Spatial relationship was appreciated, while reading, writing and the capacity for spoken language were perfectly preserved. The patient could cook and sew, and walked, dressed and ate normally. The amnesia seemed to comprise principally the educational or school memories, events and the names of objects, persons and places. Everything she read appeared to her as if she had read it for the first time. Thus it appears that the more unstable memories alone disappeared, following Ribot's law for the destruction of memory, called by him the "law of regression," which may be stated that memory advances progressively from the unstable to the stable. Thus the higher, special and acquired memories, with their looser organization, were obliterated in Susan N. This comprised the names of objects, places, events and the

knowledge of general literature. These will be designated as the psychic memories. The more closely knit associations, which included the knowledge of her mother-tongue, reading, writing and the memories for coördinated movements, were preserved. By constant repetition, the latter had become almost automatic in their activity and the name of organic memories can well be applied to them. It was these organic, these stable memories, which were preserved, while the unstable psychic acquisitions were totally obliterated.

While at the hospital, the patient spent considerable of her time in reading, writing, sewing and fancy work, all of which she accomplished freely. She never attended religious services and knew nothing of the various sects, their names conveying no meaning to her. Although a little reserved in manner, yet she made friends easily. Her attitude toward the "lost period" of her life was never one of indifference, but rather a stoic bowing to the inevitable. According to the testimony of friends and relatives, there was no change in her character; both as the original Susan N. and in her new state, she was quiet, affable, sincere and possessed of uncommon intelligence. This disposes of any hypothesis of multiple personality, at least in its most fully developed form. The spontaneous activity was free and complete, there was no change in the psychical life, no transformation of character or the birth of a new ego, no new reaction to environment other than that demanded as a process of re-adaptation, the inevitable result of the extensive amnesia.

During July, 1906, the patient was taken for a drive and visited the chief places of interest in Lowell, including the railroad station,¹ in the hope of reviving the memory by old associations. Although she intelligently appreciated all the scenes, yet everything was unfamiliar to her. One episode about this period is of interest, as throwing light on the spontaneous flashes of memory as revealed in the automatic writing and the phenomena of spontaneous distraction. One day, while idly holding a pencil over a block of paper and talking at the same time with a hospital attendant, the hand wrote automatically the words "Victoria

Wood." The patient was unable to explain the words or to point out their significance. She was unable to recognize her old friends and relatives, and her attitude toward her sister was as if she had seen her for the first time. About the middle of August, 1906, another peculiar incident occurred, which also may be interpreted from the standpoint of dissociated isolated memory flashes. She was visited by a fellow member of the church society to which she formerly belonged and who wore a pin which was the emblem of that society. The patient recognized the pin without having her attention called to it, but did not recollect the wearer.

After having thus given an account of the general features of the amnesia, we may now conveniently proceed to a more specific analysis of the memory. It will be best to begin with a brief statement concerning her first impressions after awakening from the stupor. The first thing recalled in the hospital was lying in bed in a small room with a woman sitting beside her. When asked her name, she gave it as "Margaret Kelley," stating that "it was the first name that came to my mind." This was possibly a memory flash from the period belonging to the letter previously described. When addressed as "Sarah Wilson," she paid no attention to the name. After getting up from bed, she remembered seeing the physician first and also remembered being transferred from the Infirmary to the Hospital Ward. She stated, "When I first saw trees and houses, I never remembered having seen them before." It was necessary to teach her the use of ordinary objects. Fortunately, I was present at the visit of an old and intimate friend of the patient, the Mrs. A. before alluded to. This furnished an excellent opportunity for the study of her reaction to former acquaintances. She was unable to recognize Mrs. A., even when her name was mentioned and when she was brought face to face with her. She reiterated "I don't remember," in answer to questions relative to prominent incidents of her childhood and early life. She asked the name of some nasturtiums brought by her visitor, and did not recall having seen similar flowers before. When the name "bobbins" was used in the course

of the conversation, she naively inquired, "What are bobbins?"

At the time of the examination she was perfectly oriented, knew her name, age, where she was, date, etc., but explained her correct answers only from having learned these data recently. There was no disorder of the time sense. All concrete facts, such as contemporary events, the names of authors, the titles and contents of their works, were only remembered from her reading since coming to the hospital.

For educational memories, such as grammar, history, geography, arithmetic, she was totally amnesic, excepting for those facts she had acquired since awakening from the stupor. Her description of objects furnished some interesting data. Some were correctly given, but only from "seeing them since," as she expressed it; but for many of the objects of which she knew the uses, she was unable to attach a name. For instance, on being shown a candle, she knew its use but not its name or ever having seen one before. The same was true of a pen and of pictures of various domestic and wild animals. At all times, she carefully distinguished what she learned from what she acquired. Definitions of simple words were correctly given. Once she pertinently stated, "It is mostly names of people and of places that have gone from me entirely." She calculated well, there was no disorder of apperception, but the associations were narrow, being mostly of a modifying or descriptive type. Some objects, such as tables, electric cars, boats, were familiar to her, both by name and use, but only from having recently seen or read about them. She did not remember the name of any animal she had not seen since coming to the hospital. In a test for reading, the French word "curé" occurred, which was not only correctly pronounced, but recognized as being a French word. When asked the definition of a triangle she drew one correctly. A careful quizzing over the various incidents of her life, school, work as a domestic in the mills, work as a school teacher, various places in Lowell, the Merrimac River, Normal School and Saugus episodes, her friends and relatives, the attendance at St. Anne's Church, disclosed

a total amnesia previous to "waking up" at the Lowell City Hospital. She frequently reiterated — "I only know what others tell me, I only know my friends and relatives because they tell me so and I believe them."

Physical Examination

The patient is tall, thin, of a dark complexion and has dark brown hair, streaked with gray. She has an intelligent and rather serious facial expression. She sleeps well, does not suffer from headache and displays nothing that is popularly termed "nervousness"; knee jerks brisk and equal; tongue median and steady; no conjunctival or palatal anaesthesia. The pupils are equal and react promptly to light and accommodation. There is no limitation of the visual field, no localized or hemi-anaesthesia or hyperaesthesia, no allocheiria, no disturbance to tests with aesthesiometer. It will be seen that the amnesia did not run parallel with any disturbances of sensation, phenomena which Janet has noted as being of frequent occurrence. In spite of the amnesic symptom-complex, "those special stigmata, which in the popular neurological mind are supposed to be almost the *sine qua non* of hysteria, were absent" (Prince). Even the fugue presented no concomitant phenomena which would interpret it as a protracted hysterical somnambulism.

III. DREAMS

As in other cases of mental dissociation leading either to amnesia or to multiple personality, a careful record of the dreams serves to elucidate the dissociated states. Studies along these lines in the case of Susan N. yielded interesting results. These dreams were looked upon by Susan N. as strange and bizarre, not synthesized with her normal waking or sleeping personality, and therefore possessing only the ulterior significance of similar phenomena in healthy individuals. That these dreams were dissociated memories is evident when we analyze the dream records of all carefully studied cases of amnesia. Like the experimental distraction memories and those sudden and spontaneous flashes of memory which were so prominent in the case of

Susan N., these dream memories were very intense, were clearly remembered in the waking life, and there was a frequent recurrence of the same dream.

In Charcot's observations on Madame D., the patient was frequently heard to talk in her sleep and mention names and incidents for which in her waking state she was amnesic. In Sidis' case of Rev. Mr. Hanna, many of the lost memories reappeared during dreams. Vaef's patient, with a retrograde amnesia for a trip to Australia, occasionally dreamed he was in the latter place, but the dream would rapidly fade away on awakening. That dreams are often memories of dissociated experiences is best seen in Prince's case of multiple personality, Miss Beauchamp. These dreams were all recorded by Sally, one of the personalities, thus offering an exceptional opportunity for the study of the dreams of the other personalities designated as B I and B IV. Dr. Prince says, "As a matter of fact, as a result of the inquiry into the dreams, it transpired that however distinct and separate was the ideation of B I and B IV during the waking state, during sleep these personalities reverted to a common consciousness and became one and the same. That is to say, the dreams were common to both; each, B I and B IV, had the same dreams, and each remembered them afterwards as her own. The logical consequence of this, was that the dreams might have had their origin in the waking experience of B I or B IV."

This observation is the most important one made on the supposition that dreams have their origin in the waking experiences of an individual and establishes that in states of psychopathic dissociation dreams are often memories of the experiences of the original, primary personality, of which there is amnesia in the waking state.

As to the dreams of Susan N.

1. "One dream stands out very clear. This was several weeks ago. It seemed as if there was a man and a woman came to see me with Mr. C., and they told him they were relatives of mine and were willing to take care of me. So he sent me off with them and we travelled quite a distance. On part of the road there seemed to be trees growing on both sides, not very close together, and after a time they

came to a house and after they took me inside the man commenced to beat me and the woman to pull my hair out. The man had coarse whiskers and I think I'd know the woman if I should see her." This dream was repeated several times in an identical manner. As an interesting and valuable sequel to the above, one afternoon in August, the patient was taken for a drive to her old home in the village of Tyngsboro, in an effort to ascertain if she would recognize any of the scenes of her childhood and early youth. But everything was strange and unfamiliar to her: the old cemetery, a former schoolmate who was encountered on the village road, and even the building in which she had formerly taught school. She was then taken up the road to the house where her brother and sister lived, and on reaching it she immediately said, "This is the house of my dreams. I can see very plainly the man dragging me off the wagon and the woman pulling my hair up those two steps and through the piazza into the kitchen in the back." On being confronted by her sister, the patient exclaimed, "That is the woman of my dreams," and although immediately recognized by her sister, Susan N. disclaimed any knowledge of her and was very frigid in her manner.

2. "I seemed to be going to a place — Townsend (spelling the word). I was in the trolley going to the railroad station. A lady was with me, and we were starting to go to that place, and when we got to the railroad station my dream ended." Further analysis disclosed that this Townsend dream occurred before the patient was taken into the city in July, 1906, and that at this latter date the station was recognized as the building seen in the previous dream but without any feeling of familiarity. In both these episodes the dreams were memories of dissociated periods or experiences for which the patient was amnesic in her waking state and which were therefore interpreted as purely imaginative creations.

3. "In one dream I seemed to be picking flowers here on the grounds, red and white blossoms. It was an ordinary garden with plants."

IV. EXPERIMENTAL DISTRACTION MEMORIES

What I called distraction memories in a previous communication, are those fragmentary or partially organized flashes from the dissociated mental life which become synthesized with the consciousness when the attention is experimentally distracted by a monotonous sensory stimulus or which arise as a result of voluntary or involuntary abstraction. To the latter (involuntary abstraction) the term spontaneous may be applied, to distinguish them from the experimental variety. The experimental method has yielded valuable therapeutic results in the synthesis of amnesia. In the Hanna case it was possible to effect a complete restoration of the entire dissociated memory system. In four cases of alcoholic amnesia which I published in this journal, I was able to completely restore the memories of the amnesic period by this method. The method was also successful in other personal observations: a case of hysterical amnesia with impulsive episodes of excitement and attempts at suicide, in a case of functional amnesia with wandering impulses, a case of organic amnesia of the retrograde type following a cerebral embolism and finally in a protracted fugue with the execution of many complicated acts, lasting several days and for which the patient was totally amnesic. It is hoped that the details of these interesting cases will be published later.

The application of this method to the amnesia of Susan N. was only partially successful, yet yielded such interesting results in the form of isolated flashes of memory, to warrant being recorded. The monotonous tick of a stop watch was used; the patient was asked to thoroughly relax, to think of nothing but listen intently to the watch tick and tell what thoughts came to her mind. The first trials yielded only a few isolated questions, such as "When did I leave Lowell to go to North Adams?"; or, "Did I ever teach school?" When asked if these were genuine memories, she replied, "I call them wonderments." The fifth trial was more successful, and the following resulted (five minutes' stimulation): "A quotation —

'How strange it seems, with so much gone,
Of life and love, to still live on!'"

Asked the origin of the quotation, she replied that the lines were in Whittier's "Snow Bound." As it was previously noted that all her knowledge of literary works had disappeared, these lines must be of the nature of dissociated memories. Then she continued, evidently by a process of continuous association with the above, as she was not distracted at that particular moment.

"Life is ever Lord of Death, and Love will never lose its own."

As an interesting corollary, she added, "I have a good many lines that come that way. I don't know where from." The above quotations are in reality from Whittier's "Snow Bound," and were correctly given.

Sixth trial (five minutes):

"He is dead, the beautiful youth,
The heart of honor, the tongue of truth,
He, the life and soul of us all,
Whose voice was blithe as the bugle call,
Whom all eyes followed with one consent,
The cheer of whose laugh and whose pleasant word
Hushed all murmurs of discontent!

"That's from Longfellow."

[The quotation is from Longfellow's "Killed at the Ford," and is correctly given, with the exception that the word "soul" in verse 3, should be *light*.]

"Have you read that lately?" "No, I can't tell where I read it or when, but I am sure not since I came here."

Seventh trial (five minutes):

"From the strong will and the endeavor
That forever wrestles with the tides of fate
From the wreck of hopes once scattered,
Tempest shattered
Floating wastes and desolate,
Ever drifting, drifting, drifting
On the shiftless current of the restless main."

Then she added spontaneously, "These quotations come to my mind and I can't account for them."

[The above quotation is from Longfellow's "Seaweed." It is incorrectly given, the last two verses being transposed from a previous stanza.]

Eighth trial (fifteen minutes). "I was wondering how far away California is. Those two men who claim to be my brothers and the one who says she is my sister, are my relatives. I know San Francisco is in California."

Other experiments yielded nothing of value.

Automatic writing produced only a portion of a quotation from Longfellow's "Seaweed" and the name "Walter Marston, Boston." Crystal gazing likewise was negative in its results, while hypnosis was impossible.

V. SPONTANEOUS DISTRACTION MEMORIES

The spontaneous distraction memories or the memory automatisms of Susan N. are of the same nature as the experimental distraction type, with the exception that they occurred in normal abstraction during reading or conversation. Chiefly allied to these are the dream memories. These memory automatisms are genetically related to the paradoxical, scrappy and fragmentary memories of Miss Beauchamp and Mr. Hanna, and because not synthesized with the personal consciousness, they are not looked upon as memories, but as strange, unfamiliar and isolated phenomena, which Susan N. well expressed by the term "wonderments." Examples have already been given in the writing of "Victoria Wood," the assuming of the name "Margaret Kelley" in awakening from the stupor and the recognition of a pin as the emblem of a church society. The others follow.

1. "Sometimes I have vivid memories of Eastport, when I was sitting and thinking. It came to my mind as other things do. It is a small place with small wooden houses, the streets aren't wide or clean, and they have many ups and downs. It is near the water. It doesn't seem to me as if I had been in a house there. They told me since that I have passed through there going up to St. Andrews a few years ago."

2. "I seem to have an idea of Portland, but it is not so clear as Eastport. All I can see is lots of nice looking houses and a great many trees."

Does anything of Boston come to your mind?

"When you say Boston, all I see is the word; when you say Portland or Eastport, I see the houses and trees."

A prominent feature of all these distraction memories was their complete isolation; they did not act as a nucleus around which other memories grouped themselves by association. In discussing similar phenomena in Miss Beauchamp (BI), Prince has given us a very pertinent description of these isolated flashes of memory. "The first class comprised memory flashes which were perfectly spontaneous, uninfluenced by any volitional effort of her own. They were the emerging into her mind of isolated memory images, such as a name, a face or a place, which seemed to come from out of nowhere, without any connection with anything else. They did not bring with them any extended associations and were unimportant so far as affording definite aid in adapting herself to her environment. Finding herself speaking with an apparent stranger, for instance, the correct name of this person would flash into her mind, or the face of an apparent stranger in a street car would suddenly become familiar, but there was nothing more extensive than this."

VI. ANALYSIS OF THE CASE

Before proceeding to the discussion of the complex psychic phenomena presented by this case of Susan N., it would be well for the sake of lucidity to preface the analysis by a brief account of some features of amnesia. If there has been a conservation of a certain group of organized memories and their reproduction cannot be brought about, we have the general condition of amnesia. In many types, particularly the functional, amnesias, the loss of memory is not absolute, but merely relative and apparent, that is, dissociated. However, when there exists an actual organic lesion of the cortex, the memories are not merely dissociated, but irrevocably destroyed, and under these conditions, not only do they fail to reappear in certain states of distraction, but all experimental restoration becomes manifestly impossible. Sometimes there are exceptions to this statement, as in a case of retrograde amnesia due to cerebral embolism, in which I was able to completely restore the memories of the amnesic period. Perhaps in this case, the embolic process

acted merely as a dissociative and not an actual destructive factor.

It is not the organic, but rather the functional amnesias, that display the most interesting and valuable phenomena. It is these forms that have cast considerable light on the mechanism of associative memory and to which the greater part of the published cases belongs. It is in these functional amnesias that the loss of memory for a given period is not absolute; there is rather a dissociation of an organized group of memorial images in such a manner that they fail to synthesize with the normal consciousness. Therefore, it may be stated as a general law that the memories of a functional amnesia for a given period are never lost, but merely dissociated. In states of experimental distraction (hypnotic and hypnoidal conditions, crystal gazing, automatic writing), in spontaneous distraction (dreams, reveries, waking abstraction), or finally in pathological distraction (delirium or hallucinosis) these dissociated memories become more easily synthesized with normal consciousness. In sleep, the memories of the amnesic period which are revised or synthesized in our dreams are looked upon as pure imaginative creations.

In waking abstraction, the memories are interpreted as strange thoughts, foreign to the personality, because lacking the personal synthesis of a normal stream of memory.

The relation of firmness of organization to memory has already been touched upon, and it is this organization which determines whether the amnesia be of the retrograde or continuous type. In the former, only those images are dissociated in which the organization is loose, and therefore a retrograde amnesia arises, because the most loosely organized memories are nearest to the present in point of time. In continuous amnesia, there is no apparent fixation of images, no organization and consequently under normal conditions there can be no later reproduction.

Thus it appears that a stimulus of a certain length and intensity is necessary for the healthy nerve cell, in order that its substance may reach such a state of equilibrium, that a physical, sensorial reaction may be reproduced as a psychic fact. This forms the dynamic basis of ease of reproduction

of certain images. In Rieger's case, unless the patient succeeded in finding the name of an object in eighteen seconds, he was unable to do so at all, and in some personal experiments on a case of amnesic aphasia, ten seconds was the maximum for recalling either the word or its equivalent association. Therefore it is best to regard memory as an expression of the activity of the cortex as a whole from characteristics retained by the neurons from previous excitation and stimuli. Amnesia is either a dissociation or a destruction of this reproductive activity, and according to the exact condition, it may be broadly divided into organic and functional. The factors in the production of the organic amnesias are the various poisons, of which alcohol is of prime importance, trauma, epilepsy, and diffuse or localized brain lesions, such as occurs in general paralysis, senile dementia, Korssakow's disease, tumors and hemorrhages. The functional amnesias stand in a casual relation to hysteria and the emotions, which factors are highly productive in causing dissociations of memory. So far as the synthesis of these dissociated memory disorders is concerned it is only in the functional and in a few of the organic types, such as some alcoholic, epileptic or traumatic amnesias, that experimental procedure seems to be successful. Here there is no real oblivion or destruction of images; they are merely inhibited, or in popular psychological parlance, are dissociated from the personal conscious perception. In the organic types, the destruction is real, because the functioning tissue of the cortex itself suffers a physical deterioration.

Symptomatically, amnesias are systematized when they take in all the memories of a period, localized when they comprise the memories of a certain epoch of life and general when the patient has no recollection of the previous life. These in addition to the continuous, retrograde and anterograde amnesias which have been previously mentioned, form the principal types of this particular memory disorder. There are a few instances, however, in which there seem to be localized amnesias for certain concepts only, usually the deeper associations being spared, as in the cases of Rieger and Wolff, thus showing again the relation of retentiveness to firmness of organization.

With these few considerations, the case of Susan N. may be defined as one of general functional amnesia, in which the higher psychic memories, such as the knowledge of objects, places, events, literature, were destroyed, while the lower and more organic acquisitions, such as reading, writing, speech, were preserved. This is in harmony with the law of regression, to which we previously alluded. In this respect, the case is unique of its kind, from the standpoint of general amnesia. In the Hanna and Mary Reynolds cases the entire previous mnemonic life was destroyed, even the narrowest automations being impossible. Certain aspects of the memory disorder of Susan N. have already been discussed, but there remains the important query,—what caused this profound disturbance in the dynamics of her memory? A toxic or traumatic etiology can easily be dismissed, likewise any hypothesis of multiple personality or an hysterical dissociation, as there is nothing, either in the history or symptomatology of the case, which could lead us to consider any of these factors. Unless we can postulate some adequate cause, we are forced to return to the unsatisfactory term of functional, which is equivalent to expressing a total ignorance. A careful review of the case has left but one explanation, which in itself is merely tentative. It is possible that an intense emotion of a religious nature may have taken place during the patient's attendance at church, and we know how far-reaching may be the dissociating effects of the emotions in producing amnesia or multiple personality.

The reason for the selective action of any emotional storm, in dissociating one group of memories and sparing others, cannot even be conjectured. The inability to recognize objects or to tell their names, unless these data were recently acquired, showed that sense perceptions failed to call forth the complete associations of the object with anything previously learned. This of course could not be otherwise, considering the wide extent of the amnesia. The discussion of the other data in the case has already been given as a running commentary. Finally it may be stated that the experimental evidence in this case of Susan N. shows that we are dealing with mere isolated, disconnected

fragments of a wide system of memorial images, which in her present state are totally dissociated from the conscious mental life.

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