

## CURRENT IDEAS ON APHASIA

WITH STUDIES OF AN INTERESTING CASE\*

A. W. HOISHOLT, M.D.  
STOCKTON, CAL.

### HISTORY OF THE THEORY OF APHASIA

The first observations on the subject of aphasia were made by Bouillaud in 1825 and by Dax, senior, in 1836, but the fundamental understanding of speech-defects and of their origin in lesions of the brain-cortex is due to the studies of Broca, who formulated the results of his researches in a declaration made before the Academy of Medicine of Paris in 1861, in which he claimed to have shown that the center of speech is located in the third frontal convolution of the left hemisphere. Since Broca, in the early seventies, finally succeeded in overcoming all opposition to his doctrine, establishing that the location of the speech center in the right hemisphere is found only in left-handed persons, the cerebral location of the center of speech has been moved more and more laterally and posteriorly in the cortex. It is especially to Wernicke's clinical and pathologic researches that we owe a fuller understanding of the subject. He has given us a scientific basis for the subdivision of aphasia into two distinct forms, a motor aphasia and a sensory aphasia, for the understanding of which it is necessary to assume the existence of three cortical centers, a motor center in Broca's convolution for the perception of speech-movements, a center for auditory word-pictures in the posterior half of the first temporal convolution, and a center for the visual word-pictures located more posteriorly in the angular gyrus. Wernicke and Déjerine do not recognize a special center for written word-pictures, but teach that efferent nerve-impulses pass from the visual and auditory centers directly to the general arm-center. Through these three centers each word-picture may be said to have three dimensions, an auditory, a visual and a motor-speech, each picture-dimension varying greatly in importance and in independence of the other two in different individuals.

Charcot divided man, in accordance with this idea, into three groups: *les auditifs*, in whom the sound-picture plays the greatest rôle;

---

\*Paper read before the Sacramento Society for Medical Improvement, June 16, 1908.

*les visuels*, who depend largely on the optic pictures, and *les moteurs*, who make most use of the memory of spoken or written words.

The terms used in connection with the subject of aphasia have been manifold and many chaotic changes have been made in the application of the terms. Thus, Finkelnburg applied the term "asymbolia" to aphasia in general. Aphasia was at one time confined to its motor form, while before that Broca (in 1865) suggested the term "aphemia" for motor aphasia. Now aphemia is applied by some to cases of pure word-deafness. Kussmaul's differentiation between amnesic and atactic aphasia is obsolete, because amnesia is present in all forms of aphasia.

Various terms are employed to define the elementary manifestations making up the defects of speech-functions. "Agraphia," a loss of ability to write, was first discovered as a symptom by Marcé in 1856 (the name "agraphia" was invented by W. Ogle in 1867). "Alexia" is the inability to read written or printed letters. "Amusia" is a loss of the ability to produce or comprehend music, and may accordingly be motor or sensory.<sup>1</sup> "Paraphasia" is an interchange of words. When the interchange is observed in reading or writing it becomes a "paralexia" or "paragraphia."

"Asymbolia," instead of being a term for aphasia in general, is now applied to a disturbance in the understanding of gestures (sensory asymbolia), or to a defective emission of motor impulses to produce gestures spontaneously or in reply (motor asymbolia). It is supposed to be caused by a focal lesion of the supramarginal gyrus and may or may not be combined with hemianopsia. Aphasia may sometimes, in the total absence of motor paralytic symptoms, be associated with an inability to handle or make use of objects in the manner for which they are designed. This perversion of muscular action has been termed "apraxia." An apractic patient may, for instance, put coins given him into his mouth, may not know what to do with matches or a match-box, may not know what to do with a knife, or he may not be able to close his eyes on command, or to open his mouth; he may use the spoon at the table very awkwardly, or, when told to take off his trousers, may help the left leg with his right hand, etc. The patient acts as if "his limb were absent-minded," and always shows the symptom, although he has understood the command fully. Apraxia may be observed in the right, but is usually present in the left extremity. It is only recently that this dis-

1. A case of the latter form of amusia observed in the Stockton asylum in 1890-1892 was reported by me in the *Occidental Medical Times*, September, 1893. An excerpt was afterwards published in the *American Journal of Medical Sciences*, February, 1894.

turbance has been fully explained by H. Liepmann<sup>2</sup> of Berlin, who reported a case of motor apraxia in 1900. His findings have been corroborated by others. The disturbance is supposed to be due to lesions in the supramarginal gyrus and in the corpus callosum, where the lesion causes a destruction of the commissural fibers uniting one hemisphere with the other, making one hand—usually the left—guideless.

After Broca's doctrines of speech-localization had been undisputed for a period of half a century a neurologist came forward with a treatise in which he tried to establish proofs so completely upsetting this theory that his publication has acted—as Dr. August Wimmer<sup>3</sup> of Copenhagen puts it—like the battle signal of Roland's horn when it echoed through the valleys of Roncesvalles.

When the first article<sup>4</sup> of this noted neurologist, Prof. Pierre Marie of Paris, one of Charcot's most eminent pupils, appeared about two and a half years ago it could not fail to act like an earthquake to the current views on brain localization, as its title was, "Revision of the subject of aphasia: the left third frontal convolution plays no special rôle in the function of speech." While time will probably show that Marie has gone a step too far in making this positive statement, he is no doubt right in pointing out that the area of cortex destroyed is not a true index of the damage to the brain, the destruction subcortically extending in different directions and usually complicating the clinical picture by affecting the function of distant parts of the brain. In this way, he says, observers have fallen into error by ascribing all loss of function to lesion of the cortical area involved. Marie asserts that one finds cases of isolated destruction of the base of the left third frontal convolution in non-left-handed persons in whom there was no aphasia. He has observed one such case himself; and, on the other hand, says that he has met a case of pronounced Broca's aphasia without finding a lesion in this region of the brain. It is most singular that this part of Marie's personal study of the very brains which led Broca to make observations resulting in his epoch-making declaration in 1861 relative to the localization of the center of speech, a declaration which, though at first opposed by Trousseau, Vulpian and Charcot, was afterward established as a doctrine and almost became a dogma, helped along by the enthusiasm of his followers and the results of experiments of cortex-stimulation in the early seventies. Even Charcot finally adopted the teachings

2. Liepmann (H.): Ueber die Rolle des Balkens beim Handeln, etc. *Allg. Ztschr. f. Psych.*, lxiiv, 450.

3. Wimmer (August): *Hospitalstidende*, Oct. 23, 1907.

4. *Semaine méd.*, May 23, 1906.

of Broca. The brains above referred to are still found as specimens in the Musée Depuytren in Paris, and when they were examined by Marie it was found that Broca had examined them only on the surface and macroscopically. In the first of the two brains, Leborgne's case, Marie did find an affection of the left third frontal convolution, but he also found changes, and still greater ones, in the zone of Wernicke or zona lenticularis. In the second brain, Lelong's case, there were no pathologic changes in the last mentioned zone, but there was also an absence of characteristic lesions in the left third frontal gyrus. The brain was atrophic *in toto* and included an atrophy of the last mentioned gyrus, but what Broca considered a pathologic change is now looked on as a simple senile atrophy. The patient was eighty-four years old and probably presented symptoms of senile dementia.

A further declaration by Marie is that "every aphasic shows a more or less pronounced disturbance of the understanding of the spoken word, which defective understanding is less pronounced the more motor the type of aphasia." This disturbance in the word-understanding is not a word-deafness, as Wernicke says, but a loss of ability to understand the meaning of the concrete word—the aphasic of the motor type understanding a complicated command when repeated slowly a part at a time. Marie sees in this an enfeeblement of intelligence, which he considers a cardinal symptom of every aphasia, associated with loss of ability to read and write. Marie says that there is, therefore, but one cerebral location for aphasic disturbances, because there is but one aphasia. Broca's aphasia he considers an anarthria (due to a lesion in the lenticular nucleus, in the anterior knee of the internal capsule and in the capsula externa of the left as well as of the right hemisphere); that is, an incoordination—not a paralysis—of the muscles of speech, which incoordination is complicated with aphasia. Marie's one cerebral location for aphasia is Wernicke's zone (gyri supramarginalis et angularis), the base of the first<sup>5</sup> and second temporal convolutions.

Marie says that it is incorrect to speak of different centers as "word-center, visual-center or reading-center." Whenever Wernicke's zone is

5. With regard to our present knowledge of the microscopic structure of the first temporal convolution, it may be here stated that Dr. Campbell, of Edinburgh, has demonstrated the presence of very large nerve-fibers and a certain cell-structure lamination in the posterior third of the first temporal convolution and the adjacent portion of the transverse gyri of Heschl within the Sylvian fissure, which join the posterior gyri of the insula. Campbell believes that this differentiates the above region sufficiently from the rest of the temporal lobe and the anterior part of the insula (which latter is probably olfactory in function) to be characterized as "the audito-sensory area."

affected we have the syndrome, Wernicke's aphasia, with the elements of word-deafness, alexia and agraphia, the degree of defect being proportional to the extent of the lesion. Broca's aphasia is, therefore, Wernicke's aphasia plus anarthria, which combination is so frequent, because it is due to softening caused by blood vessel disease, usually disease of the arteria fossæ Sylvii, which gives the vascular supply to certain parts of the cortex, principally bordering on the Sylvian fissure, as well as to certain parts of the central ganglia and neighboring white substance of the brain. The variations in the clinical pictures of aphasia are more dependent, according to Marie, on individual variations in the blood-vessel supply and anastomoses than on the topography of the cerebral convolutions affected.

While some of Marie's conclusions are true, or at least worthy of serious consideration, others have provoked sharp contradictions, both in France and Germany. In France it is Déjerine especially who has criticised them. In a masterly manner Déjerine points out that, even if the speech-understanding is at times—though not necessarily—affected in motor aphasia, it is much less so than in the sensory form, and, when found in the patient directly after the insult, it disappears quickly with the initial alexia and agraphia. Déjerine also insists that a pronounced and permanent anarthria can not be caused by a lesion in the lenticular nucleus, and he states that he has never seen a pronounced anarthria following a unilateral lesion, whether in the cortex or in the internal capsule. The great majority of writers make a sharp distinction between anarthria and motor aphasia. The few words still at the command of the motor aphasic are well articulated, and, as Déjerine says, one may meet patients suffering from this form who can sing melodies learned prior to their illness with absolute correctness, both as to pitch and time, while it is impossible for them to cite the words; "the patient with motor aphasia is, therefore, not suffering from dysarthria." "The aphasic can pronounce only a few words—the sufferer from anarthria all words, but badly." On the subject of intelligence-defects in the aphasic Déjerine has pointed out that a general paralytic can speak and write, and his feeble-mindedness is much more pronounced than the intelligence-defects observed in an aphasic individual.

In Germany Heilbronner, Liepmann, Henneberg and others have expressed the same views as Déjerine. The first-mentioned believes that the intelligence-defects observed by Marie are in a large measure the result of misinterpretation of the symptom of apraxia.

When Marie's teachings were discussed at a meeting of the *Société de neurologie de Paris* (Nov. 8, 1906) Dr. André Thomas said that he

did not deny that in some cases of aphasia there might be a diminution of intelligence, but he attributed it to a more or less marked disturbance of the "inner speech." This "inner speech" is the mental repetition of words or sentences subconsciously practiced in understanding the spoken word. In motor aphasia there is an interruption in the transfer of the word-picture (that is, the sound-picture) to the motor speech-apparatus, which makes the memorizing difficult, to which becomes added a further difficulty in the reproduction itself of the word-picture. Marie's doctrine of loss of intelligence in the aphasic has been considered the least tenable of his new theories.

In spite of the large clinical material which is at the command of Déjerine, he has so far been able to furnish but two cases to prove that Broca's aphasia may be caused by an isolated destruction of the third frontal gyrus, and these were published about a year and a half ago (May, 1907). The two cases published by Déjerine some months before this to illustrate motor aphasia did not stand the scrutiny of Marie, who in a later article showed that the lesion extended in one of the cases beyond Broca's region into the white substance under the gyrus supramarginalis or the neighborhood of the zone of Wernicke, while in the other case Marie shows that, besides the cortical lesion, a degeneration was found in the internal capsule and the external part of the thalamus. In justice to Marie it must be admitted that it is surprising that the medical literature has so far furnished so few clear cases in proof of the existence of Broca's center. The justification for its elimination, however, has not been fully established.

#### REPORT OF CASE

During the past year I have studied a very interesting case of aphasia at the Stockton State Hospital. It was interesting because of the complete word-deafness present, especially in the early part of the history of the case, combined with complete alexia and agraphia and a certain degree of apraxia mixed with asymbolia, the patient appearing at the same time to be quite intelligent considering his age and the symptom-complexes present. He was neat in person, energetic in his attempts to make the nurses understand his wants and attentive to his fellow patients. He showed acuteness in visual apperception and his behavior as to affects seemed quite normal. Besides being clinically interesting, the pathologic findings have a certain bearing on the questions stirred up by Marie's publications. The encephalomalacia found in the case was

without doubt caused by the lodging of an embolus in the artery of the left Sylvian fissure. In such cases it is, of course, extremely difficult to decide how far the symptoms present during life were due to destruction of gray matter of a certain locality or to degeneration in the underlying white matter, which contains not only afferent and efferent neurons, but also association-fibers connecting more distant parts of the cortex.

*History.*—J. G. W., aged 72, farmer, well nourished for his age, was admitted to the institution June 26, 1907. From relatives it was learned that there was no history of insanity or nervous diseases in the family, but his father and sisters were said to have been subject to attacks of articular rheumatism and heart trouble. There was no history of apoplexy. He had enjoyed very good health all his life until about twelve years before admission, when disturbances referable to the heart began to set in; these, however, were slight, consisting of palpitation, some sensation in the region of the heart and dyspnea on exertion. Prior to May 6, 1907, he did light work about the house, was active for his age, interested in the newspapers and wrote a good average hand. He had always been right-handed.

*Present Illness.*—On the morning of May 6, while he was dressing himself, his wife, who was in an adjoining room, heard him fall, and on going to him found him lying in an unconscious state on the floor. He could not be aroused and remained in this condition about three days, when he gradually recovered consciousness and could say two or three words. The attending physician reported that he was quite prostrated, apparently equally helpless in all four extremities. No paralysis in the face was observable, but a speech-difficulty was apparent. He could say only a few words, which were misapplied, could not make himself understood, nor could he understand what was said to him. No detailed investigation into the nature of the manifestations was made at this time. About a month after the attack began he was able to leave his bed and seemed to have about equal strength in the right and left extremities, but showed the same difficulty in understanding and making himself understood, and seemed confused and irritable because the family could not carry out his wishes. This irritability kept on increasing until about a week before his commitment, when he became threatening and violent, frightening his family and the neighbors so that they finally had him sent to the asylum.

*Examination.*—When he arrived at the institution the patient seemed to have become quiet and showed no excitement or irritability. He seemed well preserved for his age as far as his outward appearance was concerned. His pulse was 70, irregular and intermittent every five to seven beats, radials and temporals arteriosclerotic. Heart dulness extended to the upper border of the third rib and to the right border of sternum; apex beat was in the mammillary line. A faint systolic murmur was heard at the ensiform and at apex; the diastolic tone was roughened. Pulsation of the carotids was visible in the neck. Lower border of the liver was sensitive to pressure, and found about one inch above umbilicus. The spleen was not perceptibly enlarged. Auscultation of the lungs showed nothing pathologic. The cranium was fairly symmetrical, not sensitive to percussion. There was no edematous swelling of face, and no defective function of eye muscles. Pupils reacted normally and equality was present. Fundus: Right eye showed optic disk of normal color with clear-cut margins and without cupping. The blood vessels showed distinct pulsation in the veins. Left eye: Chorioidal

atrophy around rim of disk, which was otherwise normal. Pulsation of veins likewise observed—not of arteries. Perimetric examination of the field of vision gave the results shown in Figure 1.

There was slight inequality in the right side of the face; the upper nerve branches not involved. The tongue pointed straight and was equally movable; soft palate normally suspended; sensibility in face normal. The patient had good use of his upper extremities. The dynamometer showed  $42\frac{1}{2}$  in the right, 59 in the left hand. There was no muscular atrophy; sensibility and reflexes normal. The patient's walk was erect, gait normal, muscular strength in lower extremities about equal. There was no incoordination in upper or lower extremities. Romberg was present to a slight extent. There was no atrophy of muscles in lower extremities. The knee-jerks were equal and about normal; other tendon-reflexes and skin-reflexes likewise. The bowels were fairly regular; no symptoms of indigestion. Urine contained no albumin or sugar. The patient made the impression of being quite bright and active. He was fairly well oriented as to time and place; his behavior was orderly, the state of affects was quiet and the attention was markedly present. There were no symptoms of confusion and no hallucinations or delusions ascertainable. He was cleanly in habits.

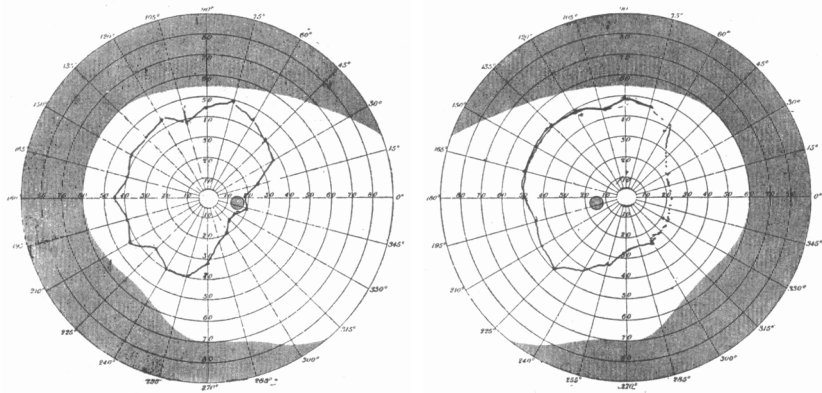


Fig. 1.—Perimetric examination of patient's field of vision.

1. *Examination of the Speech-Ability.*—In talking with the patient it is at once noticeable that he used only a few words, but these words are well pronounced—the stamp is nearly perfect, no trace of inarticulation.

A.—Spontaneous Speech: This is characterized by a search for words and by paraphasia. Being paraphasic his words are, of course, usually irrelevant and sometimes unintelligible but not muffled.

B.—Repetition of Words Spoken by Examiner: Short simple words in common use he repeats fairly well, as “good morning.” Uncommon or longer words he can not repeat.

Examiner, requesting patient to repeat: “This is the 16th of September.”

Patient: “This is— Say, I don't know as I understand that name just exactly.”

Examiner: “This is the 16th of September.”

Patient: “I don't understand it.”

Examiner: To-day is Thursday.”

Patient: “Yes, sir.”

Examiner: “You repeat, this is 1907.”



Patient: "This is 19— site, site, he it. I can't do it."

Examiner: "They have commenced to pave the streets."

Patient: "They went to work, to see him at the work."

C.—Understanding of Speech: The patient now and then fails to understand the words spoken to him, sometimes not when the question has been repeated several times; and when he replies to questions he tries to employ circumlocutions and uses paraphasic expressions. At first he answers questions in a quiet way but soon shows excitement and paraphasic expressions are uttered more and more until a jargon is the result, or, as the Germans say, *Wortsalat*. He is visibly annoyed by his failures and makes earnest efforts to overcome them; sometimes he succeeds and shows he is conscious of his inefficiency.

Examiner: "What is your name?"

Patient: "It's G. G. G. J. Hoppa in Wallapalla."

Examiner: "How old are you?"

Patient: "152 reason—yes s'n, I have; sometimes I can step as well as can be, sometimes I can't do it."

Examiner: "Where were you born?"

Patient: "The doctor, doctor, you want me allow where I do; don't you? Derwood. It was Annie Lary—he lives in assent, absert, all on postaros; some of them was of the colatos. You could say it, but I can't say it sometimes. Sometimes for two or three days, I will just see it all right."

Examiner: "Where are your people?"

Patient: "She has the ageration of pusen of noderats of all the people, and I want to say enough to now my father—the last she says and he lived with her, my father. You don't want to see she is out of the opponies of one all elderly of this country so winisin, nor nothing of the kind. I never tried to hurt any one; well sir I can't tell you in a minute, if I can think of it, if I can see it, all right."

Examiner: "How came you to be here?"

Patient: "No, sir. I never tried to hurt anybody in my life, the brother: no sir, I never did, and they done it, that is more; just as quick as I can used among the lose. Never in my life have I been in an asylum. No sir, I never had the thoughtness. I was so hurt with it."

D.—Identification of Objects: The patient hardly ever names the object correctly, or identifies it from among a number of names, although he sometimes recollects part of the word or something resembling it; frequently he circumlocutes.

Examiner: Shows patient a key.

Patient: "No sir, it is no medicine, it majiness."

Examiner shows an ink-bottle.

Patient: "Quickness, I guess, doctor, I should think it was."

Examiner shows scissors.

Patient: "It will cut the rappa, you can get of that cotta."

Examiner shows a postage stamp and asks: "Is that a pen-knife, a pencil or a stamp?"

Patient: "Well, sir, it was a hipna of the masons, the ridamite of the doctor."

Examiner shows a pair of scissors again.

Patient: "Scisson, sitton, chisel, shudden, scissum, sicum, hipple; an aggita-tor of this shittum that cut it up and sent them all up together for a long with somebody else."

Three pieces of paper of different length being placed on the table, the patient is asked to give to the doctor the longest.

He takes hold of the longest but leaves it on the table.

Examiner: "Give me the smallest of the three pieces."

He picks out the correct piece but leaves it on the table when told to give it to the doctor.

Examiner: "Pick out the medium-sized paper and give it to me."

Patient (He doesn't seem to understand): "I can't say that I did; that light person there—that doctor there (pointing to the nurse) can tell you just as much about it as I can. You want the bigginess pound?" Picks out the largest piece of paper.

He is told to rise, go to the bed and get the paper and put it on the table. He does so correctly.

When told to get up from his chair, shut the door and go and get the smallest piece of paper and give it to the nurse, he rises from his chair, goes past the door into the hall and asks: "Did you want me to go out?"

When told again to do the same thing, the command being repeated three times, he gets up from his chair, goes out into the hall and says: "I will come when you are ready."

2. *Ability to Read.*—The patient was given his spectacles and told to read aloud the word "Monterey."

Patient: "Yes, sir, he is appola, mesia, anesia, meni, memisia, deme."

Pointing to one letter at a time of the word "Monterey," the examiner asks the patient to name each letter.

M—"Doctor."

O—"Munet."

N—"Nego."

T—"60."

E—"Eda."

R—"Derider."

E—"Hita."

Y—"Juney."

When asked to read "Joseph," spelling it, he spells, "M, w, j, h."

Asked to read the word "hat," he reads, "Satch," "book," "kemipy."

Asked to spell "Stockton," he spells, "S, g, j, g, n, e, j, g."

He had just before been asked to read "J. G. Wright," which he did correctly. These are the only letters and word he recognizes.

In cases of motor aphasia in which alexia did not seem to be present, it was found by Déjerine (1895) that latent disturbances in the ability to read are often discovered. These are ascertained through the fact that, although the patient is able to read words written or printed in the usual manner, he can not read them when the letters are written a certain distance apart or when written in a vertical line instead of horizontally. Although our patient can read his name as above, he fails when subjected to Déjerine's test. He is not only unable to read aloud, but when asked to read to himself and requested to tell what he has read it is found that he has not understood a word. He was given a letter from his wife to read, which he read fluently and with the utmost confidence, only now and then hesitating a little when looking at certain words, continuing with a significant nod of the head, as if to express satisfaction with his interpretation. He read in part as follows: "I heard them, we believe them, in life. I think that I heard them—that I believed them—that I heard them. I think that I lived them in the. . . . when we heard them. I thought them that if when we heard them I lived in belief—I heard them. I did not then, that it each had that they both of them in the wife in them when I live when we both them in the help we had," etc. When asked to give the number of syllables in a given word by gesture (putting up fingers), after careful explanation of what is expected of him, he fails. For instance: Broom—two, wagon—two, pen—one, floor—two, bedstead—two, sunlight—one, etc. This defect of the inner speech is in this case

shown to be present in cortical sensory aphasia, which Sahli in his last edition says has not yet been met with.

3. *Ability to Write.*—A. Spontaneous writing: This frequently amounts to an illegible scrawl—resembling that of a child of two or three. In the writing one can recognize “w,” “J” and “G,” and one or two other letters here and there, as illustrated in the appended letter to his wife.

J. J. Wright

J  
K  
right

for. never at  
J. J. Wright can see to  
run my car or a  
any car  
none and so

can see the one  
in ed. m. a.

B. Writing from dictation: The examiner, showing the patient a hat and making him repeat the word “hat,” says: “Now, write down the word ‘hat.’” The patient writes:

C. H. H.

Examiner (pointing to and taking hold of the patient’s right hand): “What do you call this, Mr. Wright?”

Patient: “That is Wright—no, my right hand.”

Examiner: “Now repeat the word ‘hand.’”

Patient: “Yes.”

Examiner: “No, you say ‘hand.’”

Patient: “Yes, I do.”

Examiner: “No, say ‘hand.’”

Patient: “Hand.”

Examiner: “Now, you write ‘hand.’”

Patient writes:

*stove*

Examiner: "Now, write down at my dictation the word 'stove.' I will spell it, and you write one letter at a time. S t o v e."

Patient writes:

*J o s e p h*

Examiner: "Now, write at my dictation your first name, 'Joseph.' I will spell it, giving you one letter at a time before you write: J o s e p h."

Patient writes:

*J o s e p h*

A letter to his wife, consisting of the simplest words in three or four lines and running as follows, is dictated to him:

Dear Wife:—I received your letter yesterday and was glad to hear from you. Yours truly.

The patient writes:

*Dear*  
*Wife*  
*I received your letter yesterday and was glad to hear from you.*  
*Yours truly*  
*J. M. Henry*

That he understood the dictation, in a general way at least, is shown by the scribbling for "dear wife" and "yours truly," being short lines. Below the "yours truly" appears in proper place what is meant for his signature, which is sometimes written so that it can be read; at other times only part of it is legible.

Told to write his name, the patient writes as follows:

*J. M. Henry*

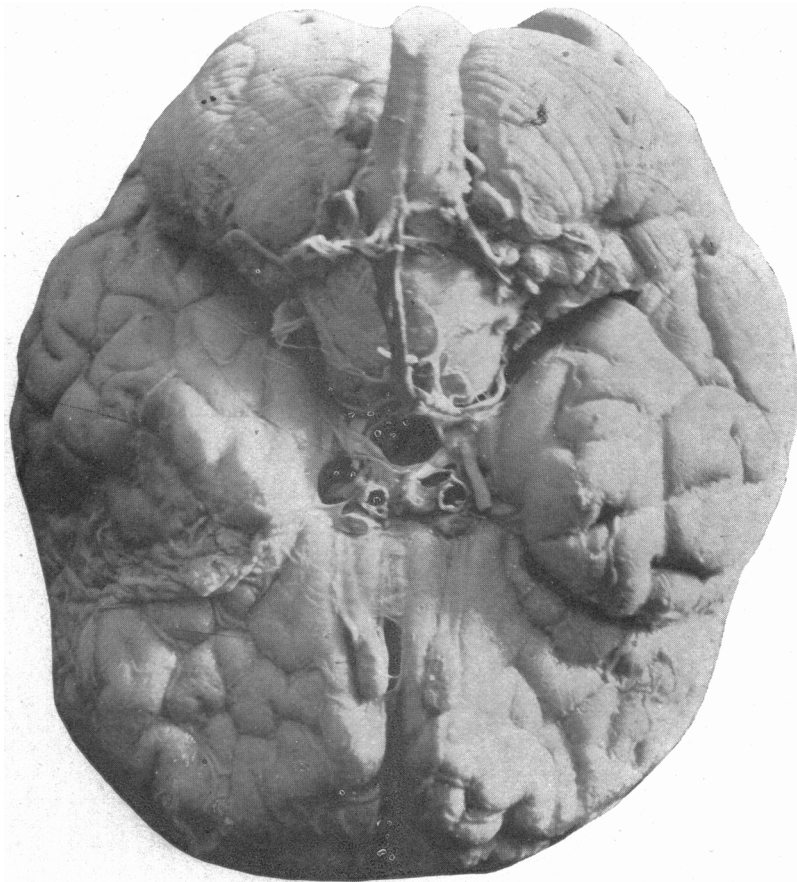


Fig. 2.—View of the base of the brain, showing the pronounced atrophy of the anterior portion of the left temporal lobe.

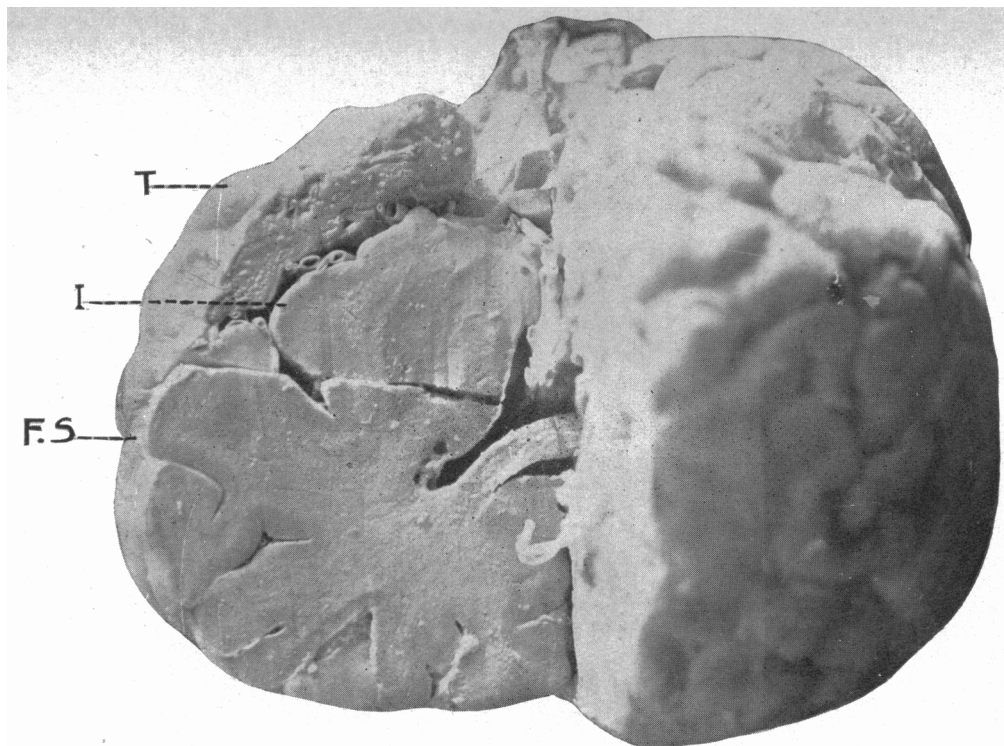


Fig. 3.—View of the anterior sectional surface of the frontal section of the left hemisphere, showing the atrophy of the temporal lobe, which increases from the basal surface toward the fissure of Sylvius; T., temporal lobe; I. insula or isle of Reil; F. S., fissure of Sylvius.

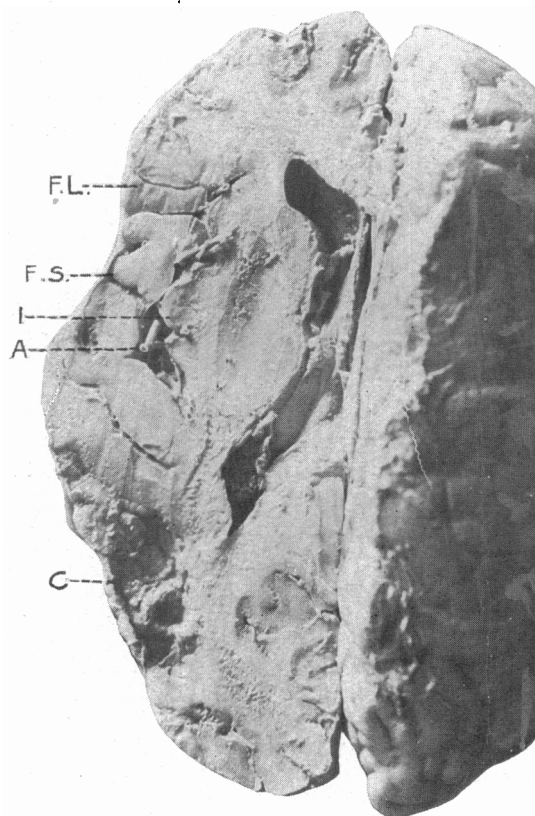


Fig. 4.—Basal sectional surface of the horizontal section of the left hemisphere, showing location of the large cavity with malacial surroundings in the posterior part of the brain; F. L., frontal lobe; F. S., Sylvian fissure; I., insula; C., large cystic cavity; A., arteriosclerotic arteria fossæ Sylvii.

Told to write "Lodi," he writes:

*W 2 -*

To the dictation of the isolated letters shown below, he writes the characters appended:

A: *W* D: *W*  
 H: *L* J: *L* G: *L* L: *L*  
 M: *L* O: *W* W: *L* S: *W*

He has always been right-handed and writes better with his right hand. The scribbling with the left hand shows no evidence of mirror-writing, which has often been observed in agraphia of left-handed persons. Told to write the figure 3, he writes a W; told to write the figure 4, he writes a W. He can not write numbers from dictation and can not read them, but can write them spontaneously to a very limited extent in series, but he can not write beyond 9. He frequently skips numbers or repeats them and inserts now and then J and W. Asked, "What is your age?" he replies: "I am 72 years old." Told to write "72," he writes the three initials of his name, "G. J. W." This symptom, called perseveration, is frequently observed in aphasia, alexia, agraphia and disturbances of the gesture-speech, and consists of a sticking to a certain innervation (Haftenbleiben). This was especially illustrated when studying series. Told to say the alphabet, he says: "A, b, c, d, e, f, g, h, J. G. Wright," laughs and says: "J. G. W., J. G. G.," repeating this three times, until he gives it up in disgust. When counting, "1, 2, 3, 4," etc., and the physician whispers "J. G.," he inserts these and is unable to proceed; begins again with "1, 2, 3," etc., and the same phenomenon repeats itself.

C.—Copying: The patient is unable to copy letters and only to a slight extent figures. He succeeds in copying squares and triangles, but very imperfectly. His writing from copy is illustrated in the following two or three lines of the same letter to his wife which, as told above, was given to him as dictation:

*W 2 -*  
*W 2 -*  
*W 2 -*

4. Musical Perception.—The patient had received no musical training but he had been able to sing a little and to whistle. Examination as to his expressive musical ability showed this to be fairly intact under the circumstances,

as he was able to continue songs like "The Star-Spangled Banner" and "Yankee Doodle," when the first five or six notes had been sung or whistled by the examiner.

5. *Test of Gestures.*—A. Spontaneous gestures: The patient makes use of spontaneous gestures fairly well; nods his head and moves his hand in greeting, points to objects and makes use of other gestures fairly well when trying to make himself understood.

B.—Gestures by Dictation: The patient responds to commands faultily, which is no doubt partly due to his failure to understand the commands.

C.—Imitation of Gestures: It is especially noticed that the patient imitates poorly with his left hand.

The patient's right hand being held by a nurse, the physician asks him to imitate with his left hand:

Physician touches point of nose with left index finger.

Patient puts flat hand to the side of his face.

Physician repeats this gesture.

Patient puts flat hand to side of head.

Physician puts two fingers parallel across his eyebrow.

Patient covers his whole face with his hand.

Physician puts one finger over the closed eyelid.

Patient again covers the whole face with his hand.

Physician puts index finger in his mouth.

Patient puts four fingers into his mouth.

Physician makes military salute.

Patient covers his mouth with his hand.

6.—*Understanding of the Use of Objects.*—As a rule, the patient seems to understand how to use a variety of utensils and other objects. Occasionally there is a trace of apraxia present.

Shown a spoon, he is asked, "How do you use that?"

He replies: "Bad medicine—yes, it might be something of the kind—or strong medicine"; then uses it correctly.

Shown a matchbox, he is asked what it is.

"It's pump. I think it is a machine for clocking—to burn anything."

He is asked to use it.

He opens the box, takes out a match and tries to strike it on the top of the box (wears spectacles at the time). After a couple of futile attempts he uses the side of the box.

Given a pencil, he uses it upside down.

On a subsequent day he put on his shoe and took it off properly, closed a knife and used a corkscrew and other objects correctly. He can not make the simplest arithmetical computation orally, no doubt in part because he doesn't understand: For instance:

$2 \times 2 = 12$ ;  $5 \times 6 = 72$ ;  $3 \times 3 = 15$ ;  $6 \times 6 = 72$ .  $\$2 - \$1 = \$6$ .

This is out of keeping with his intelligence in other respects. Asked to put on his spectacles, he replies: "I have them here," putting his hand in his left side coat pocket at once and finding them. He had not made use of them that morning. He missed a fellow patient who had made his escape, etc.

#### SUMMARY OF RESULTS OF EXAMINATION

Summing up the findings in the case, we have in the above a cortical sensory aphasia, which is associated with a trace of apraxia and with asymbolia. There is present a loss of understanding of spoken language and inability to repeat words. The speech is paraphasic. Spontaneous and dictated writing are lost; likewise understanding of language written by the patient and reading aloud as



well as understanding of what has been read. Copying is present but defective. These defects are not complete in all the spheres; the lesion has left certain remnants of association-fibers intact. The symptom-complex is therefore made up of aphasia, alexia, agraphia, to a slight extent apraxia and asymbolia. It is possible that the lesion, which probably was caused by an embolism resulting in cerebral malacia, is multiple, one being located in the sensory speech-center of Wernicke in the first temporal convolution, the other in the angular gyrus. The presence of asymbolia, contracted fields of vision which amount to an incomplete right-sided homonymous hemianopsia, and the partial loss of ability to copy, speak for this second lesion extending in to the occipital lobe.

#### PATIENT'S LATER HISTORY

After this clinical report had been read at the meeting of the San Joaquin Valley Medical Association, which met at Fresno, Nov. 13, 1907, the patient's condition remained about the same as far as the aphasic symptom-complex was concerned until the following March. He had been subject to attacks of bronchitis with asthma for years, and a severe attack of this kind set in about March 10, which was followed by a capillary bronchitis to which he succumbed on March 21, 1908.

#### AUTOPSY

An autopsy was permitted on the brain only and was performed eight hours after death. The walls of the cranium were found below the average in thickness; there were marked adhesions along the sagittal suture. The dura mater seemed normal in appearance, and on incision allowed a moderate amount of cerebrospinal fluid to escape. The pia-arachnoid was found milky and thickened over the convexity of the hemispheres, especially over the left, which posterior to the frontal lobes showed a flattening of the surface, most marked behind the Sylvian fissure in the temporal lobe, the contours of this lobe being in marked contrast with those of the corresponding lobe of the right hemisphere, as shown in Figure 2. The greater part of the left temporal lobe had a gelatinous appearance, and when the brain was handled showed a fluctuating movement of its surface. The cerebral arteries presented marked arteriosclerotic changes, especially the anterior cerebral and arteria fossæ Sylvii. The flattened or atrophied portion of the temporal lobe extended from the beginning of the first temporal gyrus in the Sylvian fissure nearly to its center, took in the anterior one-third of the second temporal and a small portion of the anterior one-third of the third temporal gyrus, a small hemorrhagic cyst being found in the last-mentioned locality. Corresponding to the convolution surrounding the lower of the two terminal branches of ramus horizontalis post of the Sylvian fissure was another small cyst, and a third hemorrhagic cyst, lenticular in form and of the size of a large bean, was found on the area surrounding the posterior termination of the first temporal fissure and laterally from the interparietal fissure, that is, in about the location of the gyrus angularis. A horizontal cut was made through the left hemisphere about on a level with the center of the genu of corpus callosum in front and the posterior projection of the thalamus opticus behind. This section crossed the Sylvian fissure about the center of the operculum, passed about 0.6 cm. below the inferior limits of the small cyst—afterward located in the neighborhood of the supramarginal region and passed through the elongated cyst in the lower part of the angular gyrus. A frontal section was made about perpendicularly to this, and about along line 4—4 of Hermann's Plano-projection.<sup>6</sup> The cut passed through the anterior part of the operculum and the atrophied portion of the anterior part of the temporal lobe. The anterior sectional surface of this cut is seen in Figure 3, which shows the outlines of the section of the temporal

6. Fig. 25, von Monakow's *Gehirnpathologie*, p. 37.

lobe in this locality to taper from a fairly broad base in its inferior portion to almost a point where it terminates in the horizontal cut. In its upper part the cortex is entirely absent. Additional sections into the frontal convolutions revealed no microscopic pathologic changes. The surface of the horizontal section is shown in Figure 4. In the posterior parts of these was found a large destruction of brain tissue. An elongated cavity lined with a brownish-colored detritus extended below the cortex, or in part of its extent just beneath the pia for a distance of about 3.8 cm., completely undermining and, in fact, in most of its extent, destroying the cortex in the region of the gyrus angularis and the convolutions anterior to it. The cavity measured about 1.9 cm. in depth, that is, in the direction of the medullary substance, and its deepest part was below the cyst which was visible on the convolutional surface. A small irregularly shaped malacial change, about 0.4 cm. in diameter, was found below the cortex of the second occipital lobe. The outlines of the cavities are plainly visible in the illustrations. A section made through the center of the supramarginal gyrus showed no pathologic changes, but when another perpendicular section was made in the convolution just in front of this gyrus a malacial cavity was exposed, measuring 0.6 cm. by 0.75 cm. The largest cyst extended anteriorly in the direction of the cyst found in front and beneath the supramarginal gyrus. In other words, the malacial changes described were found in the left temporal lobe involving the location of the gyrus lenticularis of Wernicke, extending from here into the region of the angular gyrus and the second occipital convolution.

Stockton State Hospital.