solution the pain will be relieved without the use of an anodyne. He believes in the starvation, or rather the water treatment of infantile diarrhea; the use of the various diluted broths, such as barley water, amounts to little else. The water is improved, in his opinion, by aërating it.

DR. ROSA ENGELMANN, Chicago, said that physicians who work in the dispensaries and slums see other insects, such as fleas, bedbugs and cockroaches, that are not above suspicion as disseminators of disease. A possible instance of this came under observation not long ago in Chicago. In a large apartment house containing about twenty families five cases of typhoid fever were reported. The first case developed on the lower floor, and the second case on the same floor, in the apartment on the opposite side. The two families on the floor above moved away, leaving that floor vacant. In the course of a month the third case developed on the third floor, and subsequently two more cases developed on the fourth floor. The source of the infection could not be traced to the water supply (artesian), to the milk nor to the ice. It was learned, however, that this apartment house was absolutely overrun with cockroaches, contaminating the food supply. In the apartment house opposite, where there were no cockroaches, with the same water supply, no cases of typhoid fever were reported. It was unfortunate that none of the cockroaches was caught and allowed to run over a culture medium, and thus proved to be the source of the infection; since they, of all insects, are water inhabitants and consequently probable disease carriers. Investigation should be done along these lines, as has been done with fleas and bedbugs in respect to plague.

DR. WM. T. WATSON, Baltimore, said that the mothers in his practice are, most of them, very busy women, who can not afford to employ nurses. He likes to make things as easy for them as possible. He thinks that Dr. Kilmer's advice to boil nursing bottles for an hour is carrying precaution to an unnecessary extreme. Surgeons do not boil their instruments for an hour. According to Rotch, all bacteria are killed at a temperature of 154 F., and Abbott says that all pathogenic bacteria and their spores are killed by five minutes' boiling. Boiling for five minutes ought to be enough for the disinfection of bottles, which is merely surface disinfection. During the past few years Dr. Watson has been feeding an increasing number of babies on raw milk. The milk comes from the Walker-Gordon farm and is modified at home. Where the mothers are intelligent he finds no trouble to arise from feeding this milk raw. He asked Dr. Southworth if he considers this a rash practice.

DR. WILLIAM L. STOWELL, New York City, said that raw milk for infant feeding has been used at the Children's Hospital a portion of the time for the past six years. At present they are using the gravity cream from their own dairy. The milk was given raw, except in extremely hot weather, and he was surprised to see how weak children thrived on it.

DR. W. H. F. PARK, New York City, said that it has been proved that the *Bacillus dysenteriæ* is the cause of infantile dysentery. He said he believed that the Shiga bacillus gives rise to typical symptoms. There are many different kinds of bacteria in the intestinal tract, and in every case of infantile diarrhea the special organism found should be clearly identified and labeled.

DR. J. H. KNOX, JR., does not think it is claimed by anyone that the *Bacillus dysenteriæ* (Shiga) is the cause of every case of infantile diarrhea. The differences culturally between the so-called "acid" and "non-acid" type (to mannite) are not striking, no more so than differences known to exist between the various colon and typhoid bacilli. He said that it must be conceded that in their series the dysentery bacillus was found in the several varieties of intestinal diseases both mild and severe, called, clinically "summer diarrhea," and it is felt that it is responsible for a large number of these cases. The importance, however, of other bacteria should not be minimized. In many cases streptococci and other pathogenic organisms were present in the intestines. It may be that when there is evidence of ulceration we may often be dealing with a secondary infection with streptococci superimposed on that by the dysentery bacillus.

DR. THOMAS S. SOUTHWORTH, replying to Dr. English, said he does not know how long a baby can live without milk or cream, but he does know that babies, depending on their age, have lived for weeks and months on food other than milk. In reply to Dr. Gilbert, he said that he has recommended the use of opium only for the control of excessive peristalsis in cases where the movements are more frequent than is necessary for a proper drainage of the bowel.

TREATMENT OF APHASIA BY TRAINING.*

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PHILADELPHIA.

As long ago as 1880 I published an account of a case of aphasia greatly benefited by training which was largely of the patient's own initiation and conducted by himself.

The patient fell in an apoplectiform attack, and was taken to one of the London hospitals, where he was seen by Dr. Sieveking and Dr. Broadbent. He was a right hemiplegic and was also totally aphasic and agraphic, but appeared not to have been word deaf, as he understood what was said to him. He had lost all ideas of numbers, but was evidently not word blind, as he understood from the first what he saw in print or in script. When he read aloud he had a marked form of paraphasia, his speech being of the jargon or gibberish type. Like many such patients, he read off this jargon as if to himself he were reading correctly. He could copy, although unable to write spontaneously. After a time he improved under rest and internal remedies. He then began, partly under direction, to try to improve his powers of speech and of writing. He was a man of considerable intelligence, of fair education and of great determination.

This man came under my observation about two years after the attack which caused his aphasia and accompanying condition, having returned to this country, and he remained under my care for several years, during which time he slowly but continuously improved until he became able to communicate both in speech and in writing without difficulty. When I examined him he could understand all that was said to him. He could answer almost any ordinary question, although he occasionally mispronounced and was at a loss for a word. It was particularly difficult for him to remember the names of individuals, although he could give a connected account of his former life. Specimens of his writing, of different dates, showed progressive improvement in writing, spelling and in the formation of sentences. He could count, repeat the multiplication table and add and subtract simple sums. He could name objects pointed out to him much better than when studied by Dr. Broadbent.[1] Instead of reading gibberish he pronounced almost every word correctly, stumbling only occasionally over a large word; each word was distinctly separated from the others, but he did not hesitate.[2]

In connection with this early recorded case I shall refer to a case treated by me during the past year, that of a well known physician, forty-five years old, residing in one of the Western States.

In July, 1902, he had an attack of right hemiplegia with complete aphasia, first consulting me eighteen months later. The paralysis, although still marked, was much improved. No loss of sensation and no affection of the bladder or bowels were present. The face was the seat of a moderate right-sided paresis, the tongue not deviating to either side. The deep and

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* Read at the Fifty-fifth Annual Session of the American Medical Association, in the Section on Nervous and Mental Diseases, and approved for publication by the Executive Committee: Drs. Richard Dewey, F. W. Langdon and H. T. Pershing.

1. Brain, vol. i, January, 1879.
2. Mills, C. K., Med. Bulletin, Philadelphia, May, 1880.

superficial reflexes were of the usual type found in cerebral hemiplegia, exaggerated knee jerk with front tap and ankle clonus and the Babinski response being present on the right side.

When tested with Wyllie's[3] physiologic alphabet it was found that he could repeat the vowels i, e, a, o, and u well, having been previously trained in their pronunciation, but he could not remember them from day to day. In like manner he could repeat the consonants of the alphabet, but could not recall them spontaneously. He was partially word deaf, having regained word hearing to some extent by time and training. He could understand most familiar expressions, but if a strange or unusual word were used he did not understand it. He was also partially word blind, having relearned to read considerably before he was seen by me. With his left hand he was able to write the words that he could read. He could not understand the meaning of such prepositions as *of*, *to*, and *for*, if pronounced or read. He could not spontaneously write these words when asked, but could copy them graphically.

In connection with a study of his reacquisitions of language, particular attention was paid to the degree in which he regained different parts of speech. It was noticeable that in his efforts to talk he chiefly used his nouns and verbs, occasionally employing a pronoun. The words which expressed the qualities of things, which join and relate things to each other and to actions, in other words, adjectives, adverbs, conjunctions and prepositions, were still almost entirely eliminated from his vocabulary. Auxiliary verbs, like to have, and to be, in all their modes and tenses, were apparently without any meaning to him. The word is or was occurring in the sentence seemed to worry him. In brief, this patient was a hemiplegic aphasic, the aphasia having at first been both sensory and motor and nearly complete, an appreciable degree of recovery from his word deafness, word blindness and even motor aphasia having occurred under the method of training by repetition and by efforts at spelling, reading and writing.

With the assistance of Dr. T. H. Weisenburg and of the patient's secretary, a systematic and progressive course of training was at once instituted, this being continued under my direction for several weeks, and since up to the present time on similar lines at his own home. Letters, words and the names of objects were repeated by him after others or as the result of reading, in so far as he could do this, this being simply a continuation of the methods previously employed. In the next place the physiologic alphabet of Wyllie was employed.

Since becoming acquainted with this alphabet, in every case in which I have attempted to train or to have trained an aphasic I have made use of it, varying, of course, the sentences employed in illustration. A special effort was made to test it in the present case, as the patient saw at once its value and the method of adapting it to his own case. He was able to improve his manner of using the vocabulary which he had regained by the methods of repetition, to articulate and denunciate with more clearness, that is, with greater ease to make use of the words, sentences and phrases which he had from time to time reacquired. The physiologic alphabet, however, like the method of training by mere repetition from dictation, reading or otherwise, had its limitations with him. The patient could be carried only a certain distance by these methods, which it was necessary to supplement by others. The letters, words and physiologic sounds, or many of them, often could not be recalled even after they had apparently been thoroughly acquired, one of the chief reasons for this probably being that they were remembered only as separate entities and were not recalled in their relations to other words in description, that is, in phrases and sentences. After a time a phonetic reader was used to some extent.

In this book the sounds of letters and of their combinations are taught by special associations with objects, and in sentences which advance from simple to more complex forms similar sounds are repeated in various combinations. The sound element rather than the meaning of the sentences is made the first object in the method of instruction, although the words, phrases and sentences employed have definite meanings and are spelled in the usual manner.

Much use was made of the dictionary, chiefly by the patient's own initiative. He made considerable advance by looking up the definitions of words and when he found words and expressions in the definition which he could not comprehend, these in their turn were looked up at the appropriate place. A language primer and a grammar were next employed, the patient being instructed much as a child would be in the nature and use of the parts of speech, in the methods of conjugating verbs and of giving the cases of nouns, attention being particularly paid to the repetition of illustrations of the manner of using what was being acquired. The patient, in other words, was retaught, insofar as possible, the grammar which he had learned in childhood and which had slipped away from him as the result of the cerebral lesion.[4]

After the patient's return to his home I received from time to time communications regarding him. He steadily improved though at first his progress was comparatively slow. Three months after his return his secretary wrote as follows: "Dr. X. continues to improve right along, and as he puts it, 'slowly. slowly up hill.' He impressed on me to tell you that if he were told anything of length or importance, he missed some of it at times, but if it were written and he could see it, he understood it all. He reads his papers and magazines alone now all of the time and understands fully."

Three months later she again wrote as follows: "At the present time there is a noticeable improvement since his stay with you. I am sorry to say that for more than a month his studies were very much neglected and interrupted, but he has now settled down to work again and we can see the improvement almost daily. The woman who is teaching him is under the supervision of one of the principals in the city schools who is a relative of Dr. X. They are working along original lines, taking up what seems to be of benefit. He is using more voluntary expressions every week, and a noticeable feature just now is that when we tell him to say a certain thing, instead of repeating it verbatim, he will express the idea in his own words. He reads a great deal and plays whist and other games aside from his studies. He has just finished transacting some business for the institution, the first which he has done of any importance since his illness."

I received a letter dated May 25, 1904, from a physician associated with this patient, which is so interesting in relation to this case as well as to the general subject of the treatment of aphasics by training, that I shall reproduce it in large part. After speaking of the doctor's steady improvement under the methods suggested and also of his own devising, the letter continues:

"Following out the suggestions you gave him, as well as an unusual originality in method which he has devised for himself, I believe the improvement will continue until the doctor will not be troubled to any appreciable extent at all. In order to give you a minute understanding of his present condition, I would like to call your attention to a few things, the import of which you will understand as soon as they are mentioned. In the first place, there has never been any particular affection of the memory. He recalls readily names, places, incidents of his past experience, and at times seems unusually capable in this respect, recalling and reminding others of the family of incidents which they themselves may have forgotten entirely. The word-blindness is improved considerably and is hard to detect unless special effort is made in this direction. The word-deafness, of course, is more pronounced than the word-blindness, as was the case when you examined him. His use of words to express an idea is much more general than has been the case heretofore. He now expresses in his own words answers to questions, in the form of a sentence rather than a single word; and it is noticeable that he is able to use a dif-

3. Wyllie, J.: The Disorders of Speech, Edinburgh, 1894.

4. The reader is referred for further notes on the training of this case to Dr. Weisenburg's remarks in the discussion.

ferent word to express the same idea. For instance, if we ask him, 'Do you feel cold?' he answers, 'Yes, I feel chilly.' Or, if we mention the sun's 'setting,' in answer he would say that the 'sun goes down about 7 o'clock,' or something to this effect. Formerly he used single verbs and nouns to express his ideas without putting them into the form of sentences, often leaving out the smaller words, such as the articles, 'a,' 'the' and 'and'; but he now uses these words without omission, and at times makes a sentence of considerable length. These sentences are formed of his own volition and are not simply a repetition from having some one else urge him to talk. There has been no particular difficulty in having him repeat sentences at dictation; but this feature of his case in which he originates his sentences is one of the points which shows a marked improvement, and this rapidly increasing vocabulary which he is now using is due, as I have intimated, to a natural tendency toward recovery, and the painstaking and conscientious use of a small dictionary, together with a thorough systematic schooling in the use of words by means of a blackboard, writing, speaking, etc., which we have endeavored to carry out to the fullest possible extent. It is remarkable to see the interest and enthusiasm with which the doctor himself appreciates the improvement in his condition, as well as the possibilities of the future. In carrying out the idea here referred to we have him do considerable reading aloud, afterwards repeating the sentences he has read without being allowed to see the book or the blackboard. In regard to number work and mathematics in general, it is much more difficult for the physician to make himself understood than is the case in the use of words. I would say at this point that I believe he had more of a natural talent for language than mathematics as a student, which somewhat accounts for the seeming difference between language and mathematics in his present work. It seems to be harder for him to express the numerals used in mathematics than to express the words used in speech. We also have him do a great deal of writing, urging him to write his own ideas rather than simply copy something which has been written by others. On account of the slowness with which he has to write it is hard for him to keep pace with what he is thinking about at the same time, so that here again we notice a disposition to leave out some of the words in forming his sentences. On the other hand, when he cannot immediately speak the word he has in mind, he is able to write it at once. Oftentimes when hesitating for a word, before he is willing to wait until he can express it in speech, he will spell the word on a book, or table, or any place convenient where he can make the word so that it can be read. He is being taught along the line of what is known in the schools as the 'word method,' instead of using each letter as in the older method of spelling. It is exceedingly interesting to observe the quick perception with which he grasps a new word that he has not thought of or come across before, when using this little dictionary. After this word has been brought to his attention, and especially pronounced by him and used in a sentence, that particular word is added to his vocabulary for good and he can use it in the future without any trouble. There is no doubt but that the zone affected is becoming smaller and smaller, or else that the right side of his brain is being educated to take the place to some extent of that part affected on the left. As, of course, you will readily appreciate, it is extremely difficult for me to know whether it is really a smaller portion of the zone affected which enables him to show these signs of improvement or whether it is the education of the opposite hemisphere which is taking up the function of that part of the brain affected."

In the first of these two interesting cases the methods pursued were in part the same, and in both they were much assisted by the native intelligence and the determination of the patients. In the case recorded in 1880, the patient largely followed his own methods; procedures such as naturally suggested themselves to one who has lost language and wishes to recover it. He began by the repetition of letters and words, and then by combinations of the latter. He read aloud, correcting himself and having others correct him. He copied words, phrases and sentences, keeping samples of his writing from time to time and sometimes securing the assistance and direction of others in correcting and in proving what he had done or tried to do. The inability to name objects by sight, the so-called optic aphasia, was, as in so many cases of aphasia, one of his chief difficulties, and this he slowly corrected by repeating after others the names of objects held before him, and later by calling up the names of objects before him unassisted. This at first required much effort. Summarized then, his methods were chiefly as follows: 1. The repetition of letters, words, phrases and sentences, recognized by him in reading or repeated by him after others; 2. The repetition of the names of objects seen by him, or the naming spontaneously of such objects either seen or made known to him through his other senses, as for instance, by touching or handling; 3. Writing, either copy, from dictation or spontaneously, slowly and patiently improving himself in this respect.

The various pedagogic methods of treating aphasics can be summarized as follows:

1. The method of repetition after others which later becomes that of spontaneous recall as the patient improves; and allied or assisting methods like reading aloud, copying and writing from dictation.

2. Phonetic methods such as the method of the physiologic alphabet suggested by Wyllie and the use of phonetic readers.

3. The employment of vision to assist in the training as when the aphasic imitates the movements of articulation, enunciation and vocalization as made by others or by himself, in the latter case observing these in a mirror.

4. The re-training of the patients in the grammar of language when the aphasic is educated and when not, reorganizing so far as possible such language as he originally had.

5. Various special methods suggested by different authorities, as, for instance, that of Goldscheider of training the patient to repeat meaningless syllables.

With regard to the method of training by repetition many directions and many illustrations might be given. Those furnished by Dr. C. L. Dana[5] in a recent publication will answer as a basis for work of this kind, and I shall therefore, as they are brief, take the liberty of citing them fully. Such methods can be varied almost indefinitely.

1. Repeat five exclamatory words, such as: Ah, Oh, or another exclamation expressing joy, anger or other emotion.

Repeat after the teacher ten single monosyllabic nouns and pronouns.

Repeat ten polysyllabic nouns.

Repeat ten verbs.

In these latter exercises, each time a noun is named, let the patient see the object, feel it, and see the written or printed name of it on a piece of paper before him, thus stimulating his visual, auditory and tactile memories at the same time, as for example: Watch; pencil; pen; cane; box; book; and so on.

2. Repeat the letters of the alphabet, these letters being held in front of him.

Repeat the letters of the alphabet after writing and looking at each one.

Repeat the figures up to ten.

Repeat while looking at the written figures in front of him. Write and repeat these figures.

3. Repeat ten simple, qualifying adjectives, such as: White;

5. Studies from the Department of Neurology, Publications of Cornell University Medical College, N. Y., 1904, vol. i.

black; red; smooth; soft; rough. At the same time let him see the object and color, or feel the same.

4. Later let him try to repeat sentences of three words in which the noun is joined to the adjective, using the familiar nouns and the familiar adjectives already experimented with, thus: Pencil or pen is black; box is white; book is red; and so on.

5. If the patient ever had any musical capacity, have him sit at the piano and hum the notes of the piano, going through an octave, and then let him try to hum a tune, striking a note at the same time. Finally teach him to sing the tune through and then introduce the possible words. Some patients can sing before they can talk.

6. Copy sentences made up of the words he is being taught. Let him have an ordinary copy book and have the copy at the top of the page. Let him fill a page every day, trying at the same time to pronounce the words as he writes them. Have him copy first the familiar nouns, and then the simpler verbs, then the simple adjectives; finally let him copy sentences.

Take a small vocabulary and repeat from this, not trying to enlarge too soon.

A PHYSIOLOGICAL ALPHABET

I.—VOWELS.

y—i e a o u—w

These should be pronounced in the Latin manner, as *ee, eh, ah, oh, oo*; *y* and *w* are consonants, not vowels, but, as explained in the text, they have very close relationships to the vowels, initial *y* being very closely related to *i*, and initial *w* to *u*.

II.—CONSONANTS.

	Voiceless Oral Consonants.	Voiced Oral Consonants.	Voiced Nasal Resonants.
Labials. (1st Stop Position.)	P (W)	B W	M
Labio-Dentals.	F	V	
Linguo-Dentals.	Th[1] S	Th[2] Z	
Anterior Linguo-Palatals. (2 Stop Position.)	Sh T (L)	Zh D L R	N
Posterior Linguo-Palatals. (3rd Stop Position.)	K H or Ch	G Y (R)	Ng

The voiceless *W* and the voiceless *L* have been given above within brackets, the former being now almost confined to Scotland, and the latter being peculiar to Wales. The burring or uvular *R* is also given within brackets.

ILLUSTRATIVE SENTENCES

I.—VOWELS.

Even ancient elves are awed over oozing.

This sentence represents only long vowels. Their short equivalents can be represented, as shown by Mr. Pitman, by attaching the letter *t* to each vowel, thus:—

e͡et, it, et, at, ut, ot, o͡ot.

II.—CONSONANTS.

Labials. (1st Stop Position.)	**Peter Brown made white wax.**
Labio-Dentals.	**Fine villages.**
Linguo-Dentals.	**Thinkest thou so, zealot?**
Anterior Linguo-Palatals. (2 Stop Position.)	**She leisurely took down nine large roses.**
Posterior Linguo-Palatals. (3rd Stop Position.)	**Can Gilbert bring Loch Hourn youths?**

7. Write the letters of the alphabet, and as he writes them, try to repeat them. Do this without a copy, if possible. Then let him write words to dictation, using the same vocabulary above referred to. Finally let him try to write short sentences to dictation, then try to read them after he has written them, with assistance at first, then without.

8. Write numbers up to twenty and say them out loud when written.

9. It would do no harm and might be of some benefit to try the effect of hypnotic suggestion in helping him to get along in these exercises.

10. The patient should allow himself to be read to for a short time twice a day, and he should also try himself to read a quarter of a page every day.

Much attention has been given by a few of the writers on the subject of aphasia and its treatment to the methods of re-education in language by phonetic methods such as the proper use of the vowel and consonant sounds and their combinations in particular ways. Undoubtedly a knowledge of the best method of producing and using special sounds and phonetic associations, will be of value in the restoration of speech lost by an adult, or even by a child, as it is in the primary education of a child. Wyllie gives a physiologic alphabet with a series of simple sentences illustrating its use, which I have reproduced.

In this physiologic alphabet the exact methods of forming and using both vowels and consonants need to be understood. A little practice, however, and the knowledge of the principles of the formation of these sounds, as described by Wyllie, will enable this to be done. He discusses at length the manner in which the consonant sounds are formed by the movements and positions of the lips, teeth and tongue. He especially considers the so-called stop positions resulting from placing the tip of the tongue at various points, as on the teeth, and anterior, middle and posterior locations as regards the roof of the mouth. In each of these positions certain sounds, labial, labio-dental, linguo-dental, anterior-linguo-palatal, and posterior linguo-palatal, are formed by the action of air passing through the oral cavity and outlets. Practice with the table and the illustrative sentences given in it, or with others which can easily be formed on the evident principles involved will soon familiarize one with the methods of its use even without an understanding of all the technicalities in the production of voice.

With regard to motor aphasia and the method of training by repetition and by the phonetic method, Wyllie says that it is often advantageous to have the patient repeat spoken words, and he holds that it is largely in this way that he reacquires his speech. He

believes, however, that the process can be much expedited by having the patient in the first instance master the simple letter sounds such as are explained in connection with the discussion of his physiologic alphabet.

He gives an interesting and detailed account of the treatment of a case of motor aphasia, the patient not being agraphic, in which complete recovery was obtained by the method of repetition and of training in the use of letter sounds.

A young man of twenty-five with mitral cardiac disease, had had an apoplectic attack which left him a hemiplegic and motor aphasic. He recovered the power of saying yes and no about four weeks after the attack. Two weeks later he had for the first time replied in writing to a question, using his left hand for the purpose. He continued to answer questions in writing, at first with some difficulty and awkwardly because he was not naturally left-handed. He could however, always recall the words he wished to use in writing. His hemiplegia in large part disappeared first from the leg and later from the arm.

He came under the observation of Dr. Wyllie four months after the attack causing the aphasia; at this time having a slight right-sided facial paresis and a marked paralysis in the distal portion of the right upper extremity, these being the remains of his former almost complete hemiplegia. His aphasia was still marked, almost his only utterances being yes and no. He improved, however, somewhat rapidly in acquiring single words which he often mispronounced, but what he did say whether the pronunciation was correct or not, was distinctly articulated. Tested with the physiologic alphabet he could not repeat many of the consonant sounds. He could produce the middle vowel sounds ah and oh, but had difficulty with the sounds at the ends of the list, often converting *ee* into *eh* and *oo* into *oh*. A full account is given of the consonant letter sound which he pronounced both correctly and incorrectly, showing considerable deficiency, this often being of a peculiar character. The tests were made with simple syllables containing the letter sounds. He expressed himself very much better in writing, but even in this respect showed considerable deterioration as was proved by comparing his writing before his aphasia with recent samples. He could read silently, but was easily fatigued in so doing.

This patient made an unusually rapid recovery attributed in large part by Dr. Wyllie to the use of the physiologic alphabet. As the main object of this paper is to call attention to practical methods of treating aphasics, I shall cite here from Wyllie what is said of the exact method in which he employed this alphabet:

"We did not trouble the patient with the names of the letters, but taught him from the beginning the letter sounds of the physiologic alphabet. In doing so, we adopted what may be called the 'Mother's Method.' Beginning with the labials, we taught him to say *papa, apap, appa*, thus giving him the consonant P as an initial, a terminal and a mid-letter. Then we taught him to say *baba, abab, abba*; then *mama, amam, amma;* then wee wee; and so on throughout the alphabet. He was shown by 'lip-reading' how to place the lips, tongue, etc., for the pronunciation of each letter-sound."

He was then supplied with primers in which to study short sentences, gradually increasing their length, and in various ways he also practised speaking. Eight months after his apoplectic seizure he was able to articulate almost anything he wished to say, but it was necessary to do this slowly and carefully. His powers of writing which were always relatively good, were restored.

At my request Dr. T. H. Weisenburg has examined the recent German literature of the subject of the training of aphasics and as a part of the discussion of this paper we shall give especially the methods of Goldscheider[6] and of Gutzmann.

Summarized, the methods of these German neurologists are much the same as have been indicated in discussing those pursued by Wyllie and by me. They have, however, some points of special value and a few of some originality. The methods used are those of the repetition, not only of letters, words and phrases, but somewhat after the manner embodied in the physiologic alphabet of Wyllie, the repetition of sounds in particular letter or syllable associations, combining vowels, for instance, with the labials, dentals and other consonants. Tongue exercises are practiced; tones are taught; the patient is made to imitate movements of articulation and enunciation by watching the facial movements of others, and to improve himself in the same respects by observing in a looking glass his own movements and expression in articulating; the association of vocalization with reading and writing as well as with speech is practiced, in other words, the patient learns to read aloud and also to repeat what he writes; geometric forms are taught; and the aphasic writes from dictation, from copy or spontaneously; words are associated, not only with their meanings, but a suggestion is made to repeat meaningless syllables in various combinations. The association of names with concrete objects is brought about by one of the well known methods of repeating the names of objects seen, handled or recognized through any of the senses.

Gutzmann teaches that sensory aphasia is more difficult to treat than motor aphasia, a statement with which I do not entirely agree. He recommends that the speech movements should be observed and fully remembered. It is well known that the words of a singer can be told by watching his expression and the movements of his mouth. Feeling the different vocal organs as the larynx, the lips and the cheeks, while one is speaking is of value. The education of the sensory aphasic is that of a child. An object is held in front of him, the name is told, a picture is shown, and the word is pronounced, spelled and written. Sometimes when a patient is able to read the meaning of the words from a speaker's lips, he is unable to derive their meaning from the written words. In such a case a better way is to write the words while observing the lips. Gutzmann has what he calls a "phonetic picture script (alphabet)" where the letters are indicated by the pictures of the lips, cheeks and the expression of the face.

With regard to the treatment of auditory aphasia, Wyllie cites approvingly the plan used by Schmidt in an interesting case of pure auditory aphasia recorded by the latter. In this case words were deliberately spoken to the patient and she was asked also to read aloud printed words, she not being word blind. At first she repeated with difficulty. Wyllie suggests that "probably the practice was imprinting the word-images efficiently in the uneducated auditory center, and at the same time establishing connections of the requisite intimacy, between these images and those of other speech centers."

It became a matter of interest to me in observing aphasics who were striving to recover their lost powers, to note the particular parts of speech which were most obscured and most difficult to regain, and also the particular difficulties which attended their reacquirement or prevented this. A patient who has so nearly lost language that he has only one or two recurring utterances, regains by repetition, and recall, word after word, especially nouns. Later a few verbs are acquired. Adjectives, adverbs, prepositions and ar-

6. Goldscheider, A.: Handbuch der physikalischen Therapie, part 2, vol. li, Leipz., 1902; Gutzmann, H.: Arch. f. Psych., vol. xxviii.

ticles, the parts of speech whose uses are to modify, limit, or express relation are so entirely lost to the patient as to cause, more than anything else, his difficulty in language. The same remark applies to conjunctions like *and* and *but,* and with a special force to the auxiliary verbs in all their modes and tenses. The meaning and use of such words or combinations of words as, *is* and *was* and *has been* are in eclipse or lost to a varying extent. The impairment or loss of the faculty of constructing sentences, or propositionizing in language is one of the most important, if not the fundamental defect. While thought is at times expressed by a single word, the sentence is the usual unit of thought expression, and the aphasic patient, or at least some aphasic patients, find their chief difficulty in regaining those parts of speech which are concerned with qualifying and correlating. The grammar of language no longer exists for them.

Considerations of this kind led me to the use of primers and grammars in the retraining of aphasics; and these with individuals previously reasonably educated are of great value. Patients should be taught the grammar as a child is instructed, in other words, by teaching him the meaning of the different parts of speech and the exact methods of using them in phrases and sentences. The significance and value of the qualifying, relating and conjoining parts of speech should be enforced by numerous examples. When the aphasic in his efforts to repeat after another or to respond to what another asks or indicates, uses incomplete sentences, the complete sentences should be given and explained. In every possible way the manner of using adjectives, prepositions, conjunctions and auxiliaries should be impressed. The patient with the book before him should be taught to conjugate verbs, decline nouns and pronouns, compare adjectives, and in other ways to go through the routine methods of studying language employed in the schools, these being modified by the particular requirements of the case. The dictionary can often be used as a valuable adjunct to the grammar, some patients taking a particular interest not only in reacquiring words in this way, but in thus learning their meaning and their uses as parts of speech.

A few words should be said about the general management of aphasics while attempts at their re-education are being made. It should not be forgotten that, owing to the impairment of their powers of communication with their fellows, they often tend to become irritable or emotional under strain, or even at times with little or no cause, although this is by no means without exceptions, as I have seen a number of instances in which the deprivation of language has been borne with patience. The instructor should be both patient and considerate. The aphasic should not be pressed too hard in the process of re-education. If the aphasia is of comparatively recent date, not improbably some dangers may be apprehended from too insistent methods of training. The limitations of each patient should be studied, and the crippled brain should not be exhausted and irritated by too prolonged sittings. Patients suffering from word deafness who are beginning to recover their cerebral hearing are at first easily exhausted and may become discouraged in this way, and the same is true, but probably to a less extent, of cases of pure motor aphasia. If the patient is given lessons in the repetition of letters, words or sentences, in reading aloud, in writing from copy or dictation, in the physiologic alphabet, in naming objects at sight, in the study of words in a dictionary or of parts of speech in a language primer or grammar; in whatever way the training is pursued, and whatever stage it has reached, the patient's powers of endurance and of further developments should be carefully studied and should be the main guide as to each succeeding stage.

When language is reacquired by an aphasic, how is this brought about? The answer to this question is not always easy. The basis of reacquirement may differ, and for several reasons: 1, Because of the difference in the original capacity and previous education of the aphasic; 2, because of the form of the aphasia; 3, because of the degree of destruction of the centers or tracts in the zone of language.

Everyone with experience among aphasics has noticed the difference in the time and in the completeness of the recovery in cases apparently equal in the original loss. This remark applies not only to those cases in which aphasia is the only symptom, but to the more numerous classes in which hemiplegia or hemiparesis is associated with the aphasia. A man of intelligence or education, or of both, and especially if he is endowed with a strong character, will often advance with great rapidity on the road to recovery. The previous business or mode of life of the individual, in persons of equal degrees of education, may also have much influence on recovery. One needs, indeed, only to recall and compare his hospital experience with his experience in private practice to appreciate the full force of these statements. In the nervous wards of the Philadelphia Hospital, where a number of aphasics of different types are always to be found, the majority of the patients have little or no education. Among these patients recoveries from aphasia are comparatively rare and are relatively incomplete, while better cared for private patients show much greater improvement and approach more nearly to complete recoveries when properly and persistently trained.

With regard to the type of aphasia, my personal experience, like that of others, has varied. Usually cases of pure sensory aphasia make rather rapid partial recoveries, at least this is true of cases with word deafness. Where sensorimotor aphasia is present associated with hemiplegia, the recovery from the aphasia is usually partial. It would seem probable that in many cases destruction of the cerebral areas for speech is incomplete, in these cases language being partially reacquired by calling into activity the unimpaired portions of these regions. The centers in the right hemisphere have a potentiality for speech which can be developed under necessity, but it is doubtless true, as Bramwell and others have pointed out, that the ability of the right hemicerebrum to take on the function of speech differs greatly in different persons.

In further illustration of some of the points given with regard to the training of aphasics, I would like to call attention to two patients who have been trained under my direction, in large part by Dr. T. H. Weisenburg, and who have made great improvement under the systematic efforts employed:[7]

The patient was a young man, painter by occupation, who had no history of syphilis, but had indulged in alcohol not infrequently to excess since the age of 15. When he was admitted to my wards at the Philadelphia Hospital, Dr. Weisenburg was the interne, and took charge of his training under

7. These patients were presented at the meeting of the section and a demonstration made of their improved ability in talking, reading and writing.

my direction. So far as his speech was concerned he was a typical instance of motor aphasia. He had no spontaneous vocabulary except the words yes or no, and his name, or a part of it, usually speaking of himself by his first name only. He could repeat single words if he took his time, but was easily confused. He could not read, although he was able to do so before his illness. He answered questions fairly well by pantomime. If given a start he could count from one to eleven, but forgot easily. He could not read aloud either script or text, although he seemed to understand them by sight. He was not word deaf. When he attempted to repeat what was said to him he did much the best as regards nouns and next as to verbs, but was unable to repeat a complete sentence, even a short one, by repetition. Besides his aphasia he suffered from a typical form of Jacksonian epilepsy. The spasm always began in the right side of the face, and sometimes extended to the right arm and even to the right leg. The initial phenomenon was always facial. The spasms frequently recurred. The eye examination showed no optic neuritis.

The training was confined to the method of repeating words from dictation and by having them pointed out in reading and writing, and to the method of Wyllie's physiologic alphabet. The man made slow but continuous improvement, until he left the hospital a few months after admission. During this time also the spasms practically ceased, the last seizures occurring at intervals of several weeks. When he left the hospital he continued to carry on his re-education at home, using a primer, and with the assistance of members of his family, re-studying the meaning and pronunciation of words and combinations of words.

He gradually improved till he could communicate spontaneously with others, but in a slow and halting manner, marked by the elision of a considerable number of words from sentences. Even the most careless study of the re-acquired language showed that the words chiefly at his command were, in the first place, nouns expressing the abstract; next, those of a concrete kind; next, verbs, and perhaps next pronouns. He very seldom put a sentence together unless it was a short one.

It is now about four years since this man was first attacked with his aphasia and Jacksonian spasms. Since he has left the hospital he has not had any recurrence of the convulsions. He has been able to earn money in various employments, as by peddling.

It is not improbable that a considerable part of his improvement has resulted from the use of iodids, although the method in which the case occurred would not seem to point to gummatous meningitis, but rather to a sudden hemorrhage localized to the left subfrontal convolution chiefly, perhaps invading slightly the lower extremity of the precentral gyre.

This patient can now communicate with others in an intelligible manner, although his sentences are incomplete. He can read aloud from a primer, and even from a book or paper sentences which are not too elaborate. He has made, in short, a degree of improvement commensurate with his original capacity and education, but not nearly so great as that of the highly educated physician recorded in this paper.

The second case is of so much interest in the study of aphasia that it is worthy of publication for its own sake, as well as to emphasize what can be gained by persistent training over a short period in cases of sensory or mixed aphasia.

The patient was a hotel keeper, aged 44. He was entirely well until November, 1903, when, after worry and hurry home, he was suddenly taken with severe headache and dizziness, but did not become unconscious and had no aphasia nor other objective symptoms.

After this, once or twice weekly he experienced severe attacks of headache, and on two or three occasions between November and February had attacks with dizziness. About the middle of February he had a sudden attack, in which he first called out, "Oh, my right arm," and very soon afterward became unconscious, remaining in this state for three days, with congested face and disturbed breathing. When he regained consciousness he was totally unable to speak except in jargon fashion, and could not understand a word that was said to him for a week. He was not, however, paralyzed in arm or leg, although he had difficulty in standing and in using his right arm. He could not carry it with precision to the place intended, as for instance, to his shoulder. Surely and gradually he re-acquired, although by no means fully, the power of speaking spontaneously or in response in conversation, using less and less of the jargon.

After his attack in February he had never been able to read the newspapers or anything else, as formerly, although evidently anxious to do this, as shown by his frequent efforts. It is interesting to note that he could read every word in the books in which he kept his accounts.

In testing him for his powers of word-seeing, letter-seeing and number-seeing, it was evident that he recognized some letters and some words much better than others. This was especially true with regard to words. He could always pick out words which had evidently been unusually familiar to him before his seizure; for example, the words whisky, brandy and beer in the hospital diet list were at once recognized, although most other words he could not tell, except in a few cases with difficulty. He showed curious variations in his ability to recognize words and letters, as when, for instance, he could spell out the word head, pronouncing all the letters except the d; sometimes he recognized a word without correlating it with its meaning. He had not only a well-known form of optic aphasia, that is, inability to indicate by name the object seen, but what might have been regarded the reverse of this, the inability to translate into meaning the word which he recognized. Sometimes when asked to spell an easy word, he did so correctly, and then would not be able to find the word in a page in which it was printed, although perhaps on the same page and nearby he would recognize another word of about the same simplicity. It happened at times that he could recognize a word on a page at one minute and a little later would be totally unable to do this. He made some curious mistakes in recognizing, or failing to recognize, parts of speech, as when he picked out *an* when asked to indicate *the*, although the latter word occurred several times on the page. Looking at *an* he would spell it out as if it were *the*.

Letters in a word like words on a page or in a paragraph were sometimes correctly recognized and sometimes not. He picked out some numbers on a calendar, and when asked to indicate other numbers he sometimes became confused. In some instances he would get at the number by starting with the units or numerals before the number and working up to it, as, for instance, when asked to indicate 15, he pointed to it and said, 12, 13, 14, 15.

It was noticeable in this man's case that if he were allowed to have his own way in talking spontaneously he apparently had very little difficulty in using language; for instance, when he was asked to count out money values he took notes of different value and various coins from his pocket, counted their number and talked about them almost as anyone else would.

Word deafness was a marked feature in the history of this case. At first, from what could be learned from members of his family, this was total. He had, however, slowly regained the power of recognizing some words and later some expressions, the improvement in this respect proceeding slowly when he came under my observation. In listening to others he was aided in his understanding of what was said by watching the facial expression and movements of the lips. I made frequent tests of his word deafness and found that it was partial and seemed to vary much from time to time. Another point of great interest was the fact that his word hearing powers were soon exhausted by efforts to communi-

cate with him. He would become confused and sometimes unable to comprehend what was said to him if the conversation were continued too long. He also became extremely confused if more than one person attempted to talk to him at the same time, or if a miscellaneous conversation were going on in his presence.

The patient stated that before he had the first attack in November, his hearing was different on the two sides. He heard better with his left ear than with his right; when he was a locomotive engineer he had often noticed this. Examination of his hearing with the watch tick showed on the right aërial conduction at 7 inches, and good bone conduction; on the left hearing was acute, hearing the watch tick at 41 or 42 inches; bone conduction was also good on the left. Such deafness as he had, except that noted for the right ear, was evidently cerebral and not peripheral.

With regard to his appreciation of tones and music, his daughter said that on several occasions during the first months after the apoplectic attack when she was playing the piano her father said that all music sounded alike to him. His wife also stated that he said to her on one occasion when he heard music, "It all sounds the same to me." Lately he had not said much about recognizing music. While at my office the patient's daughter played two or three familiar tunes, which he evidently recognized, and one of which he was able to hum in unison with the piano, but he could not recall the name of the song, although he said he knew well what it was; neither could he recall the words.

Careful examination of this man for reflexes, motor paralysis and hemianopsia was negative. Sensation in all its forms was retained, as was also stereognostic perceptions; he had, however, partial tactile amnesia as well as partial optic aphasia, not being able to name objects either through touch, manipulation or sight.

In brief, this patient was originally a total aphasic, the lesion being on the sensory side of his cerebral zone of language, probably near the position where the higher visual and higher auditory centers are coterminus, that is, about the caudal extremities of the first and second temporal convolutions. His early motor aphasia was simply due to the great general disturbance of his zone of language; his amusia also probably resulted from similar disturbance or from pressure rather than from direct lesion, as he recovered from this at a comparatively early period. Word hearing, word seeing, letter seeing and number seeing were the fundamental cerebral functions lost as the result of the destructive lesion. His partial recovery up to the time he came under observation was probably due largely to the recovery of power in those parts of the left cerebral hemisphere uninjured. The right hemisphere was also probably beginning to respond to the efforts at re-education, which he had pursued in an irregular manner spontaneously and with the assistance of those around him.

During a stay of less than a month in the Hospital of the University of Pennsylvania under a course of training which included some of the features of most of the different suggestions made in this paper, he made rapid progress, gaining steadily in his ability to understand spoken words, reading and writing and to carry on both responsive and spontaneous conversation. Although a man of quick perceptions and ready wit, he was not well educated. He had, however, been a fluent talker, and was able to write with fair correctness before his attack. He lost this power entirely, but is recovering it with considerable rapidity.

The following are two samples of his writing, the first made about three months after his apoplectic attack, and the second a few days later:

"Anie you to talk to last night me yhy did anie how long at this round time you whar is Chas Frindt did he work to fesh to me yet Anie did you teel about Dutch Rimling is he drink to fr him Anie you tell that to woking to me all to mutch calt whar is mind ducks thim ded or what happened."

"1904

Pheliaphet May 16,

Emma i will com from you at the Rehrig rail rod will com from 12.20 Right dont tell about the Boyes i will sneep Back on the holl Bor i haas mie things."

It must be remembered in passing a judgment on the man's improvement, as indicated by the above specimens of his writings, that he could not read or write a word a short time, probably only about three or four weeks, before the date of the first of these productions.

DISCUSSION.

DR. T. H. WEISENBURG, Philadelphia, stated that, under the direction of Dr. Mills, he trained three of the aphasics referred to in the paper. The principle of the methods employed was essentially the same in all the cases, but there was a wide difference in their application. In the first patient, a pure motor aphasic, Wyllie's physiologic alphabet proved of the greatest value, with the additional practice in letter and word writing and reading. The patient was sufficiently instructed in a short time to be able to carry on his studies by himself. Dr. Weisenburg did not see him afterward for over two years, when he told him that he was earning his living by street peddling, and that while selling his wares he could talk with but little hesitation. He still has difficulty in talking, but in view of the fact that he could say nothing but "yes, yes" when instruction was begun, the improvement is remarkable. This patient was young, fairly intelligent, and possessed of the greatest amount of determination. This last point is a very important factor in the prognosis. Dr. Weisenburg said that the second patient referred to by Dr. Mills was a sensory motor aphasic. A highly intellectual man, imbued with the determination to speak, he spent nearly all his time in study. The training was begun by a systematic instruction in sounds, first the vowels, then the consonants; the proper positions and relations of the mouth, tongue and lips were insisted on. After this point was firmly impressed on him and mastered by him, the improvement was rapid. Newspapers were read by another person, the patient following, all misunderstood words being explained by the use of a dictionary. Writing with the left hand, playing with pictorial cards, the reading of illustrated sentences, and drawing of geometrical figures were practiced and proved to be of the greatest benefit. Grammatical constructions were taught. The improvement was rapid. The third patient was a pure sensory aphasic, with little education and with much less intelligence and determination than the preceding patient. Here the training was difficult and consisted mainly in the repetition of letters, words and sentences, and the constant rewriting of the same; nevertheless, the improvement was considerable. Dr. Weisenburg said that from the experience he has gained, especially from these cases, that the method of training will largely depend on the form of the aphasia, and that most patients will be benefited if properly instructed. The mixed form is probably the hardest type to teach, although less progress was made for the time spent on the patient with pure sensory aphasia than on the others. The following brief résumé of the methods employed in training aphasics is taken from the Handbuch der physikalischen Therapie, Part 2, Vol. II, Leipzig, 1902:

Goldscheider insists that in the training of aphasics the mere repetition of words is not enough and that a systematic instruction is necessary. A beginning should be made by the simplest instruction of sounds as by the letters and short syllables. Gutzmann recommends a beginning with vowels, next the explosives and then to the first articulation P. The explosives are bound with the vowels, as Pa, Po, Pe, Ba, etc. Then come the nasal consonants, N and F and W, and so on in the list of consonants.

If the patient can not repeat sounds as they are he should be instructed to watch the mouth of the speaker and to try and imitate the sound thereby. If the patient is then sufficiently instructed he should next be taught articulation. Gutzmann also thinks that the comprehension of optic perception of speech movements can be greatly benefited by the patient watching articulatory movements in the looking glass, comparing this with illustrations at hand.

Goldscheider believes that systematic tongue exercises are of benefit, as the patient learns how to control accurately tongue movements.

If the aphasic has progressed sufficiently in the repetition and understanding of simple sounds, he should learn how to repeat sounds in a systematic manner, and by himself. This should not be always according to the alphabet, but should be changed. If the intelligence and the perception of the patient is sufficient, he should next be taught the different tones.

Further on, after the patient has learned to associate vocal sounds with speech movements, he should learn how to associate these with other perceptions, as writing and reading. This should consist in the copying of words, writing by dictation, or automatically. If there is paralysis of the right hand, the left hand should be instructed. The instruction should be systematic, as letters, syllables, words, sentences, etc. If there is optic aphasia, the patient should be instructed for forms as letters, as, for instance, he should be shown a letter from the alphabet, and should be made to remember it and to be able to point it out. Geometric perception should be taught, as this will help optic perception. Matches can be taken and figures built and the patient should reproduce them, or should do so by memory.

A number of aphasics are unable to read words, though they are able to perceive the letters of the word. These should spell a word loudly and be allowed to pick words from the alphabet, and should repeat the word until known.

It is also well known that a word can be better remembered, for instance, if impressed on more than one sense. So, a word heard should be repeated, written down, spelled, and so on. A patient should never be instructed for a long period at one time, and, again, should not entirely depend on the teacher, but should learn enough to write, spell, computate and observe movements in the glass by himself.

Next, the patient should be taught to repeat and remember short words. This should be done in a systematic manner and the words impressed by reading, writing and spelling.

Ruger aids optic and acoustic perception by aid of fingers. Each finger is made to signify certain words or numbers, and as each number is called the finger is projected, and so forth.

The association of words with their meaning is now the next point to be desired. This can be accomplished in various ways, notably by holding an object in front of him, telling him what it is, making him repeat the word and asking him to spell it, and to pick it out by alphabet, until it is thoroughly impressed on his memory.

It is to be remembered that in aphasics the words for abstract objects and for the pure formal speech elements are in a large measure better controlled than for concrete objects. Therefore, the teaching of this is highly important.

To instruct the tones and accents of the words is very important. This is helped by declensions and conjugations very materially. A better way is for the patient to learn certain sentences, paragraphs, sayings, and to learn to repeat them properly, and also to be able to write them and to read them loudly. Goldscheider thinks that the best way is to memorize rows of meaningless syllables, the order of these being changed from time to time. By this method the patient learns to differentiate syllables, accents and tones, and learns to remember different shades of sounds. It is well known that it is more difficult to remember meaningless words than words with meaning, and that it is harder to remember words spoken than the meaning of them. Herein lies the value of this training.

The syllables ut, re, mi, etc., are taken and arranged in rows as shown below; the combinations may be changed indefinitely:

ut	re	ut	re	mi
ut	mi	ut	mi	re
re	ut	re	ut	mi
re	mi	re	mi	ut
mi	ut	mi	ut	re
mi	re	mi	re	ut

DR. C. W. BURR, Philadelphia, said that the first case was a patient of his before he was a patient of Dr. Mills, so that he is able to certify and to state that there has been a very great amount of improvement in his speech since he saw him at that time. Dr. Burr considers that, so far as speech is concerned, these patients are in a state of childhood, and it seems to him that the only way to teach them is to proceed as if teaching a child. Show the object, call the object by a certain name; write down the name of the object, let the patients draw pictures of it, and they will gradually learn what the object is. Dr. Burr does not think it a good thing to make them repeat monosyllables in order to educate the auditory centers, notwithstanding that high authorities approve that method. He believes it is much better to educate them in sounds that mean something—boy, bell, book, and so on. Dr. Burr said that it is very hard for us to say how much of the improvement is due to education and how much is due to the natural course of events. In a case of syphilitic brain disease, a case of this character, from the pure use of mercury, independently of instruction, may regain largely the powers of speech and writing. Unless specific disease can be excluded, it seems to Dr. Burr possible that some of the improvement is due, not to the training, but to improvement in the specific disease.

DR. W. G. SPILLER, Philadelphia, said that there are four factors to be considered in regard to the prognosis: Age; nature of the lesion; extent of the lesion; intelligence of the patient. He has never seen an adult who was aphasic, although there might be hemiplegia on the right side, provided the hemiplegia developed very early in life. At one time he examined 30 cases of hemiplegia developing in early childhood without finding any case of aphasia accompanied by right-sided hemiplegia. In cases where the lesions are in a limited portion of the speech area, there will be improvement in the natural course of events. Traumatic lesions, Dr. Spiller says, give better results, so far as aphasia is concerned, than hemorrhage into the brain or thrombosis of blood vessels. Seven years ago Dr. Spiller examined a man with distinct motor aphasia who has now entirely recovered. The aphasia was caused by an injury received on the head. Another interesting case was that of a man who received a blow on the head and had word deafness as a result. He was found to have a large cyst in the left temporal lobe. This man, by his own efforts, recovered partially from his word deafness. In a case due to trauma the aphasia may last a short time; if due to arteriosclerosis it may be of considerable duration.

DR. JOHN PUNTON, Kansas City, Mo., agreed with Dr. Mills that if complete success is desired attention must be paid to the co-ordination of the speech. Complete success is often impossible; patients never recover completely, and Dr. Punton does not believe physicians are warranted in holding out a prognosis of complete success in that sense. It seems to him that the nature of the lesion in the case should have something to do with the prognosis, as Dr. Spiller has said. In a large number of cases there is embolism and thrombosis, and whether their presence would have anything to do in determining a second attack. It seems to him that the extreme efforts the patient would put forth in trying to accomplish his end would have a tendency to induce a second attack. That is one of the things that text-books warn against.

DR. F. W. LANGDON, Cincinnati, Ohio, stated that erroneous ideas prevail in the profession on the subject of the function of Broca's or the third frontal convolution. It is not a motor speech center, and its destruction gives rise, so far as can be seen, to no defect of motion whatever. Dr. Langdon prefers to speak of it as a language construction center, where the words are thrown together in their proper relation, but the real motor center is the lower Rolandic region, where the movements of the face, tongue, lips and so on are directed. Dr. Langdon said that he does not consider that grammar has anything to do with the acquirement or reacquirement of language by a patient with motor aphasia. The acquirement of language and grammar is purely a memory process. The child raised in refined surroundings will acquire a very different language from that of a child raised in the slums; and with a child raised in the slums the language of the slums will occasionally crop out, in spite of education and grammatical training. Language must be looked on as a matter of pure memory and arrangement, independent of grammatical relation.

DR. C. W. BURR, Philadelphia, said that he did not mean that in a man whose brain was occluded through the obstruction of an artery due to syphilitic disease iodid of potassium would dissolve that softening and create a new brain, and hence bring about restoration of function. He meant that in syphilis there may be syphilitic arthritis, not sufficient to produce softening of the brain, but quite sufficient to interfere with the function and to produce aphasia which, under the administration of mercury and iodid, certainly does clear up.

DR. W. J. HERDMAN, Ann Arbor, said that this whole matter can be summed up in the simple statement that while educational methods are the best to employ when there is any capacity left after injuries or organic disease of the different sorts, yet it is this capacity for recovery that is really the condition which determines how far the recovery will take place. There are some cases in which one would not by any process of education expect any degree of improvement. There are other cases which do possess such a capacity for improvement, and the individual will no doubt, without any very great help, show progress for the better, but it is the physician's business to employ therapeutic measures so far as they are helpful. Whether it is called a "grammatical process" or not, there is no question that the aphasic, if he retains any capacity in language, retains the vertebræ of that language, and in order to make it more ornate and intelligible he must, of course, place on the vertebræ the soft parts. Dr. Herdman does not agre with Dr. Langdon that the instruction of the aphasic must proceed along the same lines as the instruction of a child. The whole possibility of development in an aphasic depends on what remains of what actually did exist there, and in arousing this into action again. If the capacity never existed it could hardly be expected that the patient could be educated beyond the stage of his former acquirements; if the capacity does, or did exist, then the process of a systematic attempt at education is exceedingly helpful.

DR. CHRISTOPHER C. HERSMAN, Pittsburg, said that it is true that language is used in spite of grammar, and that after language has been learned it is perfected by grammar. If the patient is word blind and has to be taught words, he also needs synthetic teaching, or instruction in synthesis, building up, as well as teaching the individual words, and while teaching him the words, if the construction is also taught, more thorough advance is made than by simply teaching him the words.

DR. CHARLES K. MILLS said that the method of re-educating the aphasic is not exactly that which is applicable to children. The aphasic has both an advantage and a disadvantage as compared with the child. His advantage over the child is that his brain was thoroughly organized and in some cases thoroughly educated before the occurrence of the lesion; his disadvantage is that the child in its education started out with a potential mechanism of speech not affected by disease. Dr. Mills, of course, has taken the nature and extent of the lesion into consideration. He has seen cases of gummatous meningitis with aphasia and without other symptoms, the aphasia disappearing under the action of iodid. The first patient may have had a specific infection, but there was something more, a destructive lesion of the language center, and it is for this that he requires re-education. Dr. Mills has seen uremic aphasia and aphasia due to all sorts of affections which are remedied and do remedy themselves in time, but the remarks here apply to cases not to be restored to speech by time or medication. Dr. Mills stated that one inference drawn from part of the discussion is that these patients would get well anyhow by the progress of time in proportion to their natural, plus their acquired capacity, before the aphasia; but this is not quite true, as he knows from a long experience. He used the term grammar in a rather broad sense, in order easily to convey his idea. The patient must be restrained in the use of language as he formerly used it. There is a grammer of the slums. If a child who lives in the Bowery and uses the language of Jimmie Fadden becomes aphasic, he must regain this particular sort of language. The method of training must not be simply a method of memory. The patient must learn again the use of prepositions, adjectives, conjunctions, and auxiliaries, of all the parts of speech that go to make up sentences, and the methods of arranging these in sentences for the expression of thought.

THE CONTROL OF INTERNAL HEMORRHAGE BY DRUGS.*

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By the term internal hemorrhage, as used in this paper, I include all forms of bleeding in which the bleeding point is not within reach of direct topical application.

It will be my purpose to set forth the general principles on which rational medical treatment is based, and not to discuss the relative merits of surgical and medical means.

In the first place, it may be stated that we have no specific remedy for the control of bleeding, and secondly that the employment of many of the drugs recommended is not based on rational grounds. As will be seen presently various agents are advised for a similar condition which act antagonistically, so that if one does good, the other must do harm.

The preference given to many remedies by clinicians is too often based on insufficient data. The action on a small series of cases of certain character may not apply to all hemorrhagic conditions, and the tendency of the bleeding to cease from nature's efforts is so important a factor that we are never sure our drugs have exercised any influence whatever.

In order to discuss intelligently the control of internal hemorrhage, I shall state the following general principles:

1. The mere onset of hemorrhage does not necessarily indicate medical treatment. The general tendency of bleeding is to cease from natural causes, and often more harm than good is done by overdrugging.

2. All patients, bleeding from whatever cause, must be kept in a state of absolute rest and quiet, bodily and mental, so far as this is possible.

3. All forms of hemorrhage may be more or less benefited by what may be termed collateral treatment. Change of bodily posture as indicated, drawing the flow away from the bleeding point as much as possible, the use of cold, heat, counter irritation, ligature of the limbs, etc.

4. The drug treatment of hemorrhage includes:

A. First, the use of hemostatics, acting locally when this action may be secured, as in certain forms of bleeding in the gastro-intestinal tract. Second, the use of internal hemostatics.

B. First, the use of drugs for the purpose of lowering the blood pressure, by depressing the heart or widening the blood paths. Second, the use of drugs to produce a local constriction of the vessels around the bleeding point.

In the consideration of the action of drugs on the vasomotor system we face one of the great difficulties of our problem. Vasoconstrictors to be of value must possess an affinity for the vessels around the bleeding

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