REMARKS ON THE CLINICAL EXAMINATION OF CASES OF APHASIA.

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INTRODUCTION.

THE examination of cases of aphasia is in many cases attended with great difficulty, and the results obtained, unless the observer should happen to have directed special attention to the subject, are often very unsatisfactory. This is much to be deplored, for there is no subject in the whole range of cerebral physiology and pathology which is of greater interest and scientific importance. Indeed, I am personally disposed to go farther than this, and to say that, from a scientific point of view, there is no subject in the whole range of cerebral physiology and pathology which is so important; for by the examination of the speech defects to which the term "aphasia" is applied we are able to get some idea—though our knowledge is as yet very rudimentary and imperfect—of the manner in which some of the higher parts of the cerebral mechanism work than by any other means with which we are as yet acquainted. It is very desirable, therefore, that cases of aphasia should be exhaustively studied during life and thoroughly examined after death. Fortunately, cases of aphasia are, comparatively speaking, common—far more common than is usually supposed—and it cannot, I think, be doubted, notwithstanding the great complexity of the subject and the rarity of simple and uncomplicated cases, that with the increased attention which is now being given to the subject, our knowledge of the pathology of aphasia, and consequently—for the two subjects are very intimately connected—of some of the more obscure and debatable points in cerebral physiology and pathology, will, before long, be considerably increased.

Provided that a thoroughly well-considered plan of examination is carefully followed, the clinical observation of cases of aphasia is by no means so difficult as it at first sight appears. The great difficulty which the practitioner who has not directed special attention to the subject of aphasia and to the investigation of cerebral disease experiences is due to his want of knowledge as to how to go about the clinical examination, and as to the points which should be specially investigated—in other words, as to what he should look for and what he should expect.

The pathological examination can be thoroughly and satisfactorily carried out only by one who has had a special training in the modern methods of examining the brain after death, and by a pathologist who is intimately acquainted with the morbid anatomy and pathology of aphasia. It is desirable, therefore, that the *post-mortem* examination of cases of aphasia, and in particular the more minute examination of the brain after its removal from the body, should, if possible, be undertaken by a specialist—a skilled pathologist who has devoted special attention to the examination of the morbid brain. When the services of a skilled pathologist cannot be obtained, the brain should be carefully removed in the ordinary way by the medical attendant, and at once sent packed in a sufficient quantity of preservative fluid,¹ to a specialist² for further and more minute examination.

Several different plans of case-taking for cases of aphasia have from time to time been published. The following is based upon the difficulties encountered and the experience gained in the observation of the cases which have from time to time come under my own notice.

METHOD OF CASE-TAKING AND PLAN OF THE EXAMINATION.

Preliminary Points.—It is well to ascertain and note at the commencement of the examination:

1. Whether the patient is right-handed, left-handed, or ambidexterous; and, if left-handed or ambidexterous, whether he has been accustomed to write with the right hand, with the left hand, or with both hands.

2. Whether he has learned to read and write: and, if so, whether he was in the habit of reading or writing much—that is, with facility.

3. Whether, prior to the onset of the aphasic attack, he was intelligent, mentally active, highly educated, etc.

4. Whether there is any motor paralysis or anæsthesia, especially in the right hand, face, or tongue; and whether there is any inco-ordination or impairment of the muscular sense, especially in the right hand and arm (I refer more particularly to right-handed persons).

5. The condition of the mental, intellectual, and emotional faculties, so far as this can be determined at this stage of the examination. But it must be remembered that in many cases it is only after the aphasic symptoms have been thoroughly studied that a reliable opinion can be formed as to the mental condition of the patient. It is especially important to ascertain whether any marked or obvious alterations have occurred in the mental, intellectual, and emotional condition of the patient since the onset of the aphasic symptoms or of the brain lesion which is the cause of the aphasic condition.³

The functional condition of the different speech centres and of the connecting fibres and commissural tracts passing between the different speech centres must then be examined.

In testing the speech faculties, it must be remembered that in many cases of aphasia the brain power is easily exhausted; consequently it is in many cases impossible to complete the examination at a single sitting. Time, care, patience, and accuracy in regard to the investigation of each detail are absolutely essential in order to obtain a full record and reliable clinical result.

Further, it must be remembered that in many cases the aphasic symptoms or speech defects are (for the time) markedly increased by the nervous perturbation produced by the examination. In many cases of aphasia, the efforts which the patient makes, in order to answer the different questions which are put to him, and in order to perform the different tests applied with the object of determining the exact character of the aphasic and other symptoms, are attended with flushing of the face and other indications of mental strain and effort (probably with some local elevation of temperature, though I am not aware that as yet any detailed observations have been published on this point).

Again, it must be remembered, on the one hand, that in many cases it is very difficult or impossible to form a reliable opinion as to the exact nature of the aphasic symptoms and speech alterations which are the direct results of a destructive lesion of one of the speech centres or its connecting fibres, until the temporary disturbances (due to shock, œdema, pressure, irritation, inhibition, etc.) have passed off; and on the other, that after these initial disturbances of a temporary kind have passed off—and this applies more particularly to those cases in which the lesion is of some standing—the aphasic symptoms due to a destructive lesion of one of the speech centres or its connecting fibres may be much less marked than one would expect, or the aphasic symptoms which were very marked in the earlier stages of the case may become much less apparent or may even entirely disappear in consequence of the production of compensation. In contrasting the nature and severity of the aphasic symptoms which were present during life with the extent of the lesion (the amount of damage in a speech centre or its connecting fibres) which is found in the brain after death, one must remember the great possibilities in the direction of the restoration of the speech functions which this process of compensation affords.

Main Headings of the Examination.—In investigating the condition of the speech centres and of the connecting fibres and commissural tracts which pass between the different speech centres, the following points in particular have to be noted:

1. The condition of the auditory speech centre—the patient's ability to understand spoken language.

2. The condition of the motor vocal speech centre—the patient's ability to express himself in spoken language.

3. The condition of the visual speech centre—the patient's ability to understand written speech (manuscript, print, shorthand, etc.).

4. The condition of the motor writing centre—the patient's ability to express himself in writing.⁴

5. The condition of the connecting fibres and commissural tracts passing between these different centres.

The Points which should be specially investigated.—In testing the speech functions of aphasic patients, the following points in particular should be observed:⁵

1. Ability to understand broken language, and, if impaired, the degree of such impairment and the exact form of the defect.
 2. Ability to speak spontaneously, and, if impaired, the degree of such impairment and the exact form of the defect (paraphasia, etc.).
 3. Ability to sing and to articulate speech sounds (words, etc.) in singing.
 4. Ability to repeat spoken language.
 5. The presence of emotional and reflex expressions (unintellectual language) and of recurrent utterances, and, if present, their exact nature, etc.
 6. Ability to understand written language (manuscript, print, shorthand, etc.), and, if impaired, the degree of such impairment and the exact form of the defect.
 7. Ability to read aloud.
 8. Ability to spell, and, if impaired, the exact form of the defects.
 9. Ability to name objects at sight.
 10. Ability to point out objects named to him.
 11. Ability to write spontaneously (manuscript, print, shorthand) and, if impaired, the degree of such impairment and the exact form of the defect.
 12. Ability, after a short interval, to read what he has just written.
 13. Ability to write from dictation.
 14. Ability to copy print, manuscript, and shorthand intelligently; to transcribe print into manuscript and manuscript into print; to arrange separate (block) letters in the form of words, and to write on the typewriter.
- The patient's ability to write spontaneously from dictation, and to copy manuscript, print, shorthand, etc., intelligently with the left as well as with the right hand, must be tested.
15. Ability to copy mechanically.
 16. Ability to draw intelligently and mechanically.

THE CONDITION OF THE AUDITORY SPEECH CENTRE.

The object is to test the patient's capability of intelligently understanding speech sounds (auditory speech symbols) which pass to the cerebrum by the ear.

As a preliminary test it is necessary to ascertain whether the patient can hear and understand the meaning of ordinary sounds and noises other than speech sounds (spoken language).

In testing the condition of the auditory speech centre, a question or questions should first be put to the patient. If he answers correctly and intelligently, it is obvious that he is not only able to hear sounds and noises, but that he is able to intelligently understand speech sounds. In other words, it is obvious that both the lower auditory centre and the higher auditory centre (the auditory speech centre) are functionally active; there is no word deafness (or at all events no marked or obvious degree of word deafness).

And, further, as I will presently point out, if the patient correctly answers spoken questions by vocal speech, it is obvious not only that the auditory speech centre is functionally active, but that the motor vocal speech centre is functionally active, and that the connecting fibres passing between these speech centres are functionally active.

If the patient does not answer spoken questions put to him, the fact that he does not answer may be due to a variety of different causes—namely:

1. He may be deaf to all sounds. This may, of course, be due to a lesion of: (a) the end organ of hearing (ear); (b) the auditory nerve trunk, its central terminations in the medulla oblongata, etc., or the conducting tracts passing from the auditory nerve nuclei to the auditory perceptive centres in the cerebral cortex; or (c) the lower auditory perceptive centres in the cerebral cortex; destruction of both lower auditory centres in the cerebral cortex—a very rare condition—would produce deafness to all sounds, and would necessarily entail subcortical word deafness.

The acuity of hearing in each ear must therefore in the first place be tested. Even in cases of complete word-deaf-

ness there is, of course, no difficulty in ascertaining the exact condition of hearing, provided that the patient is able to understand written language (that is to read) and to express himself either by means of vocal speech or in writing.

2. He may be able to hear noises, and he may be able to hear speech sounds as noises, but he may be unable to understand speech sounds. He may not be deaf, but he may be word deaf. His auditory speech centre (higher auditory centre) may be functionally inactive or paralysed.

In testing the condition of the auditory speech centre by means of spoken questions, it is very important to avoid giving the patient information in any other way than by vocal speech. The physician should take care to avoid giving the patient any information by gesture or pantomime. When asking the patient to put out his tongue, for example, care should be taken not to look at the patient's mouth.⁶ Further, it must be remembered that some intelligent patients are quick at reading lip language (just as deaf mutes who have been taught lip reading are). In testing the condition of the auditory speech centre, therefore, in cases of word deafness, it is farther advisable, if every precaution is to be taken, not to let the patient see the movements of the lips while the question is being asked. The patient's eyes may be bandaged, or the physician may stand behind, or at the side of, the patient. This procedure may perhaps appear to be an over-refinement, but it is a necessary refinement if absolute accuracy is to be attained.

If the patient is word deaf, the degree of the word deafness must be carefully ascertained, and the form or variety of the word deafness (whether cortical or subcortical) determined. In all cases of aphasia, whether the auditory speech centre appears to be directly implicated by the lesion or not, but especially, of course, in cases in which there is reason to suspect a slight but not marked degree of word deafness, the patient's power of understanding complicated spoken questions must be carefully tested. It is not enough to ascertain whether he understands a simple question containing some word or words which he recognises; but the form of the sentence should be varied so as to see whether he intelligently comprehends the different meanings conveyed by slight variations of language, when similar words are used.⁷ Thus he may be asked in the first instance, Are you married? Then, When were you married? How long have you been married? Where were you married? What age were you when you were married? How old was your wife when she was married? Have you enjoyed good health since you were married? Where have you lived since you were married? What did your wife wear when she was married? etc.

In those cases in which, prior to the onset of the aphasic symptoms the patient could understand several languages, it should be noted whether he retains the power of understanding each of these languages or not, and whether he retains the power of understanding his native language better than other languages subsequently acquired.

3. He may be able to hear speech sounds, and his auditory speech centre may be (for him) unimpaired—as functionally active as it ever was in his individual case; but he may be unable to answer the spoken questions put to him, or he may answer incorrectly or may not answer at all, because:

(a) His expressive (motor speech) mechanisms are inactive or defective, that is, owing to the presence of motor aphasia or graphia, or both.

In complete word deafness with motor vocal aphasia and graphia, word blindness is usually also present; in short, there is usually a condition of total aphasia; in such cases there is usually also paralysis (right hemiplegia).

In those cases in which the patient is suffering from complete motor aphasia and graphia, that is, is unable to express himself in spoken or written language, one must judge of his capability of understanding spoken language by observing (a) whether he answers spoken questions intelligently by means of pantomime, and (b) whether he reacts intelligently by emotional expression to the spoken questions which are put to him. He should, for example, (a) be told to perform some simple act, put out his tongue, close his eyes, touch the tip of his nose, etc.; or (b) some absurd or insulting question, for example, Are you a fool? Do you dye your hair? etc., should be put to him with the object of observing whether there is any emotional reaction.

If there is paraphasia or jargon aphasia, the fact whether the patient is conscious or not of using wrong words should be noted.

If there is a marked degree of word deafness, the patient's ability to recognise his own name should be noted. Many patients who are almost totally word deaf can recognise their own names and a few other words which by frequent repetition have become so familiar as to be, as it were, part and parcel of themselves. I am disposed to think that in such cases the name or other familiar words (spoken speech) are probably recognised and understood in consequence of the auditory speech centre in the right hemisphere being functionally active.

The patient's ability to recognise words spelt aloud should also be noted. In recognising a word spelt aloud it is probable, in some persons at all events, that not only the auditory speech centre, but also the visual speech centre, and consequently the connecting fibres passing between these two centres, are brought into play. In most persons there is, I think, every reason to suppose that, for the purpose of spelling, the action of the auditory speech centre is by far the more important of the two. Possibly in rare cases the action of the visual speech centre is the more important. Now it is conceivable that in a case of word deafness due to defective action, but not to complete destruction, of the auditory speech centre, the additional information derived from stimulation of the visual speech centre might enable the patient who was unable to recognise a word when merely spoken to recognise it when it is slowly spelt aloud.

(b) He is addressed in a language which he does not understand. (The nationality of the patient and his ability to answer questions in his own language at once show the reason why he does not answer in this case.)

(c) His intelligence is defective. When the inability to answer is due to defective intelligence, the history of the case, the mental condition of the patient prior to and subsequent to the onset of the aphasic condition, the general conduct and associated actions of the patient are usually quite distinctive and conclusive. In cases in which there was not, prior to the onset of the present attack, any mental impairment, there is usually no difficulty in determining by observing the facial expression, conduct, and whole mode of action of the patient, and the manner in which he reacts by pantomime and emotional expression to spoken and written questions, to ordinary stimuli (pinching, pricking, etc.), and to gestures, whether his inability to answer spoken questions is due to word deafness or to a more general intellectual defect.

Inability to understand the full meaning of a word may of course be due to defective education or defective intelligence. It may not be the result of an aphasic defect, a defect in the auditory speech centre or its connections. It is unnecessary to point out that the same word conveys very different meanings to different individuals in accordance with their degree of intelligence and the extent of their education and knowledge. Hence in trying to form an estimate of the degree of functional activity of the auditory speech centre and of its connections, one must take into account the degree of functional activity which it possessed prior to the onset of the aphasic symptoms; in other words, one must adapt one's test questions to the normal intelligence and mental acquirements of the individual.

(d) He does not choose to answer, or because he wishes to deceive and wilfully makes erroneous or peculiar answers.

In the case of shamming (unless the patient should happen to be a medical man, but I know of no recorded case in which a medical man or a person acquainted with the physiology and pathology of aphasia has feigned word deafness), the malingerer does not feign to be word deaf, but to be totally deaf. These cases need not, therefore, detain us.

In some cases of hysteria there is considerable difficulty in forming an opinion, but a correct diagnosis can usually be made by a careful study of the associated symptoms and whole facts of the case (age, sex, mode of onset, etc.), and especially by watching the course and progress of the case.

The points of distinction between the subcortical and cortical varieties of word deafness are considered in detail in my lectures on aphasia.⁸

THE CONDITION OF THE MOTOR VOCAL SPEECH CENTRE.

The patient's ability to express himself in spoken speech must next be tested. The observer should note:

The Condition of Spontaneous Speech.—Whether the patient speaks spontaneously, that is, whether the patient is able voluntarily to call up by an act of recollection and to express in spoken language the words which represent his ideas; and, if so, whether he makes use of appropriate language; whether there is any defect of articulation, etc.

If the patient can understand spoken language (that is, if there is no word deafness), he should be asked questions and encouraged to talk, with the object of further testing the condition of the motor vocal speech centre. He may be asked, for example, to give a detailed account of his illness, his feelings, his complaints, etc.

If the patient cannot understand spoken language (is word deaf), written questions should be put to him.

If he is word blind as well as word deaf, one has to observe whether he speaks spontaneously, and whether he makes use of language when irritated or stimulated (pricked, pinched, etc.) and in response to signs (gestures, pantomime).

In those cases in which motor vocal aphasia is present, the degree of the impairment must next be carefully noted—whether the patient uses wrong words, substitutes roundabout phrases for nouns (paraphasia); whether he speaks in jargon, in mirror speech, etc.⁹

In those cases in which there is paraphasia or jargon aphasia, the fact whether the patient is conscious or not of using wrong words should be noted.

(a) In those cases in which the patient's vocabulary is very limited, in which, for example, he can only say "Yes" and "No," the observer should carefully ascertain whether the words which he uses are used intelligently and appropriately, that is, in a propositional sense, or merely as emotional, reflex, or recurrent utterances.

(b) In those cases in which the patient makes use of emotional expressions, their exact nature should be stated.

(c) In those cases in which the patient makes use of recurring utterances, their nature should be stated; and it should if possible be ascertained whether they were words which were about to be uttered, or which were last uttered, or whether they were appropriate for the conditions, circumstances, and surroundings of the patient when he was attacked with the aphasia.

(d) Further, if, prior to the onset of the aphasic symptoms, the patient could sing, it should be noted whether he retains the ability to sing; and, if so, whether in singing he can pronounce words which he is unable to make use of in ordinary vocal speech (in voluntary speaking).

(e) If prior to the onset of his aphasic symptoms the patient could speak several languages, it should be noted whether his ability to express himself in these different languages is retained or not.

THE CONDITION OF THE CONNECTING FIBRES PASSING BETWEEN THE AUDITORY SPEECH CENTRE AND THE MOTOR VOCAL SPEECH CENTRE.

Ability to Answer Questions.—The condition of the connecting fibres passing between the auditory speech centre and the motor vocal speech centre is tested by observing whether the patient can answer in spoken language spoken questions which are put to him. If he answers such questions correctly in spoken language it is obvious that, not only are the auditory and the motor vocal speech centres functioning satisfactorily, but that the connecting fibres passing between the auditory speech centre and the motor vocal speech centre are intact.¹⁰

But it must be remembered that the ability to answer questions correctly and intelligently implies much more than the mere integrity of the auditory speech centre, the motor vocal speech centre and the connecting fibres passing between the auditory and motor vocal speech centres. It implies, not only that the auditory speech centre and the motor vocal speech centres are functionally active, but that the intellectual faculties (so far as they can be tested by the particular question which is asked) are unimpaired; in other words, that the other associated and higher cerebral centres and the connecting fibres passing between the auditory

speech centre and the other (associated and higher) cerebral centres through which the question has, as it were, to pass before an intelligent judgment on it can be arrived at and an appropriate answer mentally determined upon are also functionally active.

In almost all cases the answer necessarily involves an act of memory and of recollection—the voluntary recall of a past mental impression; consequently even in those cases in which the question is quite simple, that is, does not involve much intellectual ability, thought, judgment, etc., inability to answer correctly may be due to mental defect or impairment rather than to a defect in the cerebral speech mechanisms properly so called.

Repeated Speech.—This is tested by observing whether the patient can repeat speech sounds (words and sentences) which he is told to repeat. If the patient can hear ordinary sounds, but is word deaf, and yet can repeat words and sentences which he is told to repeat, it is, I think, reasonable to conclude (provided that there is no defect of general intelligence) that the nervous impulses which pass in by the ear and out by the motor vocal speech centre probably make their way to the motor vocal speech centre through some other channel than through the left auditory speech centre. (a) They possibly pass directly from the lower auditory centre to the motor vocal speech centre; or (b) perhaps from the lower auditory centres to, and through, the right auditory speech centre (which in popular language is insufficiently educated to enable the patient to decipher the meaning of the spoken words while it is sufficiently educated to enable the reflex repetition to take place), and thence to the left motor vocal speech centre (Broca's convolution).¹¹

If such a condition as supracortical aphasia actually occurs, it would of course satisfactorily account for the patient's inability to understand the spoken words which he is able to repeat. In this case the nervous impulses concerned in repeated speech would pass from the auditory speech centre to the motor vocal speech centre, without reaching, as it were, and exciting the associated and higher centres in the cerebral cortex.

The condition of a patient who can repeat spoken language, but who is word deaf—that is, does not understand the words which he is able to repeat—corresponds to that of a healthy person who is able to repeat (pronounce) words of a foreign language which he does not understand. This parrot-like speech is also frequently practised by the young child in the process of learning to talk. In such cases the patient repeats words or sentences, as the husband of one of my word-deaf patients explained it, and expressed it “by sound and not by sense.” It is interesting to note that this patient, who could not understand a sentence addressed to her, was in many instances able to understand it after she had repeated it in this parrot-like way (by sound and not by sense); possibly, as I have suggested in commenting upon the case, she was able to understand the sentence by the aid of the additional information (stimulation) afforded by the kinæsthetic impressions associated with the act of vocalisation.

THE CONDITION OF THE VISUAL SPEECH CENTRE.

The object is to test the patient's power of understanding speech symbols which pass to the cerebrum (visual speech centre) through the eye. As a preliminary test, it is necessary to ascertain if the patient can see ordinary objects (that is, if central vision, the acuity of vision, is intact), irrespective of his power of appreciating and understanding the special objects (visual speech symbols) which are represented in the visual speech centre—that is, that part of the higher centre for vision in which visual speech symbols are brought into connection with other parts of the cerebral cortex. In testing the acuity of vision, errors of refraction must of course be corrected and allowed for. Objects (drawings, pictures, etc.) of different sizes should be shown to the patient, and his power of recognising them at different distances must be tested.

If central vision is intact, the condition of the fields of vision should next be investigated, for in many cases of word blindness there is right-sided lateral homonymous hemianopsia. When hemianopsia is present, the fields of vision should be carefully mapped out by means of a self-registering perimeter, special care being taken to ascertain whether the

divisional line passes through or round the fixing point, and whether there is any constriction of the unaffected (left) halves of the fields of vision. But it must be remembered that the presence of right-sided lateral homonymous hemianopsia and the exact relationship of the divisional line to the sound and blind sides of the field and to the “fixing” point are of no consequence so far as the aphasic defect—the word blindness—is concerned; though they may be of considerable importance from a localising point of view, that is, they may enable the physician to determine more accurately than he could otherwise do the exact position of the lesion. Hemianopsia is an associated symptom, and when associated with word blindness is usually due to a lesion which involves the optic radiations of Gratiolet.

The condition of the fields of vision for colours should also be tested, though this (for the purpose of interpretation of the aphasic symptoms) is a matter of no importance. In those cases in which the hemianopsia is due to a lesion of the optic radiations of Gratiolet, hemiachromatopsia is (? always) associated with the hemianopsia.

After these preliminary points (the acuity and fields of vision) have been noted, the condition of the visual speech centre must next be investigated.

There is, of course, no difficulty in testing the condition of the visual speech centre in those cases in which the patient is able to express himself by means of vocal speech or in writing.

A question in writing should first be put to the patient. If he answers correctly in vocal speech, he is not only (a) able to see, but (b) he is able intelligently to comprehend written speech symbols, that is, there is no marked word blindness, (that is, no word blindness for the particular written characters which have been placed before him); and (c) the connecting fibres passing between the visual speech centre and the motor vocal speech centre (which in ordinary circumstances seem to pass through the auditory speech centre) are also intact.

If the patient is able to understand simple written sentences, a complicated written sentence should then be placed before him, and he should be asked to explain its meaning; in other words, the condition of the visual speech centre and of the efferent fibres passing from it to the auditory and motor vocal speech centres should be more fully investigated.

If the patient does not answer the written question which is put to him, the fact that he does not answer may be due to a variety of different causes:

(a) He may be blind to all objects; both his lower and his higher visual centres may be inactive. The preliminary test (acuity of vision) has, however, eliminated his error.

(b) He may be able to see ordinary objects; he may be able to see visual speech symbols (letters and words) as ordinary objects, but may be unable intelligently to understand their meaning as speech symbols, that is, he may be word blind. This may be due to the fact:

(1) That he has never learned to read.

(2) That the visual impressions received in the half vision centres and perceived as ordinary visual images are unable to reach the visual speech centre (which is itself intact) in consequence of a block in the connecting fibres passing from the lower (half vision) centres to the visual speech centre. In these cases (subcortical word blindness) the patient is usually (? always) able to write spontaneously and from dictation, to write with his eyes closed, to arrange separate (block) letters in the form of words, and to write on the typewriter (there is no agraphia); but he is unable, after a short interval, to read what he has written. Further, in many (? all) of these cases he can decipher the meaning of written speech (the letters and words which he has just written, but is unable to read in the ordinary way) by the aid of the muscular sense and ingoing (kinæsthetic) impressions which attend the act of writing, that is, he can read by tracing the letters and words over with his index finger, by tracing the letters which he has just written, but which he cannot read by the sense of sight, over with a pencil, or when he is helped to trace over the letters with a pencil or on the blackboard with a piece of chalk, the movements of his hand being guided by the physician. In these cases, too (cases of subcortical word blindness), it is probable that there will be

little or no defect in the patient's ability to spell. Further, his mental conception of the form of the letters (which he is unable to read) will be retained. He will be able to describe the form of the letter *a*, for example (an *o* with a hook, as one of my patients expressed it), but he will not be able to read it, that is, to name it when he is asked to read it.

All of these points (inability to write spontaneously, from dictation, with the eyes closed, on the typewriter, to arrange separate block letters in the form of words, to decipher the meaning of written speech by tracing the letters over with the finger, etc.), must be carefully investigated.

(3) That the visual speech centre is itself inactive or destroyed. In these cases (cortical word blindness) the patient is not only unable to read, but he is also unable to write, either spontaneously or from dictation (there is agraphia); he is unable to read (decipher) letters and words by tracing them over with his finger; his visual spelling will be impaired or destroyed; he will have lost the mental conception of the form of the letters; he will not be able to describe (in words) the form of the letter *a* for example; and he will not be able to arrange separate (block) letters in the form of words or to write on the typewriter. If the patient was, prior to the onset of the aphasic symptoms (word blindness), able to read and write shorthand, his ability to read and write shorthand should be tested.

(4) He may be able to see and understand speech characters (his visual speech centre may be functionally active), but he may be unable to answer the written questions which are put to him, or he may answer incorrectly or in some abnormal way:

(a) Because his expressive (motor speech) mechanisms are inactive or defective. He may be unable to answer a written question in spoken language, because the motor vocal speech centre or the connecting fibres passing between the visual speech centre and the motor vocal speech centre are destroyed; and since the nerve impulses necessary for the production of a spoken answer to a written question seem, under ordinary circumstances, to pass through the auditory speech centre, in order to reach the motor vocal speech centre, a lesion which interrupts the connections between the visual speech centre and the auditory speech centre will, under ordinary circumstances, interfere with the patient's ability to answer a written question in spoken language. Again, the patient may be unable to write (to answer a written question in writing) because the motor writing centre or the connecting fibres passing between the visual speech centre and the writing centre are destroyed.

(b) Because his intelligence is defective.

(c) Because he does not choose to answer, or because he wishes to deceive and wilfully makes erroneous or peculiar answers.

In order to determine which of these conditions is present, some of the same points which have already been enumerated in connection with the testing of the auditory and the motor vocal speech centres must be investigated.

In those cases in which the patient is suffering from motor aphasia and agraphia, one must judge of his capability of understanding written speech by: (a) asking him in writing to perform some simple act (put out the tongue, close the eyes, touch the tip of the nose, etc.); and (b) by observing whether there is any emotional reaction to some absurd or insulting question which is put to him in writing.

In those cases in which the patient is word blind, the degree of the word blindness must be ascertained, and the form or variety of the word blindness (whether cortical or subcortical) determined.

In order to determine the degree of the word blindness, the patient's power of naming and understanding—(a) individual letters, syllables, short words, sentences, and complicated passages; (b) individual numbers and combination of numbers—must be carefully tested.

The patient's ability to tell the time on a watch should be noted. If the patient can correctly read and tell the time on a watch, it is obvious that there is no defect (a) in the visual centre (though there may be in the visual speech centre); (b) in the intellectual faculties concerned in appreciating and forming a judgment on the visual impression generated by the object watch, the position of the hands of the watch, etc.; (c) in the connecting fibres passing between the visual centre

and the auditory speech centre, and in the connecting fibres passing between the auditory speech centre and the motor vocal speech centre.

The points of distinction between the cortical and subcortical varieties of word blindness are set forth in my lectures on aphasia.¹²

Having noted the condition of the visual speech centre, the condition of the connecting fibres which pass between the visual speech centre and the other speech centres and the motor writing centre must then be examined.

(a) *The Condition of the Connecting Fibres passing between the Visual Speech Centre and the Motor Vocal Speech Centre.*—This is tested by observing whether the patient can read aloud. If the patient can read aloud, the connection is obviously intact and the motor vocal speech centre is also intact.¹³ If the patient can read aloud and understand what he reads, it is obvious (a) that the visual speech centre and the afferent fibres which pass to it from the half vision centres are intact; (b) that the motor vocal speech centre is intact; and (c) that the connecting fibres which pass between the visual speech centre and motor vocal speech centre are intact.

In the act of reading aloud the visual speech centre is first called into play, and then under ordinary circumstances the nervous impulses pass from the visual speech centre to the motor vocal speech centre *via* the auditory speech centre. Hence, if the patient can read aloud it may further be concluded—under ordinary circumstances at all events—that the auditory speech centre is intact, and that the connecting fibres passing between the visual and the auditory speech centres, and the connecting fibres passing between the auditory and the motor vocal speech centres are intact.

But it is highly probable, I think, that in some persons (strong visuals) and in certain cases of disease (deaf-mutes and some cases of aphasia—word deafness) the nervous impulses concerned in the act of reading aloud pass directly from the visual speech centre to the motor vocal speech centre and not through the auditory speech centre. Hence the fact that the patient can read aloud does not necessarily prove that the auditory speech centre (through which the nervous impulses concerned in the act of reading aloud usually pass) is intact.

(b) *The Condition of the Connecting Fibres passing between the Visual Speech Centre and the Auditory Speech Centre.*—This is tested by observing whether the patient is able to name letters and words which are shown to him, and also, as has just been stated (in most healthy persons), by noting whether he can read aloud.

If the patient is able to name letters and words which are shown to him and to read aloud, the connecting fibres passing between the visual speech centre and the auditory speech centre are intact. Under such circumstances it may also be concluded that the connecting fibres passing between the auditory speech centre and the motor vocal speech centre are intact; for in naming aloud a written letter or word the auditory memory of the word must (under ordinary circumstances at least) be recalled in order that the motor equivalent may be emitted; in other words, it would appear that in most normal individuals the nerve vibrations excited by the visual speech symbols (letters and words) flow over from the visual speech centre to the auditory speech centre, from which they finally pass to the motor vocal speech centre. After the cell group in the visual speech centre which corresponds to the visual speech symbol (the letter or word) is stimulated, the associated cell group in the auditory speech centre in which the auditory symbol of that letter or word is stored is stimulated, and finally the associated cell group in the motor vocal speech centre in which the motor equivalent (symbol) of that letter or word is represented is stimulated.

Hence it follows that in those cases in which a patient can name a given visual speech symbol (written or printed letter or word) the cell groups in the visual speech centre, the auditory speech centre and the motor vocal speech centre which represent the visual, auditory, and motor vocal speech equivalents of that letter or word are intact, and the connecting fibres which pass between these cell groups in the visual speech centre, the auditory speech centre and the motor vocal speech centre, are intact.

This does not of course imply that the visual speech centre, the auditory speech centre, the motor vocal speech centre, and the connecting tracts passing between these speech centres are as a whole intact, but merely that the individual cell and fibre mechanisms comprised in these centres which represent the visual, auditory, and motor equivalents (symbols) of the particular letter or word which is correctly named are intact. But if the patient is able to read aloud all letters and words (which he has been trained or taught to read aloud), it may then be concluded that the visual, auditory, and motor vocal speech centres are as a whole intact.

(c) *The Condition of the Connecting Fibres passing between the Auditory Speech Centre and the Visual Speech Centre.*—This is tested by naming a letter or word, and seeing whether the patient is able to pick it out from a number of other letters and words which are placed before him.

(d) *The Condition of the Connecting Fibres passing between the Ordinary (Lower) Visual Centres and the Auditory Speech Centre.*—This is tested in the same way—namely, by showing the patient an ordinary object (not a visual speech symbol—a letter or word), such as a knife, etc., and telling him to name it. Some patients seem to be able to name pieces of money when they cannot name other objects, possibly because the knowledge of money has become so thoroughly organised that the names of pieces of money are represented in the right as well as in the left auditory speech centre.

(e) *The Condition of the Connecting Fibres passing between the Auditory Speech Centre and the Lower Visual Centre.*—This is tested by naming an object to the patient, and asking him to pick it out from a number of objects placed before him.¹⁴

THE CONDITION OF THE MOTOR WRITING CENTRE.

In all cases of aphasia, the presence or absence of agraphia must be carefully noted; and the condition of the motor writing centre and of the connecting fibres passing between the visual speech centre and the writing centre must be tested. The patient's ability to write spontaneously, to write from dictation, to copy intelligently (transfer manuscript into print and *vice versa*), both with the right and with the left hand, must be tested.

At the commencement of the examination the physician must ascertain whether the patient is right, left-handed, or ambidexterous; in other work, whether he has been accustomed to write with the right or with the left hand; and it must be remembered that most persons who are left-handed for all ordinary purposes have been trained to write, and many of them can only write with facility with the right hand.

In right-handed persons, inability to write (agraphia) may be due to:

1. The fact that the patient has never learned to write.
2. Paralysis or inco-ordination of the right hand.
3. A lesion of the auditory speech centre.
4. A lesion of the connecting fibres passing between the auditory speech centre and the visual speech centre.

Complete destruction of the auditory speech centre (or, to speak more accurately, of both auditory speech centres) and of the connecting fibres which pass between the auditory and the visual speech centres may, and in most persons probably will, produce agraphia (inability to write spontaneously), since in spontaneous writing internal speech or thought first takes concrete shape (in most individuals and under ordinary circumstances, at all events, and more especially so far as nouns are concerned) in the auditory speech centre, from which the nervous impulses pass to the visual speech centre, and thence to the motor writing centre. Possibly in some cases (strong visuals) the agraphia produced in this way is only temporary.

5. A lesion of the visual speech centre.
6. A lesion of the connecting fibres passing between the visual speech centre and the motor writing centre.
7. A lesion of the motor writing centre; and
8. (?) A lesion of the motor vocal speech centre.

This is a disputed point. Most authorities think that destruction of the motor vocal speech centre (Broca's convolution) produces agraphia; in other words, they believe that the nervous impulses which put the writing centre into action pass through the motor vocal speech centre. Together with Bastian, I differ from this opinion, and think (a) that the

nervous impulses which put the motor writing centre into action in all probability pass directly from the visual speech centre to the writing centre, and (b) that destruction of Broca's convolution does not necessarily, and presumably, therefore, does not usually, produce agraphia.

Spontaneous Writing.—The patient's ability to write spontaneously (that is, to express his thoughts in writing) may be tested by asking him to write a description of the mode of onset of his illness, the symptoms and sensations of which he complains, etc. If this test is satisfactorily performed, it is obvious that the cerebral mechanisms concerned with thought and internal speech, and the way out for thought and internal speech through the motor writing centre are intact; and since it would appear that in most healthy individuals and under ordinary (normal) circumstances, in the act of spontaneous writing (in the act of voluntarily expressing thought and internal speech in writing) the auditory speech centre is first set into action, the visual speech centre is then set into action, and finally the motor writing centre is set into action, it (usually) may be concluded (in those cases in which the patient is able to express his thoughts spontaneously in writing) that the auditory speech centre, the visual speech centre, the motor writing centre, and the connecting fibres passing between these different centres are intact.

The patient's ability to write spontaneously may also be tested by seeing whether:

- (a) He is able to answer in writing questions which are put to him in spoken language.

If the patient is able to answer correctly in writing a spoken question or request, it may be concluded that: the auditory speech and visual speech centres are intact; the connecting fibres passing between the auditory and visual speech centres are intact; the motor writing centre is intact; and the connecting fibres passing between the visual speech centre and the motor writing centre are intact.

(b) He is able to answer in writing written questions. If this test is satisfactorily performed, it is obvious that there is neither word blindness nor agraphia; in other words, that the afferent fibres proceeding to the visual speech centre (from both half-vision centres), the visual speech centre itself, and the way out for internal speech (auditory speech centre, visual speech centre, motor writing centre, and the connecting fibres passing between these centres) are intact.

In those cases in which the patient is able to write spontaneously or in answer to spoken questions, his ability to read what he has written after a short interval of time has elapsed must next be noted. If he is able to read what he has written (or, what amounts to the same thing, to answer written questions in writing), it is obvious that there is neither word blindness nor agraphia.

In those cases in which the patient is able to write spontaneously or to answer spoken questions in writing, but is unable, after a short interval has been allowed to elapse, to read what he has written (or, what amounts to the same thing, is unable to answer written questions in writing), it may be concluded that the visual speech centre itself is intact, the motor writing centre is intact, and that the connecting fibres passing between these two centres are intact, and (provided, of course, that the patient can see ordinary objects—that is, that he is merely word blind but not blind)—that the lesion involves the afferent fibres passing to the visual speech centre from both half-vision centres in the occipital lobe; in other words, that the case is one of sub-cortical word blindness.

In those cases in which the patient is able to write spontaneously or to answer spoken questions in writings, but is unable to read what he has written, the physician should next note whether he can decipher what he has written by tracing over the letters and words with his forefinger, that is, by the aid of the muscular sense and other ingoing (kinæsthetic) impressions which attend the act of writing.

The Degree and Form of the Agraphia.—In all cases in which agraphia is present, the degree of the agraphia and the exact form of the defect (the mode in which the patient expresses himself in writing, the spelling of the words, the form of the sentences, the kind of mistakes which he makes, the presence or absence of paraphasia, etc., the way in which the letters are formed) must be noted.

Paraphasia and defects in spelling should not, properly

speaking, be included under agraphia. They are the result, not of a lesion of the motor writing centre, but of the sensory speech centres which are situated behind, as it were, and above (on a higher level than) the motor writing centre. They are speech defects; whereas the defects in writing which are due to a lesion of the writing centre itself are merely manipulative or executive defects. Such speech defects are, so to speak, defects of a higher order (level) than mere motor (executive or manipulative) defects. Many patients who are unable to write anything else can sign their own names. Possibly in this case the nervous impulses which set the motor writing centre into action originate in the right hemisphere.

If agraphia is present, the physician should next note whether the inability to write is due to paralysis or inco-ordination in the right hand; whether the patient can hold a pen or pencil firmly and securely in the right hand; whether he can form the individual letters; whether he can copy, draw, etc.

In those cases in which inability to write is associated with right-sided lateral homonymous hemianopsia, the observer should endeavour to determine whether the inability to write is merely the result of the visual defect (hemianopsia) and of the inco-ordination which is often associated with hemianopsia, or whether it is the result of agraphia properly so-called. Further, it is important in cases of this description to determine whether the inco-ordination of movement merely involves the act of writing, or whether it involves the other fine and delicate movements of the right hand. In my lectures on aphasia I have discussed this question in detail.¹⁵

In those (rare) cases in which the patient is unable to write, but in which he can read (in which the visual speech centre and the afferent tracts passing to the visual speech centre are intact), in which there is no word deafness and no motor vocal aphasia, and in which there is no paralysis of the hand, it may be concluded that the lesion is situated in the connecting fibres passing between the visual speech centre and the writing centre, or (if the motor writing centre is separate and distinct from the ordinary motor centre for the right hand and upper extremity; but this is, I think unlikely) in the motor writing centre itself.

Writing from Dictation.—If the patient can write from dictation it may be concluded that the auditory speech centre is intact, the motor writing speech centre is intact, and the connecting fibres passing between these two centres are intact. And since in most persons, under normal circumstances at least, the nervous impulses concerned in the act of writing from dictation, which enter the cerebral speech mechanism, so to speak, by the auditory speech centre, probably pass out through (*via*) the visual speech centre in order to reach the motor writing centre, it may further be concluded (if the patient can write from dictation) that the visual speech centre is intact, the connecting fibres passing between the auditory and the visual speech centres are intact, and the connecting fibres passing between the visual speech centre and the writing centre are intact.

In those rare cases in which the patient is able to write from dictation but is unable to read and to write spontaneously, it may be concluded (since, when the patient is suffering from word blindness, inability to write spontaneously shows that the visual speech centre is the seat of the lesion) that the nervous impulses concerned in the act of writing from dictation pass directly from the auditory speech centre to the writing centre; in other words, in the rare cases of cortical word blindness in which the patient is able to write from dictation, it may be concluded that the auditory speech centre is intact, the motor writing speech centre is intact, and the connecting fibres passing between these centres are intact, for it must be remembered that the nervous impulses concerned in the act of writing from dictation do not necessarily in all cases pass through the visual speech centre in order to reach the writing centre. Under certain circumstances they may probably pass directly from the auditory speech centre or the tactile centre to the writing centre. Hence the fact that the patient can write from dictation does not necessarily, though it does usually, show that the visual speech centre is intact. Hence it follows that in order to form a definite opinion as to the condition of the

visual speech centre, the patient's ability to read and to write spontaneously must be noted, in addition to his ability to write from dictation.

In those cases in which the inability to write with the right hand is due to motor paralysis or to inco-ordination rather than to agraphia properly so called (that is, in cases in which other movements than the act of writing are inco-ordinate), the patient's ability (*a*) to arrange separate, printed, or block letters in the form of words, to write on the typewriter, and (*b*) to write with the left hand, must be tested.

If the patient can write with the left hand, it should further be noted whether he writes in mirror writing; whether, if he writes in mirror writing, he is conscious that he is writing backwards; and whether he can read what he has written in mirror writing.

Copying.—The patient's ability to copy manuscript and print, and his ability to transcribe manuscript into print and print into manuscript should next be noted. It is very important to draw a distinction between mechanical and intelligent copying. To my mind the words "the patient was unable to copy written characters" mean that he was unable mechanically to copy written characters. But this is not apparently the idea conveyed by the same words to some other men's minds. In recording cases of aphasia and agraphia it is not, therefore, sufficient to state whether the patient is able to copy or not; but it should be stated whether the copying is mechanical or intelligent copying. In addition to stating whether a patient can mechanically or intelligently copy written speech, it is therefore advisable to state whether he can transcribe type into manuscript and *vice versa*, for this can only be done by a patient who can copy intelligently.

In some cases of agraphia in which the patient is unable to write either spontaneously or from dictation, he can mechanically copy written characters (type or manuscript); but in such cases he always makes an exact and literal copy; he copies the written characters stroke for stroke, as he would copy a drawing or design; in such cases he is unable to transcribe manuscript into type or type characters into manuscript, and if the copy is removed he at once stops, and is unable to finish the sentence; in these cases, too, the patient is unable to arrange separate (block) letters in the form of words, and is unable to write on the typewriter. Whereas a person who understands what he reads, who is able to copy intelligently, to comprehend the speech value of the written characters, is able to transcribe manuscript into type, or *vice versa*, and has no difficulty in finishing the sentence which he is copying after the copy is removed; he is able, too, to arrange separate (block) letters in the form of words, and to write on the typewriter.

Ability to Draw.—In cases of agraphia the patient's ability (*a*) to spontaneously draw ordinary objects (other than visual speech symbols), such as a dog, man, house, etc., when asked to do so, and (*b*) to copy drawings of ordinary objects should also be noted.

Mind Blindness.—The presence or absence of mind blindness must be noted.

The condition of the mental, intellectual, and emotional faculties must in all cases be carefully tested.

NOTES AND REFERENCES.

¹ Methylated spirit is probably on the whole the best preservative fluid for the purpose, for Müller's fluid is not always obtainable and, unless injected into the vessels, does not penetrate and preserve the internal parts of the brain. In any case the jar in which the brain is placed should be sufficiently large to permit of the whole brain being surrounded by an ample quantity of fluid. A thick pad of cotton wool, which has been thoroughly soaked in spirit, should surround the whole brain. ² I look forward to the time when the Clinical Research Society will, for a sufficient fee, undertake to examine and report on specimens of this description. ³ In addition to the special points enumerated in this scheme, the condition of the whole nervous apparatus must, of course, be exhaustively examined; and the condition of the other systems and organs (more especially of the heart and kidneys) noted. ⁴ Although we test the condition of the auditory, visual and motor vocal speech centres, and of the writing centre by observing the ability of the patient to understand spoken and written language, and to express himself in vocal speech and in writing, it must be remembered that the patient's ability to understand spoken and written language, and to express himself in vocal and written speech, implies far more than the mere integrity and normal functional activity of these centres, and of the connecting fibres passing between these centres respectively. It implies that the associated centres throughout the cerebral cortex and the connecting fibres which pass between the speech

centres and these associated centres, which for the sake of convenience may (inclusive with the speech centres) be termed the seat of consciousness, intelligence, memory, judgment, and the will, are functionally active.

⁵ The points of detail which are to be noted in connection with each of these headings are elaborated in the text. ⁶ I have actually seen a house-surgeon, in a case of aphasia in which the condition of the auditory speech centre was being tested (by requesting the patient to put out his tongue), touch the patient's lips, and in one case put out his own tongue, so as to aid the patient to comprehend what he was being told to do. This gentleman did not seem to understand that the object was not to make the patient put out his tongue, but to see whether he understood the spoken request (the language) addressed to him by the physician.

⁷ Thomas, Roux, and Mirallic have directed attention to this point. ⁸ *Edinburgh Medical Journal*, July, 1897, pp. 9 and 10. ⁹ With the object of preserving and recording the utterances of aphasic patients, shorthand, or, better still, the phonograph, should if possible be employed. ¹⁰ After the answer has been mentally determined upon, it in all probability (under normal circumstances at least) first takes concrete shape, so far at all events as some parts of speech (nouns) are concerned, in the auditory speech centre and then passes over through the connecting fibres passing between the auditory and motor vocal speech centres to the motor vocal speech centre from which the motor discharge necessary for the production of the spoken answer is emitted.

¹¹ The function of the auditory speech centre, the cell and fibre mechanisms which correspond to the auditory nerve impulses representing spoken words (auditory speech symbols), is, I take it, to bring into connection the cell and fibre mechanisms of which it (the auditory speech centre) is composed with other associated cerebral centres (cell and fibre mechanisms in other cerebral centres, other parts of the cerebral cortex). The popular statement—the auditory speech centre is imperfectly educated—is, I take it, synonymous with the scientific statement that these associated connections have not been opened up and developed. ¹² *Edinburgh Medical Journal*, August, 1897. ¹³ Possibly some patients, affected with word deafness and motor aphasia, who cannot speak spontaneously may be able to read aloud by means of the motor vocal speech centre in the right hemisphere—that is, to read aloud in a reflex or automatic manner, the nervous impulses passing directly from the left visual speech centre to the right motor speech centre. ¹⁴ The condition of the connecting fibres passing between the tactile, gustatory, olfactory centres, and the auditory and visual speech centres. This is tested in the same way—namely, by making the patient touch, taste, smell, etc., some object, and then name or write down the name of the object touched, tasted, smelt, etc., or describe in vocal or written speech the nature of the tactile, gustatory, and olfactory sensations which he experiences. ¹⁵ *Edinburgh Medical Journal*, September, 1897.

TWO CASES OF OBSTRUCTION OF THE SMALL INTESTINE BY GALL STONES.*

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IN the last two years two cases of impaction of the small intestine by gall stones, giving rise to symptoms of obstruction, have occurred in my private practice, and as they have proved very instructive to me, I thought it might interest members of the Branches if I related the cases, and made a few remarks upon them, at this meeting.

CASE I was that of a married clergyman, aged 60, whom I first saw on February 25th, 1895, for slight eczema and an enlarged prostate, which had first manifested itself in the previous November. He had never had jaundice nor passed gall stones, but was of a gouty habit. During the spring and early summer of 1895 he was less vigorous than usual. Walking was more difficult, and he was easily tired. The urine was normal. I saw him again on June 24th, just before he started for the neighbourhood of Whitby for his summer holiday. Soon after his arrival there he began to be troubled with indigestion and constipation, which he attributed to drinking the peaty water of the place. His bladder did not give him serious trouble till after a long drive in a springless trap, which set up an attack of prostatitis. He was for days in great pain, and afterwards had continuous discomfort, nervous irritation, and sleepless nights. After some time a medical man was called in, who at first attributed the enlargement of the abdomen to constipation, but later on, by using a catheter, he found the bladder considerably distended, and drew off an enormous quantity of water. Cystitis followed, and an attack of phlebitis of the legs (from which he had suffered in previous years), and the ankles became swollen, so that he had to lie up. At the beginning of August he decided to return home, his legs being carefully bandaged. I saw him the evening of his arrival, and found him with a foul tongue, anorexia, and the urine containing pus. He was very weak. The bladder was washed out (Dr. Griffiths seeing him with me), and he improved, though very slowly.

Even at this time with the plainest invalid food there were, once or twice, little disturbances of digestion, which it was not easy to account for. But his mouth and tongue, which had been terribly dry for weeks, got better at last, and he began to enjoy his food. He was up for the greater part of the day; all seemed to be going on well, and I left him with Dr. Griffiths, starting for my holiday on September 6th, 1895.

On September 12th he took his first turn round the garden, had dinner downstairs, and seemed particularly bright and well. When he got into bed he had a most terrible rigor, the only one he ever had. At the same time when using the catheter much pus came away, as if an abscess had broken. Dr. Griffiths was afraid another abscess might form, but this

* Read before the combined meeting of the Cambridge and Huntingdon, the East Anglian, and the South Midland Branches, at Cambridge.

did not occur. The temperature went down, and more food and quinine were given. This treatment, however, failed: he was suddenly sick; and on September 24th felt pressure and pain below the liver, where Dr. Griffiths felt a localised enlargement, which afterwards disappeared. The pain gradually moved higher up, and with poulticing became concentrated more and more in one place, which was extremely tender to the slightest touch. The temperature kept at from 101° to 102°, and he had profuse sweats.

In this condition I found him on returning from my holiday on September 27th. The liver was enlarged, but there was no lump to be felt. He was so terribly weak that I at once ordered him champagne, though he had not, in consequence of his bladder trouble, had any stimulants for months. He revived astonishingly; so much so that when on the following day four of us—Sir George Humphry, the patient's son-in-law (who is a medical man), Dr. Griffiths, and myself—saw him in consultation to decide if an operation were advisable the swelling and pain were gone and the temperature was down to 95.8° F. More food and stimulants were now given, and with better success; but on October 6th, without any apparent reason, the liver again swelled, and the temperature went up to 100.8°. This condition soon passed off, and the temperature now kept closer to normal than it had done all along. On two occasions, however, it suddenly went up and as suddenly fell again, but, as in other respects he seemed to be going on well, we ceased to trouble about it.

He was thoroughly enjoying his recovery, was downstairs again, and even taking little walks. On Monday, November 11th, he extended his walk before luncheon a little; in the afternoon saw some callers, said good-bye to them in the hall, and was going down a step or two into his study, when he felt a sudden weakness come over him. (Probably at this moment the gall stone slipped into the bowel.) Later in the day he felt better again, tried to eat his food, and to go downstairs next day. But violent pain drove him to bed, terrible sickness came on, the vomit being almost pure bile, and this continued till his death on November 21st. No medicines seemed to have any effect. On the Sunday afternoon the vomit altered slightly in colour; on the Monday it was decidedly dark, and the smell very bad, slightly faeculent. Dr. MacAlister saw him with me that evening, and it was decided to wash out his stomach. This, however, was not done, as the patient became so very weak. Opium pills were prescribed by Sir George Humphry, who saw him again, and these quieted him, but the sickness did not stop, and on Thursday, November 21st, failure of the heart ended his sufferings.

At the *post-mortem* examination a gall stone was found impacted in the jejunum, which had escaped from the gall bladder through a large opening—about one inch in diameter—into the first portion of the duodenum. No abscess was found in the liver, nor any pus in the neighbourhood of the gall bladder. The stone was about 1½ inch in diameter and nearly spherical. The prostate was enlarged and the urinary bladder inflamed and sacculated. The heart was thin and flabby, and the kidneys were cirrhotic.

CASE II.—The second case was that of a widow lady aged 60 of a gouty habit, but who had never passed gall stones nor had jaundice, and who was in her usual health on Saturday, May 1st, of this year, and dined out that evening.

On the following day (Sunday) she had a feeling of weight in the chest all day, as if of something having disagreed with her. This feeling increased throughout the day, with a sense of general *malaise*. A draught of hot water followed by a little neat whisky seemed to move the feeling of weight lower down. Throughout Sunday night she was wakeful and uncomfortable.

On Monday, May 3rd—the day I first saw her—she had increased feeling of lassitude and discomfort. A copious draught of hot water was followed by violent vomiting of green matter. This brought some relief, but the distressing sickness soon returned. The feeling at the pit of the stomach had become pain, severe and overmastering, but not amounting at any time to agony. There was a lull of some long intervals in the pain and sickness during the night of Monday, whilst taking some calomel powders (½ gr. each). Before this, after the violent sickness there were great coldness and a sense of collapse.

On Tuesday, May 4th, the sickness throughout the day was more severe than ever, and increasingly so till I injected ½ gr. of morphine subcutaneously at 5.30 P.M. The vomit looked like pure bile. After the morphine injection there was little or no sickness and no pain. Before going to bed I injected another ½ gr. of morphine, and she had beautiful sleep for some hours. She had no food to speak of from Monday morning till 6 A.M. on Wednesday, when she had a nutritive enema of milk and brandy, which sensibly removed the feeling of extreme prostration.

The sleep after this was extremely trying, not, she thought, due to the effect of the morphine. There was very little tendency to sleep, but any dozing immediately produced a distempered condition, and more than dozing a hideous feeling on waking of being surrounded with the most overpowering smell—not taste—of poisonous plants, such as laurel, etc. This occurred severely twice, creating a perfect terror of falling asleep. The next stage was more like vivid nightmare dreams. After that there was no more of the smell and very little disposition for sleep. The nights of Wednesday and Thursday were the two bad ones in this respect. At times a loud report seemed to go off in the top of the head, which caused waking, and pictures or things near were visually altered. Gradually this condition passed away, and power of sleep slowly returned. There was little or no tenderness left in the abdomen by the attack, and by degrees the patient was able to take more and more food. The bowels did not act till 11 A.M. on Friday (May 6th), when, as the result of an enema, the gall stone which I show you was passed. Its weight is 13.72 grammes (nearly ½ oz.); length, 1½ inch, or 4.35 cm.; diameter, 1½ inch, or 2.8 cm.; circumference, 3½ inches.

REMARKS.

Cases of intestinal obstruction from gall stones are so rare (only one having occurred in the Manchester Royal Infirmary between the years 1883 and 1896, during which time 50,000 in-patients had been treated, and only four during twelve