Papers and Originals

Perseveration as a Sign of Diffuse and Focal Brain Damage*—I

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Dr. William Croone, who at his death in 1684 left plans for the lectureship he had designed to found, was interested in the nature of, and the laws governing, muscular motion, and it is upon one aspect of this subject that I should like to speak today—namely, the particular disturbance of psychomotility that is known as perseveration.

The phenomenon is not to be confused with persistence or perseverance, which is tested by setting a task, without a time limit, and observing how long the subject sticks to it (Woodworth and Marquis, 1949). Perseverance is voluntary, perseveration involuntary; and this is the principal difference between the meanings of the two like-sounding terms (Yates, 1960), although the point is not made in standard dictionaries of medical terms (Meyers, 1932; MacNalty, 1961; Dorland, 1965).

Definitions

Perseveration is defined as "the continuation or recurrence of an experience or activity without the appropriate stimulus" (NacNalty, 1961; Dorland, 1965), but over the years the meaning attached to it has undergone redefinition and reinterpretation, so that there is danger of this becoming as varied as those that use it (Rogers, 1935a). Thus certain reflex activities such as ankle clonus are included (Goldstein, 1942); the repetition of a given movement incongruously is spoken of as "motor perseveration" and inability to relax a movement as "tonic perseveration." Some authors—for example, Purves-Stewart and Worster-Drought (1952)—prefer the adjectives "kinetic" and "static" in the same sense, while others find difficulty in chronic brain disease in distinguishing at times between perseveration and the general mental disturbance so often present in these cases (Nielsen, 1946).

Definitions that stress its apparently "senseless" character are misleading, because in true perseveration the subject's response to the first stimulus—that is, when his mind is "uncontaminated" by previous stimuli—is invariably correct. Perseveration does not occur spontaneously: two or more successive stimuli need to be given to provoke it. As Cameron and Caunt (1933) say, in perseveration there is a "tendency for an activity to persist after the subject has decided to change that activity, this persistence in the primary activity being shown by a transitory interference with the new activity that follows it." The definition given by Jasper (1931) also emphasizes the physiological aspect of the phenomenon: "the tendency of a set of neurons, once excited, to persist in the state of excitement autonomously, showing resistance to any change in this state."

The word perseveration was coined by Neisser (Kinnier Wilson, 1908), the occasion being a clinical meeting in Breslau in 1894 at which Heilbronner demonstrated a case of what he called "asymbolie." This was in a man of 43 years who had been a heavy drinker, and who, when first seen, was in a state of stupor and later in delirium. As the level of consciousness rose it was observed that he was slightly dysphasic. At no time, however, did he show any signs of hemiplegia, sensory impairment, visual-field defect, agnosia, or apraxia. The crux of the residual disability lay in his faulty responses to impressions (Eindrücken) (*Allg. Z. Psychiat.*, 1895).[1] He could understand what was said and do what was required, but on being given other commands he went on making the same response. Heilbronner referred to this peculiar behaviour as "haftenbleiben" (haft=hold, bleiben=to stay, remain), and in the discussion that followed Arnold Pick (1892) said that he was familiar with the phenomenon, which he had called "pseudoapraxia." Neisser acknowledged this but pointed out that as it occurred in such a variety of morbid conditions—in the psychoses as well as in focal brain damage—it deserved recognition in its own right, and he proposed the name "perseveration," or "perseveratory reaction," by which it has since become known.

From the original context in which the term was used it appears probable that Neisser and his colleagues were considering perseveration chiefly in relation to purposeful or psychomotor activity, and I propose to do the same—that is, to discuss its occurrence chiefly in relation to situations which (the stimuli being novel) require some preliminary reflection before an appropriate response can be made. Admittedly, human mental processes are too complex to make it always possible to predict what will be the response to any given stimulus or what particular quality of a stimulus may be concerned in determining the nature of a response. The stimulus "becomes modified by all the other stimuli which are incoming at the moment, and the higher in the nervous system it spreads this modification increases, so that it becomes more and more difficult to think of or to speak of it as a stimulus to one isolated function such as vision, hearing or feeling" (Collier, 1934). Many psychomotor activities are more or less set in motion automatically at a subcortical level; others are more dependent on reflective thought. So I have borrowed from Kinnier Wilson's (1925) lectures on "Disorders of Motility and Muscular Tone" the useful concept of motility being neither purely voluntary nor automatic, but a combination of both, certain acts being more properly described as "most automatic" and others as "least automatic."

Applying this principle to the routine bedside examination of patients, one may include under "most automatic" such simple performances as putting out the tongue, closing the

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[1] "Besonders auffallend blieb während der ganzen Beobachtungszeit das 'Haftenbleiben' des Patienten an vorhergegangenen Eindrücken und vielleicht dadurch bedingte falsche Reactionen; häufig wurde übrigens der Eindruck gewonnen, als ob Pat. thatsächlich die richtige Bewegung ursprünglich intendirte und erst im Verlaufe der Ausfuhrung zu Fehlreactionen käme; im weiteren Verlaufe wurde wiederholt beobachtet, dass Pat. Gegenstände richtig benannte, aber trotzdem gar nicht zu benützen verstand oder falsch gebraucht."

eyes, shaking hands, turning in bed, and repeating the days of the week. "Least automatic" will include more complex commands and acts such as reversing the order of counting, searching for hidden objects, naming cities, flowers, etc., from memory, composing a letter.

In the sense, therefore, in which it is proposed to use the term, perseveration is defined as the continuance or recurrence of a purposeful response which is more appropriate to a preceding stimulus than to the succeeding one which has just been given, and which is essential to provoke it. The subject responds correctly to the initial stimulus, and before testing for the sign, therefore, one must make sure that he comprehends the nature of the stimulus and has the ability to make the appropriate response. The phenomenon is involuntary because, although testing involves voluntary co-operation on the part of the subject, perseveration cannot voluntarily be checked by him.

Clinically Associated Phenomena

When perseveration is pronounced it interferes with the communication of ideas and the elicitation of responses, but in less severe cases examination through spoken, written, or otherwise presented stimuli may proceed normally for some time before it makes its appearance. It may affect the responses to all stimuli, independent of their perceptual quality, or occur only in relation to certain stimuli and not to others.

Other phenomena with which perseveration is clinically associated and with which it may be confused are *verbigeration*, the "meaningless repetition of words and sentences, a 'verbigeration' such as that of Thorpe's patient, who called out 'Generous Annie' and 'Swanky Gordon' for hours at a time" (Wilson, 1940); and *echolalia* and *echopraxis*, in which the subject repeats, parrot-wise, statements or acts made before him. These symptoms are often described under Pick's and Alzheimer's diseases and their "mental" origin tacitly assumed. But *palilalia*, like perseveration, is not so readily accepted in this class, and is believed to be more neural than of psychological origin. Souques (1908), quoted by Wilson (1940), defined it as "la répétition involontaire et spontanée . . . d'une même phrase ou d'un même mot. D: comment allez-vous ce matin? R: ça va bien, ça va bien, ça va bien." Souques found that the condition was associated with denial of illness and that there was usually deterioration of intellectual faculties.

Wilson (1940), Brain (1955), and others note that in palilalia the utterances tend to be made faster and faster with decreasing volume, and that it occurs most often in patients suffering from post-encephalitic Parkinsonism. Brock and Krieger (1963) believe that cerebral cortical involvement plays a part, but Brain (1955) comments on the apparent paradox of its association with Parkinsonism, in which the motor pathways for articulation are affected, while in palilalia fully articulated words and phrases are repeated. It may be that when the cerebral cortical involvement is such as to create only a minimum language deficit and the patient is to some extent aware of his double handicap, palilalia may represent a device to facilitate expression. This assumption, however, would impair its involuntary status, which it holds in common with perseveration. At times the two conditions may be hard to differentiate, but the comparative rarity of palilalia, its association with Parkinsonism, the repetitive character of the utterances, and the observation that these occur as readily in response to the first as to subsequent stimuli serve to differentiate them.

Perseveration of a Natural Phenomenon in Health

It is of interest that, although first defined as a symptom of diffuse and focal brain disease, for years attention centred chiefly around its natural occurrence in normal healthy people. In children its incidence is high, but this declines towards adolescence and reaches a stable level in adult life, although it rises again in extreme old age (Cattell, 1935). Cattell believed that as a natural trait it is more common in the Mediterranean races than among people of Nordic extraction, commoner in Jews than in Anglosaxons. Yule (1935) found it more pronounced in monozygotic than in dizygotic twins. Müller and Pilzecker (1900) equated perseveration with the tendency which every idea has, after having once occurred, "to remount into consciousness spontaneously." Gross (1902), approaching perseveration more objectively, recognized that it has two distinct aspects, which he called primary and secondary functions: the intensity of the stimulus giving rise to it and the duration of the response. Gross and other psychologists after him tried to relate the tendency of some individuals to perseverate more than others with differences in their personality structures. Spearman (1927) thought the perseveratory trait was "the greatest of all the faculties, if by this may be signified the one which has been the most lavish of promises for individual psychology," and he went on to suggest, "there does appear to exist, as a unitary functioning factor, varying in degree from one individual to another, a tendency for mental processes to have a certain lag or inertia, and in this meaning to 'perseverate.'"

Yates (1960), to whose admirable review of the literature I have had frequent recourse, describes Cattell's (1945) efforts to elucidate the "Riddle of Perseveration" in these terms. Cattell drew up tables showing the distinctive personality features of "high" and "low" perseverators respectively, and illustrated their difference by suggesting that if faced with Hamlet's alternative, "whether 'tis nobler in the mind," etc., the high perseverator would "suffer the slings and arrows of outrageous fortune," whereas the low one would "take arms against a sea of troubles and by opposing end them." By means of timed tests four types of perseveration were evolved:

1. Sensory: duration of response or secondary function—for example, after imagery.

2. Motor: (*a*) inertia or lag, elicited by "alternation tests" in which the time taken by the subject in switching to and fro between two comparable activities was measured—for example, X Y X Y. (*b*) "disposition rigidity," shown by "creative effort" tests scored by the difference in time taken to perform a task in an accustomed manner and doing it in some novel way—for example, S S S ♀ ♀ ♀ S S S.

3. "Associative" perseveration (Notcutt, 1943)—for example, declaring itself spontaneously in thought or action.

Cattell's studies indicated that there was a general personality factor in creative effort tasks which he called "disposition rigidity." Other workers in this field included Lankes (1915)—whose paper, like those of Stephenson (1931) and Rogers (1935), are notable for good descriptions of the tests used—Cameron (1933), and Kay (1955). The last-named showed that in the process of learning errors made in earlier trials tended to build up patterns of response to tasks given later, though the subject might know they were wrong.

However, Jasper (1931) found no significant relation between the measures of perseveration shown by depressed subjects and those who could be classed as "introverted" or "extraverted," and concluded that there was no evidence to support "the hypothesis of a broad group factor of perseveration or mental inertia." Similar conclusions were arrived at by Pinard (1932), Notcutt (1943), and Rim (1954); and Eysenck (1953) concluded that, "while the notion of a general factor of perseveration has to be given up, there is little doubt that some relation does exist between certain groups of so-called perseveratory tests and certain personality traits."

Allowance being made for individual differences, the *more complex the stimulus* and required response the more likely is perseveration to occur. Thus telling a person to place his right hand on his right shoulder and then to put the left hand on the right shoulder is more likely to induce perseveration than simply directing him to touch first his left and then his right ear. The *timing of successive stimuli* is also important. Ideally, a series of stimuli should be applied at short but

regular intervals (Critchley, 1953). The converse is also true, for if too long a time is allowed to elapse between stimuli, and the intervals between them are irregularly spaced, perseveration may not be evoked.

Of other psychological factors encouraging perseveration probably the two most important are *mood* and *fatigue*. Mental tension, anxiety, and fatigue increase the tendency, probably because of the subject's failure to grasp sufficient details of the first stimulus to enable him to perceive that the second one is different. Fatigue effects are to be expected towards the close of any examination or series of tests, and it is for this reason that prolonged sessions to elicit the sign are to be deprecated.

Clinical Tests for Perseveration

Whatever may be the influence of personality in determining the occurrence of perseveration in health, it may be said with confidence that when the phenomenon is pronounced, and more or less constantly present from day to day, it is a reliable if not a pathognomonic sign of disturbed brain function. Freeman and Gatherocole (1966) have contrasted its occurrence in two groups of patients, one suffering from chronic schizophrenia and the other from organic dementia, and were able to distinguish three types of perseveration. The first occurred when an act was repeatedly emitted—for example, when a patient was asked to put out his tongue he continued to put it in and out for several minutes. This they equate with Luria's (1965) "efferent motor perseveration" or "compulsive repetition." The second was seen in alternation tests involving "switching," and the third was the ideational variety. They found that although more organic dementing patients gave evidence of impairment of switching, and whereas compulsive repetition was more characteristic of the schizophrenic group, there was no significant overall difference, the dementing patients showing perseveration on an average of 5.8 tests and the schizophrenics on an average of 5.4 tests.

We have no experience with psychotics, but over the past 15 years we have been interested in searching routinely for the sign in a wide variety of organic brain conditions, ranging from acute and chronic diffuse affections to focal, neoplastic, and vascular lesions. We have not found it ever pronounced in the neuroses—that is, when these have not been complicated by the coexistence of physiological disturbance of brain function. The tests are unstandardized and untimed, though based on the original models, and have been routinely and constantly employed in the investigation of all our patients. A battery of standardized and timed tests would be unsuitable, because, depending on the patient's state, the degree of comprehension and ability to respond appropriately must vary so much from case to case. Our tests involve simple psychomotor performances, creative mental effort, and switching from one activity to another, and are arranged in two respects. Tests 1 to 3 require for their application only a minimal use of speech, tests 4 to 7 are dependent largely on speech and language function. Secondly, the tests have been arranged to show how much perseveration occurs in largely automatic activities, and how much in respect to performances demanding some preliminary reflection.

The Eyes-Tongue : Tongue-Eyes Test

The stimulus "Please shut your eyes (tightly)" is given verbally, with the examiner avoiding any suggestion of testing, and is usually responded to correctly without hesitation. When the patient complies he is then told: "Now I want you to put out your tongue: show me your tongue." Perseveration is judged to be present when after responding correctly to the first request the patient either: (*a*) closes his eyes again and fails to put out the tongue, or (*b*) puts out his tongue and shuts his eyes simultaneously. If he does (*a*) only it is permissible to remind him that he must now put out his tongue, and perseveration should not be scored unless he again closes his eyes.

Another simple psychomotor test is to ask him to place the right hand on his head and then to do the same with the left hand. This complicates matters slightly by introducing the concept of right and left, but Claude and Lhermitte (1910) demonstrated an excellent illustration of perseveration by this means:

"On lui dit de mettre la main droite sur la tête, elle le fait, mais l'y laisse longtemps, et lorsqu'on veut lui baisser le bras, elle se raidit et résiste. On lui dit de mettre la main gauche sur la tête, elle met la main droite ; on lui fait observer que ce n'est pas le mouvement commandé, sa main droite quitte alors la tête et se place sur son épaule gauche."

Drawing Tests

Earl (1933) showed that perseveration was a common feature in the drawings of adult mental defectives. Given paper and a pencil, the patient is told to draw a circle, then a square, and finally a diamond or triangle. In perseveration the patient on the second direction repeats his drawing of a circle. Ability in alternating between two simple activities is tested by getting him to make a series of X's and Y's, and to shift from accustomed to novel activity by writing the letter S and then reversing it (Fig. 1). Arrow-drawing provides another way of testing for perseveration. Our experience confirms that of Gooddy and Reinhold (1963), who point out that one of the earliest signs of organically determined disorientation in space may be inability to draw an arrow pointing in any required direction. They give an illustration of compulsive or motor perseveration—that is, of the kind "usually associated with dementia"—where the patient has added as many barbs as space would allow to his arrow shaft. But perseveration may also be shown by the repeated drawing of an arrow in one direction, and this form is common as a sign of early clouding of consciousness from any cause. We have seen it, too, as one of the few early signs of a tumour involving the non-dominant parietal lobe.

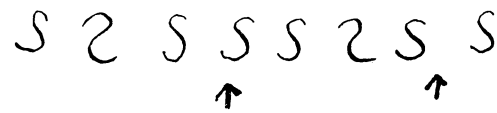


FIG. 1.—Alternating S and 2. Case 226, woman aged 36. Post-partum cerebral venous thrombosis with residual dysphasia.

Testing is done as follows: the examiner draws an arrow pointing towards the patient, who is asked to say what it is. If he knows, he is told to copy it and to say whether it is pointing towards him or towards the examiner. If he answers correctly he is then told to draw an arrow in the reverse direction, this time pointing towards the examiner. The procedure may be repeated on a subsequent occasion, this time the direction being varied, so that there is no room for doubt that he understands the meaning and execution of instructions such as "to the right," "away from," or "towards one." Perseveration is shown by his success on the first attempt and subsequent tendency to repeat the first performance on the second or third instruction.

Searching Tests

Searching tests again require little use of speech. Three distinctive-looking objects—for example, a comb, an orange, and a watch—are shown to the patient, who, if speechless, should be able to demonstrate by pantomime that he knows what they are. Then while he looks on the objects are concealed from view, each in a different place but all within easy

reach, and he is encouraged to find them. Perseverating patients have no trouble in finding one object, which may be any one of those hidden, but often when they turn to look for the others their search is hindered by their continually coming back to the first hiding-place, a frustrating effect which they are not slow to realize.

Serial Tests

Counting from 1 to 10 or from 1 to 20; giving the names of the days of the week and the months of the year, both forwards and backwards. We have given such serial tests in this order because to most people this is how they appear in order of complexity. As always in perseveration, the patient has no difficulty in responding to the first request, be it counting, naming the days or naming the months. It is when he is required to switch to the second task that the symptom declares itself. Thus, when after reciting "Monday . . . Tuesday . . . Wednesday . . ." etc. he is told to name the months of the year, he may proceed: "Monday . . . no, you want the months now, don't you? . . . January . . . February . . . Tuesday . . . Wednesday . . . no . . . I'll start again: January . . . February . . . Monday . . ." Perseveration often is seen, too, when having repeated the days and months forwards the patient is invited to repeat them backwards.

Naming Sighted Objects

A series of both common and unusual objects is set before the patient, who is then required to pick them up and name them as he does so. This test brings out perseveration, especially in patients with expressive dysphasia. We have not seen perseveration occur with it in non-aphasiacs, but patients with diffuse cerebral cortical damage—for example, dementia—often show both perseveration and paraphasia (Allison, 1962):

Examiner: "And what do you call this?" (fountain pen)

Patient: "Is it a minor pen of some description?"

Examiner: "That's right . . . it's a pen. Now, what do you call this?" (a comb)

Patient: "A No. 2 small pen."

Naming from Memory

The patient is invited to give the names of towns or cities (any town or city anywhere in the world), and then of vegetables, animals, etc. ("as many as you can think of"). This test may be beyond the capacity of many dysphasiacs with severe expressive difficulties, although some of those with circumscribed lesions involving the speech area are better at naming from memory than at naming sighted objects. The "creative effort" involved shows up to particular disadvantage patients with diffuse cerebral cortical damage and signs of early presenile dementia. For subjects with no speech or language defect the test described by Cameron (1933) may be used, modified as required—for example, the patient being invited to name a city or town, the name of which begins with the letter D, for example, Dublin. He is then instructed to take the last letter in the name (N) and give another city beginning with it—New York—and so on. Perseveration in thought can thus be brought out in apparently normal old people (Hurwitz and Allison, 1965):

A woman of 93, the widow of a professional man, was in hospital recovering from bronchopneumonia and pyelitis. Her mood was warm and friendly, she took interest in her surroundings, and read some of the newspaper every day. She had a good memory for names, topographical detail, and the sequence of events in the past, and one day, commenting on the importance of keeping her mind active, she agreed to be tested:

Examiner: "I want you to give me the name of a town or a city anywhere beginning with the letter 'L.'"

Patient: "London."

Examiner: "Now take the last letter in the name London and give me the name of another town or city beginning with it."

Patient: (pauses and thinks) "Northern Ireland . . . oh no, that wouldn't do, would it? . . . you want the name of a town."

Examiner: "That's right, the name of a town beginning with N. How about Newry, wouldn't that do?"

Patient: "Yes, of course, Newry."

Examiner: "Now, go on—another town the name of which begins with the last letter."

Patient: "That's difficult . . . I can't think of any town beginning with a Y."

Examiner: "York, wouldn't that do?"

Patient: "I hadn't thought of that . . . I have been trying to think of a town in Northern Ireland."

Writing Tests

As Neisser observed, one of the best ways of demonstrating perseveration is in writing. The ability to copy letters and words and then to write from dictation should be tested, and

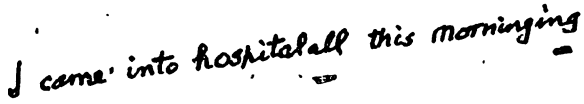


FIG. 2.—From Allison (1962).

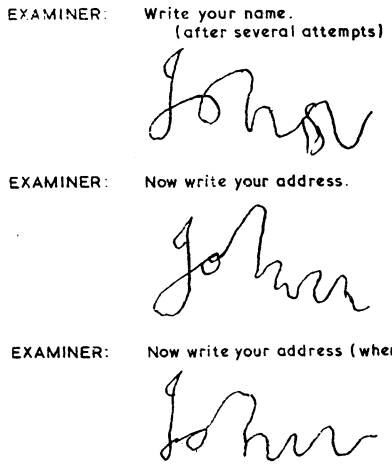
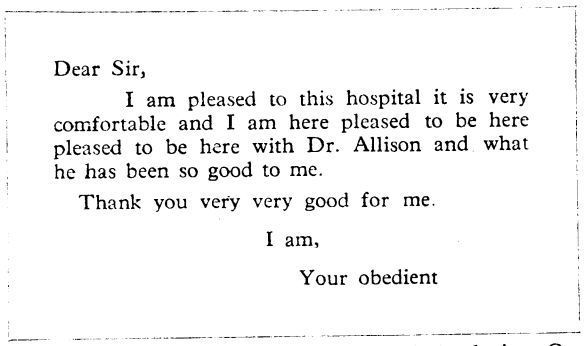


FIG. 3.—Case 178, man aged 56. Residual dysphasia with slight weakness in right arm. Left cerebral thrombosis. Hypertension.



Dear Sir,

I am pleased to this hospital it is very comfortable and I am here pleased to be here pleased to be here with Dr. Allison and what he has been so good to me.

Thank you very very good for me.

I am,

Your obedient

FIG. 4.—Case 217, woman aged 62. Residual dysphasia. Carotico-vertebral atheroma with left cerebral infarction.

finally the patient invited to compose a note or short letter to a friend. Perseveration may be evident in "most automatic" activities such as copying or writing from dictation, words or letters being repeated (Figs. 2 and 3), or it may not be apparent until reflective thought is involved, when it is seen to be very pronounced (Fig. 4). The following is another illustration from a man with a left-temporal-lobe tumour (Allison, 1962). It was suggested he should write a short note

to a friend about the weather. After dating the paper correctly and beginning "Dear X," he went on: "I am John R . . . of 50 B . . . Road, London, born on the 1st day of April, 1885. The weather is born to be warm and I am bound to be in it."

Perseveration in Diffuse Brain Affections

In clinical practice perseveration most often occurs in states of disturbed consciousness. Like Cinderella in the fairy-tale, however, it may pass unnoticed among the other more obvious symptoms which are associated with the concept of "clouding of consciousness": impairment of recent memory; inability to learn or to register new information; disorientation in time and place; delirium. The recovery of full consciousness has to be slow to enable it to be studied to best advantage, but when this condition obtains, as it does after severe closed head injury, and especially in the phase of disorientation, it may dominate the clinical picture in the extent to which it interferes with "thought, word, and deed" (Symonds, 1937, 1938). Perseveration can be equally prominent in patients recovering after carbon monoxide intoxication (Pinéas, 1924; Adler, 1944; de Ajuriaguerra and Rignault de la Vigne, 1946); and in post-anoxic states in general it may be one of the last of the symptoms of clouding to disappear before full consciousness is regained (Allison, 1950) (Fig. 5).

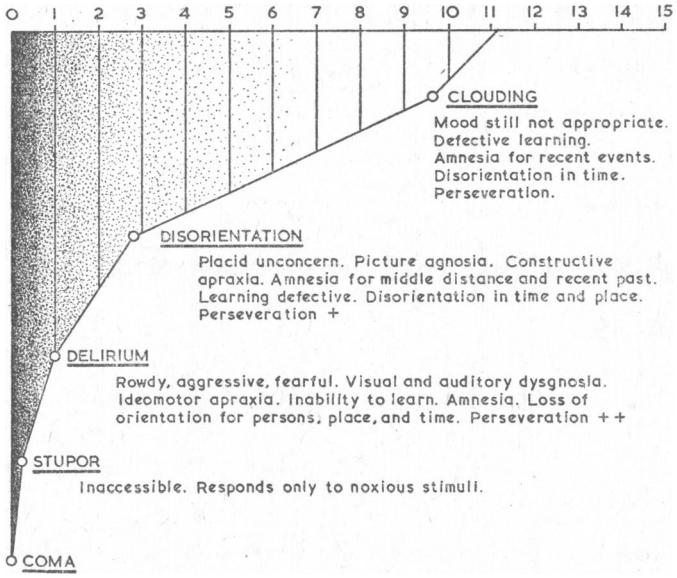


FIG. 5.—Recovery of "full" consciousness after anoxia.

It is no less common as an early sign of dissolution in Pick's and Alzheimer's diseases as in arteriosclerotic dementia and it may be one of the first symptoms to lead to their recognition. With the passage of time, however, in the dementias it tends to become submerged in "the sea of mindlessness" (Wilson, 1940). In the case of acute and subacute vascular and neoplastic lesions involving one or other hemisphere its appearance, along with other symptoms of clouding, is usually indicative of increasing intracerebral oedema, leading to displacement of the neuraxis, herniation, and pressure effects on the centrally placed subcortical grey matter. Hughlings Jackson's four principles concerned in the development of symptoms—the site of the lesion, its extent, rate of development, and the type of brain in which the lesion occurs—are indeed particularly applicable to perseveration. It is understandable that the rapidity of decline in patients with acute vascular disturbances, and in those with fast-growing tumours or a subdural haematoma, may sometimes interfere with its observation, but this applies to a less extent in certain acute medical and surgical emergencies whose noxious effect on the brain is indirect and chiefly blood-borne.

As an Early Sign of Acute Medical and Surgical Emergencies

Conditions of especial importance are: cardiovascular disease with incipient circulatory failure; concealed internal haemorrhage; alcohol and other drug intoxications; disturbances of the electrolyte-and-water balance; insulin hypoglycaemia; and hepatic encephalopathy.

Formerly it was not infrequent for the operation of extraction of a cataract in an elderly person to be followed by unexpected "mental confusion" or, more properly speaking, transient clouding of consciousness, in which a patient might keep on tearing at his bandages in a perseveratory fashion so that transference to a mental hospital occasionally became necessary (Greenwood, 1928; Clark, 1949; Allison, 1952). Dementia-like symptoms in old people after anaesthesia for surgical operations have also been reported by Bedford (1955). In my own experience this has been a rare sequel of hypoxia, and although the occurrence of marked perseveration at the time may simulate dementia, the symptoms are usually reversible.

In *hepatic encephalopathy*, however, recurring transient perseveration and other symptoms of clouding of consciousness may appear long before biochemical tests reveal any clear evidence of liver insufficiency. In such patients, when tests for perseveration are given regularly and the protein intake is increased, positive results in the former will be found to coincide with the earliest recognizable changes in the electroencephalogram (Hurwitz and Allison, 1955) (Fig. 6), and the occurrence of concealed stomach or intestinal haemorrhage may declare itself in the same way.

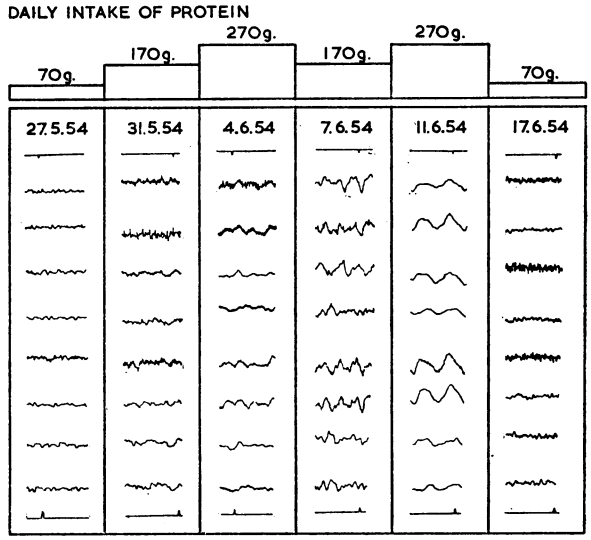


FIG. 6.—Encephalographic changes occurring in hepatic encephalopathy.

Insulin hypoglycaemia in diabetics is still too common, and may, partly at least, be due to insufficient recognition of the value of mental symptoms as an early diagnostic sign. Gladys Wauchope (1933) was one of the first to stress their importance, and to observe that a diabetic in hypoglycaemia may dimly realize that something is wrong but feel compelled to continue what he is doing—for example, driving a car—and not to take sugar. Similar examples are to be found in the literature dealing with Arctic and Antarctic exploration, where hypoxia is regarded as one of the principal hazards (Andrée Diaries, 1931; Byrd, 1939; Yandell, Henderson, and Turner, 1940). When diabetics are being cautioned about hypoglycaemia some responsible relative should be present so that the significance of any bizarre or inappropriate behaviour on the part of the patient will immediately be recognized by them and counteraction taken.

There is a further point I should like to stress about these acute medical and surgical emergencies. In the casualty department and wards of large general hospitals, where they are

common, it is upon the junior medical and nursing staffs that the primary responsibility for their detection rests. In casualty departments a form is often provided for the guidance of the house-surgeon in the examination of cases of suspected brain injury, alcoholism, epilepsy, and a space left for the testing of consciousness. In my own hospital, for example, the examiner is required to put a mark against the appropriate item: "fully orientated"; "conscious but disorientated"; "unconscious but responds to stimuli"; "deep coma." Much better would it be for doctors and nurses alike to record what they actually observe, the conscious level, as Ellis and Calne (1965) recommend, being "charted according to the patient's response to stimuli." The questions put to patients to assess their conscious level are often too subjective or ill-defined, and indeed it may be easier to record their responses to tests for perseveration, such as "put out your tongue" or "close your eyes," than to try to determine whether they are fully orientated or not—questions devised to elucidate the latter point often upsetting patients more than giving them simple tests to uncover perseveration, if such be present.

Similarly, in the wards young doctors and nurses have no difficulty in recognizing profound clouding of consciousness, but they can easily be misled into mistaking the incongruous behaviour of perseveration for hysteria (Allison, 1956) if not for plain or wilful awkwardness on the part of a "difficult" patient. Adams and Hurwitz (1963) have referred to the difficulties to which it may give rise in patients recovering from hemiplegia after a stroke. Reinhold (1953) has emphasized its importance in the differentiation between functional and organic mental states, but none of the general nursing manuals and textbooks I have consulted make any reference to it. A few common examples may be given.

When a patient is being tidied up or bed-bathed, and is told by the nurse to flex his knees so that she may straighten the sheet or wash underneath them, he will comply readily enough; but a moment later, when told to extend them again so that she can deal with some other part, he may seemingly redouble his efforts to keep them flexed, giving the impression either that he has not comprehended or that he is wilfully refusing to do so. Or again, willingly enough, he may roll over to one side to allow his back to be rubbed, but when asked to turn to the opposite side he will not do so, maintaining his former posture despite all appeals to change it. This "motor" perseveration or "tonic-innervation," which is often spoken of as "gegenhalten" (Kleist, 1931), can be, and in our experience often is, an early sign of clouding of consciousness. An even more obvious perseveration sign is when a bowl of water, soap, and towel are placed before a patient and he is told to wash, then dry, his hands, but instead proceeds to wash the towel. Perseveration, too, may account for a patient's behaviour in making repeated attempts to get out of bed, although repeatedly urged to the contrary. Elsewhere (Allison, 1962) I have described such a patient, who, when his request was acceded to and he was taken by the arm for a short walk about the ward, ending at his bedside, got in again without demur and shortly after fell asleep, the same procedure serving to overcome the difficulty on subsequent occasions.

[*The second lecture, with a list of references, will be published in our next issue.*]

Senile Breakdown in Standards of Personal and Environmental Cleanliness

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This investigation is a study of a small group of individuals who cease to maintain the standards of cleanliness and hygiene which are accepted by their local community. We have called this condition senile breakdown, because, with the exception of one psychiatric patient, we found it only in the senile epoch. It is not a common condition, but there can be few general practitioners or community workers who have never encountered it.

The usual picture is that of an old woman living alone, though men and married couples suffering from the condition are also found. She, her garments, her possessions, and her house are filthy. She may be verminous and there may be faeces and pools of urine on the floor.

These people are often tolerated for years by the neighbours, who may suddenly decide that they cannot stand this state of affairs any longer and report the case to various organizations, such as the police or the health department. By this time conditions are usually so bad that many organizations have to spend a disproportionate amount of time and energy in trying to put them right, often with little result.

From our experience we believe that there is an argument for holding the condition to be a syndrome. There is a similarity of pattern in its causes and course, though many gradations are found. The severe self-neglect we have observed is by no means the usual concomitant of old age. Many of the cases were psychotic, but in others the deviation from the accepted personal and environmental standards of the local community occurred without a psychosis being present.

Origin, Scope, and Course of Investigation

A number of these cases are referred sooner or later to the mental health department, and one of us (D. M.) realized that little was known about the factors which lead to the development of the condition. In order to investigate these factors an inpatient unit of eight beds was set aside in Mapperley Hospital. One of us (P. S.) was given a four-year contract to undertake the field work, and this began on 1 August 1961. This paper reports the results for all cases accepted during the three years ending on 31 July 1964. These were then followed up for a further year.

At first all patients were offered admission in order to carry out full physical and psychiatric examinations and a psychological assessment, but by May 1962 we realized that the greater number of those who had been admitted had degenerated

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