In operation the pump is connected to the patient's bladder (B), to a bag under the bed (A), and to a bottle of normal saline over the bed (C) (fig. 3). In the piston's normal or resting position the urine from the bladder will run directly into the bag under the bed along the groove in the piston. In the event of the catheter becoming blocked the pump handle is rotated clockwise through 90 degrees. This links up the groove in the piston with the port in the cylinder connected to the bottle over the bed. The piston is then withdrawn to its limit, thus filling the cylinder with saline. When the handle is rotated through a further 90 degrees the contents of the cylinder are connected to the bladder into which they are emptied when the piston is pushed into the cylinder. In this position only one movement is allowed by the location of the peg in the piston, and this is upwards, withdrawing fluid from the bladder. A further rotation of 90 degrees brings the groove in the piston next to port A, into which the contents of the cylinder can then be pumped. The final rotation

of the handle through 90 degrees brings the piston back to its starting point, the groove joining port B to port A.

No internal dimension within the pump is less than $\frac{1}{4}$ in (6 mm) in diameter and this appears to be adequate to prevent blockage by blood clots. The pump has been used successfully on patients and the nursing staff find the sequence of operations easy to follow, as the pump allows only one movement from a given position. The pump can break up quite large clots and eject them into the drainage bag. Because any fluid used to wash out the bladder is "metered" into the drainage bag urine output is easy to calculate.

The piston of the prototype pump was made from polytetrafluoroethylene and the cylinder was made from Perspex. The device has been sterilized in glutaraldehyde (Cidex) as the present materials do not withstand autoclaving. The possibility of making the pump out of stainless steel in a form which will allow it to be taken apart for cleaning and autoclaving is being investigated.

Medicine in Old Age

Dementia in the Elderly: Diagnosis and Assessment

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Few patients are so taxing to doctors as the confused and demented. No other condition generates so much crisis, irritability, and interprofessional friction. Dementia is common: about 10% of old people are demented, half of them severely, and in the over-80s this proportion rises to more than one in five. Most are women, because among the very old women outnumber men by over two to one. There will be even more old people with dementia as the number of old people, and particularly the very old, continues to increase.

Until recently virtually no doctors took any interest in dementia, with a few outstanding exceptions. Yet an average general practitioner's list is likely to contain about 30-40 demented patients, and every general practitioner knows that the demands that many of these patients will make are out of proportion to their numbers, not least because their problems often present as crises.

It is not difficult to see why the "psychogeriatric crisis" is so common; one reason is that dementia heads the list of important conditions among elderly patients at home of which their general practitioners are likely to be unaware. Williamson and his colleagues in Edinburgh found that over 80% of moderately or severely demented old people were not known to be so to their general practitioners. Since these patients only very rarely seek medical help for themselves, not surprisingly they produce crises when their disabilities impinge on others or are "unmasked" by the death of a spouse, or the marriage of a daughter. Preventive measures must be based on the general-practice team, but the high rate of admission of old people to hospital

means that every admission gives an important opportunity for screening the patient's mental function.

What is Dementia?

Dementia in the elderly is a global disruption of personality, affecting behaviour and intelligence, with impairment of the ability to learn new responses—and thus to adapt to a changing environment. The emotional response is disorganized and blunted, and, most striking of all, there is loss of the ability to remember recent events. Often an astonishing degree of function may be preserved, provided the old person retains a constant environment with which she is familiar and that new demands on her are not great. Even so, such preservation is always precarious, depending on a constancy and security which are unlikely to last for long.

SENILE AND ARTERIOSCLEROTIC DEMENTIA

Dementia is of two main types, senile and arteriosclerotic. In the former there is degeneration of the parenchymatous tissue of the brain, the rate of which is mainly determined genetically. In the latter the brain substance degenerates as the result of impaired blood supply, with disseminated softenings due to infarction. In senile dementia the surface of the brain shrinks, the sulci are widened, and the ventricles dilated; most commonly, the parietal lobes are particularly affected. The pathological process in senile dementia is the same as that in Alzheimer's presenile dementia, the difference between "presenile" and "senile" Alzheimer's dementia being the genetically determined early onset and more rapid progression of the former. Other rare types of presenile dementia include Pick's disease (affecting chiefly the frontal lobes), Jakob-Creutzfeldt disease (which usually runs a very rapid course), and Huntington's chorea (with an autosomal dominant inheritance, the gross

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clinical manifestations of which are only very rarely delayed until late life).

By contrast, in arteriosclerotic dementia the deficits are attributable to the site of vascular damage; thus a patient may have much brain damage without dementia, but dementia is unlikely to occur without a certain minimum volume of brain having been destroyed. Whereas senile dementia generally follows a steady downhill course, a "stepwise" course is typical in arteriosclerotic dementia, often with relatively lucid intervals. During these intervals the patient may retain so much insight into his own predicament that his plight is one of the most pitiful in medicine. There is often a shallow lability of mood, in which the patient is laughing at one moment and crying the next, and this makes it easy to miss the depressive state which is common in these patients, and which often responds well to antidepressant drugs or electroplexy. A history of hypertension and strokes is common. Epilepsy is much more common in arteriosclerotic than in senile dementia.

Some patients have both senile and arteriosclerotic brain damage simultaneously, since both are common. Wandering, incontinence, and impaired capacity for self-care are features of both conditions, as are paranoid developments; visual hallucinations are more characteristic of arteriosclerotic dementia. Neuropathological studies have confirmed that clinical distinction between the two types of dementia is fairly accurate, and there is a relationship between the characteristic histological changes in the brain in senile dementia ("senile plaques" and neurofibrillary tangles) and its clinical severity. The expectation of life for both groups is from a quarter to a half that normal for the age.

OTHER CAUSES OF DEMENTIA

Other causes of dementia are listed for completeness, but in the absence of specific evidence of them are uncommon. They are: tumours, subdural haematomas, giant aneurysms; trauma, including the chronic trauma of boxers; syphilis and non-syphilitic inflammatory disease; chronic alcoholism; "normal pressure" or "communicating" hydrocephalus; myxoedema; vitamin B₁₂ deficiency; chronic epilepsy; carcinomatosis.

AMNESTIC STATES

In amnesic states, the commonest of which is Korsakoff's psychosis of chronic alcoholics, there is a specific defect of recent memory, without the damage to personality, intelligence, and emotion. The sparing of intelligence is shown by the ingenuity of the "confabulation" which fills the deficits of memory. The syndrome may present acutely or subacutely as a confusional state, with the ataxia, eye-signs (most commonly nystagmus), and peripheral neuritis of Wernicke's encephalopathy. The neurological features of thiamine deficiency almost always respond quite rapidly to parenteral vitamins in high dosage, but the mental changes improve more slowly and not always completely.

ACUTE CONFUSIONAL STATES

Almost any physical, social, or psychological disturbance in an old person may produce a confusional state (acute delirium). In arteriosclerotic dementia such acute episodes are common, but in general, the more severe the underlying dementia, the more readily may an acute confusional episode be precipitated; and, the more demented the patient, the less specific may be the precipitants of the confusional state.

Why does Dementia so often Present as a Crisis?

Obviously an old person who is demented but not known to be so is more likely suddenly to catch the doctor unawares than is one for whom measures of support have already been brought to bear. Crises are inconvenient, unpleasant, and difficult to deal with coolly—for anxiety is readily communicable. Crises are inherent in this work, and they cannot be wholly "organized away"; but insight into their genesis should help to make them more intelligible, less common, and perhaps even more bearable. The following rough classification is suggested.

Firstly, something has happened to the patient, such as a development in the dementing process—for instance, in the case of arteriosclerotic dementia, a stroke or an intercurrent illness. Often such a change will present as acute confusion.

Secondly, something has happened in the environment, such as a sudden change in support—for instance, the main caring relative has been admitted to hospital, or has died; or a patient who lives alone has suddenly been discharged from hospital, with no evident forethought about her capacity to cope. Often the event is less straightforward: tolerance of the old person may snap because of a marital row in the family caring for her, or the family may become anxious about the effect of the confused old lady on a teenager who is working for exams.

Thirdly, "enough is enough": people can take so much, and then often no more, particularly when no end is in sight. Thus the old lady may wander out of her house in her underclothes and be cheerfully fielded back, but when she has done so a second or third, or a tenth time, tolerance may break—especially if the caring service has not responded adequately.

Fourthly, the crisis may be a manipulation of the caring system, for one or more of the following reasons.

Poor Local Services

If it is impossible, or thought to be impossible, to get help from local services in response to cool and reasoned referral, then families and general practitioners will understandably have recourse to declaring an emergency. It follows that where a well-run service is established there is invariably a fall in the rate of crisis referrals (and an increase in referrals as a whole).

Ignorance

Many doctors and social workers cannot formulate a "psycho-geriatric" problem in any other terms but as the need to get it instantly off their hands. They are most unlikely ever to have had training in these matters—a state of affairs which is slowly improving for doctors, and rapidly deteriorating for social workers. A subcategory of this group are those who become irritable and resentful when asked to deal with anything but a straightforward somatic problem: these are the "limited graduates" described by Walton and his colleagues.¹

Guilt

A common manifestation is the "Monday morning syndrome" familiar to many general practitioners, psychiatrists, geriatricians, and their secretaries. An old lady, often doing quite well, if not perfectly well, is living on her own and her children come for their quarterly Sunday visit. They see she could well do with rather more care than she is having, but are unable or unwilling to provide it themselves. They telephone the general practitioner "first thing on Monday morning" to say that "something must be done."

The "Preventive Crisis"

This paradoxically is an example of forethought, though this is rarely carried over into the general management. We call it the "Friday afternoon crisis," and it derives from the fact that those

concerned with the patient—relatives or professional attendants—are planning to go away for the weekend.

This list oversimplifies: the genesis of crises is always multifactorial.

Assessment

An organic psychiatric syndrome should always be assessed initially at home because it is an old person's capacity to function in her normal surroundings that needs to be assessed. Assessment at home also makes it possible to see the physical surroundings and often to make practical suggestions for domestic rearrangements. Members of the family and neighbours should be interviewed—and one cannot overstress that a reliable history obtained from others is paramount in assessing dementia. It will often be helpful for a social worker to be present, so that discussion and joint decisions can take place on the spot; alternatively, the health visitor or the district nurse may be the most appropriate colleague to accompany the general practitioner.

It is always wise to inquire whether the patient is already known to the social services department, since general practitioners are not always notified when confused old people are referred direct to the social services by relatives or neighbours. If after initial assessment specialist help seems to be needed then it will usually be best for the specialist also to see the patient at home.

Only rarely can general practitioner, social worker, and specialist all visit at the same time (as the Government circular on *Psycho-Geriatric Assessment Units* suggests); it is more important that they should be easily accessible and able to discuss a case together.

THE HISTORY

The assessment begins with a history from a relative, neighbour, or other informant. I prefer to obtain this initial history before I meet the patient, who is often in another room and unaware of one's arrival. Once one becomes engaged with a demented person it is often very difficult to disengage again—if one excuses oneself to go and talk to a relative, the patient is likely to become anxious, wondering what one is up to, and to interrupt with repetitive, perseverating questioning, repeatedly coming back into the room. The history from the relative usually helps to orient oneself to the problem so that the subsequent interview with the patient may be better directed to the points at issue.

EXAMINATION

The assessment itself follows general principles of physical and mental examination. Some points should be noted routinely, as follows.

General Appearance

Is the patient's general appearance compatible with the history?
Do the mental and physical states more or less match each other?

Are any of the following present: anaemia, myxoedema, or neurological and locomotor deficits?

Is the patient deaf (using a deaf aid?) or blind?

Is there chestiness or heart failure?

Is she smelly or wet?

State of the Household

If the old person lives alone, the state of her home will often be the best measure of her capacity for self-care (though one must take care to establish what help she is having from others). The

kitchen and the contents of the larder are particularly eloquent—what was the last meal, how much of it has been eaten, is there any accumulation of bottles? More generally, is the place clean, is it warm; is there gross neglect of hygiene; signs that the bed has been slept in?

Mental Examination

The mental examination follows standard lines, but is particularly directed to assessment of cognitive functions, largely by finding out the patient's grasp of the material of everyday life. The examination must be unhurried, and the patient will need a few moments to take in what is happening. A strange man suddenly appearing off the street and immediately asking "What is the name of the Prime Minister?" is likely either to put the final touch to the patient's confusion, or to convince her that she has fallen into the hands of a madman. One should explain carefully who one is (I usually also ask the patient to remember my name, which I then repeat to her, explaining that I will ask her to repeat it for me later "because I want to see how good your memory is"). The questioning should develop naturally from the opening remarks, and so far as possible take the form of a normal conversation.

The interview will deal with personal details such as the patient's age, date of birth, address, etc., and general matters. Wilson and Brass² have shown that a very short series of questions can detect, and roughly measure, intellectual impairment in old people living at home: their 10 questions were, in brief: Town? Address? Date? Month? Year? Age? Year of birth? Month of birth? Prime Minister? Previous Prime Minister? The important thing is to ask the questions, and never simply to assume the answers, and to record the results, for comparison with future (or previous) testing. Finally, simple tests of cortical function—dysphasia and dyspraxia—should be made.

BASIS OF MANAGEMENT

At the end of the assessment, as well as having a good idea of the mental state, the doctor should be able to answer the following questions, on which the subsequent management largely rests:

Does the patient live alone?

How long since she was "normal" and competent? Was the change in her sudden, or gradual?

What has been the course of disability since then—steady or intermittent?

Is the patient mobile? Does she go out of the house?

What can she do for herself—toilet, wash, dress, clean, shop, cook?

What odd or undesirable behaviour—Does she wander? Is she incontinent?

Is she up at night? Does she make paranoid accusations? Is she aggressive or destructive?

What resources—relatives, friends, money—are available?

What services are already concerned?

Which Consultant to Call?

If further specialist help is needed either in the home assessment or for possible hospital admission, the psychiatrist should be called when the problem is primarily one of behaviour disturbance. When it is primarily one of physical illness or decrepitude the geriatrician should be called. This division of responsibilities has recently been codified in the Government Memorandum on *Services for Mental Illness Related to Old Age*. One test of the quality of a district service for old people is that it should not matter too much if the "wrong" specialist is called, because geriatrician and psychiatrist will be used to working together and to taking patients from each other.

When even with the aid of a specialist the home assessment does not enable one to decide whether the disability is primarily

medical or psychiatric, or when it appears that further assessment or care will need both general medical and psychiatric skills, the patient may be admitted to a "psychogeriatric assessment unit," or "joint patient unit." Unfortunately, few such units exist at present, but probably there will be more.

Investigations

In most cases a diagnosis of dementia, senile or arteriosclerotic, can be made at home. The history in an elderly person of progressive deterioration over months or years is so typical that when it coincides with the clinical findings, both physical and mental, the diagnosis can be regarded as conclusive. Nor is it necessary in such patients to pursue elaborate investigations designed to find one of the rare and so-called reversible causes of dementia, when clinical evidence of them (for example, anaemia, hypothyroidism, papilloedema, or other abnormal neurological signs) are not in evidence. The most fashionable "reversible" causes of dementia are hypothyroidism, vitamin B₁₂ deficiency, and normal pressure hydrocephalus, but when there is established dementia with a long history of progressive deterioration treatment of the first two is most unlikely to benefit the mental state of the patient at all; of the third, with its triad of dementia, gait disturbance, and incontinence—which should be considered especially when there is a history of subarachnoid haemorrhage or meningitis—the same pessimistic view may ultimately prove to be justified, and there is the added hazard of the remedial operation. In most patients, who will be mostly in their 80s, home assessment will be sufficient to reach a conclusion, and the issue will then turn on management rather than on further investigation.

FURTHER OBSERVATION OR FULLER INVESTIGATIONS

In the following groups the history and initial examination should not alone be regarded as conclusive diagnosis of dementia.

(1) Patients in whom there is a history of depressive illness, or any features suggestive of depression.

(2) All patients under the age of 70, except when there is an obvious cerebrovascular cause.

(3) Patients of any age whose history is atypical or uncertain—for example, too short a course, an apparently rapid fulminating course, an atypically intermittent course.

(4) Patients in whom there are other unusual features—for example, recent significant injury, intercurrent illness, alcoholism, drug abuse—and patients with unexplained physical findings, or whose physical state is strikingly incongruous with their mental state, or whose mental state on examination is greatly at variance with what would be expected from the history.

(5) Patients in whom "one has the feel" that they are somehow "not right." This is hardly a helpful category to others, but psychiatrists working in the field of psychogeriatrics will know what I mean. These patients may turn out to be depressed. Some may attribute this category to imprecision of thinking or observation, and they may be right.

Further investigation is likely to comprise blood count and sedimentation rate; Wasserman or equivalent test; blood sugar and urea levels and electrolytes; urine analysis; chest and skull x-ray films; protein-bound iodine (or other more specific tests of thyroid function); serum vitamin B₁₂ and folate; liver tests will be appro-

priate if there is any evidence of alcoholism. The test for syphilis in the elderly is nowadays done more for tradition's sake than for the likelihood that it will yield a result of significance for the patient: the occasional positive W.R. picked up in this way is almost always incidental to rather than the cause of the dementia and is one of the "persistent positives" which occur among thoroughly treated cases of syphilis. Most of the above are tests which we perform routinely on inpatients, but of course most of our inpatients are not demented, and many have acute confusional states; other laboratory tests may be made necessary by specific findings.

Psychological tests may sometimes help when there are specific deficits, though in our experience they are more helpful in providing a base-line against which to measure change. Electroencephalography is likely merely to confirm the presence of diffuse abnormality in severely demented patients, and to be normal in the mild or uncertain case, though this and radioactive brain scan or ultrasonic techniques may be useful if there is a suspicion of a cerebral tumour. Examination of the cerebrospinal fluid is only rarely necessary in demented elderly patients; grounds for suspecting a brain tumour or syphilis are the main indications (and a sample of cerebrospinal fluid will anyway be available if pneumoencephalography is performed).

WHEN TO DO AIR STUDIES

In the absence of evidence suggesting space-occupying pathology (when angiography would sometimes be the appropriate technique) the value of pneumoencephalography is almost wholly limited to confirming the presence of brain atrophy. Such confirmation may reassure doctors and relatives and so give confidence in planning further management, and on these grounds may be justified, at least in the "younger" geriatric patient. But one should remember in these circumstances that one is ordering the investigation more for confirmation than in the hope of revealing remediable pathology.

The procedure is unpleasant and not without risk. In the investigation of dementia in the elderly air studies should be restricted to:

(1) Patients under 70, or perhaps 75, in whom there is no obvious cerebrovascular cause for their dementia to confirm the presence of cortical atrophy;

(2) Patients in whom despite negative findings in other tests, there is still some reason to suggest a space-occupying mass; and

(3) Patients in whom there is cause to suspect the presence of "communicating hydrocephalus."

These comments refer to patients with a typical history and clinical picture of dementia, and not to acutely confused patients who may require exhaustive investigation, which will indeed often reveal remediable lesions. All those patients in whom we have found tumours, subdural haematomas, cysts, etc., have had clinical features which have led us to investigate more fully. I do myself not recall any patient who, having been routinely investigated with pneumoencephalography merely on the grounds of being under 70, has surprised us by revealing some unsuspected remediable condition; and it is fair to assume that the results of performing these procedures on older typically demented patients would be no different.

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