PROBLEMS OF AGEING AND CHRONIC SICKNESS*

BY

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In my first lecture I recalled impressions gathered from a general review of several infirmaries and presented a more detailed analysis of the patients of one large institution. Before I discuss the clinical material as a whole I propose to describe some conditions that deserve more attention than they have hitherto received. They fall into four groups: (1) Extreme contractures developing without apparent lesions in either the nervous or the locomotor system. (2) Some peculiar conditions of the feet. (3) Unusual phenomena in the late stages of vascular hemiplegia. (4) Incontinence.

Contractures

The contractures to which I would draw attention are usually found in very old people who have been long in bed. The posture is one of extreme flexion; the knees are drawn up to the abdomen, the heels touch the buttocks, the arms are held close to the sides, with the elbows bent so that the hands are close to the mouth, and the chin rests on the chest. The wrists and fingers and sometimes one elbow are freely movable; when feeding, either hand is used to stuff food into the mouth without the help of spoon or fork. The attitude recalls that of the intrauterine foetus. Such patients are difficult to examine. Left to themselves they pull the bedclothes over their faces and lie motionless for hours. In all that we have examined we have found the plantar responses flexor, but it was hardly possible to be certain of the tendon reflexes. Rough testing of sensation showed no gross change, but vibration sense was absent. Attempts to straighten the limbs were obviously painful.

There was no history of arthritis or any detectable abnormality in the joints. A few of these old people talked freely and sensibly when they were roused, but they certainly preferred to be left alone. Invariably they were totally incontinent.

We speculated much about the cause of this condition, which I had never encountered before; it may be that there is some degeneration in the central nervous system that accounts for it, but the extraordinary agility of the fingers of both hands in manipulating food makes that explanation improbable. Eventually we came to the conclusion that the very old adopt a position of flexion in bed in order to conserve heat; for the same reason they pull the bedclothes over their heads and rebreathe their expired air. In the course of time the immobile muscles are fixed in one position. It is likely that regular massage and passive movement would prevent this horrible and distressing distortion. If, as is common in cases of arthritis, the contracture of the legs is not symmetrical and one thigh rests across the other, extraordinary atrophy of the soft tissues occurs at the place of pressure, so that the femur may be felt almost immediately beneath the skin on the medial aspect of the thighs. The tissues adjacent to the place of contact seem to be moulded round the opposite limb.

The Feet

The deplorable condition of the feet of the aged poor is notorious. On admission to the infirmaries many patients have deformities not only of the toes and feet but also of the nails which must have made walking painful. In some the nails grow to such an extent that they are bent over by the shoe and bury themselves in the soft tissues on the under side of the toe. Relief of this distress by rest in bed leads some of them to avoid activity, and soon they become permanently bedridden. We have no doubt that the deformities are increased, and in a few cases caused, by the pressure of bedclothes tightly tucked in. In many patients lying supine we found the terminal phalangeal joints flexed with the skin shiny from the pressure of the sheet; the great toe later is inclined outwards, usually on the dorsal aspect of the foot in the position of extreme hallux valgus, but sometimes it is pressed under the other toes and comes to lie on the ball of the foot so that when the patient tries to stand the weight is borne on it.

As an example to show how so simple a deformity may wreck an individual life I recite this simple history.

A woman aged 58, in active work in a factory in 1940, fell and broke her humerus. She was admitted to hospital; there was some difficulty with the fracture and she lay in bed for two months. She then got up, but complained that walking was painful and was put back to bed. As she persisted in her complaints she was transferred to the infirmary, where she lay for over seven years. She was the picture of health, and her only disability was that the big toe lay transversely under the ball of the foot. Treatment was refused, because she did not wish to leave the institution in which she had been treated so kindly.

Steps have now been taken to supply simple "cradles" to all the beds.

Hemiplegia

The common consequence of a vascular lesion involving the internal capsule is familiar: spastic paralysis in extension of the leg on the opposite side, adduction of the arm at the shoulder, flexion of the elbow, and sometimes extreme flexion of the wrist and fingers with rotation of the forearm. In a few the flexion of the fingers is sufficient to cause the nails to make deep grooves in the palms of the hands. We were surprised to find in a number of patients some years after the original stroke that the posture of the limbs varied from the usual pattern. In some there was gross flexion of the affected leg with the knee drawn up to the belly, and the arm might be either extended or flexed at the elbow. At first we thought that the variation was the result of another stroke, but we could obtain no history suggestive of an episode of that kind: several experienced nurses assured us that the postural pattern of the affected side of the body slowly and almost imperceptibly changed in the course of years, and some considered that the flexion deformity of the leg could be prevented by massage, movement, and daily traction. We examined a number of these anomalous cases in great detail; there were no demonstrable sensory changes, and the departure from the usual pattern could not be related either to spontaneous activity after the stroke or to any form of physical treatment or position in which the patient had been nursed. It is of course conceivable that these irregular postures developed as a result either of slowly progressive thrombosis around the original lesion or of independent vascular occlusions in other situations which we failed to trace. If the observations of the nurses about the slow insidious course of the change in posture are correct (and I have no reason to doubt them) there is an

*The second of two Lumleian Lectures delivered at the Royal College of Physicians of London on April 5 and 7. Lecture I was published in last week's issue.

obvious need for careful study of the morbid nervous anatomy of these cases.

We noticed, too, in a few cases some difference between the texture of the skin on the paralysed and unaffected legs, and we propose to investigate this by biopsy to see whether inactivity of a limb leads to demonstrable structural change in the skin.

Incontinence of Urine

Incontinence in the aged and chronic sick is the most serious of all the problems in the day-by-day management of an infirmary. The burden that it places on the nursing staff needs no emphasis. I remind you only that no fewer than 457 were always or occasionally incontinent out of a total of 943 bedridden patients when we began our survey. The cost in laundry and in the wear and tear of bed linen is formidable. Preliminary analysis shows that a large proportion developed incontinence after admission to the institution and confinement to bed for varying periods. Of the 714 patients included in the survey 252 were incontinent—79 males (25%), 173 females (44%). The proportion is smaller than the one given to us on our first visit because our figures exclude some of the occasional and accidental offenders. Of the 252 cases 97 were certainly incontinent on admission, but no fewer than 108 lost control of the bladder while in the infirmary; in 47 cases the date of the onset was unknown.

In only one-quarter of all the incontinent cases was it possible to find a physical condition that might reasonably be considered to be the cause of it, but no investigation worthy of the name has been possible. An important result of our analysis of this symptom was the fact that in these patients incontinence in either sex was not a consequence of age; there was very little difference in the incidence in the ten-year groups 60 to 69, 70 to 79, and over 80.

In the Leeds survey the proportion of incontinent patients was much smaller (males 8.5%, females 10.5%). I have already suggested that the better condition of Affleck's cases may have been due to greater activity in the wards.

There was general agreement that incontinence could not be avoided by "screening" rounds even at very short intervals; patients might be left with bed-pans for ten minutes without result and the beds would be soiled within a few minutes of their removal. We tried the effect of acetylcholine derivatives to produce a result while the bed-pan was in position, but the experiment failed and the patients resented the injections. It had been noticed that if bedridden patients were encouraged to get up and move about with help from the nurses the incontinence often ceased, but the labour of getting them out of bed and caring for them when up was greater than that of cleaning them every four hours and was too much for the small staff.

The reverse was also true: a few clean bedridden patients became incontinent when they were removed from bed—especially if the adventure was undertaken against their wishes—and it was clear that evacuation of the bladder and bowel was with several of them a sort of protest against the disturbance of their peace.

These facts suggest that much incontinence in infirmaries is due to psychological disorder induced to some extent by institutional routine, although it may also be aggravated by infection and local pathological changes. The patients do not seem at all distressed by it, and this supports the view that the mental factor (the lack of conscious inhibition) is more important than the overactivity of the bladder mechanism that Wilson (1948) found by cystometric methods.

Psychologists have expressed the opinion that incontinence in the senile is a form of regression to the anoral eroticism of infancy. It may be so. I lack the training and ability to explore the unconscious motivation of the incontinent who were brought to my notice. The analysis must, I think, be difficult.

Of one thing I feel confident—that the burden of incontinence will not be reduced until it is possible to ensure greater activity and more effective treatment to the senile and chronic sick than is now possible with the restricted staffs of the infirmaries.

The Clinical Material

The patients of a large infirmary are a rich mine of clinical material for teaching and investigation. Strange phenomena of human pathology abound, and one of my registrars, after a happy afternoon with cases of hereditary cerebellar ataxia, Huntington's chorea, and paraplegia due to localized Paget's disease of the spine, remarked that the place was a censor's paradise. The simile is fair, but lacks precision; his recent struggle for the membership of this College had perhaps clouded his judgment of the appropriate paradise for censors.

Our original intention was a clinical classification of the patients based on accurate diagnosis, but, apart from the inherent difficulty of the extent and variety of the material, we were confronted with so many individuals who showed evidence of numerous distinct and serious pathological processes in one body at one time that we found it impossible to classify them even by "systems." This was true in at least half the cases, and in the remainder a single diagnosis was often not more than approximately accurate because in achieving it the psychological condition, the blood pressure, and the state of the arteries might be conveniently ignored. We eventually decided to classify the patients according to the condition which seemed most disabling at the time of survey. Thus, in Table V, "cardiac condi-

TABLE V.—*Diagnostic Category of Most Disabling Condition at Time of Survey*

Chief Disability	Males				Females			
	No. of Cases	% of Total	Mean Age (Years)	Mean Stay (Months)	No. of Cases	% of Total	Mean Age (Years)	Mean Stay (Months)
Cerebral thrombosis	73	23	72	23	61	16	73	37
Senility	43	14	79	47	67	17	83	39
Cardiac conditions	29	9	73	23	46	12	77	33
Chronic bronchitis	27	8	76	28	33	8	78	42
Arthritis	20	6	74	44	53	13	75	45
Result of fractures	16	5	75	44	16	4	78	27
Nervous disease	15	5	60	70	5	1	61	44
Dementia	14	4	76	17	33	8	82	31
Cancer	13	4	73	7	12	3	73	10
Parkinsonism	12	4	62	47	13	3	64	30
Tuberculosis	3	1	66	28	2	1	51	8
Prostatic disease	11	3	77	38				
Other diagnosis	21	7	72	39	41	10	72	48
No diagnosis	21	7	74	31	14	4	69	23
Total	318	100	74	34	396	100	76	37

tions" include only cases of gross cardiac failure and not those with symptoms of cardiac insufficiency. Chronic bronchitis with heart failure was classed as cardiac; advanced arthritic changes with hemiplegia were counted as arthritis, and severe hemiplegia with moderate arthritis was reckoned as cerebral thrombosis, and so on. In the senile groups were the extraordinary contractures that have already been described. The final result, for the reasons that I have given, is of dubious value. The large numbers of cases with multiple pathology led me to heretical criticism of the theory of the single diagnosis.

The Theory of the Single Diagnosis

This dogma of the single diagnosis holds almost undisputed sway in English medical teaching. It is founded on the simple faith that if we are clever enough and thorough in our investigation of a clinical case we will eventually be able to show that all the symptoms and all the physical signs are the result of a single process of disease. The appropriate label may then be affixed, honour is satisfied, and the dogmatic are content. I do not think I exaggerate. On all sides I hear the warning, "Don't diagnose two diseases simultaneously." Those about to give classes search diligently for good teaching material, by which they mean cases which permit the plausible demonstration of the validity of the theory: clinical examinations are conducted to test (among other things) ability in this exercise.

I can find no specific account of the origin of the theory; I suspect that, like Topsy, "it just grew" in the nineteenth century under the stimulus of the triumphs of exact science and with the development of morbid anatomy, the discovery of micro-organisms and the consequences of their invasion, and particularly, perhaps, with the elucidation of certain obscure syndromes and their constant association with gross lesions in particular organs. Consider, for instance, Addison's disease of the suprarenals—its strange and perplexing symptoms and signs and the splendid demonstration that they were hardly ever found in a patient without manifest destruction of one or both of two small glands.

The discovery of the bacillus of tuberculosis, the definition of the architecture of the basic lesion, and its natural history showed that many very dissimilar clinical conditions were in truth the result of a single pathological process. Before this advance had been made it was difficult to believe that there could be a unity linking chronic phthisis in the adult with tuberculous meningitis in the infant, although a few physicians with prophetic insight had suspected it. The proof that the pale spirochaete was the cause of all the varied lesions of syphilis and especially of general paralysis and tabes, had a like influence, and it is unnecessary to multiply examples.

The human mind longs for order, and soon the theory of the single diagnosis was born and waxed mighty. And indeed it served a very useful purpose, for adherence to it undoubtedly led to more careful examination and more accurate classification of clinical syndromes. Pragmatically the theory was justified; it worked. Later it was buttressed—as useful theories are often buttressed—by somewhat dubious argument. A hypothesis of independence was introduced (I do not know whence) which stated simply that, as in human beings serious disease apart from epidemics was a rare event, it was inherently improbable that two serious processes of disease would coexist in the same person. But this argument neglects important facts.

First, a person who is already the victim of one serious disease is often as a direct result more prone to develop another. Consider, for example, the high incidence of cancer in the post-cricoid region in patients who have suffered long from an iron-deficiency anaemia; or the frequency of arterial degeneration in the diabetic. Text-books recognize the coexistence of serious diseases, but in deference to the theory of the single diagnosis they call one of them a complication of the other.

Secondly, a disease which in a healthy man is but a trivial affair may in those already subject to a serious malady assume lethal significance. A sore throat in a

strong young man is unpleasant; in the victim of chronic nephritis it is something worse.

Thirdly, the longer a man lives the more likely is he to bear scars and disabilities of previous indiscretions and random attacks of disease which may in part be balanced by the acquisition of "immunological wisdom" by his tissues. The response to fresh disease or injury in the sick and aged will therefore paint a clinical picture confused and complicated by differing contributions from many sources, and the assessment of the relative importance of the separate contributions is the particular task of the clinician rather than the construction of a single diagnosis to account for them all.

As I have already said, the application of the theory of single diagnosis, which has given the familiar working world of doctors the fallacious appearance of a multitude of separate and unrelated disease processes, has produced results of the greatest practical value—not only in the recognition of disease and the discovery of effective treatment of its immediate cause, but also by the accumulation of knowledge which enables us to prevent or restrict the operation of those causes. At a certain stage in the training of students, too, dogmatic teaching has its worth. The theory is therefore not lightly to be set aside as a working hypothesis; in acute illness occurring in the young or previously healthy a single diagnosis is likely to be justified, but in the aged and chronic sick it is rarely relevant.

The Problem of Ageing

Senescence implies a series of changes most of which commonly but not invariably occur in an individual who has lived through a period of chronological time. In man the changes are familiar: the skin is pale, often yellowish, wrinkled, and inelastic. On the backs of the hands purpura is common and there is patchy pigmentation of brownish hue. The hair is white and often sparse; the back is bowed, the limbs are sometimes tremulous, and the teeth are lost. Movement is slow and often clumsy. There is a tendency to fall, and, as Sheldon has shown, the fears of accident may be so great that they dominate the life of the old person. Muscular effort entails distress, especially with breathing. Sleep is short and easily disturbed, though drowsiness is frequent. Vision fails and deafness is common. Sexual desire wanes and infertility in females is absolute and in males possible.

Observation of others and, more rarely, contemplation of ourselves acquaints us with certain more subtle changes in personality—the conservatism and intolerance of change, a slightly contemptuous indifference to popular opinion and fashion, the loss of memory for recent events, and the difficulty in recalling names. All these things, with the physical changes, are accepted as natural, inevitable, and irreversible with the grim resignation that proclaims that an old dog can't learn new tricks.

It is reasonably certain that ability to learn declines in the human species soon after growth ceases, but my colleague, Professor M. V. C. Jeffreys, of the Department of Education, tells me that no work has been done in this country that justifies any opinion about that quality in those over 50 years of age. In America preliminary investigation suggests that considerable capacity to acquire new knowledge and skill may be retained until late in life, and that judgment and experience may compensate in large measure for the slowness of the learning—an opinion that I can describe as comforting.

Foulds and Raven (1948), on the other hand, were satisfied that the capacity to form comparisons and to reason

by analogy diminished slowly after the age of 25. They did not investigate persons over 60 years of age, but said that if the rate of decline in later life remained the same as in maturity it would follow that by the age of 80 the average individual's ability to grasp fresh ideas and adopt new methods would be no greater than that of a child of 8. Eysenck (1945) had already produced evidence in support of that grim conclusion. Freud, too, at one time discouraged psychological analysis in patients above 50 "because old people are no longer educable." We may readily concede that mature experience is likely to prove an infertile soil for the cultivation of psycho-analytical concepts and reserve a hope that, for that reason alone, it may not be incapable of wisdom and greater knowledge.

With respect to the physical changes, belief that the disabilities of age are the result of a natural and inherent process in human life is based on the frequency with which they occur and the simple fact that no man has yet escaped death. The belief is also sustained by the common observation that longevity is often a familial characteristic and by the experimental evidence that modification or removal of one gene in *Drosophila* will materially affect the life duration of the resulting stock.

For several reasons, however, it is possible to maintain speculative doubt whether the changes of senescence are wholly inherent and inevitable in the course of life.

First, there is considerable variability in the time of onset of the disabilities of age not only in individuals of the same family but also in different peoples. Senescence occurs earlier, for instance, in tropical races than in those of the temperate zones. This suggests (but does not prove) that the effects of external environment, the incidence of infection, accident, malnutrition, or indiscreet excess may play a larger part in the development of senescence than has previously been suspected.

Second is the fact that in certain forms of life ageing does not occur. Insects die almost invariably without showing any signs of the wear and tear accepted as the usual prelude to natural death in the human being; a possible exception is the worker bee—the indomitable woman of the hive who is said to show a loss of hair and some fragmentation of the wings before she dies—but this is not certain.

Third is the strange irregularity of the distribution of changes attributed to age—the tissues of the body are not affected equally. In the vertebrates, including man, as Carrel has pointed out, these changes occur first in what may be termed the closed systems and the plasma, in the teeth, in the joints (arthritis deformans) and particularly the vertebral articulations, in the amount and distribution of fat, and in the arteries long before there is any detectable alteration in the organs. Are we to assume that tissues age independently of each other, or is it possible that these early changes in the closed systems are the result of metabolic or other disturbances conditioned from without?

Fourth is the riddle of marine life. Bidder (1925, 1932) has maintained that in natural conditions the growth of fish is unlimited by time and that they do not become senescent or infertile. They die by random chance, or "parental" deaths occur, as in the male salmon. Established knowledge is small and the matter highly debatable.

These mysteries have more than intellectual interest; in view of the changing age structure of human populations they are among the most urgent of our problems. In the present state of knowledge, it seems to me, senescence must be regarded as the product of two components or groups of factors: (1) effects produced in an individual by processes inseparable from life as an organism over a period of time; and (2) random effects of changes in environment, disease, famine, surfeit, and activity. Age and death are phenomena resulting from the variable interaction of the two.

Influence of External Conditions on Ageing

There is no satisfactory definition of ageing. Minot (1908) measured vitality in terms of growth; not the mere rate of growth but the specific rate—that is, the ability of living tissue to reproduce itself at the same speed as that at which it was itself formed. If that criterion be accepted the vitality of tissues declines soon after the fertilization of the ovum; at first reproduction is unrestricted in geometrical progression—from the zygote to 2, 4, 8, 16 cells—but as not more than between 300 and 400 cellular reproductions are likely in the whole nine months of gestation the rate must soon decline. In other words, man has aged considerably before he is born, and continues to age rapidly in youth and more slowly as life advances.

In a study of the shape of the human form as a function of time my colleague, Professor P. B. Medawar (1943), reached a parallel conclusion—that the rate of change falls off progressively from the fifth month of foetal life to maturity. In a review (Medawar, 1942) of the biological mechanisms controlling growth he recorded the opinion that it is likely that there is a non-diffusible protein in the intercellular fluids of adults that discourages the inception of free growth.

Minot's ideas raised the problem whether changes in the rate of growth might alter the vitality and survival of organisms. Early experiments in mice led to the belief that a high rate of growth was associated with increased longevity, but the result was dubious because the possible influence of genetic differences had been ignored. Study of the brook trout, indeed, suggested that the relation of rates of growth to longevity might be inverse, and Saxton (1945) investigated the matter afresh in rats carefully selected to avoid genetic difference. He found that, if the rate of growth were reduced by feeding them on a diet properly balanced in respect of all the known essentials but of smaller calorie value than the rats would normally consume, the longevity of the experimental animals was increased by no less than 100% when compared with that of a similar group on unrestricted diets. This remarkable increase was noted in both specific and potential longevity, in the mean age of survival of the group, and in the duration of the life of the individuals.

The application of such diets to rats at maturity undoubtedly prolonged their lives, and this experimental result strengthens the appeal for moderation that the empirical wisdom of physicians has so often addressed to the middle-aged.

That I should not be charged with the wish to impose moderate hunger as a condition of the discipline of well-conducted nurseries I think it prudent to say that in my judgment Saxton's general conclusion, that retardation of growth in rats by restriction of calories significantly increased their life span and reduced the development of inflammatory, neoplastic, and degenerative diseases, is of only theoretical interest until we learn the fate of successive generations of animals bred in such conditions. His work is none the less important, because it shows that longevity in rats may be increased to a surprising degree by a simple change in diet.

The Evidence from Botany

There is great variation in the life span and life cycle of different plants, and both the span and the cycle may be greatly modified by artificial culture. Monocarpic plants mature seeds but once and die. Why they die is unknown; it may be from starvation due to exhaustion of available food by seed production or the result of some poison

elaborated in the process. Nevertheless the life of monocarpic plants may be indefinitely prolonged by modifying their environment in such a way that growth continues without the formation of flowers and seeds.

Gardeners long believed that vegetative reproduction soon led to degeneration and that sexual propagation was in some way necessary to rejuvenation. But it now seems probable that the degeneration was in fact due to virus diseases, which only exceptionally are transmitted through seeds. In perennial plants there is no certain morphological evidence of senescence in succeeding years, though the temporary organs such as leaves and fruits show obvious cycles ending in senescence and death. The conclusion is that suitable modifications of external conditions may enormously prolong the period of growth and survival of plants and seeds.

Tissue Culture

There is now no doubt that the life and reproduction of most cells may be prolonged by artificial culture beyond the limit of the natural span of the organism from which they are taken, although some of them, like those of the nervous system and the muscles, soon become incapable of reproduction. It has been noticed, too, that cultures from an aged tissue, though slow in starting, will grow as well as those from a young one and that the growth is favoured by the introduction of tissue fluids from a young animal of the same species. The interesting problem arises whether the ageing of tissues may be a consequence of some humoral change in the organism.

These fundamental questions in the present state of knowledge have little immediate relevance to the urgent problem of the infirmaries, but I mention them to show that the study of the aged and their disabilities may be something more than an exercise in clinical taxonomy and worthy of the attention of physicians.

Our work in Birmingham is in a preliminary stage; we have found in apparently healthy old men a curious alteration in the pattern of the chemistry of the blood—the sodium and the chloride are reduced, there is delayed response to hypoglycaemia due to intravenous insulin, the storage of vitamin C is defective, and there is a diminished excretion of 17-ketosteroids. These changes suggest a deficiency in the adrenal cortex, but there is no increase in the blood potassium or any clinical evidence of Addison's disease. Injections of testosterone restore the pattern of the blood chemistry to the accepted normal and the patients gain several pounds in weight and profess that they feel better. Clinical physicians have exceptional opportunities in this field, for to them alone will come the cases of sudden and premature senescence which may be expected to afford material suitable for exact investigation. All of us are familiar with the rapid ageing of healthy individuals submitted to the strain of injury, bereavement, fatigue, and illness, but the biological processes underlying the manifest change are rarely studied—the condition is accepted as "natural." And yet in these cases the phenomena of age are sometimes reversible. In this connexion I cite a published case (Thomson, 1938) illustrating the sudden appearance of senility after an accident.

In April, 1937, a healthy virile man aged 55 had his hand crushed in a machine and suffered much pain. In three months he was completely bald and withered; his weight fell from 10 to 8½ st. (63.5 to 54 kg.) and his friends did not recognize him. Sexual desire almost disappeared, and he shaved only once a week instead of daily. His hair slowly grew again and was white; his skin was wrinkled and inelastic. There was no change in the external genitalia, but the pubic hair was scanty. No evidence of disease was found after investigation in the

out-patient department, and he refused admission. I saw him at intervals for several months and he improved slowly without treatment. Two years later his hair was brown and thick, he regained his normal weight and lost all trace of senility; sexual desire had returned, and he had to shave every day.

Similar changes are to be observed in women who suffer ischaemic necrosis of the pituitary as a consequence of severe haemorrhage or infection at parturition, and I have twice seen the sudden development of senile changes in cases of the so-called Lorain infantilism. For more than twenty years I have had under observation a dwarf, now 36 years old, who suffers from epilepsy but has no other symptoms or evidence of illness. Recently he has shown signs of sudden ageing, mainly in the wrinkling and loss of elasticity of the skin. Soon, I believe, as happened in the other two cases, he will be a typical example of the progeria of Hastings Gilford.

Summary and Conclusion

The Clinical Aspect

My purpose when I set out on this inquiry was simply the discharge of what seemed a disagreeable duty—the discovery of the best means of improving the state of the institutions for the aged and chronic sick in the Birmingham region. I now believe that the problem is one which intimately concerns the whole of clinical medicine and yet has been almost entirely neglected.

To restore the study of the aged and the chronic sick to the common stream of medical activity seems to me the paramount necessity, and the first step must be the establishment of wards in general hospitals and particularly in teaching hospitals for this purpose. Some assert that it is necessary to develop yet another specialty in the shape of geriatrics. I do not share that opinion. The problems of the aged and infirm are so varied that narrow specialism is unlikely to be profitable. Medicine to-day is too fissiparous; it breeds too many specialties. It is my view that this field is properly the domain of that under-privileged class the general physicians, and that by cultivating it they may contribute to the integration and generality of knowledge for which the Harveian Orator pleaded lately and so eloquently.

The virtual exclusion of the aged and the chronic sick from the wards of teaching hospitals is responsible for serious defects in the training of medical students. In general practice the care of such patients constitutes a considerable proportion of the work, and the fact that the newly qualified embark on it relatively untrained is a reproach to clinical teaching. In excuse it is urged that the pressure of the waiting-lists has prohibited the admission of these patients, and in the past that has been true. The difficulty is not insoluble.

In the Birmingham Region we estimate that the waiting-list of general medical and surgical cases is about 14,000. Of these, 60% are cases of hernia, piles, varicose veins, and prolapse. My belief is that the provision of a few recovery hospitals to which clean surgical cases of this sort could be removed within a few days of operation would end the problem of the waiting-list and permit the establishment not only of wards reserved for the aged and chronic sick but also of provision for specialized services.

In the wards for the aged in general hospitals the duration of stay should rarely exceed three months. Our analysis has shown that the critical period in which the fate of the elderly is determined is about 100 days—that is, whether they die or become fixed in an infirmary bed for years or return home. In a general hospital that period would not only enable a proper decision to be taken about the best provision for the individual but it would permit

research and dispose of the scandal of admission to the infirmaries without adequate investigation—the position at present in six out of seven admissions to the Western Road institution. In Hereford County Hospital and in the Manor Hospital at Walsall in Staffordshire we found in the course of our survey wards reserved for the reception of all patients above the age of 65 irrespective of the cause that led to their admission, and we had no doubt that the treatment and disposal of the chronic sick was better done as the result of it. Finally, there is no doubt that a necessary prelude to real improvement in the chronic institutions is regular visiting for teaching, investigation, and review by physicians in active charge of general hospital beds.

Social Aspect

A summary of our pilot survey justifies the following conclusions:

1. The outstanding characteristic of the patients is advanced age, but the mean age of the patients in the infirmary is less than that in the Highbury Home for old people, where the inmates live actively and pleasantly and at less cost to the community.

2. Of the bedridden patients in Western Road Infirmary, who form the overwhelming majority, in only a minute fraction (5%) is there any hope of rehabilitation. Disintegration of personality in the apathy of institutional routine, the development of incontinence, the contractures and deformities produced by long inactivity in bed, the lack of adequate treatment by physical methods, and the dissolution of homes are to a great extent responsible for this disaster.

3. Reform should be directed towards the prevention of complete disability in the senile. In the strictly realistic order of their possible achievement I suggest the following:

(a) The restoration of the care of the aged and chronic sick to the common stream of medical activity in the way that has already been described. Thomson and Curran (1948) have shown that the treatment of the old in general hospitals often leads to speedy recovery.

(b) Measures to maintain the cohesion of the homes of the elderly: the provision of medical and social services from the hospital as at Carshalton, the encouragement of a sense of family responsibility by training a member of it in the care of the invalid and perhaps by payment for the work done, and occasional admission of the invalid to an institution to allow holidays to those normally in charge.

(c) The provision of hostels, special housing, or accommodation for the aged in which central services and some form of domestic help is available. There is no need for uniformity or central control in this direction: local conditions and individual circumstances are infinitely varied. In an analysis of a sample of applications for help directed to the Welfare Department of the Birmingham Council for old people Miss J. E. McCrindell found that the vast majority came from independent old people who found that the battle of life was becoming too much for them and needed help at home. The sample was composed as follows: women 79% (widows 52%, spinsters 27%), men 16% (widowers or bachelors), and married couples 5%. Many of these will be on the waiting-lists of infirmaries unless some help is given soon.

(d) Industry should be encouraged to examine the conditions of the elderly in employment to discover whether adjustment is possible to prolong the useful working life of individuals beyond the customary age of retirement. A remarkable example of initiative in this direction is a special shop at Lucas's factory in Birmingham, which I was privileged to see. In this department were collected about 50 men and women, most of whom had given several years' service to the firm and then failed to keep pace with the rate of production of their fellows. In the majority the reason for the failure was premature senescence, but occasionally there was a specific physical disability. Instead of discharging them the firm established this department where

they did light work in special conditions. When I ventured to say that the enterprise seemed to be an admirable example of enlightened altruism I was promptly told not to confuse sensibility with sense: the shop had been costed and it paid.

The Problem in Relation to Evolution

It has been somewhat slickly said that what happens to individuals beyond the age of reproduction is of small importance to the race; that their fate is simply not on the agenda of evolution. It is conceivable that senescence and death soon after the term of fertility may have been genetically determined in the long struggle for survival, because in primitive conditions a race composed of the young and vigorous would undoubtedly triumph over another with a large contingent of the elderly. But human evolution is no longer determined solely by a struggle with the natural forces of the environment or by combat decided by mere physical fitness. The unique quality of mind and the development of a literary tradition are new and potent factors in directing human progress, and it may be that the wisdom of the old, less perturbed by sexual and other passion, has a greater part to play than is commonly believed. Twenty-five years have passed since George Bernard Shaw first propounded the gospel of the Brothers Barnabas in the second part of his metabiological pentateuch, *Back to Methuselah*. The brothers had become convinced that the confusion of civilization in Western Europe was due mainly to the childishness of statesmen, and that final catastrophe could not be avoided unless the span of human life were prolonged so that government might be entrusted to individuals with 200 years of training and experience instead of immature striplings in the sixties. We may justly be dubious of the biological mechanisms postulated by the Barnabas brothers and yet retain some sympathy with their doctrine that wisdom and experience in high places have some advantage over the brightness of puerility. That idea has helped me in this contribution to the study of the problems of the aged.

The Management Committee of the Western Road Infirmary made this inquiry possible, and I am particularly indebted to the Chairman of the Hospital Group, Mr. Vernon Grosvenor. Dr. Charmian Elkes, Dr. S. E. Hallisey, and Dr. P. M. Meynell did the exhausting work for the statistical survey with the help of two trained social workers, Miss Honor Pringle and Mrs. Leaver. My three registrars, Graham Marson, Lewis Arundell, and J. M. Winn, were of great help. Dr. L. Nagley, the medical superintendent, and Miss M. Thomas, the matron, of the Infirmary put their wide experience and great knowledge generously at my disposal.

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