

THE DEPRESSIVE STATES

of

OLD AGE

and

THEIR TREATMENT.

ProQuest Number: 13838675

All rights reserved

INFORMATION TO ALL USERS

The quality of this reproduction is dependent upon the quality of the copy submitted.

In the unlikely event that the author did not send a complete manuscript and there are missing pages, these will be noted. Also, if material had to be removed, a note will indicate the deletion.



ProQuest 13838675

Published by ProQuest LLC (2019). Copyright of the Dissertation is held by the Author.

All rights reserved.

This work is protected against unauthorized copying under Title 17, United States Code
Microform Edition © ProQuest LLC.

ProQuest LLC.
789 East Eisenhower Parkway
P.O. Box 1346
Ann Arbor, MI 48106 – 1346

C O N T E N T S.

| | <u>Page.</u> |
|---|--------------|
| Introduction. --- | 1. |
| An Historical Account of Ageing. --- | 10. |
| An Historical and Aetiological Survey of the Depressive States of Old Age. - | 26. |
| Differential Diagnosis. --- | 43. |
| A Review of the Case Material. --- | 57 |
| The Treatment of the Depressive States of Old Age. --- | 61. |
| Methods of Treatment Employed. --- | 89. |
| The Results of Treatment. --- | 100. |
| Conclusions. --- | 134. |
| Summary. --- | 150. |
| Appendix I. Summary of Routine Laboratory Findings and Other Items of Interest. --- | 153. |
| Appendix II. Abbreviated Case Histories. | 160. |
| Bibliography. --- | 178. |

I N T R O D U C T I O N .

OLD AGE.

"Grey hairs have many evils without end,
 The old man gathers what he dare not spend,
 While as for action, do what he will,
 'Tis all half-hearted, spiritless and chill;
 Inert, irresolute, his neck he cranes,
 Into the future, grumbles and complains,
 Extols his own young days with peevish praise,
 But rates and censures these degenerate days."

Horace, "Ars Poetica."

- - - - -

Mental disorders that are accountable for an increasing number of senile admissions to mental hospitals, that uniquely have their genesis within the ageing process, that display a symptom-complex characterised by a morbid depression which results in an alienation from the demands of social life, are obviously subjects that require investigation.

The purpose of this Thesis is to evaluate present knowledge of the Depressive States of Old Age, to review briefly the historical background to the ageing process, and to consider the aetiology of the depressive disorders which afflict the aged. Special attention is paid to the differential diagnosis and symptomatology of the Depressive States, and after a review of the modern methods of treatment,

details are given of the results obtained by the author, employing techniques which are based upon personal and practical experience during the past three years.

The Depressive States of Old Age present a vast and pressing problem in modern mental hospital practice, not only from the psychiatric point of view, but also from the manifold aspects of social life within the community. It is a problem which is likely to cause growing concern and perplexity as the span of life increases, and it is one which, so far, has received scant attention.

The advances of modern medical science, together with the improvements in hygiene, housing and social conditions, which have taken place during the past hundred years, have all played their part in leading to a greatly increased expectation of life for the average individual. Unfortunately, our highly industrialised society has failed to keep pace with these advances, with the result that the lot of the aged, especially in the large towns, is frequently a hard one. The adverse living conditions which confront many aged persons at the present time, have precipitated an increased incidence of psychiatric disorders among this section of the population, and caused a considerable rise in the number of senile admissions to mental hospitals.

Depressive illnesses form a large proportion of the psychiatric disorders peculiar to the aged, and throughout the present researches the following simple method of

classification has been adopted :-

1. The Involutional Depressive States.
2. The Reactive Depressive States of Old Age.
3. Recurrent Depressions in the Aged.
4. Manic- Depressive States in the Aged.
5. The Senile Depressive States.

This method of classification has been gradually evolved over the past three years and has proved simple but effective. The salient features of the five clinical conditions outlined above will be described fully in a later section, as a means of shedding light on the reasons for selecting this method of classification.

For statistical purposes sixty years was arbitrarily fixed as marking the commencement of "old age", and all the patients under review conformed to this condition. The case material was not specially selected in any way, and all were National Health Service patients of sixty years and over, who were admitted to the male side of Brookwood Hospital during the past three years. All exhibited mainly depressive symptoms, and each case was examined, interrogated, assessed and treated by the author in person.

The simple method of classification detailed above was employed, and records were kept of all factors of aetiological importance which could be collected from the resources available. The symptoms were also recorded systematically, and information obtained regarding the approximate duration of the depressive illness prior to

admission to mental hospital.

All this information was compiled for each patient, and it was ultimately correlated with the age and type of depressive state present. It was hoped that a careful scrutiny of all the recorded material might throw into relief some details which would prove of value as aids to the more accurate diagnosis and assessment of similar cases in the future.

A careful review of the literature suggested to the author that the members of the Vitamin-B Group are universally distributed in all living cells and tissues, and furthermore that they are intimately associated with the fundamental metabolic processes of all such tissues. Of particular interest is the fact that the members of the Vitamin-B Group appear to play an essential part in the proper metabolism of the brain and nervous tissues generally, and there seems to be a close relationship between the oxygen consumption and respiratory rate of such tissues and their Vitamin-B Group content.

In addition to the above, one member of the Vitamin-B Group, namely Nicotinic Acid, is known to have a powerful vasodilator action, which spreads to the cerebral arterioles, and causes a marked increase in the cerebral blood supply without any noteworthy harmful effects. It is probable that this action results in improved metabolism of the brain and other tissues, and in elderly patients one may assume that this can only have a beneficial effect.

It was therefore decided to try the effect of administering large doses of Nicotinic Acid and other members of the Vitamin-B Group to a series of elderly patients exhibiting mainly depressive symptoms, on the assumption that -

- (a) a deficiency of the Vitamin-B Group, and/or
- (b) impairment of the cerebral circulation (and hence of the cerebral metabolism), -

were at least partly responsible for such psychiatric disorders.

In view of the fact that the members of the Vitamin-B Group were being employed therapeutically, the physical condition of each patient was carefully scrutinised, and special note made of any signs indicative of malnutrition and avitaminosis. It was hoped to demonstrate conclusively that elderly patients with depressive symptoms, who also exhibited signs of deficiency of the Vitamin-B Group, would show a particularly favourable response to the routine methods of treatment employed.

Electric Convulsive Therapy had already been used with signal success in the treatment of depressive states in younger patients, and it was decided to use it, whenever it was deemed necessary, to supplement the routine measures outlined above. However, on account of the advanced age and poor physical condition of most of the patients so treated, it was made a routine practice to administer it under "Scoline" and Sodium Pentothal, in order to reduce the risks inherent in this rather drastic form of treatment.

In the ensuing sections the case material is reviewed as concisely as possible, and at the end of the Thesis a selection of the case histories is included as a special appendix.

The literature has been combed for details of the modern methods employed by others in the treatment of the depressive disorders which afflict the aged, and a full account is given of the routine procedures which have been perfected by the author as the result of extensive experience during the past three years.

The results of the routine methods of treatment employed are clearly shown, and comparisons are made with similar series treated by other workers in the same field. A strong plea is made for the setting up of special Geriatric Centres within each mental hospital, where all such routine therapy could be carried out. All senile patients could be admitted to such centres for examination, interrogation, assessment and treatment by specially trained teams of doctors, nurses, and medical auxiliaries, and the author is firmly convinced that if this system could be generally employed, then the results of treatment are more likely to be uniformly good, and a much larger number of aged patients would be successfully rehabilitated.

All the information so laboriously accumulated about the Depressive States of Old Age during the past three years is carefully sifted, and certain conclusions are drawn regarding the aetiology, symptomatology and response to

treatment of the various clinical conditions described.

A short statistical section is included, and finally there follows a detailed Bibliography of all the literature considered to be pertinent to the subject matter of this Thesis.

It is the author's hope that when all the material of this Thesis has been presented, that future clinicians may find in it something of lasting value in the diagnosis and treatment of the various depressive illnesses which afflict the aged. There are few more distressing complaints than depression, and it has truly been said by Watts (1) that "Depression is probably the most unpleasant illness anyone can contract: to the depressed patient whose condition is far from hopeless, there is no hope and no future". Consequently, if this Thesis has made some slight contribution towards the alleviation of this dreadful ailment, then the author will feel amply rewarded.

The aged are with us and they are deserving of all the help and sympathy we can give them. Most of them have worked hard all their lives and served the community well, so it is all the more tragic that so many should have to end their days in squalor, loneliness and despair.

The miracles of modern medical science have brought to every one of us the rich promise of a greatly increased expectation of life, and as a result the number of aged in the general population is increasing year by year. A shrinking working population cannot afford to support indefinitely

such a large and unproductive collection of elderly people, and the moment is now opportune for society to ponder over the best means of utilising the latent economic potential at present stagnating among the aged.

Such a plan will require much reorganisation of our entire national economy from the highest level, in order to create suitable conditions to enable the ageing to continue at work as long as possible, and to enjoy good health, security, and peace of mind to the end of their days. Only by such planning will the increasing incidence of psychiatric disorders among the aged be checked, and an encouraging start has been made in the recently published report (2) presented by the Minister of Labour on the employment of older men and women.

However, this but touches on the fringe of a vast problem, and the first essential is to rouse public opinion about the shocking conditions in which many of our aged folk have to live. Thereafter legislation must follow to ensure that our ageing population will spend their declining years in a well-earned peace and contentment. Only then will it be possible to pause awhile, rest content in a good job well done, and to say with Longfellow (3),

"It is too late! Ah, nothing is too late
Till the tired heart shall cease to palpitate.
Cato learned Greek at eighty: Sophocles
Wrote his grand Oedipus, and Simonides
Bore off the prize of verse from his compeers,

When each had numbered more than four-score years.
Chaucer, at Woodstock with the nightingales,
At sixty wrote the Canterbury Tales;
Goethe at Weimar, toiling to the last,
Completed Faust when eighty years were past.
These are indeed exceptions; but they show
How far the gulf-stream of our youth may flow,
Into the arctic regions of our lives.
For age is opportunity no less
Than youth itself, tho' in another dress,
And as the evening twilight fades away
The sky is filled with stars invisible by day."

- - - - -

AN HISTORICAL ACCOUNT OF AGEING.

OLD AGE.

"He that is old lieth down in misery every day,
 The eyes are small, the ears are deaf,
 The bones are painful throughout the body;
 Good turneth into evil. All taste departeth;
 These things doeth old age for mankind,
 Being evil in all things."

Ptah - Hotep. (3550 B.C.)

- - - - -

The problem of ageing is one that has attracted the attention of philosophers and scientists down through the Ages.

Man has always been interested in the problem of rejuvenation, and this theme runs through folklore and literature, but much less attention has been paid to the ageing process itself, and to the mental changes which accompany it.

The Bible contains many accounts of aged persons who lived to a great age, and were held in high esteem by their fellows, who regarded them as founts of wisdom.

In Ancient Greece the aged were considered to be of little value, although strong attachments were often developed between the old and the young with mutual benefits. As a general rule the aged were encouraged to continue to

exercise their physical and mental powers as long as possible, and this was regarded as the surest way of prolonging life and ensuring a contented old age.

Hippocrates, the "Father of Medicine", who lived in the fifth century B.C, thought the brain was the organ of the mind, and that mental illness was simply due to some disorder of the brain. He advocated moderation in all things, fresh air, personal cleanliness and regulated exercise as being conducive to a long and healthy life. Employment of some kind suited to the age of the elderly individual was also lauded, and even the modern authorities on Geriatric Medicine could hardly fault his policy for the aged.

Cicero, the Roman orator, writer and statesman, who lived in the first century B.C., described how the Roman Senate was composed of old men, and he counselled that all men should be prepared for old age and taught to accept their various infirmities. He also recommended some suitable outdoor occupation, cheerful company, and some form of mental activity as being conducive to a happy and contented old age. His views are almost identical with those of the modern Geriatricians who are campaigning for "a new deal for the old".

The Middle Ages is generally regarded as a period of stagnation and retrogression, with the art of medicine under the sway of demonology, astrology, witchcraft and sorcery, and the alchemists were occupied in searching for the "Philosopher's Stone" and the "Elixir of Life". The former would enable any base metal to be turned into gold,

while the latter, if administered to an aged person, would give him perpetual youth and great wisdom, but needless to say these discoveries were never made - and are still being searched for.

Bacon (4) the medieval philosopher and pioneer scientist, advocated a rejuvenating process every few years as an aid to longevity, and his methods smack strongly of the fashionable "cures" advocated by various spas at the present time.

After the Middle Ages there came the resurgence of learning and medical research, but the philosophers and physicians were not the only keen observers of man, for folklore and literature abound with vivid descriptions of the ravages of old age. Shakespeare's descriptions of the ageing process display remarkable insight, as in the presentation of such characters as Adam (5) and King Lear (6).

However, it was nearly two centuries later before scientific thought was directed to the possible causation of old age, and consideration given to methods of alleviating the ageing process.

In England the first person to publish a book devoted to the problems of ageing was Floyer (7), but he added little that was original to the contributions already made by the early Greeks and Romans.

Shortly after this Hill (8) wrote enthusiastically about the many good qualities possessed by the aged, and he strongly advocated moderation in all things as the key to a

long, happy and healthy life.

Towards the end of the 18th century Hufeland (9) stressed the importance of healthy stock in the parents for the attainment of a good old age. He also advocated breast-feeding, moderation in all things and peace of mind as essential aids to a long life and a healthy old age.

Early in the 19th century Bernard (10) boldly expounded his view that both men and women should be educated and prepared for old age while they are still in their prime. Similar opinions are being voiced at the present day as a means of assisting the elderly to make a more satisfactory adjustment to the advent of the ageing process, and the author is convinced that there is much to recommend such a form of adult education.

Shortly after this Salgeus (11) trenchantly declared that "All creatures which abound in our world have their term of existence succeeded by death and annihilation. This is the law of Nature from which no one is exempt - - - yet man makes every effort to escape this terrible moment or retard its progress." At the same time he strongly condemned the charlatans among the medical profession, who tried to hoodwink the gullible public by pretending to sell them immortality - at a price.

In 1838 Carlisle (12) took pains to draw attention to the rising expectation of life among the general population, and he also devoted a large section of his textbook to the Disorders of Old Age.

A few years later Elliott and Evans (13) introduced their "consolidation theory" of ageing, in which they described how all the body organs tend to increase in density and firmness with advancing age. They attributed this change to impurities in the food and drink, and advocated special diets and purified water as the best means of prolonging life.

In 1889 Humphrey (14) reported on nine hundred people over eighty years of age, and including seventy-four centenarians. After a review of the entire series he advocated moderation in all things, together with graduated rest and exercise as being conducive to a healthy old age. He gave a detailed account of the life of Thomas Parr, who continued at work until one hundred and thirty years old, and was one hundred and fifty-two at the time of his death.

The advent of the twentieth century saw an awakening of interest in the problems of ageing, and Weber (15) advocated regular exercise, fresh air, moderation in all things, adequate rest and a contented mind as the best means of prolonging life. His views were not in any way original, however, but merely a repetition of what had gone before.

In 1905 Crichton-Brown (16) set himself up as a champion of the aged, and severely criticised the view that they are only a liability. He quoted many examples of great works which were completed by famous men in their declining years, and advocated strongly that the elderly should be encouraged to remain at work as long as possible.

This view is strongly held by the modern exponents of Geriatric Medicine, but the politicians, employers and Trade Unions must be converted also before the aged will benefit.

Soon afterwards Metchnikoff (17) reviewed all the previously held theories of ageing and rejected them as unsatisfactory. He pointed out that longevity was common in the Balkans where living conditions were hard, and further that most centenarians were poor people who lived frugal and abstemious lives. He concluded that it was advantageous to prolong life on the grounds that the aged have an important part to play in society. He advocated the introduction of cultures of lactic acid bacilli into the body as a means of prolonging life, and although his treatment is now discredited, at least it helped to stimulate research in the problems of ageing.

One of the modern pioneers in the specialised study of old age was Thewlis (18) in America. In his textbook published in 1917 he stressed the importance of the aged to the community, and was emphatic that the real secret of Geriatric Medicine was "to keep the aged at work" as long as possible. His views received great support during the recent World War when large numbers of aged workers were recalled from retirement to perform meritorious service in all branches of industry, and to profit immensely from their labours. There is little doubt that in the future the elderly must be allowed to play their full part in the affairs of the community, and their knowledge and experience

must be fully utilised for the common good.

During the past few years many important research projects have been carried out on various aspects of the problems of ageing, and these approaches have been made along three main channels as follows :-

THE EXPERIMENTAL APPROACH.

Schmidt (19) in 1931 reviewed all the recent experimental work on rejuvenation. He described Steinach's Operation, which consisted in ligaturing the vas deferens in order to cause cessation of formation of spermatozoa and proliferation of the interstitial tissue. It was hoped that this would result in an increased production of the testicular hormone leading to rejuvenation, but nothing of the kind happened, and the operation has now fallen into disrepute.

About this same time Warthen (20) epitomised the situation thus:- "Summing up all the modern views as to the nature of the mechanism of the ageing process, we find they agree that age is due to a loss of growth energy, so that the cell loss exceeds the regenerative powers, and numerical and quantitative atrophies ensue." He thinks senescence is operative in all periods of development and concludes "Old Age, the major involution, is due primarily to the gradually weakening energy change set in action by the moment of fertilisation, and is dependent upon the potential fulfilment of function by the organism. The immortality of the germ plasm rests upon the renewal of this energy from

generation to generation." Warthen's views are both stimulating and controversial, and they can only be proved or disproved by further research on the problems of ageing.

In 1948 Korenchevsky (21) became interested in the occurrence of vitamin deficiencies and infections in elderly people. He advocated that the treatment of vitamin and endocrine deficiencies and infections in the aged should be systematically carried out on the largest possible scale, but his scheme has yet to be put into action. The same worker, as a result of experiments on rats, has tentatively suggested that in these animals the relative decrease in the weight of the organs is an accurate indicator of the ageing process. If this is so, it may yet be possible to work out a similar index for human beings.

Since then careful researches have been carried out by Thomson (22) to attempt to measure the changes in the blood chemistry that occur in apparently healthy old men. As a result he described various changes in the blood chemistry, which he attributed to some deficiency of the suprarenal cortex, and he thought these could be reversed by injections of testosterone. These claims require further confirmation, however, and much research is necessary in order to work out the normal blood chemistry of apparently healthy old people.

THE SOCIAL APPROACH.

Within the last few years civilised industrial countries with large urban populations have become

increasingly perturbed at the unhappy plight of the growing numbers of aged people in their midst. Indeed it has become a pressing social problem.

Recent advances in medicine and hygiene have ensured the average man a greatly increased span of life, but in none of the Western Powers is there a birth rate sufficiently high to keep pace with the resulting increase in the proportion of aged in the general population. As a result there is a progressive rise in the relative proportion of old people in the population as a whole.

It is self-evident that unless the present population trends are arrested, or the aged allowed to make a more positive contribution to the social and economic life of the community, then a stage will be reached when an immense number of retired and non-productive old people will become wholly dependent on a shrinking working population under the age of sixty. Such a burden would soon become an intolerably heavy one, and it is essential that the question of our ageing population be adequately dealt with as a pressing national problem.

Various social surveys devoted to the problems peculiar to the aged have been carried out within recent years, and the most important are detailed below.

Faris and Dunham (23) conducted a social survey in Chicago in 1939, and they found that the incidence of psychiatric illness among the aged tended to increase where there was lack of security and uncertainty about the future.

Some years later after a similar survey Dunham (24) stressed the same point and declared, "Older people in a poverty situation, and in communities of disorganised family life are more likely to be identified as psychotic cases than other old persons who live in more acceptable economic surroundings, and still enjoy a fair degree of familial support." He drew attention to the low admission rate of senile psychoses in rural as compared to urban areas, and contrasted the unhappy, precarious plight of the aged in the United States with their privileged, socially integrated, and economically secure position in "backward" China. He was of the opinion that the senile psychoses were rare in China, but this view requires endorsement.

In Britain Rowntree (25) carried out an important social survey in 1947, and he recommended the establishment of small residential homes or hostels for the care of the aged. He also advocated the provision of clubs and recreational facilities, and counselled the setting up of Geriatric Centres in association with the general hospitals as an essential part of an improved health service for the aged. A start has already been made to implement some of the recommendations of the Rowntree Committee, but much remains to be done.

In 1948 Sheldon (26) carried out a similar survey. He thought the old people faced conditions of great hardship with admirable fortitude. He pointed out that the aged were no longer allowed to participate actively in the family

life as in former days, and alleged that the younger generation no longer accepted the responsibility for the care of their aged relatives. He found that the problem was most acute in urban areas, and inferred that the advent of the Welfare State has played some part in the slow disintegration of family life.

Mainly as a result of these social surveys various organisations have sprung up to promote the welfare of the aged, the best known being the National Old People's Welfare Committee and the Club for Research on Ageing. Also many social and recreational clubs for the aged have been organised all over the country and their numbers are steadily growing.

There is little doubt that in such clubs many elderly people find the opportunities for social contact and self-expression hitherto so lacking in their lives. Indeed Goldschmidt (27) regarded the lack of social integration as being one of the major factors in the causation of psychiatric disorders in the aged, and most informed workers agree with her view.

THE PHILOSOPHICAL APPROACH.

From the time of Hippocrates this method of approach was, until recently, the only one open to writers on the subject, and modern exponents emphasise the value of the elderly to society and plead that they should be given a better deal.

Johnson (28) has laid stress on the need for

medical supervision and guidance when a man is in his prime, so that while he is in full vigour, adequate preparation should be made for retirement. If such a system was in operation, the cessation of work would not be followed by a hiatus leading to rapid mental deterioration, as so frequently happens at present. He also quotes Cicero who outlined four reasons why old age is dreaded :-

1. It withdraws us from active employment.
2. It enfeebles the body.
3. It deprives us of most of our physical pleasures.
4. It is only the next step to death.

To these four fears Johnson has added the following :-

- (a) Fear of economic insecurity.
- (b) Fear of loneliness.

Finally he concludes :- "I hope too that the readers of this book will be stimulated to begin, while in full possession of their mental faculties, to guard against a lonely and unhappy old age by cultivating a variety of interests and a wide circle of friends."

When all the facts are considered there seems little doubt that the essential feature of old age is the degree of success, or otherwise, with which the ageing person manages to adapt himself to the various physical infirmities and changed social and economic conditions he encounters with advancing years. If successful adaptation to the ageing process occurs then psychiatric breakdown is

unlikely, but everything possible should be done in the way of education and preparation to assist this process, and these steps should be taken during middle age.

During the past hundred years the percentage of aged in the general population has gradually increased, as has the average expectation of life, and the following statistical tables indicate the general trend of events :-

| <u>Period.</u> | <u>Average Expectation of Life.</u> |
|-------------------------|--|
| End of 18th century --- | 30 years. |
| 1800 - 1849 --- | 39 years. |
| 1850 - 1900 --- | 48 years. |
| 1910 --- | { 49.3 years for men. 53.1 years for women. |
| 1930 --- | { 59.5 years for men. 62.7 years for women. |

These figures indicate the gradual increase in the expectation of life which has taken place, and this trend is steadily continuing to date.

The following tables, which apply to Great Britain alone, indicate the increase in that section of the population over sixty years of age during the past fifty years :-

| <u>Period.</u> | <u>Number of Population over 60 years of Age.</u> |
|-----------------------|---|
| 1901 ---- | 2,500,000. |
| 1946 ---- | 6,500,000. |
| By 1971 (estimated)-- | 9,500,000. |

Thus the statistics show that the span of life is slowly increasing, and the percentage of aged people in the

general population is likewise expanding, but the mere prolongation of life alone without concomitant development of the social services for the care of the aged would present a really frightening problem, and one which, alas, has not yet been adequately tackled.

It is common knowledge that many men have produced their best work at a very advanced age, and all the available evidence supports the view that man is never too old to learn. Furthermore, most men are happiest and most contented when they are engrossed in some congenial task which absorbs all their attention. These facts are well known, yet in spite of them the current policy in modern industrial society is to dispense with the services of these skilled and experienced men as soon as they reach retiral age, to throw them casually on the scrap-heap, and proceed to forget all about them. This is indeed a very short-sighted policy, and it is one which must be drastically reformed ere long, or the problem of the care of the aged will become an insoluble one.

The aged are with us, and in many industrial areas their plight is indeed a pitiable one. Harsh living conditions, the threat of financial and economic insecurity, loneliness, loss of social contacts, and finally the feeling that they are no longer wanted or regarded as useful members of the wage-earning community; these are the basic factors which lead to psychiatric breakdown in the aged, and society must be educated to readjust its working rules and

regulations in the light of modern requirements.

The various social surveys referred to above have all stressed the fact that a change of policy towards the aged is long overdue. The crux of the whole problem is that they must be encouraged to carry on at work as long as possible, partly to prevent them from becoming a crushing economic burden on the rest of the community, and partly to help them to feel that they still form an essential part of an integrated society.

Many elderly persons develop depressive illnesses mainly because of the difficulties they encounter during the ageing process, and it is largely with such cases that the present researches are concerned. It is important that such patients be diagnosed and adequately treated as early as possible in their illness, for the prognosis is good, and it is frequently possible to rehabilitate them completely, so that they can return to their homes and carry on with their jobs. Without prompt diagnosis and treatment, however, the prognosis is poor, and the mental state steadily deteriorates, with appropriate physical changes.

One may sum up the purpose of the present researches by calling for a study of all the factors which have precipitated the psychiatric breakdown of these aged patients. By systematic observations of the symptomatology and differential diagnosis of the various clinical conditions described, some information of value may be gleaned which will prove of value in the diagnosis of

similar cases in the future. Finally, one can attempt to evaluate the effects of the methods of treatment employed in the present cases, and to compare the results with those obtained elsewhere.

After all this, one may with humility and due deference submit one's views as to the methods which might be adopted to prevent the development of such psychiatric illness among the aged in the future. Surely it is time to adopt some measures to improve the lot of our aged folk, so that a more cheerful and more optimistic vista may be opened for them, and it may indeed be possible for them to grow old gracefully? The words of Cicero might well be used as a fitting end to our ruminations on the subject of old age..... "Old age, especially when crowned with honour, enjoys an authority which is of more value than all the sensual pleasures of youth."

De Senectute, Ch.XVII,Sec.61.

AN HISTORICAL AND AETIOLOGICAL SURVEY OF THE
DEPRESSIVE STATES OF OLD AGE.

"Such are the penalties of the old man: he sees calamity after calamity befall his house: he lives in a world of sorrow: he grows old amid continual lamentation and in the garb of woe."

Juvenal. "Satires." Sect.X.1.190.

- - - - -

Depression was one of the earliest signs of mental disorder to be described in the Bible and many other ancient writings made frequent reference to it, and to the best means of combating this dread complaint.

Robinson (29) has vividly recorded how, in primitive times, depression and all other forms of mental disorder, were attributed to the entrance of demons into the body of the afflicted person, and the cult of the magician or medicine man was gradually evolved to combat such diseases. The following were among the methods of treatment employed :-

1. Attempting to drive the demons out of the body of the patient by wearing hideous ritual masks, by making loud bangs and noises, and by ritual dances: By beating and flogging the body of the affected person: by employing unpleasant fumes, smells or potions.
2. Attempting to appease the demons with gifts of money

or food so that they will leave the body of the afflicted person and go elsewhere.

3. Attempting to prevent the entrance of demons into the body by means of amulets or charms.
4. The use of trepanation operations to allow the demons to escape from the head of the afflicted persons.

In Ancient Egypt about 2,000 B.C. the physicians were generally priests, who regarded incantations as of much greater importance than medicines or any other form of treatment. King Cheops was described as suffering from Melancholia, and the cure consisted of incantations, the burning of incense, and a long voyage on a lake in a boat containing twenty beautiful maidens. On this regime a complete recovery resulted.

The Ancient Greeks took medicine much more seriously than the Egyptians, and their priests built special temples to cure the sick and mentally afflicted. For melancholic patients temples of particular beauty were constructed with gardens, lovely statues and sweet music, and in such restful surroundings perfumes and incense were employed for therapeutic purposes. Temple sleep and the interpretation of dreams were frequently employed with good results.

Hippocrates, the 'father of medicine', who lived about 400 B.C., believed that the brain was the organ of the mind, and that mental illness such as depression, was due to

some disorder of the brain. He advocated visits to the temple of Aesculapius for the cure of such mental disorders, and amid the lovely surroundings there, prayers and sacrifices were offered to the Gods with beneficial results.

Celcus, a famous Roman philosopher of the early Christian era, advocated starvation, chains and flogging to compel depressed and uncooperative patients to eat, and somewhat ambiguously he also advised games, music and light reading to soothe the melancholic. He further recommended friendly talks to quieten the fears of such patients; a method still greatly in vogue.

Caelius Aurelianus, also a famous Roman physician, received special praise from Henderson and Gillespie (30), because he advocated that the mentally afflicted should be treated under the best possible conditions. He emphasised the need for tact and gentleness in the attendants, and described the use of theatricals, entertainments, riding, walking and occupational therapy in the treatment of the mentally ill. During the convalescent period he advised excursions by land and sea and other distractions to expedite complete recovery. When one reads such accounts one realises that, apart from the modern physical methods of treatment, we have advanced but little during the last two thousand years.

Galen, another famous Greek physician of early Christian times, who is rated second only to Hippocrates, regarded the brain as the seat of thought, imagination and

movements. He was of the opinion that insanity was caused by the presence of air and humours in the brain and body, and he classified mental disorders as follows :- Stupor; Phrenitis (Delirium); Melancholia; Mania; Epilepsy; and Mental Deficiency. No great change in the classification of mental disorders has taken place since Galen's time.

About the time of Christ melancholia was regarded as the onset of mania, and hysteria was thought to be a disease of women related in some way to the womb.

Six hundred years later it was noted for the first time that melancholia and mania may occur in the same patient as a cyclical entity, and this may be regarded as the first recorded report of the Manic-Depressive Psychosis as at present recognised.

During the tenth and twelfth centuries the main advances in medicine and psychiatry took place in Spain under the Moors. They advocated the treatment of melancholic patients in shrines and holy places and claimed good results.

The Middle Ages was a period of stagnation so far as medicine and psychiatry were concerned, and the care of the insane was largely left in the hands of the priests. During this period demonology and beliefs in witchcraft flourished, and the mentally afflicted suffered terribly. Many mental hospitals were built in the fourteenth and fifteenth centuries, but they were more like jails, and the patients were looked after by brutal guards who exploited them in every way and took a sadistic delight in their

sufferings.

The priests devised inhuman rituals to cast out devils from the mentally ill, and this was known as exorcism. These practices had the full support of the Church, and in 1484 a Papal Bull was issued which authorised witch-hunting. There can be little doubt that many of the so-called "witches" were elderly melancholics who were forced to "confess" to their sins before suffering the supreme penalty of being burned at the stake.

Martin Luther, the German reformer and founder of Protestantism, believed in devils and demoniacal possession, and he and his followers regarded the insane as the tools of Satan, who deserved to be treated accordingly.

During the Renaissance period certain Italian physicians interested themselves in Melancholia, and one of them, da Monte, advocated frequent baths and blood-letting to effect a cure.

In Venice, Mercuriale maintained that the frequency of Melancholia was due to the life of pleasure and luxury in which many people indulged to excess. He regarded this condition as a form of Mania and prescribed frequent purgations and cautery.

The Swiss physician, Plater, who flourished early in the sixteenth century, attempted a classification of mental disorders including "mentis alienatio", which referred to mania and melancholia. He also protested against the use of mechanical restraint in the treatment of the insane.

Apart from the above no real advances were made in psychiatry, and from this period until the end of the eighteenth century the care of the insane was purely custodial, and they were chained, beaten, starved and compelled to pass their lives in foul, dark, badly ventilated cellars and dungeons, which, by modern standards, would be considered unsuitable for any animal.

The modern era in psychiatry began at the end of the eighteenth century, and the steady progress which has taken place since has been vividly described by Castiglione (31).

In 1793 Chiarugi, a prominent Italian physician, divided insanity into Melancholia, Mania and Dementia, and he regarded the former condition as being one of partial insanity, which responded favourably to psychotherapy, sedation and stimulation.

In 1796 Pinel, who worked at the Bicêtre Hospital in Paris, inaugurated the period of humane reform in mental hospitals by having the chains struck from the patients under his care. He also made walks and workshops in the hospital, and introduced fresh air, light and heat where none had been permitted before. These improvements had a beneficial effect on the patients under his care, and his lead was quickly followed by others.

In 1792 Tuke in England opened The Retreat in York, which was a private mental hospital endowed by the Quakers, and here also humane methods of treatment were

employed with good results.

Gradually throughout the nineteenth century mechanical restraint was abolished in mental hospitals all over the world, and the living conditions of the patients steadily improved. Connolly (32) of Hanwell was another strong advocate of the abolition of mechanical restraint, and he published a textbook on the subject in 1856, which won over many adherents.

In 1854 Falret in France described clinical cases who had recurrent attacks of mania and depression, and his writings were of considerable importance in the evolution of the concept of the Manic-Depressive Psychosis.

Kraepelin of Germany made a great step forward when in 1896 he clearly outlined his conception of Manic-Depressive Insanity. In this category he included periodic and circular insanity, simple mania, and melancholia, and he concluded that all these conditions were due to the same morbid process.

Janet recognised the existence of neurotic depressive states, and employed the term "psychasthenia or neurasthenia" as indicating a state of psychological depression. Other writers have described similar states under a plethora of names, while Weir-Mitchell advocated a regime of rest and special diet for such neurotic illnesses, and achieved a considerable measure of success.

When Kraepelin first described the Manic-Depressive Psychosis he deliberately omitted from his group

certain cases of melancholia which tended to occur at the involutinal period. Afterwards he tended to alter his view so as to include such cases, but Henderson and Gillespie (33) were emphatic that these elderly melancholics formed a separate clinical entity for which they reserved the term of Involutinal Melancholia. Most modern authorities agree with this view, and this condition is differentiated from the Manic-Depressive States by the fact that the patient has never suffered from any form of mental illness up to the onset of the involutinal period.

Also, within recent years it has come to be recognised that there is a group of patients who suffer from recurrent attacks of depression, which cannot be regarded as due to Manic-Depressive illness or to Involutinal Melancholia. Such patients are usually of somewhat weak and inadequate personality, and they tend to react to any minor upset or difficulty by seeking refuge in depressive illness. Such conditions are often encountered among elderly patients, who may be regarded as suffering from attacks of Recurrent Depression.

A further group of depressive states has also been recognised of late, and these have been referred to as the Reactive or Exogenous Depressive States. In elderly patients this condition tends to occur in persons hitherto regarded as normal stable individuals, who suddenly encounter some serious difficulty with which they are unable to cope. The precipitating factor may be a serious financial loss, a

sudden bereavement, or an illness, and they react to it by developing depressive symptoms. Such Reactive Depressive States frequently occur for the first time in elderly patients, and there is usually a definite precipitating cause.

After this brief historical survey of the Depressive States which afflict the aged, it is necessary to consider the method of classification employed in the present researches, and to review briefly the aetiology of the clinical conditions described.

The following method of classification of the Depressive States of Old Age has been employed in the present researches.

1. The Involutional Depressive States.
2. The Reactive Depressive States of Old Age.
3. Recurrent Depressions in the Aged.
4. Manic-Depressive States in the Aged.
5. The Senile Depressive States.

These various clinical conditions will now be briefly described :-

1. The Involutional Depressive States.

The involutional period is a physiological epoch common to men and women, which results in certain characteristic mental and physical changes. In women it usually occurs from 45 to 55 years of age, but in men the climacteric generally comes on at a later date, namely from 55 to 65 years, and the symptoms are less prominent.

In many cases the climacteric is associated with intense depression and marked emotional instability, and this condition is referred to as Involutional Melancholia. Malamud (34) considers that these Involutional Depressive States tend to occur in persons of a particular prepsychotic type, and represent a failure in adjusting adequately to the problems peculiar to later life. The prepsychotic personality type is described as rigid, introverted, obsessional and with evidence of sexual maladjustment, marked repressions, restricted interests and religious trends.

Before the condition is diagnosed and psychiatric assistance invoked there is usually a prodromal period of one to three years, during which the individual is irritable, peevish, pessimistic, depressed and emotional. Headache and loss of appetite also occur, together with disturbance of the sleep rhythm, and these symptoms gradually increase in severity. In some cases delusional ideas may appear, which may be of a persecutory nature, or may consist simply of guilt feelings or visceral delusions. Feelings of sinfulness and unworthiness associated with intense agitation may also occur.

The salient feature is intense depression and in these cases the danger of suicide is considerable. Some patients become resistive and uncooperative, refusing all food and assistance, and this quickly leads to loss of weight and a general deterioration in the physical condition.

Such patients seldom show clouding of consciousness, but remain correctly orientated, and show little memory impairment or loss of insight. Intellectual deterioration is not a common feature except in cases complicated by the presence of arteriosclerotic changes. Hallucinations are uncommon, but severe hypochondriasis may occur in some cases and is usually of bad prognostic value.

2. Reactive Depressive States of Old Age.

These are sometimes known as Exogenous Depressions, and the precipitating factors are the troubles encountered in everyday life, such as economic or domestic difficulties, retirement from work, a bereavement or some physical illness.

The Reactive Depressions are caused by unfavourable reactions to some difficulty, and they tend to occur in elderly people of limited interests who do not make a successful adaptation to the onset of the ageing process.

In such cases there is usually clear evidence of some definite precipitating incident, such as a bereavement or retirement from active employment, which has set in motion the train of depressive symptoms, and it must be stressed that there is nothing in the history indicative of any previous attack of a similar nature.

The depression is out of all proportion to the precipitating cause, and the danger of suicide must be guarded against. Insomnia and loss of appetite are common and soon lead to a deterioration in the general physical

condition. Emotional instability and agitation may also be prominent features. Certain cases exhibit mild confusional symptoms, together with some intellectual and memory impairment, but such features are frequently associated with physical illness or infection, and tend to clear up completely when adequate treatment is given. Delusions and hallucinations are not frequent and are usually found only in very acute infections.

3. Recurrent Depressions in the Aged.

These differ from the depressive states already described in that they tend to recur. It must be noted, however, that they should not be confused with the Manic-Depressive States, which are endogenous in origin and also tend to recur.

The Recurrent Depressions tend to occur in persons of weak and inadequate personality, who throughout their lives are unable to surmount the difficulties they encounter, and seek refuge from them by developing depressive symptoms. Trivial illnesses, difficulties at work, and minor economic or domestic worries are usually quite sufficient to cause a recurrence of depressive symptoms in elderly patients of the type outlined above.

In the assessment of such cases the importance of an accurate case history cannot be over-estimated, as this usually reveals the fact that there have been depressive episodes in the past whose causation is relatively trivial. The typical personality encountered is that of a weak and

inadequate person who flees from life's difficulties, and seldom makes a success of anything. He reacts to a difficult situation by developing depressive symptoms, and this depression is superficial and frequently associated with hypochondriasis. Some cases are of poor intelligence and indeed several in the present series were borderline mental defectives.

Insomnia and loss of appetite are frequently found, and may lead to some deterioration in the physical condition; but not so severe as in the conditions already described. Suicide must always be guarded against, but delusions and hallucinations are rare, and no other symptoms can be regarded as typical.

The entire picture gives one the impression that the depression encountered is a much more superficial thing than we see in the other clinical conditions described, while the weak and inadequate personality type is characteristic.

4. Manic-Depressive States in the Aged.

The Manic-Depressive States are comparatively infrequent and in the present series only six cases were diagnosed out of more than a hundred senile patients. They are of endogenous origin and a careful case history reveals the presence of mood swings over many years. There appears to be a hereditary predisposition to the disease, and Henderson and Gillespie (35) estimate that from 60 to 80 per cent are so predisposed. Kretschmer (36) has tried

to correlate Manic-Depressive States with people of "pyknic" physique, namely short, stocky extroverts with thick necks, but many dispute his claims, and our experience in the present series does not conform to his views.

The manic-depressive or cyclothymic disposition may be described as one in which the affect tends to swing from one extreme to the other, namely from a state of elation to one of depression, or vice versa. The typical cyclothymic personality is a frank, open one, fond of jokes, good living and good company, and may be typified by the average commercial traveller or soap-box politician.

Manic-Depressive States normally arise without any definite precipitating cause, and so are regarded as being of endogenous origin. Some cases occur clinically as purely depressive illnesses of a recurrent nature, and with advancing age the symptoms may become more severe and the cycle of shorter duration.

In a typical case there is a long history of mood swings associated with recurrent bouts of depression without apparent cause. The depression is usually severe and retardation may be a marked feature. The patient becomes solitary and asocial, and the attitude is one of misery and hopelessness. Hypochondriacal ideas may be expressed, and visceral or nihilistic delusions are not infrequent. Insomnia and loss of appetite are frequent and quickly lead to a deterioration in the general physical condition. Depressive stupor is a feature in some cases, and then the

patient is mute, resistive and uncooperative, and has to have all his bodily needs attended to.

Confusion is not a common feature, while the memory and intellectual faculties are well preserved, and insight is usually retained in this condition. If treatment is not given the patient may pass from a state of deep depression to one of hypomania or mild euphoria, and this cycle may be repeated over and over again.

5. The Senile Depressive States.

This group does not receive general recognition as a separate clinical entity, yet the author feels that there is a place for it. Kirchhof (37) goes nearest to this conception in a review of over 300 patients with depressive symptoms, and of this number he selected a group of 69 cases as suffering from depressive states "secondary to cerebral arteriosclerosis, hypertension or cerebral atrophy".

A glance at the statistical tables shows that depressive illness does occur in a group of senile patients at a much later age than in any of the clinical conditions so far described. These older patients give no history of previous depressive illnesses as in Manic-Depressive States and Recurrent Depressions, nor is there a definite precipitating factor as in the Reactive Depressive States. The Involutional Depressive States, on the other hand, tend to occur in a younger age-group, and so a much older group of patients remains, who also exhibit depressive symptoms.

This group will now be considered, and the general symptomatology reviewed.

These patients belong to an older age-group than any of the other clinical conditions hitherto described, and the average age incidence varies from 70 to 90 years. The case history does not usually reveal the presence of previous depressive attacks, and as a general rule there is no obvious precipitating factor to account for the breakdown. On the other hand the incidence of Arteriosclerosis, Cerebral Vascular Disease and Hypertension, is much higher than in the other clinical conditions under consideration, and this group closely resembles the cases described by Kirchhof as suffering from "depression secondary to cerebral arteriosclerosis, hypertension or cerebral atrophy". In some cases there was a definite history of a stroke with or without some temporary hemiparesis, and others had apparently suffered from hypertensive attacks in the past.

As stated above, the case history may point to previous hypertensive attacks or minor cerebral vascular "incidents" from which recovery has been almost complete and there is no gross evidence of intellectual deterioration. Depression without obvious cause is a constant symptom and it varies in intensity. Emotional instability is another common feature and some patients tend to weep on the slightest provocation. Restlessness and insomnia are frequent at night, and may be accompanied by transient confusional periods which quickly clear up. By day the mind may remain

quite clear, and drowsiness is common, in contrast to the nocturnal restlessness. Loss of appetite is also frequent and this leads to a deterioration in the general physical condition. Transient periods of confusion, memory impairment and some degree of disorientation are common, but all tend to improve with adequate treatment. Delusions may occur in a few cases but are not characteristic or deeply fixed, while hallucinations were not encountered in any of the patients in the group under consideration.

The aetiology of the Depressive States of Old Age having been briefly reviewed, it is now pertinent to consider the differential diagnosis of these conditions.

- - - - -

DIFFERENTIAL DIAGNOSIS.

In the previous section a general review has been made of the main historical, aetiological and clinical features peculiar to the Depressive States of Old Age. It is now pertinent to summarise the main diagnostic features of the various clinical conditions described, and to consider in detail other psychiatric disorders afflicting the aged from which they must be differentiated.

The Involutional Depressive States :-

These tend to occur during the involutional period and there is usually no previous history of depressive illness. The depression is of endogenous origin and there is no obvious precipitating factor.

Agitated depression is the characteristic feature, but anxiety symptoms and hypochondriasis may be prominent. The danger of suicide is considerable and must be guarded against. Insomnia and loss of appetite are common and soon lead to loss of weight and deterioration in the general physical condition.

With adequate treatment the prognosis is good, and after recovery there is little tendency to recurrence.

Reactive Depressive States of Old Age :-

These depressions are of exogenous origin and there is usually some obvious precipitating factor. The cause of the breakdown is normally encountered in everyday life, and may vary from the death of a loved one, to retirement from

active work, or some domestic or economic upset. Loneliness, loss of social contacts or some physical illness may also act as precipitating factors, and the patients are usually elderly people of restricted interests who react badly to the ageing process. The average age incidence falls in the early sixties and there is no history of previous depressive illness.

The case history usually reveals some definite cause for the depressive illness, but the severity of the symptoms is out of all proportion and these cases must all be regarded as potentially suicidal. Physical illness may lead to reactive depression, and may be accompanied by transient confusional symptoms, disorientation and memory impairment. Insomnia and loss of appetite are frequent and quickly lead to physical deterioration. Delusions and hallucinations are rare except in very acute cases associated with some physical illness.

With adequate treatment the prognosis is good and there is no tendency to recurrence.

Recurrent Depressions in the Aged :-

The case history gives a clear picture of previous depressive attacks, precipitated by apparently trivial causes, in patients of a somewhat weak and inadequate personality type. Such patients seem unable to cope adequately with the normal stresses and strains of everyday life, and react to their difficulties by developing depressive symptoms. However, these recurrent attacks of depression are of

exogenous origin and should be clearly distinguished from the Manic-Depressive States, which are considered later. The factors which precipitate the depressive illness may be relatively trivial ones such as unimportant illnesses, small troubles at home or at work, or some insignificant financial worry. The average age is again in the early sixties.

The patient is often a weak, dependent, over-protected individual, who seldom makes a success of life, and seeks refuge in depressive illness each time difficulties are encountered. The depression is out of all proportion to the cause, and hypochondriacal features are common. Insomnia and loss of appetite are frequent, but less troublesome than in the other conditions described above. Suicidal ruminations may be present, but the risk is not so great as in the other depressive states. Some of these cases are of subnormal intelligence as well as being weak and inadequate, and several of this type occurred in the present series.

The response to the steady influence of institutional life is fairly good, but the prognosis is poor and the risk of recurrence is great.

Manic-Depressive States in the Aged :-

This condition is a relatively rare one, is of endogenous origin, and the case history usually reveals a prepsychotic personality in which mood swings are a prominent feature. There is a strong hereditary predisposition and 60 to 80 per cent of patients have a family history of

similar illness. The typical cycle is a phase of elation followed by one of depression, but some cases present simply as recurrent attacks of depression without an intervening manic phase. With advancing age the depressive attacks sometimes tend to become more frequent and to increase in severity.

The case history is usually diagnostic and a typical clinical picture is that of recurrent attacks of depression of endogenous origin in a patient of cyclothymic temperament. There is no obvious precipitating cause, but one of the earliest signs is loss of interest, retardation, and then a gradual withdrawal from all social contacts. The patient looks miserable, depressed and apathetic, while insomnia and loss of appetite are common features. Nihilistic or visceral delusions may occur, but are not characteristic. Insight is usually well preserved, and there is seldom evidence of confusion, memory impairment or intellectual deterioration.

The response to treatment is usually good, but the prognosis must be guarded as the risk of recurrence is considerable.

The Senile Depressive States :-

The characteristic feature of this group is that the depressive illness occurs for the first time in senile patients whose average age is much higher than in any of the clinical conditions previously described. These cases are well past the involutional period, and they are well-balanced

individuals with no previous history of psychiatric illness. The case material presents increasing evidence of the degenerative changes commonly associated with old age, such as Cerebral Arteriosclerosis, Hypertension and Cerebral Vascular Disease. Some may even give a history of hypertensive attacks or cerebral vascular "incidents", without permanent damage and without intellectual deterioration.

There is no previous depressive illness in the case history, and the average age at the time of onset varies from 70 to 90 years. The onset is fairly rapid as compared to the insidious process seen in Senile Dementia, and while some cases exhibit no obvious precipitating cause, in others some physical illness or cerebral vascular "incident" may precede or accompany the depressive symptoms. Depression is a constant feature and emotional lability is also frequently encountered. Insomnia and loss of appetite are common and the physical condition rapidly deteriorates. Agitation and restlessness are often more marked by night than by day, and transient periods of confusion and memory impairment are also encountered. These tend to clear up with adequate treatment, and there are no permanent lesions.

Because of the advanced age the prognosis must always be guarded in these senile patients, but with adequate treatment the recovery rate is most encouraging. Roth (38) has stressed the high recovery rate in this group compared to similar series of patients suffering from Senile and Arteriosclerotic Dementia, and our findings correspond with

his.

Arteriosclerotic Dementia :-

Arteriosclerosis is the commonest cause of circulatory deficiency of the brain, and it tends to occur in people over fifty years of age. It appears to run in families, whose members show premature signs of arterial degeneration, and similar changes occur in the cerebral vessels.

The onset is often dramatic, and an apoplectiform seizure may usher in the illness, with mental symptoms following on behind. There may be almost complete recovery from the original "incident", but usually there is some loss of initiative and working efficiency, and a tendency to tire easily. This is followed by progressive memory impairment, and the gaps in the memory are filled by confabulations. Emotional instability is an early feature, and there is increasing irritability with occasional outbursts of morbid anger. Periods of clouding of consciousness may occur in which acts of violence may be committed. Restlessness and sleeplessness by night are constant features, and there is a gradual deterioration in the patient's general cleanliness and personal appearance. Insight is retained at first, but with further extensions of the cerebral vascular lesions, it is lost completely, and there is a final stage of complete mental disorganisation with confusion, focal lesions causing aphasia and apraxia, and physical helplessness.

In most cases the dementing process is a fluctuating

one, and there may be periods of partial improvement between the recurrent cerebral vascular "incidents". Major epileptiform seizures may be a feature, and each incident is followed by a deepening of the dementing process. The average age of cases suffering from Arteriosclerotic Dementia is about sixty years, and the response to any form of treatment is poor. Death usually supervenes within a few years from the date of onset.

Senile Dementia :-

This term is now reserved for the chronic mental disorders which occur in the aged and show gradually progressive evidence of organic mental deterioration associated with characteristic changes in the brain.

Heredity, congenital equipment, and mental and physical stress are cited as important factors determining the presence of senile degeneration. A well balanced personality and the ability to adapt successfully to the various physical and mental changes which accompany the ageing process are also positive factors of importance. However, in industrial communities, the difficult social conditions which confront the aged are often the precipitating factors in psychiatric breakdowns. Failure to make a successful readjustment after retirement from active work, financial worry, a sense of insecurity, loneliness, inadequate diet, and loss of social contacts are other factors of importance in the aetiology of Senile Dementia.

Senile Dementia may occur at any time after the age

of sixty, but the average age is seventy-five years. The onset is usually insidious over several years, and there is an exaggeration of the previous personality traits, of conservatism and of egocentric tendencies. There is an imperceptible lowering of general efficiency, a gradual loss of memory, and a steady mental deterioration. Obstinacy, miserliness, jealousy and intolerance may be features, and perverted sexual desires are not uncommon. The dementing, old man tends to live in the past, and may become a garrulous, old bore who prattles childishly of events long since forgotten. Virgil put the decline in the mental faculties with ageing as follows :-

"Age steals away all things, even the mind."

There may be periodic attacks of acute confusion, and delusions and hallucinations may occur. As time goes on the intellectual deterioration and memory impairment become more marked, and the speech becomes rambling and incoherent. Insight is lost and complete disorientation is a feature. Sleeplessness and restlessness at night are of common occurrence, and such dementing patients may wander out into the street in their night attire and be unable to find their way home again.

Finally the patient lapses into a state of complete dementia, his physical condition deteriorates, loss of sphincter control follows and he becomes the helpless and bedridden old man of whom Shakespeare (39) has written :-

"Last scene of all,
That ends this strange eventful history,
Is second childishness and mere oblivion;
Sans teeth, sans eyes, sans taste, sans everything."

The disease is slowly progressive and little improvement results from any known form of treatment.

The Toxic Confusional States of Old Age :-

These must be differentiated from all the clinical conditions detailed above.

The onset is usually sudden and these confusional states frequently complicate an acute infection, or follow some accident or surgical operation. They are usually of short duration and the following factors are of aetiological importance.

1. Drugs such as opium, cocaine, the bromides, the barbiturates, and antibiotics such as Penicillin and Streptomycin.
2. Bacterial toxins due to any general infection in the aged.
3. Physical illnesses, malnutrition and avitaminosis.
4. Any sudden trauma such as a fracture or a major surgical operation.

There is usually a history of some acute illness, trauma, or surgical interference followed by the acute onset of a state of confusion or delirium. The patient may be febrile and his speech becomes rambling and incoherent. Restlessness may be a feature, and some cases are resistive

to any form of interference. They may be restless, noisy and delirious at night, and may experience vivid dreams of a terrifying nature. Other cases pass through a stage of delirium to one of coma, which is usually of grave import. Some cases are completely lost and confused, and delusions and hallucinations are common. After recovery there is frequently a complete amnesia for the whole acute stage of the illness, and some describe their feelings as "like waking up from a bad dream".

Unless the condition is correctly diagnosed and treated in its early stages the prognosis is poor, as the physical state tends to deteriorate rapidly and death may occur from exhaustion.

With early diagnosis and appropriate treatment the prognosis in the Toxic Confusional States is good, and the symptoms quickly clear up without causing any permanent damage.

Psychoses Associated with Syphilis :-

Syphilitic diseases of the nervous system are now encountered relatively infrequently, and the following three groups are described :-

1. General Paralysis of the Insane or Dementia Paralytica.
2. Tabes Dorsalis with Psychosis.
3. Cerebral Syphilis.

Dementia Paralytica :- This disease is of syphilitic origin but only 2 per cent of syphilitics ever develop

General Paralysis. The reason for this is not clear.

It may be described as an organic disease of the brain, manifesting itself in progressive mental deterioration, and accompanied by definite physical signs and serological findings.

It attacks people in the prime of life, and usually manifests itself from five to twenty years after the initial infection. The average age varies between thirty and fifty years, and cases above the latter age are infrequent.

The disease is of insidious development and the first signs involve changes in the character and mood of the affected person. The patient is quite unaware of this change, but the relatives notice the alteration in the personality, and are at a loss to account for it. The working capacity becomes impaired, and the memory becomes increasingly unreliable, both for recent and remote events. Disorientation for time is a feature, and some cases lapse into a state of contented dementia. Others exhibit grandiose delusions of a bizarre type, associated with a feeling of euphoria, but some develop a state of intense depression which may progress to stupor with mutism.

Nihilistic delusions are common in this state of depression, and attempts at suicide are not infrequent. Finally, a state of complete dementia supervenes and the patient lives an entirely vegetative existence, having to be fed, nursed and cared for in every way.

Convulsive seizures may occur during the course of the illness, while the facial features tend to smooth out and take on a vacant expression. Pupillary changes are characteristic and consist of inequality of the pupils, irregularity of outline and absence of the light reflex. The speech becomes slurring and words are often distorted beyond recognition. The writing also deteriorates, the tendon reflexes may be lost or exaggerated, and loss of control of the organic reflexes is a feature.

The serological reactions are pathognomonic of Syphilis of the nervous system. The blood and cerebro-spinal fluids exhibit positive Wassermann reactions and the Lange Colloidal Gold Reaction shows a characteristic paretic curve which reads as follows :- 5.5.5.5.5.4.2.1.0.0.

The signs and symptoms mentioned above taken in conjunction with the serological findings are usually sufficient to differentiate cases of General Paralysis from the clinical conditions previously described.

Tabes Dorsalis with Psychosis :-

Tabes dorsalis is also a syphilitic disease of the nervous system, and some cases later develop General Paralysis. Others develop chronic hallucinatory paranoid states, and depressive psychoses. Kraepelin has described a state of acute hallucinatory excitement of sudden onset in which the patient becomes terrified, agitated, aurally hallucinated and persecuted.

The salient signs and symptoms include lightning

pains, unsteadiness and incoordination of voluntary movements, disorders of vision such as the Argyll Robertson pupil, areas of cutaneous anaesthesia, and loss of sphincter control.

The serological findings are characteristic, and usually clinch the diagnosis.

Cerebral Syphilis :-

This disease is also of syphilitic origin and the symptoms usually commence within five years of the initial infection and in fairly young persons.

The mental symptoms consist of delirium of fairly acute onset, associated with loss of memory for recent events. Affect is variable and a phase of excitement may be followed by one of depression and anxiety. Occasionally a state of stupor results with loss of sphincter control.

The serological findings are very similar to those in General Paralysis, except that the Colloidal Gold Reaction shows a luetic curve reading as follows :-
1.1.2.3.2.1.0.0.0.0.

The above features are sufficient to differentiate this condition from the Depressive States of Old Age and the other clinical conditions already described.

Other Conditions :-

The above are the main conditions from which the Depressive States of Old Age must be differentiated, but it is necessary to mention a number of other illnesses, although these are encountered infrequently, and no attempt

will be made to outline their main diagnostic features.

1. The Alcoholic Psychoses.
2. The Presenile Dementias.
3. Dementia associated with Diabetes mellitus.
4. Cerebral Embolism.
5. Chronic Subdural Haematoma.
6. Cerebral Tumour.

These are the main conditions to be considered in the differential diagnosis of the Depressive States of Old Age, and it is now pertinent to review briefly the clinical material encountered in the course of the present researches.

A REVIEW OF THE CASE MATERIAL.

For the purpose of the present researches sixty years was arbitrarily fixed as marking the commencement of "old age", and only cases above this minimum were considered.

All the cases were males of sixty years or over, and the reason for this was that the author's work in hospital chanced to be mainly with male patients. These elderly men had all been admitted to mental hospital during the past three years, suffering mainly from depressive disorders of varying aetiology. All were National Health Service patients, and the entire series of cases may be regarded as a typical cross-section of our ageing male population, such as mental hospitals throughout the country are being called upon to admit at the present time.

These patients came from all parts of the County of Surrey, with a fairly even distribution between rural and urban areas. All income groups save the very wealthy were represented, and a wide variety of trades, industries and professions was encountered in the group as a whole.

In compiling the case material no special method of selection was adopted, but every new admission over sixty years of age who exhibited depressive symptoms, regardless of the cause, was automatically added to the series.

After admission each new case was physically examined, interrogated and assessed by the author personally, a full social history was obtained, and as soon as the

diagnosis was established then the appropriate method of treatment was commenced.

The method of classification employed has already been described in detail in a previous section, but it is of interest to consider briefly the distribution of the clinical material encountered :-

| <u>Clinical Condition.</u> | <u>Number of Cases.</u> |
|---|-------------------------|
| Involutional Depressive States. ----- | 24 |
| Reactive Depressive States of Old Age.-- | 33 |
| Recurrent Depressions in the Aged. ----- | 20 |
| Manic-Depressive States in the Aged.----- | 6 |
| Senile Depressive States. ----- | <u>35</u> |
| | <u>118</u> |

At this point it must be mentioned that the above figures include a small number of cases who were not given the routine methods of treatment accorded to the majority of their fellows. These cases were admitted while the author was on vacation and as they were not specially selected in any way, it was decided to include them as a small but informative control group. Such cases received only symptomatic treatment, and they were distributed as follows:-

| <u>Clinical Condition.</u> | <u>Number of Cases.</u> |
|---|-------------------------|
| Involuntional Depressive States. ----- | 2 |
| Reactive Depressive States of Old Age. -- | 10 |
| Recurrent Depressions in the Aged. ----- | 1 |
| Manic-Depressive States in the Aged. ---- | - |
| Senile Depressive States. ---- | 7 |
| | <hr/> |
| | 20 |
| | <hr/> |

If this small group is deducted from the total, then the number of patients actually treated reads as follows:

| <u>Clinical Condition.</u> | <u>Number of Cases.</u> |
|---|-------------------------|
| Involuntional Depressive States. ----- | 22 |
| Reactive Depressive States of Old Age. -- | 23. |
| Recurrent Depressions in the Aged. ----- | 19 |
| Manic-Depressive States in the Aged. ---- | 6 |
| Senile Depressive States. ---- | 28 |
| | <hr/> |
| | 98 |
| | <hr/> |

It is impossible to record the clinical data of such a large number of patients in a work of this size, but a special appendix has been prepared, bearing the abbreviated case histories of a number of selected cases, who may be regarded as typical of the clinical conditions outlined above. It is hoped that this method of presentation will also help to make clear the reasons for adopting the system

of classification employed.

After this brief review of the case material it is now pertinent to consider the measures employed by others in the treatment of the Depressive States of Old Age, and this will be followed by full details of the routine methods evolved by the author as a result of his experience during the past three years.

- - - - -

THE TREATMENT OF THE DEPRESSIVE STATES
OF OLD AGE.

Prior to launching into a detailed description of the routine methods of treatment which have been evolved during the present researches, it is perhaps of interest to consider the measures which have proved of value in the hands of other workers in the same field.

Until relatively recently it was the practice to group together all the psychiatric disorders of old age, to classify them roughly under the general heading of "Senile Dementia", and to regard the prognosis as hopeless. The mental symptoms were attributed to progressive organic lesions of the brain due to the ageing process, and no treatment was thought to be capable of reversing this deterioration. As a result of this mistaken attitude most aged patients were allowed to stagnate in bed, or to sit passively in some chronic ward of a mental hospital, without active treatment of any kind, until death finally came as a welcome relief.

Within the past few years a gradual change has taken place in the attitude of many clinicians towards the psychiatric disorders which afflict the aged, and for this we are indebted to Roth (40) and other workers with similar enlightened views on this subject. They have pointed out that the affective disorders of old age should be carefully distinguished from the true Dementias, as the prognosis is

much better, and the response to adequate treatment is surprisingly good.

It is now generally recognised that the affective disorders of old age do form a separate clinical entity from the Psychoses of Senility, and it is becoming increasingly clear that with early treatment the chances of full recovery are very good indeed.

Our knowledge of the Vitamins is expanding year by year, and attention is being increasingly focussed on the important role played by these substances in the metabolism of the body cells in general, and the brain in particular. It should come as no surprise, therefore, to find that Vitamin preparations are being employed as therapeutic agents in various psychiatric disorders, including states of depression.

Himwich (41) has shown that the brain is dependent for its normal functioning on a carbohydrate substrate, an adequate supply of oxygen, and various enzyme and coenzyme systems. A disturbance affecting any of these constituents interferes with the metabolism of the brain and therefore with its function.

At least three members of the Vitamin-B Group, namely Thiamine, Nicotinic Acid, and Riboflavin, are known to be concerned with the proper metabolism of carbohydrate, and there is increasing evidence that mental symptoms may result when these substances are lacking in the diet.

Jolliffe (42) has presented evidence to show that

when the diet is deficient in Thiamine mental symptoms may result. The most prominent include lethargy, weakness, depression, irritability, feelings of tenseness, emotional instability and memory impairment. The administration of Thiamine usually results in improvement and disappearance of the symptoms.

Work on Pellagra and minor degrees of Nicotinic Acid deficiency has been carried out by Spies (43). The earliest symptoms he records include nervousness, dizziness, headache and insomnia. In more advanced cases intense depression may ensue, and in the terminal stages he describes fear reactions, hallucinations, periods of mental confusion and finally delirium. The intravenous administration of large doses of Nicotinic Acid usually results in the disappearance of the above symptoms and a return to normal.

Another of the modern physical methods of treatment which is being increasingly employed in depressive disorders among elderly patients is Electric Convulsive Therapy. The results are most encouraging and patients of great age are now being successfully treated.

Evans (44) employed Electric Convulsive Therapy in a series of fifty depressed patients, all of whom were over fifty years of age. Of this number only ten showed no improvement.

A similar series of seventy-six patients, all over sixty years of age, was reported on by Mayer-Gross (45) in 1945. Of this number thirteen made a complete recovery,

and only fifteen showed no improvement.

An even older series was reported on by Wilbur and Fortes (46) in 1947. In their series thirty depressed patients, all over seventy years of age, were treated with Electric Convulsive Therapy, and of this number twenty-eight responded favourably.

These results are most encouraging, and one must be pardoned a feeling of exhilaration about them, when it is remembered that but a few years ago such patients would simply have been admitted to mental hospital to die. How different is the picture at the present time! By employing drugs such as "Scoline" and Sodium Pentothal, it is now possible to administer Electric Convulsive Therapy to patients of advanced age, with physical disabilities which hitherto were regarded as contraindications.

Various other workers have also claimed good results in the treatment of depressive disorders during the past few years.

Thus Myerson and Myerson (47) have reported on four female patients over sixty years of age, who exhibited intense depression associated with tension. After all other measures had been employed without success, the operation of Prefrontal Leucotomy was performed, and relieved the symptoms in each case.

Davidoff (48) has reported favourably on the use of hormonal-replacement therapy (employing Diethyl Stilboestrol) in Involutional Depressive States, but the

author's personal experience of this method of treatment has not been encouraging.

Narcoanalysis has been advocated by Horsley (49) for the treatment of depressed patients who are markedly retarded, but his views are not generally accepted, and the author has no personal experience of this method.

Slater and Sargent (50) are strong advocates of the use of Benzidrine in the treatment of depressive states, but the euphoriant effect of this preparation is of short duration and it is of limited value. Also it does not appear to be so effective in elderly patients as in the young.

Jolliffe (51) has issued a report on "An Encephalopathic Syndrome" in senile patients, which he attributed to Nicotinic Acid deficiency in the diet. He claimed a good response to intravenous Nicotinic Acid therapy.

Good results with Nicotinic Acid therapy were also claimed by Sydenstricker (52) in a series of cases suffering from "stupor, lethargy and various other psychiatric disorders". The patients treated were not suffering from Pellagra, but must rather be regarded as mild cases of Nicotinic Acid deficiency, many of whom showed a typical glossitis in addition to the mental symptoms. Thirty-eight such cases were treated, and of this number twenty-two showed improvement with Nicotinic Acid therapy.

Both Jolliffe and Sydenstricker were of the opinion that deficiency of Nicotinic Acid resulted in the

development of mental symptoms, but Aring (53) does not agree with their views. He is of the opinion that the beneficial effects of Nicotinic Acid therapy are probably due to its vasodilating action on the cerebral arterioles. He claims that after the intravenous injection of 40 mg. of Nicotinic Acid there is a marked increase of the cerebral blood flow which lasts for about twenty minutes. The increase in the cerebral blood flow averages twenty per cent in normal persons, and it may exceed this in cases where there is a deficiency of Nicotinic Acid.

Aring's theory is that if the cerebral blood flow increases, and there is no alteration of any importance in the level of the blood pressure, then there is a strong possibility that the cerebral functions will improve if the original mental symptoms are actually due to deficient cerebral circulation. Therefore he presupposes that the beneficial effects of Nicotinic Acid therapy are due solely to its vasodilating effect on the cerebral arterioles, and considers that such effects ought to occur whether or not there is an actual deficiency of Nicotinic Acid.

Another advocate of Nicotinic Acid therapy is Medlicott (54) who strongly recommends a therapeutic trial with this preparation in all psychiatric disorders affecting the aged, before more drastic forms of treatment are attempted. The author is disposed to agree with this view.

In 1943 Hardwick (55) issued a very instructive paper drawing attention to the fact that many chronic

patients in mental hospitals, whose feeding habits are faulty, are probably potential pellagrins, and many of the symptoms they present tend to clear up with Nicotinic Acid therapy.

Washburn (56) strongly advocated the administration of Nicotinic Acid by means of intravenous infusions in the treatment of depressive states, and recorded clinical improvement in fourteen cases out of fifteen, although relapses tended to occur if therapy was discontinued. She is of the opinion that the beneficial effects of Nicotinic Acid are due to its harmless but powerful vasodilator action.

The treatment of depressive states by Electro-narcosis under Thiopentone and "Eulissen" has been described by Harris (57), who claims complete recovery in twenty-four cases out of thirty-two treated. However, this method of treatment appears to have no advantages over modified Electric Convulsive Therapy, and is even more risky in aged patients.

Cleghorn (58) has tried the effect of Pituitary A.C.T.H. injections on patients suffering from depressive states, on the assumption that the depressive symptoms were due to adrenal insufficiency, but the results were disappointing.

The treatment of depressive states with intravenous injections of Dintrile Succinate has been reported on by Harris (59), but he was not convinced that this preparation had any specific therapeutic action.

Mall (60) has reported on his experiences with Prostigmine in the treatment of Involutional Depressive States. He has put forward the theory that sympathetic over-activity occurs at the involutional period, and this effect can be combated by prolonged Prostigmine therapy. However his final results are somewhat confused, as he supplemented this method with Electric Convulsive Therapy in a number of his successful cases.

A favourable report on the treatment of depressive states with Desoxyephedrine Hydrochloride has been issued by Delgado (61). In a series of twenty-four depressed patients, all save three recovered or showed improvement.

The effects of Cortisone and allied preparations on depressive states have been reported from Germany by Büssow (62). In almost the entire series transient improvement in the mental symptoms occurred, but relapses were frequent after treatment was terminated.

Within the past month an interesting article has appeared in the medical press written by Watts (63) on the treatment of acute psychiatric illness among aged patients in general practice. He advocates Vitamin-B Group therapy for such cases, and reports very encouraging results. He concludes with the following remark, "Most physical methods of treatment in psychiatry are quite beyond the scope of the general practitioner, but here is one that can safely be tried on the patient in his own home by his own doctor." The author is entirely in agreement with this point of view.

From the above it is obvious that within recent years a considerable amount of research work has been carried out on the treatment of the depressive states, and the results in many cases are most encouraging.

The preparations used in the present researches will now be described in detail.

It is first of value to consider the Vitamin-B Group, and to survey modern knowledge of the various members known to medical science at the present time.

The Vitamin-B Group :-

This consists of a series of water-soluble factors, which are found in the tissues of all species. The history of development of the group is a long and complicated one, and the term "vitamin B" was first applied to the water-soluble substance present in yeast and wheat germ, which was found to be necessary in small amounts for the nutrition of animals.

It soon became evident that "vitamin B" was composed of several substances, and as these were gradually isolated they were given specific chemical names. However, there would appear to be good grounds for grouping these substances together, for they appear to be universally distributed in all living cells, a state of affairs which does not apply to the other vitamins. Another fact of importance is that the Vitamin-B Group appears to be intimately associated with certain fundamental metabolic processes, and the need for its members closely parallels

the metabolic rate of the organism. There is also a close relationship between the oxygen consumption and respiratory rate of living tissues and their Vitamin-B Group content, which is not true for the other vitamins.

In short, it may be said of the members of the Vitamin-B Group that they are concerned with the fundamental metabolic systems, such as the oxidation of foodstuffs, and so they are indispensable for the normal functioning of all the tissues. In the living body these substances are the main constituents of enzyme systems concerned with tissue oxidations.

The various members of the Vitamin-B Group will now be briefly reviewed.

Vitamin B1. (Aneurine or Thiamine Hydrochloride).

Beriberi is a deficiency disease said to have been recognised in China about 2600 B.C., but first described clinically in the middle of the seventeenth century. It was not until 1882 that the disease was shown to be curable, and Takaki almost eradicated it among Japanese sailors by supplementing their rice diet with fish, vegetables, meat and barley.

In 1890 Eijkman produced experimental avian polyneuritis, which closely resembled Beriberi, and showed that the curative factor was a water-soluble substance present in rice-polishings.

In 1901 Grijns first suggested that Beriberi and avian polyneuritis were due to deficiency in the diet of

certain substances of importance to the metabolism of the nervous system.

In 1911 Funk cured Beriberi and avian polyneuritis with an extract from rice-polishings and next year he put forward the theory that Beriberi, Scurvy, Pellagra and Rickets were deficiency diseases caused by the absence of special substances from the diet. He also used the word "vitamine" for the first time as he believed that the crystalline substance he isolated from rice-polishings was an amine.

The chemical constitution of Vitamin B1 was worked out by Windaus in 1932, and the substance was synthesised in 1936 by Williams.

Natural Sources :- Skin and germ of cereals, nuts, yeast, egg-yolk, liver and pork.

Unit :- 1 mg. Vitamin B1 (B.P.) = 320 International Units.

Human Requirements :- The optimum daily requirement is 1.2 to 1.8 mg. for an adult.

Physiological Functions :- It forms an integral part of enzyme systems essential for metabolism.

In Vitamin B1 deficiency, peruvic acid and ketone bodies accumulate in the blood and tissues instead of undergoing further degradation. These substances have been found in the blood of Beriberi patients, and their concentration runs parallel with the degree of Vitamin B1 deficiency.

Vitamin B1 is essential for the nutrition of the nerve cell, probably by promoting the oxidation of glucose

within the central nervous system. Cases suffering from deficiency show histological evidence of nerve degeneration, the usual picture being that of peripheral neuritis. It would appear that the vitamin is an essential factor for the transmission of nerve impulses, augmenting the activity of acetylcholine at the nerve endings.

Symptoms of Vitamin B1 Deficiency :-

Gross deficiency gives rise to Beriberi and three main types are described :-

- (1) Neuritic or "dry" type.
- (2) Cardiac or "wet" type.
- (3) Cerebral type (or Wernicke's syndrome).

The symptoms include nausea, vomiting, decreased food intake and gradual physical deterioration. The working capacity is diminished, and there is weakness of the legs and diminished reflexes. Some cases complain of soreness of the leg muscles and become very depressed.

Minor degrees of deficiency cause listlessness, anorexia, apprehension, fatigue, irritability, mild confusion and symptoms resembling "neurasthenia".

Among the earliest mental symptoms noted are depression, lassitude and irritability, together with inability to concentrate, anxiety and a tendency to wander. Finally organic changes may occur in the nervous system with characteristic symptoms such as peripheral neuritis and neuralgia.

Riboflavin. (Vitamin B2) :-

It was discovered in 1920 by Emmett that when the anti-neuritic factor of "Vitamin B" was destroyed by heat that a growth-promoting factor is left. This growth-promoting factor is now known as Riboflavin.

Natural Sources :- Yeast, green vegetables, milk, liver, fish roe and kidney.

Unit :- None yet available.

Human Requirements :- The Optimum daily requirement is 0.7 to 1.0 mg. for an adult.

Physiological Functions :- It can combine in the tissues to form two co-enzymes, both flavoproteins, which can combine in turn with specific proteins to form several different enzyme systems for hydrogen transfer. In this way Riboflavin, together with the nicotinamide-containing enzymes codihydrogenases I and II, takes part in carbohydrate metabolism. This factor may be essential to the mechanism of vision, and in man and animals it is thought to be essential to growth and life.

Symptoms of Riboflavin Deficiency :-

Deficiency of Riboflavin in the diet leads to increased vascularity of the cornea, photophobia and loss of visual acuity. The lips become dry and "chapped" and angular stomatitis occurs. Glossitis may also occur which closely resembles that found in Nicotinic Acid deficiency. Some cases also show a seborrhoeic dermatitis involving the naso-labial folds and the skin around the eyes and ears.

As yet there is no definite evidence that Riboflavin deficiency alone results in any specific neuropsychiatric conditions in human beings, but more research is needed to clarify the situation.

Pyridoxine (Vitamin B6) :-

This substance was separated from the other members of the Vitamin-B Group by Gyorgy in 1934, and was shown to cause a characteristic dermatitis (acrodynia) in rats and mice.

Natural Sources :- Egg-yolk, peas, soya beans, yeast, meat and liver.

Unit :- None yet devised.

Human Requirements :- Not yet known.

Physiological Functions :- It appears to play an essential role in protein metabolism. It facilitates the conversion of Tryptophane into Nicotinic Acid, and may be concerned in the normal production of red and white blood cells.

Symptoms of Pyridoxine Deficiency :-

Deficiency in the diet of rats and mice leads to a characteristic dermatitis (acrodynia), while in dogs and pigs it results in a severe microcytic hypochromic anaemia. Severe deficiency in animals causes neuro-muscular disturbances with epileptiform seizures and muscular weakness.

Man appears to be able to satisfy most of his needs for Pyridoxine by intestinal synthesis, and specific deficiency has not been recognised. Nevertheless it is regarded as a factor of importance in human nutrition in

our present state of knowledge.

Pantothenic Acid :-

This substance was isolated in 1933, and in 1939 Jukes identified it with a substance whose deficiency in the diet of young chicks gave rise to a Pellagra-like dermatitis.

Natural Sources :- Liver, kidney, yeast, wheat and bran.

Unit :- None yet devised.

Human Requirements :- Estimated at 4 mg. daily for an adult.

Physiological Functions :- It occurs in the tissues as a component of the coenzyme for acetylation, and is concerned with biological acetylations such as the formation of acetylcholine or the detoxification of certain drugs.

Symptoms of Pantothenic Acid Deficiency :-

It appears to be essential in many species, and the effects of deficiency affect the central nervous system, adrenal cortex, gastrointestinal and respiratory systems. In Pellagra the blood Pantothenic Acid level is low, and it has been suggested that the "burning feet" syndrome among malnourished prisoners of war in Japanese hands, is due to lack of this substance.

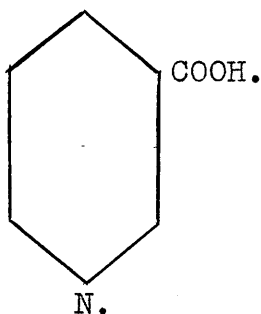
Nicotinic Acid (P.P. Factor) and Nicotinamide :-

Nicotinic Acid was first prepared in 1867 as a derivative of Nicotine, but its importance as a vitamin was only established a few years ago when the crude extracts of the water-soluble Vitamin-B Group began to be fractionated

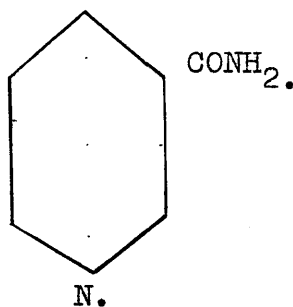
and chemically identified.

The existence of a pellagra-preventing vitamin was postulated by Funk in 1912, and in 1924 Goldberger and Tanner (64) showed that Pellagra was a disease due to deficiency of the pellagra-preventing or P.P. factor. Many attempts were made to isolate this factor and finally in 1937 Elvehjem (65) succeeded in doing so. Since that time it has been extensively used in the treatment of Pellagra.

Nicotinic Acid is pyridine - 3 - carboxylic acid, and Nicotinamide is Nicotinic Acid Amide. Their formulae are presented below :-



Nicotinic Acid.



Nicotinic Acid Amide.

Natural Sources :- Liver, yeast, meat, milk, cheese, cereals and eggs.

Unit :- No recognised international unit.

Human Requirements :- 12 - 18 mg. per day for an adult.

Physiological Functions :- Nicotinic Acid is a constituent of two compounds, diphosphopyridine nucleotide (Cozymase or Coenzyme I) and triphosphopyridine nucleotide (Phospho-Cozymase or Coenzyme II), which participate as coenzymes in

reactions associated with carbohydrate metabolism.

These coenzymes act on certain "enzymes" which are proteins, and the latter each possess a special affinity for a particular substrate. Each of the coenzymes participates in a variety of reactions, in all of which it has the function of a hydrogen acceptor. In some reactions this results in oxidation of the substrate and in others its fermentation, while the symptoms of Nicotinic Acid deficiency are thought to be due to an inability to carry on these reactions on account of the absence of an adequate supply of the vitamins for the synthesis of the coenzyme molecules.

The vitamin is absorbed from the intestine and conveyed by the blood to the liver, where it is stored and probably takes part in the metabolism of carbohydrate. It is also thought to be essential for the normal functioning of the haemopoietic system, gastrointestinal tract, skin and nervous system.

The only apparent difference in physiological action between Nicotinic Acid and Nicotinamide is that the former possesses marked vasodilator properties.

Symptoms of Nicotinic Acid Deficiency :-

A marked deficiency of Nicotinic Acid is the essential factor in the aetiology of Pellagra. The symptoms of Pellagra are often described as "Diarrhoea, Dermatitis and Dementia", and a very full account is given by Spies and Butt (66).

The gastrointestinal symptoms frequently appear

first and include glossitis and stomatitis, nausea, vomiting and diarrhoea. The skin lesions are typically symmetrical and confined to the limbs, and they are precipitated by exposure to sunlight or heat. The early mental symptoms include lassitude, apprehension, depression and loss of memory, and these may be followed by disorientation, confusion, and excited outbursts.

All these symptoms tend to improve with the administration of Nicotinic Acid.

Vitamin B12 :-

Liver has long been known to be effective in Pernicious Anaemia, and in 1936 Castle postulated that some preliminary reaction between an "extrinsic factor" in the food and an "intrinsic factor" in the gastric mucosa is an essential feature of the process. This "extrinsic factor" was isolated from liver in 1948 by Rickes, and it is now believed to be identical with Vitamin B12.

Natural Sources :- Liver and milk.

Unit :- No international standard yet devised.

Human Requirements :- Not yet known.

Physiological Functions :- It is essential for proper functioning of the haemopoietic system, and combines with the "intrinsic factor" to aid haemopoiesis in a manner not yet understood.

Symptoms of Vitamin B12 Deficiency :- Deficiency in the diet causes severe macrocytic anaemia and may lead to

subacute Combined Degeneration of the Cord. Vitamin B12 is the preparation of choice in Pernicious Anaemia, especially when neurological symptoms are prominent, and its administration leads to improvement.

Folic Acid :-

In 1935 Day described an anti-anaemic factor for monkeys found in yeast and liver concentrates. This substance was named Folic Acid by Mitchell in 1940, and this was confirmed by Day in 1945.

Natural Sources :- Green leaves, liver, kidney, yeast and milk.

Unit :- No international standard yet devised.

Human Requirements :- Not yet determined.

Physiological Functions :- It is necessary for the proper functioning of the haemopoietic system. It appears to restore the bone marrow and blood to normal in certain macrocytic anaemias, but it aggravates any neurological symptoms which may be present.

Symptoms of Folic Acid Deficiency :- The evidence is too scanty at present to be precise, but it is now known that this preparation is advantageous in macrocytic anaemias such as Sprue, but is definitely contraindicated in Pernicious Anaemia especially when neurological symptoms are prominent.

Biotin (Vitamin H.) :-

Natural Sources :- Yeast, liver and kidney.

Unit :- No international standard yet devised.

Human Requirements :- Not yet known.

Physiological Functions :- Biotin combines chemically with the protein Avidin which is present in large amounts in raw egg-white. Ingestion of Avidin may result in the condition known as "egg-white injury".

Symptoms of Biotin Deficiency :- Experimentally produced deficiency in rats first causes dermatitis, loss of hair, and later spasticity and profound mental disturbances. Such deficiency symptoms have not, so far, been encountered in man.

.....

It is obvious from the above that the members of the Vitamin-B Group are of considerable importance clinically, and among the many things they have in common is the fact that they are usually found together in the same food-stuffs. As a result it is uncommon to find a deficiency of a single member, but more usual to find evidence of a general lack in the diet.

In the development of a vitamin deficiency in man the following are the most important aetiological factors :-

1. An inadequate intake in the diet.
2. Defective absorption from the gastrointestinal tract.

3. Defective storage mechanisms in the body.
4. Inability of the body cells to utilise the vitamins provided.

These factors should be borne in mind throughout the general discussion on the Vitamin-B Group which follows, as a deficiency of one component seldom occurs without corresponding deficiencies of the other members.

Considerable work has been carried out on Thiamine, and it has been shown that when this substance is deficient in the diet, Peruvic Acid tends to accumulate in the body fluids. The administration of Thiamine is said to return the blood Peruvic Acid level to normal, possibly by effecting Peruvic Acid oxidation. This may explain (1) why the Thiamine requirements are higher on a high carbohydrate diet than on a low one: and also (2) why the Central Nervous System, which depends mainly on carbohydrate as a source of energy, is usually the first to suffer when the Thiamine intake is low. Thiamine deficiency may produce reversible changes in the neurones, and the following is a brief description of the main syndromes which may be encountered :-

1. A "Neurasthenic" Syndrome :- This is the earliest and most frequent result of deficiency. The main symptoms are loss of appetite, fatigue and insomnia, but irritability, mild depression and headache may also occur.
2. Beriberi :- This disease is caused by a diet deficient in the Vitamin-B Group, and also possibly other

vitamins, proteins, fats and mineral salts. The salient feature is a peripheral neuritis, together with symptoms such as loss of appetite, insomnia, apathy, and extreme depression.

3. Wernicke's Encephalopathy :- Wernicke originally described this condition as characterised by clouding of consciousness, varying ophthalmoplegias and ataxia. The mental picture may present any degree of clouding of consciousness from drowsiness or apathy to coma. Polyneuropathy of the lower limbs is also frequent, and Wortis (67) has suggested that the mental changes may be due to Thiamine deficiency, although the whole syndrome is due to a multiple vitamin deficiency.

In a review of the effects of Nicotinic Acid deficiency, Caldwell and Hardwick (68) tentatively described primary irritation of the large Betz cells and anterior horn cells of the brain and spinal cord, together with hyaline changes in the cerebral blood vessels, and degeneration of the posterior and lateral tracts of the cord.

The brain appears to be the part first affected in Pellagra, whereas in Beriberi the peripheral nerves are the primary seat of damage. Furthermore, in Pellagra complicated by Beriberi the cerebral metabolism is decreased, and Himwich (69) believes that this diminution may account for the mental symptoms which occur. These may be summarised as follows :-

1. A "Neurasthenic" Syndrome :- Spies (70) has

described this condition which may precede the onset of Pellagra. It is due to a mild Nicotinic Acid deficiency, and the main symptoms are loss of appetite, fatigue, insomnia, headache, depression and general irritability. This condition is almost identical with that already described for mild Thiamine deficiency.

2. Pellagra :- This disease is due to deficiency of Nicotinic Acid, and may present with gastrointestinal lesions, mental changes and dermatitis. Stomatitis, glossitis, diarrhoea and vomiting occur frequently and the typical skin lesions are symmetrical and generally affect the limbs. The mental symptoms include fatigue, headache, depression and irritability. In more severe cases states of confusion, delirium and extreme depression may occur and finally terminal dementia.

3. Nicotinic Acid Deficiency Encephalopathy :- This condition was described by Jolliffe (71) in 1940, and he thought it was due to a complete Nicotinic Acid deficiency. The main symptoms were clouding of consciousness, cog-wheel rigidity of the limbs and uncontrollable grasping and sucking reflexes.

4. Other States of Nicotinic Acid Deficiency :- Sydenstricker and Cleckley (72) have reported on a number of severely undernourished elderly patients whose mental symptoms were suggestive of Pellagra, but in whom the usual clinical signs and symptoms were absent. A degree of glossitis was present in most cases, and the mental state

varied from "hebetude to profound stupor". Startling recoveries resulted from intensive Nicotinic Acid therapy.

The above is a brief survey of the properties and pharmacological actions of the various members of the Vitamin-B Group, and some indication is given of the researches which have been carried out with these preparations.

It is obvious that these preparations are of great importance in the normal metabolism of all the body tissues, and particularly those of the Central Nervous System. Much research remains to be done to close the many gaps in our knowledge, but for most of the information detailed above the author is indebted to the works of Wright (73) and Harrow (74), whose aid is gratefully acknowledged at this point.

The above studies of the Vitamin-B Group show that depression is a frequent accompaniment of deficiency of certain of these preparations. It seems logical to assume that the administration of adequate supplies of these substances will lead to some improvement in the mental symptoms and particularly the depressive ones.

Reasoning along these lines influenced the author to try the effects of intensive Vitamin-B Group therapy in the treatment of the Depressive States of Old Age, and the routine methods evolved will be described in due course.

Electric Convulsive Therapy.

As this form of treatment was employed on a number of patients in the present series, it is fitting that something should be said of its evolution.

Convulsive therapy was introduced in 1934 by Meduna, who employed intravenous injections of Cardiazol with beneficial results in cases of Schizophrenia.

In 1937 Cerletti and Bini first produced therapeutic fits by passing an electric current through two electrodes placed on the forehead, and since that time many thousands of patients have been treated by some modification of the original method.

Many theories have been advanced to explain the mode of action of Electric Convulsive Therapy, including the following :-

1. Meduna's Theory :- He advocated convulsive therapy for cases of Schizophrenia in the mistaken belief that there was a biological antagonism between Epilepsy and Schizophrenia. This theory is now only of historical interest and it seems clear that the major fit itself provides the main therapeutic force.

2. Psychogenic Theories :-

(a) The beneficial action is due to the emotional shock produced by the pre-convulsive aura.

(b) It is assumed that the sudden loss of consciousness is identified with death, and the beneficial effect is due to the impact of "rebirth" on the

psyche.

- (c) Flescher puts the Freudian view, namely that the fit discharges large amounts of energy inherent in the destructive and death drives, and unloads them in a harmless manner.

3. Physiogenic Theories :-

- (a) The fit causes some alteration in the cerebral water balance.
- (b) The current causes irritation of the cell membrane.
- (c) The current causes stimulation of the cell permeability.
- (d) The fit stimulates the midbrain vegetative centres of the autonomic nervous system.
- (e) The fit causes marked cerebral anoxaemia and this may be of therapeutic value.
- (f) The action of electric convulsive therapy probably puts groups of cerebral neurones temporarily out of action and this causes the beneficial effect.

The above theories have been briefly reviewed as a matter of general interest, but attention will now be devoted to the results of Electric Convulsive Therapy, and in particular those obtained with senile patients.

Electric Convulsive Therapy was found to be of particular value in the affective disorders, and the following table indicates some of the results obtained :-

| <u>Author.</u> | <u>Number.</u> | <u>Recovered.</u> | <u>Improved.</u> | <u>Not Improved.</u> |
|------------------|----------------|-------------------|------------------|----------------------|
| Muller.(1939) | 148 | 58 | 78 | 13 |
| Bennett.(1941) | 111 | 53 | 44 | 4 |
| Furst. (1942) | 65 | 75% | + 14% | 11% |
| Fitzgerald(1943) | 150 | 78% | + 17.3% | 4.7% |

Most of the above results were obtained in comparatively young and fit patients suffering from depressive states, but electroshock treatment is now being increasingly employed for older subjects.

It is a drastic form of treatment, however, particularly for frail old patients, but within recent years it has been rendered safer and more effective by the use of various short-acting muscular relaxant drugs. By these methods it has proved possible to administer such treatment to a wide range of patients for whom, on the grounds of advanced age or physical disability, it was previously considered to be contraindicated.

Modified Electroshock Therapy has been increasingly used on aged patients during the past few years with encouraging results.

Presland and Palmer (75) have reported very favourably on the use of curarising agents in Electric

Convulsive Therapy, and claim that there are hardly any contraindications to its use save advanced renal disease and Myasthenia Gravis.

In 1952 Prout and Hamilton (76) recorded the results of treating elderly patients with curare-modified Electric Convulsive Therapy, and they quote an improvement rate of 87 per cent in a series of 104 cases of depression.

Levy (77) also gave a most optimistic picture of the results of curare-modified electroplexy in aged patients.

Modified Electric Convulsive Therapy was employed as a supplementary form of treatment in certain cases during the present researches, and in all these aged patients it was given under "Scoline" and Sodium Pentothal. The exact technique will be described in due course.

- - - - -

METHODS OF TREATMENT EMPLOYED.

The information detailed in the previous section about the members of the Vitamin-B Group, greatly influenced the author in his decision to employ these preparations in the treatment of aged patients who exhibited predominantly depressive symptoms.

It has long been assumed that most of the mental symptoms encountered during senescence are due to impairment of the blood supply to the brain and hence to deficient cerebral metabolism. Now the Central Nervous System is peculiar in that it derives almost all its energy from the metabolism of glucose, and it can apparently only metabolise carbohydrate. It may well be that deficiency of the members of the Vitamin-B Group, which participate in the enzyme systems concerned with carbohydrate metabolism, produces first mental disturbances, and later permanent damage to the brain tissue.

Furtado (78) also emphasised the fact that Nicotinic Acid acts as a powerful but harmless vasodilator of the cerebral arterioles, which also produces a considerable increase in the cerebral blood flow. It was hoped to make use of this property and to employ large doses of Nicotinic Acid in the treatment of depressive disorders in the aged.

Therapy with the various members of the Vitamin-B Group was the main method employed in the present researches,

but in addition modified Electric Convulsive Therapy was used to supplement it in certain severe depressive states where it was deemed to be necessary.

The cases which received modified Electroshock Treatment as a supplement were the severely depressed old men with suicidal tendencies and marked agitation, insomnia or feeding difficulties. In such cases a more rapid improvement was effected than by Vitamin-B Group therapy alone.

The routine methods of treatment evolved during the past three years will now be described.

The present researches commenced early in 1951, since when all male patients over sixty years of age, who exhibited mainly depressive symptoms, have been treated by the author by the methods about to be described.

No special method of selection was employed, and each new admission who satisfied the requirements outlined above, was automatically added to the series. All were National Health Service patients and every grade of society was well represented, save the very wealthy. A wide range of trades, businesses and professions were included among the various occupations listed, and the whole group may be regarded as a typical cross-section of our ageing male population, such as mental hospitals everywhere are called upon to deal with at the present time.

All the cases lived within the County of Surrey, which is partly rural and partly urban, with no exceptionally

heavy industrial areas.

On admission each new case was examined, interrogated, assessed and classified by the author personally, and certain routine laboratory tests were carried out as soon as possible. These included the Blood Wassermann Reaction, Blood Urea, Blood Sedimentation Rate, Glucose Tolerance Test, Routine Blood Investigation and Complete Urinalysis. In addition, routine X.Rays of the heart and lungs were taken, and the Blood Pressure recorded regularly.

In the course of the physical examination special records were compiled of loss of weight, and clinical evidence of malnutrition and avitaminosis. Defects of hearing and vision were immediately referred to the appropriate specialist department, and the assistance of the Dental Surgeon and the Chiropodist were frequently invoked. Indeed all the measures outlined above may be regarded as essential components of any coordinated scheme for the rehabilitation of senile patients.

A careful case history was compiled from the relatives and friends, and the assistance of the Psychiatric Social Worker was most valuable in this field, and is gratefully acknowledged. This information was then correlated with the clinical findings, and the appropriate method of treatment was inaugurated as soon as possible.

Vitamin-B Group Therapy :-

This treatment was usually given either orally or intravenously and the methods employed are detailed below.

I. Oral Therapy :- A group of 36 senile patients was treated by this method. Nicotinic Acid was given orally thrice daily about 15 minutes before meals and a total dose of 500 mg. was administered daily. The other members of the Vitamin-B Group were supplied in the form of "Becosym Forte" Tablets (Roche Products Ltd.) whose formula is as follows :-

| | | |
|------------------------|----|--------|
| Aneurine hydrochloride | -- | 15 mg. |
| Riboflavine | -- | 15 mg. |
| Nicotinamide | -- | 50 mg. |
| Pyridoxine | -- | 10 mg. |
| Calcium Pantothenate | -- | 25 mg. |

These tablets were given thrice daily after meals.

The Nicotinic Acid was given before meals for its vasodilator effect, on the assumption that the increase in the cerebral blood flow would result in improvement in the cerebral metabolism, which in turn would lead to amelioration of the mental symptoms.

In the later stages of the researches the method of administering the Nicotinic Acid was altered and 300 mg. was given thrice daily before meals in the following manner. About 45 minutes before food 100 mg. was given, followed 15 minutes later by 100 mg. and a similar interval allowed to lapse before administering a further 100 mg., By this system the vasodilator action of Nicotinic Acid was spread over a longer period of time and it was hoped that the mental state would benefit accordingly.

A special chart was devised for recording the effects of oral Nicotinic Acid therapy, and a specimen copy will be included with the results of treatment in a later section.

This method of treatment was continued for an indefinite period, and throughout the entire researches no adverse reactions were encountered.

II. Intravenous Therapy :- A group of 23 senile patients was treated by this method, which consisted of daily intravenous injections of large doses of Nicotinic Acid together with the oral administration of "Becosym" Tablets as in Group I. Nicotinic Acid was injected intravenously each day from Monday to Friday in doses up to 1500 mg. and on the two "rest days" oral therapy was resumed exactly as detailed for the first group.

Nicotinic Acid was supplied in 10 c.c. ampoules each containing 500 mgm. (with the kind cooperation of British Drug Houses Ltd.), and it is of interest to record that this was the first time such a large quantity was prepared for intravenous injection in this country.

The Nicotinic Acid was mixed with sterile normal saline solution in a 50 c.c. syringe, the solutions being at blood heat, and this was injected slowly into one of the superficial veins at the bend of the elbow. The total time to administer the solution was usually 90 seconds.

The arms were used in strict rotation, and the amount of Nicotinic Acid was gradually increased up to a

maximum of 1500 mg. This routine was continued until the mental condition improved, when oral therapy was substituted, or until it was considered futile to persevere further.

In the entire group so treated no adverse reactions were encountered, and the daily injections were well tolerated.

A special chart was devised to record the results of this method, and a specimen will be included when the results of treatment are being reviewed in a later section.

III. Intravenous Therapy Supplemented by Modified Electric Convulsive Therapy.

This combined method of treatment was administered to a group of 39 senile patients, most of whom were severely depressed, potentially suicidal, agitated and resistive.

They were treated on four days of the week with intravenous Nicotinic Acid and oral "Becosym" as described above, and on two other days this was supplemented by Electric Convulsive Therapy under "Scoline" and Sodium Pentothal. The seventh day was a "rest day" and oral therapy alone was given.

It was made a routine practice to administer this form of treatment to all severely depressed patients who exhibited suicidal tendencies or were uncooperative, as the response was usually more rapid, and less strain was thrown on aged patients of frail physique. A further advantage of considerable import was that less strain was thrown on a depleted and over-worked nursing staff, by this routine.

This combined therapy was continued until clinical improvement resulted, when oral therapy was usually substituted and continued indefinitely. No adverse reactions were encountered in any of the patients so treated.

The exact technique of administering Electric Convulsive Therapy under "Scoline" and Sodium Pentothal was as follows.

Treatment was usually given twice weekly on Tuesdays and Saturdays at 10 a.m., and on the treatment mornings no breakfast was given, a bowel evacuation was encouraged, and the bladder emptied. Atropine gr. $\frac{1}{100}$ was given about half-an-hour beforehand if necessary, and the patient brought into the Treatment Room on a theatre trolley.

The weight was noted in pounds and Sodium Pentothal 5% administered intravenously according to the following formula :-

$$\frac{\text{Body weight in pounds}}{10 \times 4} = \text{dose of Pentothal.}$$

$$\text{e.g. } \frac{160 \text{ pounds}}{10 \times 4} = 4 \text{ c.c. of Pentothal.}$$

This was followed by the intravenous injection of the correct quantity of "Scoline", but it is first necessary to say something about this preparation and about the short-action muscular relaxants generally.

The South American arrow poison, curare, was the first preparation to be employed as a short-acting muscle

relaxing drug, and its effect was to compete with the acetylcholine produced on stimulation of the nerve fibre for the specific receptors situated in the end plate (receptor area) of the muscle. As a consequence the nervous impulse was blocked, resulting in muscular relaxation.

Various muscle relaxing drugs have been produced during the past few years, but in our experience "Scoline" has proved the most effective. "Scoline" (Allen & Hanbury's Ltd.) is Succinylcholine Chloride Dihydrate", and it is a muscle relaxant of short duration.

When it is injected intravenously it produces neuro-muscular block by depolarisation. It is rapidly destroyed in the body by the pseudo-cholinesterase of serum, and it can be used safely with all known anaesthetic agents.

"Scoline" is indicated wherever profound but brief muscular relaxation is required, as in Electric Convulsive Therapy, and it is injected after the Sodium Pentothal, employing a different syringe. This is partly because it is quickly hydrolysed and destroyed by the alkalinity of the Sodium Pentothal, and partly because the initial contractions it produces may be painful if the Pentothal has not taken full effect.

Sodium Pentothal is first administered slowly intravenously, and then as soon as the patient begins to feel sleepy the "Scoline" is given from a second syringe.

The amount of "Scoline is calculated thus :-

$$\frac{\text{Body weight in pounds.}}{100 \times 2} = \text{dose of "Scoline".}$$

$$\text{e.g. } \frac{160 \text{ pounds.}}{100 \times 2} = 0.8 \text{ c.c.}$$

The head-piece is then applied and about ten to fifteen seconds after the injection of "Scoline", diffuse muscular contractions can be seen on the face and hands. These result from the depolarising effect of the drug as it reaches the myoneural junctions. The contractions persist for fifteen to twenty seconds, and their disappearance indicates the onset of complete paralysis. This is the optimum time to administer Electric Convulsive Therapy, and the switch should be depressed as soon as the muscular twitchings cease.

On this routine the convulsion is beautifully modified, and the lungs are at once inflated with oxygen until natural respiration is resumed. "Scoline" produces a paralysis which lasts from two to six minutes, but by this time the modified convulsion is over, and providing natural respiration has been re-established, the patient can be safely removed to the Recovery Room. Here the patients remain at rest in bed under supervision for at least half-an-hour, after which time they can be returned to the ward.

With trained staff it is possible to administer Electric Convulsive Therapy suitably modified to ten patients

in an hour, but they must be kept under supervision afterwards, and we have made it a rule that this form of treatment should never be given to out-patients, whether they be old or young.

When Electric Convulsive Therapy is administered in this fashion it may safely be given to old as well as young, and there are no real contraindications. In our series of patients many frail and feeble old men were successfully treated, and in only one case was it deemed necessary to discontinue the treatment because of the risk to the patient's physical condition.

There is no known antidote to "Scoline", and if recovery is delayed the most important procedure is to apply gentle artificial respiration until breathing returns. However this is seldom necessary if the lungs are well inflated with oxygen as described above, but before treatment is given it is necessary to have facilities at hand to maintain a clear airway and to inflate the lungs with oxygen.

Patients given modified Electric Convulsive Therapy are seldom upset or apprehensive of this form of treatment, particularly when there is a skilled Anaesthetist at hand, and this is of special value in aged persons with depressive symptoms.

With suitable dosage and an adequate supply of oxygen the strain thrown on the heart and lungs is relatively small, while the elimination of violent muscular contractions greatly diminishes the risk of skeletal injury,

which is always a hazard when elderly patients are subjected to this rather drastic method of treatment.

The results of these routine methods of treatment will now be described.

THE RESULTS OF TREATMENT.

As a prelude to the presentation of the results of the methods of treatment employed in the present researches, it is perhaps of interest to consider the effects on the patient of the various preparations administered.

"Becosym Forte" tablets were administered as a routine to all the patients in the series, and no adverse reactions were reported from any of them.

Nicotinic Acid tablets were administered orally to a large number of these senile patients, and a careful record was kept of the reactions which resulted. About twenty minutes after the tablets were swallowed a cutaneous flush appeared first on the face and neck, and then spreading gradually all over the body. This flush usually persisted for forty minutes, and was accompanied by a sensation of warmth, together with tingling, itching or burning of the skin. A throbbing sensation in the head or even a mild headache were sometimes encountered, but nothing worse than this. Some cases sweated profusely, but this feature was not invariably present.

Other symptoms such as nausea, gastric distress, dizziness, faintness and increased gastro-intestinal activity have been described following Nicotinic Acid therapy, but were not encountered in the present series.

Large doses of Nicotinic Acid were also

administered intravenously and the resulting reactions were again recorded. Within two or three minutes of the start of the injection an intense flush and a sensation of warmth appeared on the face. Usually this started on the nasolabial folds, then the forehead, and finally the whole face was suffused with an intense flush, which spread gradually over the rest of the body. This flush usually persisted for approximately two hours, and Aring (79) has shown that the cerebral arterioles are similarly affected, with a considerable increase in the cerebral blood flow.

According to Furtado (80) the vasodilating action of Nicotinic Acid has the following characteristics :-

- (a) It is more marked for the cerebral arterioles than for the large vessels.
- (b) Vasodilatation of the retinal vessels is accompanied by a similar cerebral vasodilatation.
- (c) The vasodilatation is accompanied by a very small fall in the blood pressure, and a small increase of the pressure of the cerebrospinal fluid.
- (d) The action is transient and the cerebral arterioles return to their previous calibre in about twenty minutes.
- (e) Nicotinic Acid owes its vasodilating effect to a direct action on the vessel walls.

The above points will be commented upon in due course.

The other symptoms encountered with intravenous

therapy were similar to those already described, but of somewhat greater intensity. In no case were the symptoms of sufficient severity to warrant cessation of treatment, and some of these senile patients looked forward to their daily "heat treatment" with pleasurable anticipation.

Regular blood pressure recordings were taken before and after both oral and intravenous Nicotinic Acid therapy, and usually a slight fall resulted, but additional details on this topic will be given later.

Specimen charts are attached on Pages 103 and 104 which show the methods of recording the results of oral and intravenous Nicotinic Acid therapy.

Name:Age:

| <u>Date.</u> | <u>Dosage and Time Given.</u> | <u>Appearance of Flush.</u> | <u>Duration.</u> | <u>Blood Pressure.</u> | | | | <u>Reactions.</u> |
|--------------|-------------------------------|-----------------------------|------------------|------------------------|------------------|------------------|---------------------|-------------------|
| | | | | <u>Before.</u> | <u>10.</u> | <u>40.</u> | <u>After. + 70.</u> | |
| 25.6.53. | 200 mgm. 7.10 am. | 7.30 am. | 43 mins. | $\frac{180}{94}$ | $\frac{170}{90}$ | $\frac{172}{90}$ | $\frac{174}{92}$ | - |
| 26.6.53 | 200 mgm. 7.10 am. | 7.30 am. | 42 mins. | - | - | - | - | - |
| 27.6.53 | 200 mgm. 7.10 am. | 7.33 am. | 45 mins. | - | - | - | - | - |
| - | - | - | - | - | - | - | - | - |
| - | - | - | - | - | - | - | - | - |
| - | - | - | - | - | - | - | - | - |
| - | - | - | - | - | - | - | - | - |

+ The figures in "Blood Pressure, After" column refer to minutes.

I N T R A V E N O U S T H E R A P Y .

Name:

Age:

| Date. | Dosage. | Time of Injection. | Appearance of Flush. | Disappearance of Flush. | Number of Injection. | Arm. | Blood Pressure. + | | | | | Reactions. | |
|----------|-----------|--------------------|----------------------|-------------------------|----------------------|------|-------------------|------------------|------------------|------------------|------------------|------------------|------|
| | | | | | | | Before. | 10. | 40. | 70. | 140. | | 170. |
| 25.11.52 | 500 mgm. | 10.23 am. | 10.26 am. | 12.20 pm. | 1 | R. | $\frac{130}{70}$ | $\frac{120}{70}$ | $\frac{124}{70}$ | $\frac{120}{68}$ | $\frac{124}{70}$ | $\frac{130}{70}$ | - |
| 26.11.52 | 1000 mgm. | 10.40 am. | 10.43 am. | 12.42 pm. | 2 | L. | $\frac{126}{74}$ | $\frac{118}{70}$ | $\frac{120}{70}$ | $\frac{124}{72}$ | $\frac{126}{72}$ | $\frac{126}{72}$ | - |
| 27.11.52 | 1500 mgm. | 10.22 am. | 10.25 am. | 12.30 pm. | 3 | R. | $\frac{126}{76}$ | $\frac{118}{76}$ | $\frac{120}{74}$ | $\frac{124}{70}$ | $\frac{126}{74}$ | - | - |
| - | - | - | - | - | 4 | L. | - | - | - | - | - | - | - |
| - | - | - | - | - | 5 | R. | - | - | - | - | - | - | - |
| - | - | - | - | - | 6 | L. | - | - | - | - | - | - | - |
| - | - | - | - | - | 7 | R. | - | - | - | - | - | - | - |
| - | - | - | - | - | 8 | L. | - | - | - | - | - | - | - |

+ The figures in "Blood Pressure, After" column refer to minutes.

The results of the three routine methods of treatment employed will now be considered :-

Group I :- This group, consisting of 36 senile patients with depressive symptoms, was treated with oral Nicotinic Acid and "Becosym" tablets administered by the method described above. The distribution of the clinical material was as follows :-

| <u>Clinical Condition.</u> | <u>Number of Cases.</u> |
|--|-------------------------|
| Involutional Depressive States. --- | 5 |
| Reactive Depressive States of Old Age. --- | 10 |
| Recurrent Depressions in the Aged. --- | 6 |
| Manic - Depressive States in the Aged. --- | 1 |
| Senile Depressive States. --- | 14 |
| | 36 |

The response to this method of treatment may be presented thus :-

| <u>Clinical Condition.</u> | <u>No.</u> | <u>Dis- charged</u> | <u>Improved.</u> | <u>Not Improved.</u> | <u>Died</u> |
|---------------------------------|------------|-------------------------|------------------|--------------------------|-------------|
| Involutional Depressive States. | 5 | 3 | 2 | - | - |
| Reactive Depressive States. | 10 | 8 | 2 | - | - |
| Recurrent Depressions. | 6 | 3 | 3 | - | - |
| Manic-Depressive States. | 1 | 1 | - | - | - |
| Senile Depressive States. | 14 | 3 | 7 | 2 | 2 |
| | 36 | 18 | 14 | 2 | 2 |

These results may be expressed more simply as

follows :-

| <u>No. of Cases.</u> | <u>Discharged.</u> | <u>Improved.</u> | <u>Not Improved.</u> | <u>Died.</u> |
|----------------------|--------------------|------------------|----------------------|--------------|
| 36 | 50% | 39% | 5.5% | 5.5% |

It will be obvious from the above table that the patients in Group I, who were treated with oral Vitamin-B Group therapy alone, showed a combined Discharge and Improvement Rate of 89%. It must be emphasised, however, that this group contained no severely depressed cases such as were encountered in the other two groups treated. Indeed the type of patient so treated is frequently encountered in out-patient work or general practice, and this method of treatment has a wide application in these fields.

Large doses of Nicotinic Acid were given orally in the early stages of treatment, but with clinical improvement the dose was gradually reduced. However, many patients were advised to continue to take small maintenance doses of the Vitamin-B Group for an indefinite period after discharge.

Group II :- This group, consisting of 23 senile patients, was treated with intravenous Nicotinic Acid together with "Becosym" tablets orally, administered in the manner already described. The distribution of the clinical material was as follows :-

| <u>Clinical Condition.</u> | <u>Number of Cases.</u> |
|--|-------------------------|
| Involutional Depressive States. --- | 1 |
| Reactive Depressive States of Old Age. --- | 7 |
| Recurrent Depressions in the Aged. --- | 3 |
| Manic- Depressive States in the Aged. --- | 1 |
| Senile Depressive States. --- | 11 |
| | 23 |

The response to this method of treatment employed is set out below :-

| <u>Clinical Condition.</u> | <u>No.</u> | <u>Dis- charged.</u> | <u>Improved.</u> | <u>Not Improved.</u> | <u>Died</u> |
|---------------------------------|------------|--------------------------|------------------|--------------------------|--------------------|
| Involutional Depressive States. | 1 | - | - | - | 1 |
| Reactive Depressive States. | 7 | 2 | 2 | - | 3 ⁺ |
| Recurrent Depressions. | 3 | 2 | - | - | 1 ⁺ |
| Manic-Depressive States. | 1 | 1 | - | - | - |
| Senile Depressive States. | 11 | 3 | 4 | - | 4(3 ⁺) |
| | 23 | 8 | 6 | - | 9 |

The following simplified method of presenting the results of treatment may also be employed :-

| <u>No. of Cases.</u> | <u>Discharged.</u> | <u>Improved.</u> | <u>Not Improved.</u> | <u>Died.</u> |
|----------------------|--------------------|------------------|--------------------------|--------------|
| 23 | 35% | 26% | - | 39% |

+ Improved with treatment but died later of some intercurrent illness quite unrelated to therapy.

The above figures represent a combined Discharge and Improvement Rate of 61 per cent, which compares unfavourably with the results obtained in Group I. Two facts must be borne in mind, however, when attempting to correlate the results obtained in the two groups. The first is that the patients in this group were more severely depressed and ill than in Group I. The second is that of the cases who died, seven actually improved with treatment and then died later of some intercurrent illness.

If the latter fact is taken into account then a much rosier picture can be presented, and the combined Discharge and Improvement Rate rises to 91 per cent, which compares very favourably with the results obtained in Group I.

The average number of treatments given was twenty-two, which means that a complete course took at least five weeks and this was followed by oral therapy. It is obvious that this method of treatment can only be satisfactorily administered in hospital, but cases in favourable circumstances could be treated at home.

Group III :- This group consisted of 39 senile patients who were treated with intravenous Nicotinic Acid and "Becosym" tablets orally, supplemented by modified Electric Convulsive Therapy. The method of administration has already been described, and the distribution of the clinical material is set out below :-

| <u>Clinical Condition.</u> | <u>Number of Cases.</u> |
|--|-------------------------|
| Involutional Depressive States. --- | 16 |
| Reactive Depressive States of Old Age. --- | 6 |
| Recurrent Depressions in the Aged. --- | 10 |
| Manic-Depressive States in the Aged. --- | 4 |
| Senile Depressive States. --- | 3 |
| | 39 |

The response to this combined form of treatment was as follows:-

| <u>Clinical Condition.</u> | <u>No.</u> | <u>Dis- charged.</u> | <u>Improved.</u> | <u>Not Improved.</u> | <u>Died</u> |
|---------------------------------|------------|--------------------------|------------------|--------------------------|----------------|
| Involutional Depressive States. | 16 | 14 | 2 | - | - |
| Reactive Depressive States. | 6 | 5 | - | - | 1 ⁺ |
| Recurrent Depressions. | 10 | 8 | 2 | - | - |
| Manic-Depressive States. | 4 | 4 | - | - | - |
| Senile Depressive States. | 3 | 2 | - | - | 1 ⁺ |
| | 39 | 33 | 4 | - | 2 |

These figures may also be presented as follows:-

| <u>No. of Cases.</u> | <u>Discharged.</u> | <u>Improved.</u> | <u>Not Improved.</u> | <u>Died.</u> |
|----------------------|--------------------|------------------|--------------------------|--------------|
| 39 | 84.6% | 10.2% | - | 5.2% |

⁺Improved with treatment but died later of some intercurrent illness quite unrelated to therapy.

The above figures represent a combined Discharge and Improvement Rate of 94.8 per cent, and if one takes into account the fact that the two cases who died made a favourable response to treatment prior to death, then the overall picture shows that every patient treated was improved.

Electric Convulsive Therapy was given under "Scoline" and Sodium Pentothal, and the average number of treatments was four, with a range from two to a maximum of eight. The average number of intravenous Nicotinic Acid injections given was ten, which means that the entire course of treatment took approximately three weeks.

It is obvious that this form of physical treatment is one which can only be given in hospital under special supervision.

In the pages which follow various statistical tables will be presented, in some of which the following abbreviations have been used :-

- | | | |
|--------|---|---|
| I.D.S. | = | Involitional Depressive States. |
| R.D.S. | = | Reactive Depressive States of Old Age. |
| Rec.D. | = | Recurrent Depressions in the Aged. |
| M.D.S. | = | Manic-Depressive States in the Aged. |
| S.D.S. | = | Senile Depressive States. |
| + | = | Improved with treatment but later died of some intercurrent illness quite unrelated to therapy. |
| ⊙ | = | Not improved and discharged themselves against medical advice. |

It is of interest to take the entire case material, subdivide it into five-year age groups, and then to review the results of treatment in each of the depressive states described. The table below includes the small group of untreated cases who have already been mentioned.

| <u>Clinical Condition.</u> | <u>No.</u> | <u>Age in Years.</u> | | | | |
|----------------------------|------------|----------------------|---------------|---------------|---------------|------------|
| | | <u>60-65.</u> | <u>66-70.</u> | <u>71-75.</u> | <u>76-80.</u> | <u>80+</u> |
| I.D.S. | 24 | 18 | 6 | - | - | - |
| R.D.S. | 33 | 17 | 12 | 4 | - | - |
| Rec.D. | 20 | 12 | 4 | 4 | - | - |
| M.D.S. | 6 | 5 | - | 1 | - | - |
| S.D.S. | 35 | - | 2 | 14 | 9 | 10 |
| | 118 | 52 | 24 | 23 | 9 | 10 |

The above figures demonstrate conclusively that the cases in the Senile Depressive category fall into a much later age group than in any of the other clinical conditions.

The various depressive states will now be presented in turn, and the response to treatment clearly indicated.

1. The Involutional Depressive States :-

Number of cases = 24.

| <u>Disposal.</u> | <u>No. of Cases.</u> | <u>Age in Years.</u> | | | | |
|------------------|----------------------|----------------------|---------------|---------------|---------------|-------------|
| | | <u>60-65.</u> | <u>66-70.</u> | <u>71-75.</u> | <u>76-80.</u> | <u>80+.</u> |
| Discharged. | 16 | 12 | 4 | - | - | - |
| Improved. | 5 | 4 | 1 | - | - | - |
| Not Improved. | 2(1 ^o) | 2 | - | - | - | - |
| Died. | 1 | - | 1 | - | - | - |
| | 24 | 18 | 6 | - | - | - |

These figures show that the Involutional Depressive States occur relatively early in "old age", and that the response to the methods of treatment employed is good.

2. The Reactive Depressive States of Old Age :-

Number of cases = 33.

| Disposal. | No. of Cases. | Age in Years. | | | | |
|---------------|--------------------|---------------|--------|--------|--------|-----|
| | | 60-65. | 66-70. | 71-75. | 76-80. | 80+ |
| Discharged. | 15 | 8 | 4 | 3 | - | - |
| Improved. | 5 | 3 | 2 | - | - | - |
| Not Improved. | 4(2 ^o) | 1 | 3 | - | - | - |
| Died. | 9(4 ⁺) | 5 | 3 | 1 | - | - |
| | 33 | 17 | 12 | 4 | - | - |

This table indicates that the Reactive Depressive States tend to occur slightly later than the Involutional group, that the response to treatment is less favourable, and that the number of deaths is considerably greater.

3. Recurrent Depressions in the Aged :-

Number of cases = 20.

| Disposal. | No. of Cases. | Age in Years. | | | | |
|---------------|----------------|---------------|--------|--------|--------|-----|
| | | 60-65. | 66-70. | 71-75. | 76-80. | 80+ |
| Discharged. | 14 | 9 | 3 | 2 | - | - |
| Improved. | 4 | 2 | 1 | 1 | - | - |
| Not Improved. | - | - | - | - | - | - |
| Died. | 2 ⁺ | 1 | - | 1 | - | - |
| | 20 | 12 | 4 | 4 | - | - |

The above figures reveal that the Recurrent

Depressions also tend to occur at a somewhat later age than the Involutional group. The response to treatment is good, but there is always the likelihood of a recurrence of the depressive symptoms at a later date.

4. Manic-Depressive States in the Aged :-

Number of cases = 6.

| <u>Disposal.</u> | <u>No. of Cases.</u> | <u>Age in Years.</u> | | | | |
|------------------|----------------------|----------------------|---------------|---------------|---------------|------------|
| | | <u>60-65.</u> | <u>66-70.</u> | <u>71-75.</u> | <u>76-80.</u> | <u>80+</u> |
| Discharged. | 6 | 5 | - | 1 | - | - |
| Improved. | - | - | - | - | - | - |
| Not Improved. | - | - | - | - | - | - |
| Died. | - | - | - | - | - | - |
| | 6 | 5 | - | 1 | - | - |

The above table shows clearly the comparative rarity of Manic-Depressive States, as only six cases were diagnosed in a series of over one hundred spread over a period of three years. The ages of the cases corresponded closely with the Involutional group, and the response to treatment is good. However, one must always bear in mind the possibility of a recurrence of the depressive cycle at some future date.

5. The Senile Depressive States :-

Number of cases = 35.

| <u>Disposal.</u> | <u>No. of Cases.</u> | <u>Age in Years.</u> | | | | |
|------------------|----------------------|----------------------|---------------|---------------|---------------|------------|
| | | <u>60-65.</u> | <u>66-70.</u> | <u>71-75.</u> | <u>76-80.</u> | <u>80+</u> |
| Discharged. | 9 | - | - | 2 | 5 | 2 |
| Improved. | 12 | - | 1 | 4 | 4 | 3 |
| Not Improved. | 4(1 ^o) | - | 1 | - | 2 | 1 |
| Died. | 10(5 ⁺) | - | - | 5 | 1 | 4 |
| | 35 | - | 2 | 11 | 12 | 10 |

From the above it is clear that the Senile Depressive States occur at a much later age than any of the clinical conditions hitherto described. The response to treatment is less favourable than in the other depressive states, but one must bear in mind the advanced age of these patients, and also the high incidence of Cerebral Vascular Disease, Arteriosclerosis and Hypertension in this group as a whole. Nevertheless the response to the methods of treatment employed is better than in comparable groups of patients suffering from Senile Dementia, or untreated groups with depressive disorders, as will be indicated below.

The results obtained in the three groups treated may be compared with the recovery and improvement rates among senile patients admitted to mental hospitals in New York State during 1942 :-

| <u>Disease.</u> | <u>Recovery Rate</u> <u>per 100 Admissions.</u> | | | <u>Improvement Rate</u> <u>per 100 Admissions.</u> | | |
|------------------------------------|--|-----------------|---------------|---|-----------------|---------------|
| | <u>Males.</u> | <u>Females.</u> | <u>Total.</u> | <u>Males.</u> | <u>Females.</u> | <u>Total.</u> |
| Senile Dementia. | 1.0 | 0.5 | 0.7 | 5.2 | 4.5 | 4.8 |
| Arterio- sclerotic Dementia. | 5.2 | 4.3 | 4.7 | 15.1 | 10.8 | 13.0 |
| Senile Depressive States. | 34.1 | 23.1 | 25.6 | 33.2 | 25.7 | 27.4 |

If the male patients alone are considered the following recovery and improvement rates are obtained :-

| | | |
|----------------------------|-----|---------------|
| Senile Dementia. | --- | 6.2 per cent. |
| Arteriosclerotic Dementia. | - | 20.3 " " |
| Senile Depressive States. | -- | 67.3 " " |

These results compare most unfavourably with those obtained in the present researches.

It is of interest to consider the results of treatment on the entire series of cases treated, regardless of the method employed :-

| <u>Clinical Condition.</u> | <u>No.</u> | <u>Discharged.</u> | <u>Improved.</u> | <u>Not Improved.</u> | <u>Died.</u> |
|----------------------------|------------|--------------------|------------------|----------------------|----------------------|
| I.D.S. | 22 | 16 | 5 | - | 1 |
| R.D.S. | 23 | 15 | 4 | - | 4 ⁺ |
| Rec.D. | 19 | 14 | 4 | - | 1 ⁺ |
| M.D.S. | 6 | 6 | - | - | - |
| S.D.S. | 28 | 9 | 12 | - | 7(5 ⁺) |
| | 98 | 60 | 25 | - | 13(10 ⁺) |

These figures may be compared with those for the small untreated control group :-

| <u>Clinical Condition.</u> | <u>No.</u> | <u>Discharged.</u> | <u>Improved.</u> | <u>Not Improved.</u> | <u>Died.</u> |
|----------------------------|------------|--------------------|------------------|----------------------|--------------|
| I.D.S. | 2 | - | - | 2(1 ^o) | - |
| R.D.S. | 10 | - | 1 | 4(2 ^o) | 5 |
| Rec.D. | 1 | - | - | - | 1 |
| M.D.S. | - | - | - | - | - |
| S.D.S. | 7 | - | - | 4 | 3 |
| | 20 | - | 1 | 10(3 ^o) | 9 |

When the above two tables are compared it is obvious that the prognosis is much better for the treated cases than for the untreated ones.

The response to treatment may also be presented

thus :-

| <u>Clinical Condition.</u> | <u>Cases.</u> | <u>Discharged.</u> | <u>Improved.</u> | <u>Improved but Died</u> | <u>Total Discharged, or Improved.</u> |
|----------------------------|---------------|--------------------|------------------|--------------------------|---------------------------------------|
| I.D.S. | 22 | 72.7% | 22.7% | - | 95.4% |
| R.D.S. | 23 | 65.2% | 17.4% | 17.4% | 82.6% |
| Rec.D. | 19 | 73.7% | 21.0% | 5.3% | 94.7% |
| M.D.S. | 6 | 100% | - | - | 100% |
| S.D.S. | 28 | 32.1% | 42.9% | 18.0% | 75.0% |
| | 98 | 70.5% | 20.8% | 8.14% | 89.5% |

The above table clearly shows that the results of treatment are less good in the Senile Depressive States

than in the younger age-groups.

In order to clarify the position further the clinical material has been carefully rearranged so that all cases showing obvious signs of organic brain involvement or physical disease are segregated from the others. These two groups are considered below, and the response to treatment clearly indicated for both.

Group A :- The first group consists of patients exhibiting depressive symptoms, who displayed no evidence of organic brain involvement or physical disease to account for their condition. The distribution of the clinical material is indicated below :-

| <u>Clinical Condition</u> | <u>No.</u> | <u>Dis-charged.</u> | <u>Improved.</u> | <u>Not Improved.</u> | <u>Died.</u> | <u>Average Age.</u> |
|---------------------------|------------|---------------------|------------------|----------------------|--------------|---------------------|
| I.D.S. | 19 | 16 | 1 | 2(1 ^o) | - | 63.6 years. |
| R.D.S. | 9 | 8 | 1 | - | - | 65.1 years. |
| Rec.D. | 15 | 11 | 4 | - | - | 64.4 years. |
| M.D.S. | 6 | 6 | - | - | - | 65.0 years. |
| S.D.S. | 8 | 4 | 3 | 1 ^o | - | 76.9 years. |
| | 57 | 45 | 9 | 3 | - | |

It will be seen that the results of treatment are very good indeed, and the average age falls fairly early within "old age" except for a few patients with Senile Depressive States.

Group B :- The second group is worthy of more serious consideration, and it may be sub-divided into two sections,

namely those whose depressive symptoms are associated with definite evidence of organic brain involvement, and those in whom some severe physical illness is the main factor in the development of depression. It is important that this distinction should be made so that the results of treatment in these two sub-sections can be compared.

The cases exhibiting definite evidence of organic brain involvement will be considered first.

| <u>Clinical Condition</u> | <u>No.</u> | <u>Dis-charged</u> | <u>Improved</u> | <u>Not Improved</u> | <u>Died</u> | <u>Average Age</u> |
|---------------------------|------------|--------------------|-----------------|---------------------|--------------------|--------------------|
| I.D.S. | - | - | - | - | - | - |
| R.D.S. | 9 | 1 | 2 | 1 | 5(3 ⁺) | 67.2 years |
| Rec.D. | - | - | - | - | - | - |
| M.D.S. | - | - | - | - | - | - |
| S.D.S. | 18 | 4 | 2 | 5 | 7(2 ⁺) | 76.3 years |
| | 27 | 5 | 4 | 6 | 12 | |

The following conditions were present among the patients with organic brain involvement :-

| | | |
|------------------------------------|---|----------------|
| Cerebral Haemorrhage or Thrombosis | - | 14 |
| Cerebral Arteriosclerosis | - | 7 |
| Hypertensive Attacks | - | 4 |
| Paralysis Agitans | - | 1 |
| Cerebrospinal Syphilis | + | 1 |
| | | <hr/> 27 <hr/> |

For comparison with the above the cases showing

some severe physical illness will now be considered :-

| <u>Clinical Condition.</u> | <u>No.</u> | <u>Dis-charged.</u> | <u>Improved.</u> | <u>Not Improved.</u> | <u>Died.</u> | <u>Average Age.</u> |
|----------------------------|------------|---------------------|------------------|----------------------|--------------------|---------------------|
| I.D.S. | 4 | - | 3 | - | 1 | 63.5 years |
| R.D.S. | 15 | 6 | 2 | 3(1 ^o) | 4(2 ⁺) | 65.6 years |
| Rec.D. | 5 | 2 | 1 | - | 2(1 ⁺) | 67.2 years |
| M.D.S. | - | - | - | - | - | - |
| S.D.S. | 10 | 1 | 5 | 1 | 3 ⁺ | 76.5 years |
| | 34 | 9 | 11 | 4 | 10 | |

The following disease conditions were associated with depressive symptoms in this group of patients.

| | | |
|-------------------------------|---|-----------|
| Chronic Bronchitis | - | 11 |
| Broncho-Pneumonia | - | 7 |
| Cardiovascular Disease | - | 7 |
| Carcinoma | - | 3 |
| Diabetes Mellitus | - | 3 |
| Fracture of Femur | - | 1 |
| Syphilis & Chronic Alcoholism | - | 1 |
| Chronic Nephritis | - | 1 |
| | | <u>34</u> |

The first point of note is that the results of treatment are worst in the cases showing evidence of organic brain involvement, and most of these cases are over seventy years of age. The number also includes nine untreated cases.

The cases suffering from some severe physical

disease are mainly in the younger age-groups, and their response to treatment (which includes treatment of the disease in question, is considerably better than in the previous sub-section, although the number of untreated cases was the same, namely nine.

If the entire second group is compared with the first, then the following points are evident :-

1. The response to treatment is not so good.
2. The number of patients over seventy is greater in the second group.
3. The number of untreated patients is greater in the second group.

The entire picture may be summarised thus :-

| | No. | Dis- charged. | Improved. | Not Improved. | Died. |
|--|-----|------------------|-----------|--------------------|--------------------|
| <u>Group A.</u> | | | | | |
| Treated Cases. | 55 | 43 | 9 | 3(2 ^o) | - |
| Untreated Cases. | 2 | - | - | 2(1 ^o) | - |
| | 57 | 43 | 9 | 5 | - |
| <u>Group B.</u> | | | | | |
| <u>(a) Cases with Organic Brain Disease.</u> | | | | | |
| Treated Cases. | 18 | 5 | 4 | 2 | 7(5 ⁺) |
| Untreated Cases. | 9 | - | - | 4 | 5 |
| | 27 | 5 | 4 | 6 | 12 |
| <u>(b) Cases with Physical Illness.</u> | | | | | |
| Treated Cases. | 25 | 9 | 10 | - | 6(5 ⁺) |
| Untreated Cases. | 9 | - | 1 | 4(1 ^o) | 4 |
| | 34 | 9 | 11 | 4 | 10 |
| | 61 | 14 | 15 | 10 | 22 |

The above tables indicate a total Discharge and Improvement Rate of 91.2 per cent for the Group A cases, while for the Group B cases the corresponding rate is 47.5 per cent.

If the search is carried further in Group B the following facts emerge.

(a) Cases with Organic Brain Disease :-

| | | |
|-------------------------------------|----|---------------|
| Total Recovery and Improvement Rate | -- | 33.3 per cent |
| Treated cases only | -- | 50 per cent. |

(b) Cases with Physical Illness :-

| | | |
|-------------------------------------|----|--------------|
| Total Recovery and Improvement Rate | -- | 59 per cent. |
| Treated cases only | -- | 76 per cent. |

These figures show that the rate of recovery and improvement is higher for the treated cases than for the untreated ones, while the prognosis in cases exhibiting organic brain involvement is worse than in cases with serious physical illness.

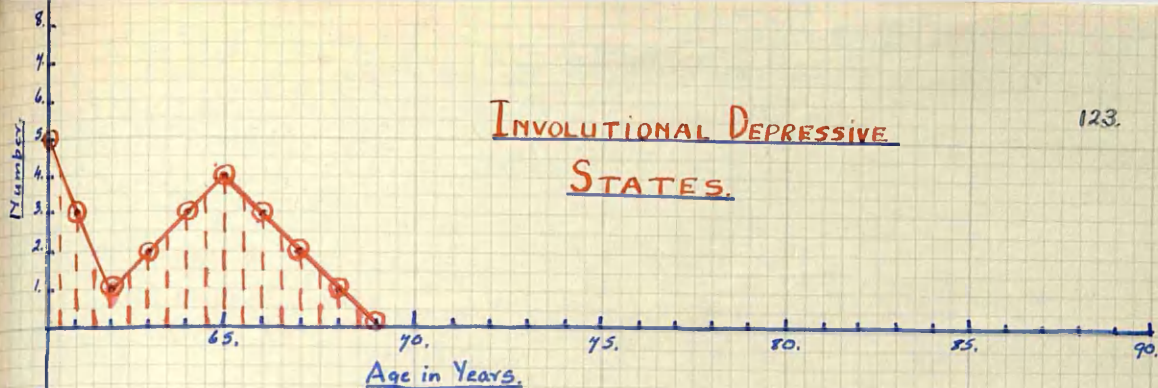
This is very much what one would expect, and indicates that the prospects for recovery are better in depressive states associated with physical illness, than in similar states where there is organic disease of the brain.

The small untreated control group will now be reviewed in five-year age groups, and then a graph presented to show the age distribution of the entire series of cases.

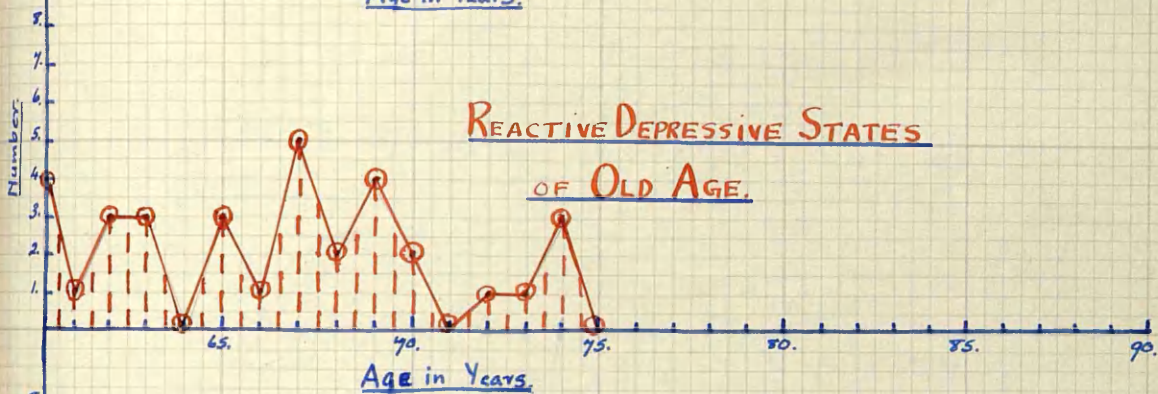
| <u>Clinical Condition.</u> | <u>No.</u> | <u>60-65.</u> | <u>66-70.</u> | <u>71-75.</u> | <u>76-80.</u> | <u>80+</u> |
|----------------------------|------------|---------------|---------------|---------------|---------------|------------|
| I.D.S. | 2 | 2 | - | - | - | - |
| R.D.S. | 10 | 6 | 4 | - | - | - |
| Rec.D. | 1 | 1 | - | - | - | - |
| M.D.S. | - | - | - | - | - | - |
| S.D.S. | 7 | - | 1 | 3 | 2 | 1 |
| | 20 | 9 | 5 | 3 | 2 | 1 |

It will be seen that the age distribution is similar to that in the treated cases, while the graph indicates clearly that the Senile Depressive States tend to occur at a much later age than any of the other clinical conditions described.

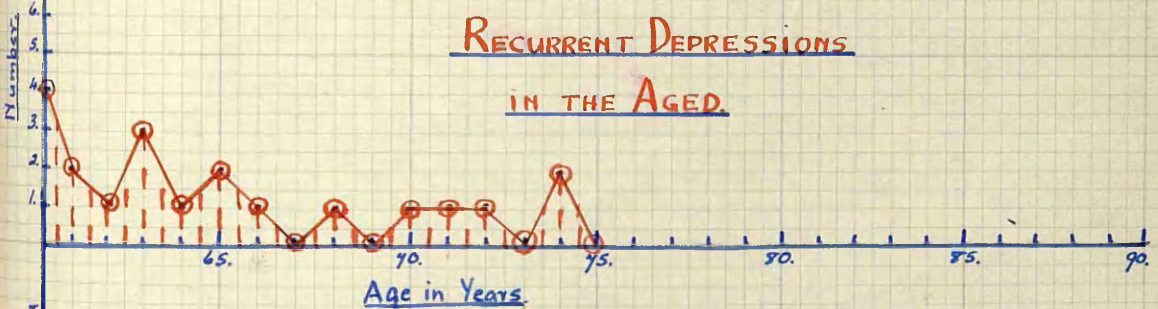
INVOLUTIONAL DEPRESSIVE STATES.



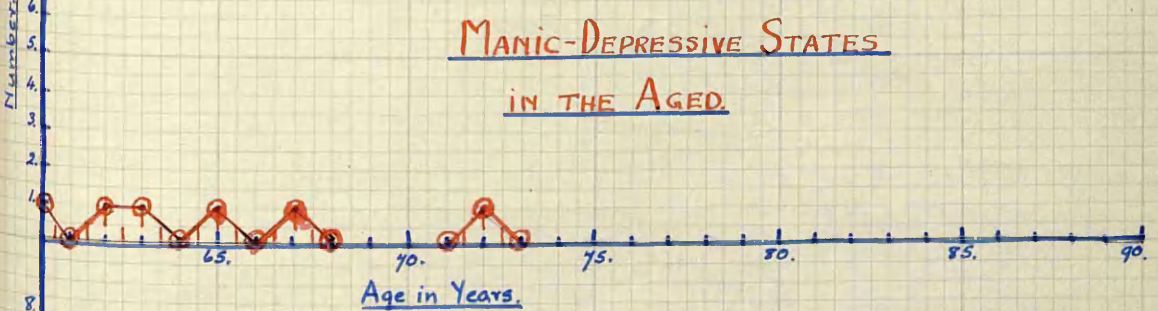
REACTIVE DEPRESSIVE STATES OF OLD AGE.



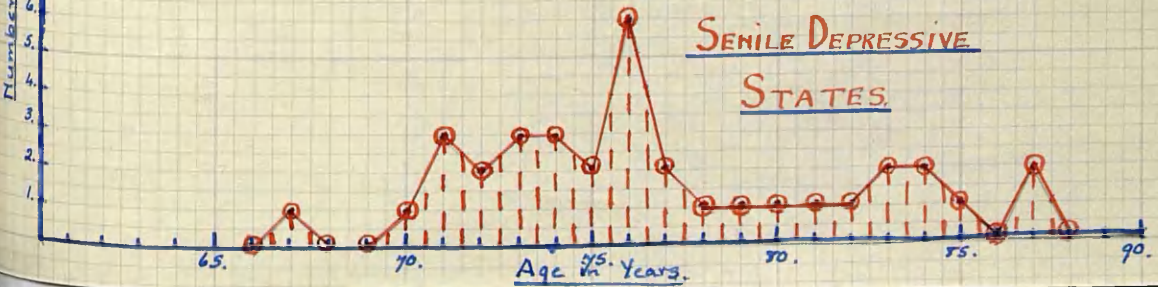
RECURRENT DEPRESSIONS IN THE AGED.



MANIC-DEPRESSIVE STATES IN THE AGED.



SENILE DEPRESSIVE STATES.



It is fitting that consideration should now be given to the patients in the series who exhibited evidence of malnutrition and avitaminosis. The table below shows the number of patients so affected and the response to treatment.

| <u>Clinical Condition.</u> | <u>No.</u> | <u>Discharged.</u> | <u>Improved.</u> | <u>Not Improved.</u> | <u>Died.</u> |
|----------------------------|------------|--------------------|------------------|----------------------|--------------------|
| I.D.S. | 11 | 9 | 1 | - | 1 |
| R.D.S. | 10 | 4 | 3 | - | 3(2 ⁺) |
| Rec.D. | 7 | 5 | 2 | - | - |
| M.D.S. | - | - | - | - | - |
| S.D.S. | 14 | 4 | 6 | 2 | 2(1 ⁺) |
| | 42 | 22 | 12 | 2 | 6 |

These results may be compared with those for the rest of the series :-

| <u>Clinical Condition.</u> | <u>No.</u> | <u>Discharged.</u> | <u>Improved.</u> | <u>Not Improved.</u> | <u>Died.</u> |
|----------------------------|------------|--------------------|------------------|----------------------|--------------------|
| I.D.S. | 13 | 7 | 4 | 2(1 ^o) | - |
| R.D.S. | 23 | 11 | 2 | 4(2 ^o) | 6(2 ⁺) |
| Rec.D. | 13 | 9 | 2 | - | 2 ⁺ |
| M.D.S. | 6 | 6 | - | - | - |
| S.D.S. | 21 | 5 | 6 | 2 | 8(4 ⁺) |
| | 76 | 38 | 14 | 8 | 16 |

In order to clarify the position further and render the comparison more comprehensible, the above results may be presented as percentages :-

Cases Exhibiting Malnutrition and Avitaminosis.

| <u>Number.</u> | <u>Discharged.</u> | <u>Improved.</u> | <u>Not Improved.</u> | <u>Died.</u> |
|----------------|--------------------|------------------|----------------------|--------------|
| 42 | 52.4% | 28.6% | 4.7% | 14.3% |

Other Cases.

| <u>Number.</u> | <u>Discharged.</u> | <u>Improved.</u> | <u>Not Improved.</u> | <u>Died.</u> |
|----------------|--------------------|------------------|----------------------|--------------|
| 76 | 50% | 18.4% | 10.6% | 21% |

A comparison of the above results reveals a total Discharge and Improvement Rate of 81 per cent for the cases in the first group as compared to 68.4 per cent for the remainder of the series.

The main signs presenting in the cases with evidence of Malnutrition and Avitaminosis were as follows :-

1. Marked loss of weight.
2. The skin is lax and atonic with loss of the subcutaneous fat.
3. The hair is dry, brittle and without lustre.
4. The lips are pale in some cases with a tendency to angular stomatitis. In others the lips are red and chapped.
5. The tongue is a purplish-red colour and may be deeply fissured. In some cases a smooth pale tongue is presented.
6. There may be marked dryness and scaling of the skin, but occasionally a scaly dermatitis of symmetrical distribution is seen, usually affecting the face, neck,

hands and wrists. Three cases in the entire series presented a coarse dermatitis of this type, which cleared up with treatment.

7. A moderate degree of hypochromic anaemia is a fairly common feature.
8. Tenderness and pain in the muscles, and peripheral neuritis occur in some cases.

All the above lesions tend to clear up when the patient shows a favourable response to treatment.

Three other aspects of the Depressive States of Old Age passed under review during the present researches, namely the symptomatology, the length of illness prior to admission to hospital, and the time actually spent in hospital. These will now be considered in turn.

Symptomatology :-

The symptoms encountered in the various depressive states were reviewed under the following headings - depression; suicidal tendencies; confused or disorientated; delusions; hallucinations; insomnia; loss of appetite; memory impairment; intellectual impairment.

This list is not exhaustive, but it does summarise the main features encountered in states of depression, and the results obtained are tabled below :-

| <u>Clinical Condition.</u> | <u>No. of Cases.</u> | <u>Depression.</u> | <u>Suicidal Tendencies.</u> | <u>Confused or Disorientated.</u> | <u>Delusions.</u> | <u>Hallucinations.</u> | <u>Insomnia.</u> | <u>Loss of Appetite.</u> | <u>Memory Impairment.</u> | <u>Intellectual Impairment.</u> |
|----------------------------|----------------------|--------------------|-----------------------------|-----------------------------------|-------------------|------------------------|------------------|--------------------------|---------------------------|---------------------------------|
| I.D.S. | 24 | 24 | 9 | 7 | 8 | 4 | 23 | 24 | 7 | 9 |
| R.D.S. | 33 | 33 | 8 | 17 | 4 | 3 | 32 | 31 | 20 | 16 |
| Rec.D. | 20 | 20 | 8 | 5 | 3 | - | 20 | 20 | 6 | 12 |
| M.D.S. | 6 | 6 | 1 | - | 1 | 1 | 5 | 5 | - | 2 |
| S.D.S. | 35 | 35 | 3 | 29 | 9 | - | 35 | 35 | 33 | 30 |
| | 118 | 118 | 29 | 58 | 25 | 8 | 115 | 115 | 66 | 69 |

It is obvious from the above table that certain symptoms are common to all the depressive states, namely depression, insomnia and loss of appetite. From experience in the present series of cases the following remarks may be passed regarding the symptomatology most characteristic of the various clinical conditions described.

Involuntional Depressive States :- Depression, insomnia and loss of appetite were constant features. Suicidal tendencies were found in nine cases out of twenty-four, while 40 per cent of the cases exhibited some degree of confusion, memory impairment, intellectual defect and delusions. Hallucinations were rare.

Reactive Depressive States of Old Age:- Depression, insomnia and loss of appetite were constant features. Confusion, memory impairment and intellectual deterioration were common to more than 60 per cent of the cases, and these symptoms tended to clear up with adequate treatment. This finding is in accord with the fact that many of these depressions are reactive to some acute illness or infection. Suicidal tendencies occurred in eight cases out of thirty-three. The other features were rarely encountered.

Recurrent Depressions in the Aged :- Depression, insomnia and loss of appetite were again constant features. Intellectual impairment was present in twelve cases out of twenty, which fits in with the fact that many of these patients are of weak and inadequate personality type, and some even of subnormal intelligence. Suicidal tendencies occurred in eight cases out of twenty, while the other features were rarely encountered.

Manic-Depressive States in the Aged :- Only six cases were encountered in the entire series, and these presented with depression, insomnia and loss of weight as common features. Only one case could be classed as suicidal, and no other features could be regarded as characteristic.

Senile Depressive States :- These cases belonged to a much older age-group than any of the clinical conditions previously discussed. Depression, insomnia and loss of weight were constantly found, but confusion, memory impairment and intellectual deterioration were almost

equally common. This fitted in with the advanced age of this group, and the fact that Cerebral Vascular Disease, Arteriosclerosis and Hypertension were much more frequently encountered than in any of the other clinical conditions under review. Nine cases out of thirty-five exhibited delusions, while only three cases could be regarded as suicidal. The other features were infrequent.

Taking the entire series of cases, delusions were relatively infrequent and it was exceptional to find hallucinations. These symptoms cannot be regarded as characteristic of the Depressive States of Old Age, nor were they found to be of prognostic value.

Duration of Illness :-

The duration of the depressive illness prior to hospitalisation, and the actual length of stay in hospital will now be considered together. Each clinical condition will be reviewed in turn, and the findings correlated with the response to treatment.

Involuntional Depressive States.

| <u>Response to Treatment.</u> | <u>No. of Cases.</u> | <u>Average Length of Illness before Admission.</u> | <u>Average Stay in Hospital.</u> |
|---|----------------------|--|----------------------------------|
| Discharged. | 16 | 4.1 months. | 2.1 months. |
| Improved. | 5 | 7.5 months. | 14.5 months. |
| Not Improved. | 1 | 18 months. | 9 months. |
| Died. | 1 | 4 years. | 1 month. |
| Discharged at own Request. (Not Improved) | 1 | 6 months. | 1 week. |

Total Number of Cases - 24.

Average Age - 63.5 years.

Reactive Depressive States of Old Age.

| <u>Response to Treatment.</u> | <u>No. of Cases.</u> | <u>Average Length of Illness before Admission.</u> | <u>Average Stay in Hospital.</u> |
|--|----------------------|--|----------------------------------|
| Discharged. | 15 | 4.6 months. | 2.8 months. |
| Improved. | 5 | 13.7 months. | 8.5 months. |
| Not Improved. | 2 | 10.5 months. | 12 months. |
| Died. | 9 | 3.0 years. | 3.6 months. |
| Discharged at Own Request (Not Improved) | 2 | 2.0 years. | 1 week. |

Total Number of Cases - 33.

Average Age - 66 years.

Recurrent Depressions in the Aged.

| <u>Response to Treatment.</u> | <u>No. of Cases.</u> | <u>Average Length of Illness before Admission.</u> | <u>Average Stay in Hospital.</u> |
|-------------------------------|----------------------|--|----------------------------------|
| Discharged. | 14 | 3.7 months. | 4.7 months. |
| Improved. | 4 | 1.3 months. | 5 months. |
| Not Improved. | - | - | - |
| Died. | 2 | 3.6 months. | 3.5 months. |

Total Number of Cases - 20.

Average Age - 65.8 years.

Manic-Depressive States in the Aged.

| <u>Response to Treatment.</u> | <u>No. of Cases.</u> | <u>Average Length of Illness before Admission.</u> | <u>Average Stay in Hospital.</u> |
|-------------------------------|----------------------|--|----------------------------------|
| Discharged. | 6 | 2.4 months. | 4 months. |
| Improved. | - | - | - |
| Not Improved. | - | - | - |
| Died. | - | - | - |

Total Number of Cases - 6.

Average Age. - 65 years.

Senile Depressive States.

| <u>Response to Treatment.</u> | <u>No. of Cases.</u> | <u>Average Length of Illness before Admission.</u> | <u>Average Stay in Hospital.</u> |
|---|----------------------|--|----------------------------------|
| Discharged. | 9 | 18 months. | 4 months. |
| Improved. | 12 | 12 months. | 11.8 months. |
| Not Improved. | 3 | 12.5 months. | 8 months. |
| Died. | 10 | 10 months. | 5.5 months. |
| Discharged at Own Request. (Not Improved) | 1 | 12 months. | 1 week. |

Total Number of Cases - 35.

Average Age - 76.6 years.

- - - - -

In considering the above tables it is perhaps permissible to consider the younger age-groups together, and then to review the older age-groups, as represented by the Senile Depressive States, as a separate entity.

If this rule is adopted, it is obvious that the cases who have been listed as "Discharged" in the first four tables have been ill a relatively short time prior to admission to hospital, and the average length of this period is 3.7 months. The average duration of their stay in hospital is 3.4 months.

Of the cases listed as "Improved" in the same four tables, the average duration of the illness prior to admission to hospital is 7.5 months, whereas the average

stay in hospital is 9.3 months.

If the Senile Depressive States are considered separately it is of interest that roughly the same state of affairs exists, except that the duration of illness prior to admission to hospital, and the length of stay in hospital, are usually considerably longer.

These facts clearly indicate that the sooner these aged patients receive treatment after the onset of any depressive illness, the better is their chance of recovery or improvement. Also the sooner adequate treatment is commenced the shorter is the stay in hospital likely to be.

A further point which emerges is that as age advances the prognosis must become more guarded, as the recuperative powers of the aged are more limited than in younger patients.

A special appendix will later be appended giving details of the routine laboratory procedures undertaken, and any other information of interest unearthed during the past three years.

In the ensuing section the conclusions arrived at as a result of the present researches will be presented as concisely as possible.

- - - - -

CONCLUSIONS.

The number of senile admissions to mental hospitals is increasing year by year, and now a stage has been reached when almost half of the annual intake are over sixty years of age.

It is important that all senile admissions should be carefully diagnosed and adequately treated, for it is abundantly clear that in the past there has been a tendency to classify all aged patients together under the heading of "Senile Dementia", and to assume that nothing could be done to help them.

Research work on the classification of the psychiatric disorders peculiar to the aged is revealing an increasing number of patients for whom some form of active treatment is appropriate, and a recent Ministry of Health report "On the State of the Public Health" (81), has specially emphasised this point.

Prominent among the psychiatric disorders which afflict the elderly rank the Depressive States of Old Age, and during the period of the present researches, patients of this group totalled nearly fifty per cent of the senile admissions to the hospital.

The Depressive States of Old Age must be clearly distinguished from "the Psychoses of Senility", as a very much higher recovery and improvement rate can be obtained

than is generally appreciated, providing these cases are correctly diagnosed and adequately treated at an early stage.

Many senile patients suffering from depressive disorders show clinical evidence of malnutrition and avitaminosis, and a survey of the literature suggested to the author that deficiency of the members of the Vitamin-B Group frequently resulted in the development of the very same signs and symptoms. Accordingly it was decided to try the effect of intensive Vitamin-B Group therapy on a large series of senile patients suffering from depressive disorders.

The patients treated may be divided into three main groups, for each of which a different method of treatment was employed.

Group I :- The first group consisted of senile patients whose depressive symptoms were comparatively mild, and they were treated with oral Vitamin-B Group therapy alone.

The response to this form of treatment was surprisingly good, and 48.6 per cent of the patients were discharged to their homes, while a further 40 per cent showed improvement.

After discharge from hospital these patients were advised to continue to take small maintenance doses of the Vitamin-B Group for an indefinite period as a prophylactic measure.

It is felt that such a regime has much to recommend it in the field of general practice and in the out-patient clinic. As Watts (82) has remarked, here is a most useful therapeutic agent which could easily be

carried around by general practitioners for use on senile patients in their practices.

The writer firmly believes that all senile patients who exhibit psychiatric symptoms, should be given a fair period of trial on Vitamin-B Group therapy before resorting to certification and admission to mental hospital. This simple method of treatment can safely be given to patients of extreme age, and a preliminary trial in all early psychiatric disorders among aged patients would certainly help to cut down the number of senile admissions to mental hospitals.

In view of the increasing number of senile admissions to mental hospitals all over the country, there is much to recommend a large-scale trial of such a regime as has been outlined above, and the writer puts in a strong plea that such a scheme should be given consideration.

Group II :- The second group consisted of senile patients who were more severely depressed and generally more ill physically, and they were treated with intravenous Nicotinic Acid together with oral Vitamin-B Group therapy. On this regime 35 per cent of the cases treated were discharged, and a further 26 per cent showed improvement.

At a first glance these results appear disappointing compared to those obtained in the first group, but it must be borne in mind that the patients were more seriously ill physically as well as mentally, while a more detailed analysis of the statistics reveals that a further 30 per

cent of the patients so treated did actually show a favourable response to therapy before dying of some intercurrent illness. If these facts are borne in mind the results obtained are quite encouraging.

On the average twenty-two treatments were given over a period of five weeks, and it is obvious that this method of treatment is beyond the scope of the general practitioner. It is best administered in hospital under special supervision, and it can safely be given to severely depressed patients of extreme age, especially in cases where the physical condition is so poor as to make one hesitate to employ modified Electric Convulsive Therapy.

The response obtained must be regarded as most encouraging, but one great disadvantage is that the improvement in the mental state is a gradual one, which renders it unsatisfactory for patients who are actively suicidal, agitated, resistive and uncooperative. For these patients modified Electric Convulsive Therapy was employed as a supplementary measure, and the combined treatment proved most effective.

Group III :- The third group consisted of senile patients, who, in addition to severe depression, also exhibited suicidal tendencies and were resistive and uncooperative. At the time of admission such patients were urgently in need of treatment in order to save their lives, and it was apparent that the sooner improvement in their mental condition could be effected the better.

As noted above, the response to intravenous Nicotinic Acid and oral Vitamin-B Group therapy was too slow, and it was decided to supplement it with Electric Convulsive Therapy administered under "Scoline" and Sodium Pentothal. The response to this combined form of treatment was more rapid, and indeed in some cases it might even be regarded as dramatic.

On this regime 84.6 per cent of the patients treated were discharged to their homes, and a further 10.2 per cent showed improvement. No adverse reactions of note were encountered in the entire group, and patients up to seventy-six years of age were successfully treated by this method.

The average number of shocks given was four, and the usual number of intravenous treatments was ten, so that the complete course of treatment took approximately three weeks. It is obvious that this method of treatment is beyond the scope of the general practitioner, and can only be given in hospital under specialist supervision.

Although this would appear to be a drastic form of treatment to administer to frail old men, yet it is entirely justified by the excellence of the results obtained. In many aged patients who are severely depressed and actively suicidal the response is frequently excellent, and in some cases even dramatic. Not only is the depressive illness cut short with surprising rapidity, but much less strain is thrown on an already overworked nursing staff,

which is a factor of no small importance at the present time.

A review of the entire series of patients treated revealed that 61.2 per cent were discharged to their homes, and a further 25.5 per cent showed improvement. These results must be regarded as very satisfactory, and they compare favourably with those obtained by other workers.

No adverse reactions, sufficient to cause termination of treatment, were encountered in the entire series of cases, and patients of the following ages were successfully treated :-

- (1) Oral therapy -- up to 87 years of age.
- (2) Intravenous therapy - up to 85 years of age.
- (3) Combined therapy -- up to 76 years of age.

The vasodilating action of Nicotinic Acid and its effects on the blood pressure were carefully observed in all the patients treated, and the following conclusions reached.

- (a) When administered orally the vasodilating effect of Nicotinic Acid lasted about forty minutes, and it caused a fall in the systolic blood pressure of approximately 6 mm. of mercury, with a return to the normal level at the end of the period of vasodilatation.
- (b) When administered by the intravenous route Nicotinic Acid caused an intense vasodilatation lasting for two hours or more, with an average fall in the blood pressure of 10 mm. of mercury. The blood pressure returned to normal

at the end of the period of vasodilatation.

(c) It was assumed that this cutaneous vasodilatation was accompanied by a similar reaction in the cerebral arterioles, as the writings of Aring (83), Furtado (84) and others would lead us to believe. It was also assumed that this resulted in a considerable increase in the cerebral blood flow with some improvement in the cerebral metabolism, and without concomitant rise in the blood pressure or other adverse effects.

Our observations would also appear to indicate that the vasodilating effect of Nicotinic Acid lasts for longer periods than was visualised by Aring and Furtado.

(d) It is the author's opinion that depressive states associated with deficiency of the Vitamin-B Group show a particularly favourable response to Nicotinic Acid therapy, but certain other cases who exhibit no evidence of Vitamin-B Group deficiency also appear to benefit from the vasodilating action of Nicotinic Acid. A recent report by Levy (85) expresses a very similar opinion.

The above results show that there is a place for both oral and intravenous Vitamin-B Group therapy in the treatment of the Depressive States of Old Age, whether in general practice or in hospital, and there is no justification for submitting all these aged patients to the risks of modified Electric Convulsive Therapy.

In the case of severely depressed patients who are suicidal and resistive, however, there appears to be

every indication for supplementing Vitamin-B Group therapy with suitably modified Electric Convulsive Therapy in order to obtain a more rapid and favourable response.

The following remarks may be made with special reference to the different clinical conditions described :-

The Involutional Depressive States :-

These tend to occur relatively early in "old age", and the response to treatment is very good, regardless of the method employed.

The Reactive Depressive States of Old Age :-

The average age tends to be somewhat later than the involutional group, and the response to treatment is not quite so good.

Recurrent Depression in the Aged :-

These also tend to occur at a slightly later age than the involutional cases, and the response to treatment is also very good. The possibility of recurrence of the symptoms must always be borne in mind, however, and a long period of surveillance as an out-patient is advisable after discharge from hospital.

Manic-Depressive States in the Aged :-

These are relatively infrequent and the average age is similar to the involutional group. The response to treatment is very good, but there is a strong possibility of recurrence of the symptoms at a later date. A period of surveillance as an out-patient is a wise precaution.

The Senile Depressive States :-

These cases tend to occur at a much more advanced age than any of the groups hitherto described, and the response to treatment, while not so good as in the younger patients, is still encouraging. It must be remembered that this particular group are much older and physically more frail than the others, while the incidence of Cerebral Vascular Disease, Arteriosclerosis and Hypertension is much higher. Nevertheless, the results obtained with this group compare favourably with those of other workers in the same field.

Depression, insomnia and loss of appetite are the three cardinal symptoms common to all the clinical conditions described, while 26.2 per cent of the patients in the entire series can be regarded as suicidal or potentially suicidal. The suicidal risk is less in the older patients, but the figures for the whole of the series help to emphasise the need for constant supervision in all acutely depressed patients.

A comparison between groups of depressed patients both with and without some concomitant physical disease, reveals that the response to treatment is much better in the latter group. Furthermore, in the former group the prognosis is better in patients with some physical disease such as Bronchopneumonia, than in the cases who exhibit definite evidence of organic brain involvement. Many of the latter class belong to the Senile Depressive States,

and the prognosis in these very aged patients is the worst in the entire series.

A survey of the entire group suggested that the response to Vitamin-B Group therapy was better in the patients suffering from malnutrition and avitaminosis than in the rest of the series, which is in accord with the hypothesis presented by the author in the introductory section.

In the whole series of cases, regardless of the diagnosis or the method of treatment employed, it was evident that the sooner treatment was initiated after the onset of the depressive symptoms, the better was the prognosis, and the shorter the duration of the stay in hospital. This leads us to the conclusion that the general practitioner and the public as a whole must be educated to seek psychiatric advice at the earliest possible moment, when elderly relatives begin to exhibit mental symptoms.

The above are the main conclusions reached by the author during the present researches, but the experience of working with aged patients during the past three years, has helped him to formulate certain opinions on the problems of the care of the aged.

If consideration is first given to the psychiatric disorders peculiar to the aged, the writer is convinced that there is a strong case for setting up special Geriatric Centres within each mental hospital. All senile patients should be admitted to such centres where they could be

examined and assessed by psychiatrists with special knowledge and experience of such cases. Hopeless cases could be immediately transferred elsewhere, but all others should be subjected to a detailed therapeutic regime under the supervision of specially trained teams of doctors, nurses and medical auxiliaries.

The physical and mental states, social problems, diet, rest and recreation should all be carefully controlled, and the author is convinced that if such methods were generally employed, then the rehabilitation of many more senile psychiatric patients would be possible than under the existing system.

If one is permitted to air one's views on the wider aspects of Geriatrics then the following facts emerge.

The proportion of aged persons in the population is increasing steadily, and the number of senile admissions to mental hospitals is likewise growing. The most recent report by the Ministry of Health (86) shows that of 135,528 beds in mental hospitals, 30,593 are occupied by patients over sixty-five years of age, and the numbers are increasing annually.

This report stresses that 25 per cent of these aged psychiatric patients could very well be cared for in special hospitals for the aged without the stigma of certification, and the author's experience endorses this view. Unfortunately there is a grave shortage of such long stay annexes for the aged, but the sooner the problem

is tackled on a national scale the better for all concerned.

The same report draws attention to the fact that many psychiatric disorders of old age respond favourably to appropriate treatment, and quotes a discharge rate of 38 per cent in some of the better hospitals. This figure compares most unfavourably with those obtained in the present series when 61.2 per cent of the cases were discharged to their homes.

The above remarks apply solely to the aged psychiatric casualties as they flood into the mental hospitals at the present time, but what steps can be taken to help to stem the flow?

A survey of the literature indicates that a multitude of factors are responsible for the increase in the flow of senile psychiatric admissions to mental hospital, but the following appear to be among the most important causes cited :-

1. The average expectation of life is increasing and the proportion of aged persons in the population is growing larger each year.
2. In the days before the National Health Service large numbers of senile patients were admitted to Public Assistance Institutions, but such bedding accommodation is no longer available.
3. Large numbers of aged persons are being compelled to retire from active employment at too early an age, and many jobs previously reserved for such aged retainers

are now being done more cheaply by young girls and part-time married women.

4. The housing, recreational and social facilities available for the aged are woefully inadequate.
5. Thanks partly to the encroachments of the Welfare State, there has been a gradual weakening of the family ties during the present century, and the younger members are no longer prepared to accept the responsibility of caring for their aged dependants.

There seems little doubt that the key to the whole problem of Geriatric Medicine is "to keep the aged at work as long as possible" as has been advocated by Thewlis (87), Kaplan (88) and Stieglitz (89).

A step in the right direction has been the recently published report (90) by the National Advisory Committee on the Employment of Older Men and Women. This report points out that old people must be kept at work as long as possible as part of the national policy. It emphasises that the elderly are more adaptable and trainable than is generally believed, and that they are more careful, more punctual, more loyal and less prone to accidents than younger workers. Furthermore, although the demands for speed in modern industry are factors which weigh heavily against the continued employment of aged workers, yet their skill and experience should be utilised as long as possible, if necessary by increased mechanisation, or by the provision of special workrooms for the aged where the speed and

competition are not so fierce.

The sense of this policy of continued employment is shown by the following figures, which show the gradual increase in the number of old age pensioners, who have to be supported by a shrinking working population under existing conditions.

- 1900: - 10 persons over sixty supported by every 100 workers.
- 1930: - 20 persons over sixty supported by every 100 workers.
- By 1960: - 30 persons over sixty supported by every 100 workers. (If present trends continue).

The author is entirely in agreement with all the above findings, and also with the plea for the overhaul of the entire pension and retirement policy to enable the aged to continue at work as long as possible if they wish to do so.

Many steps are already being taken to stimulate public interest in the enormity of the problem presented by our ageing population. A recent television programme called "As Old As You Feel" (91) proved a most interesting and informative experiment, and more publicity of this kind could only do good.

This programme gave a graphic account of the increase in the number of old people which has taken place during the present century, and advocated that they must be allowed to continue at work as long as possible. The present retiral age was considered too arbitrary, and a

good case was made for a complete revision of the retiral and pension schemes. Schemes for enabling aged persons to continue to give the community the benefit of their skill and experience, while making due allowance for their infirmities, were reviewed, and the examples shown indicated clearly the value of such measures.

Great importance was attached to the routine medical examination and surveillance of all aged persons at special Geriatric Centres, and the value of social work among the aged was stressed.

Attention was drawn to the effect of loneliness, social isolation and boredom as important factors in the psychiatric breakdown of many aged people, and the provision of special clubs and social centres for the aged was strongly advocated to counteract this.

Housing was also given special attention, and a strong case was made for bungalows to house aged couples, or small hostels to accommodate those who live alone.

The programme ended with a plea for the young to be more tolerant of old age, and it also advocated a scheme of education to prepare the average person for the onset of old age.

The writer was most impressed with the medium of television as a means of stimulating public interest in the problems of old age, and feels that increasing use should be made of it in the future for educational purposes.

The general views expressed above largely coincide

with those which have been presented by the author throughout this Thesis, and if such steps were put into effect on a national scale, not only would the aged benefit, but the nation as a whole would be enriched, and the psychiatric disorders of old age would be greatly reduced.

The case is now complete, and the author has presented his views on the current problems of old age to the best of his ability. It is hoped that others will be stimulated to take up the cudgels in such a worthy cause, and to any who may be interested but are reluctant to become involved in a problem of such magnitude, the words of Goethe may come as a source of encouragement :-

"What you can do - or think you can - begin it!

Boldness hath genius, power and magic in it;

Only engage - and then the mind grows heated;

Begin - and soon your task will be completed!"

- - - - -

SUMMARY.

A series of 118 senile patients suffering from depressive states of varying aetiology was treated with Vitamin-B Group therapy with most encouraging results.

In certain severely depressed, suicidal and uncooperative patients it was deemed expedient to supplement the Vitamin-B Group therapy with Electric Convulsive Therapy suitably modified. This was found to expedite recovery, and the response to treatment was excellent.

No adverse reactions were encountered in any of the patients treated, although some were of advanced age. Therefore age alone should not be regarded as a barrier to treatment.

About 40 per cent of the cases under review exhibited signs of malnutrition and avitaminosis, and the response to the routine methods of treatment employed was better in this group than in the remainder of the series.

The response to treatment was least promising in cases who exhibited evidence of organic brain involvement, and best in patients with depressive symptoms without concomitant physical illness of any kind.

The sooner treatment was started after the initial onset of the psychiatric symptoms the better was the prognosis, and the shorter the period of hospitalisation required.

It is suggested that the members of the Vitamin-B

Group play an essential role in the metabolism of the brain and other tissues, and when these substances are deficient in the diet of aged patients mental symptoms may result.

One member, namely Nicotinic Acid, is a powerful but harmless vasodilator whose action extends to the cerebral arterioles, and it produces a considerable increase in the cerebral blood flow. The beneficial action of Nicotinic Acid may be due to the fact that it is essential for carbohydrate metabolism, and it is generally agreed that carbohydrate is the chief foodstuff of the brain. It may well be that the provision of adequate supplies of the Vitamin-B Group, including Nicotinic Acid, improves the cerebral metabolism, and that this process is aided by the increased cerebral blood flow attributable to the vasodilator action of Nicotinic Acid.

This is pure hypothesis, but whatever the true explanation, there seems little doubt that Vitamin-B Group therapy does produce favourable results in the treatment of the Depressive States of Old Age, and that further clinical trial on a large scale is indicated.

Little more now remains to be done save to present a special appendix containing some of the laboratory findings and other data collected during the present researches, in the hope that they may prove of some interest to future research workers. In a second appendix is included abbreviated case histories which may be regarded as typical of the various clinical conditions described.

In conclusion I would like to thank my colleagues, Dr. L. Barber and Dr. D. C. Dewar, for their help and encouragement throughout the present researches, and I must also express my gratitude to the members of the nursing and laboratory staff, without whose assistance this work could never have been accomplished.

A P P E N D I X I.

Summary of Routine Laboratory Findings
and Other Items of Interest.

-----oOo-----

APPENDIX I.

Certain routine laboratory procedures were carried out on all the patients in the present series and it may be of interest to summarise the results obtained.

Blood Wassermann :- This was found to be negative in all cases save two, and these were quite unexpected. Routine anti-syphilitic treatment was initiated in both cases. This finding demonstrates the value of taking routine blood tests even in elderly patients.

Blood Sedimentation Rate :- The average reading on admission for the entire series was 32 mm. in the first hour. This suggests that many of these senile patients had some active infection on admission or were just recovering from one. With rest and adequate treatment the readings soon dropped to normal levels.

Blood Urea :- The average reading for all the patients was 40 mgm. per 100 c.c., which is within normal limits. In view of the advanced age of most of the patients it was surprising how few showed any urinary abnormality.

Haemoglobin and Blood Count :- About 20 per cent of the cases showed varying degrees of hypochromic anaemia, and these occurred mainly in the group of patients exhibiting signs of malnutrition and avitaminosis. Most showed a good response to the routine methods of treatment supplemented by liver therapy, but a few did not respond and the

prognosis in such cases was found to be poor.

Complete Urinalysis :- Most cases showed no abnormality, but a number showed traces of sugar and albumen. The glycosuria was usually a transient one, but three cases proved to be genuine diabetics and were treated accordingly, with beneficial results. Albuminuria was not a common feature and was usually associated with Arteriosclerosis. Persistent albuminuria was found to be of poor prognostic value.

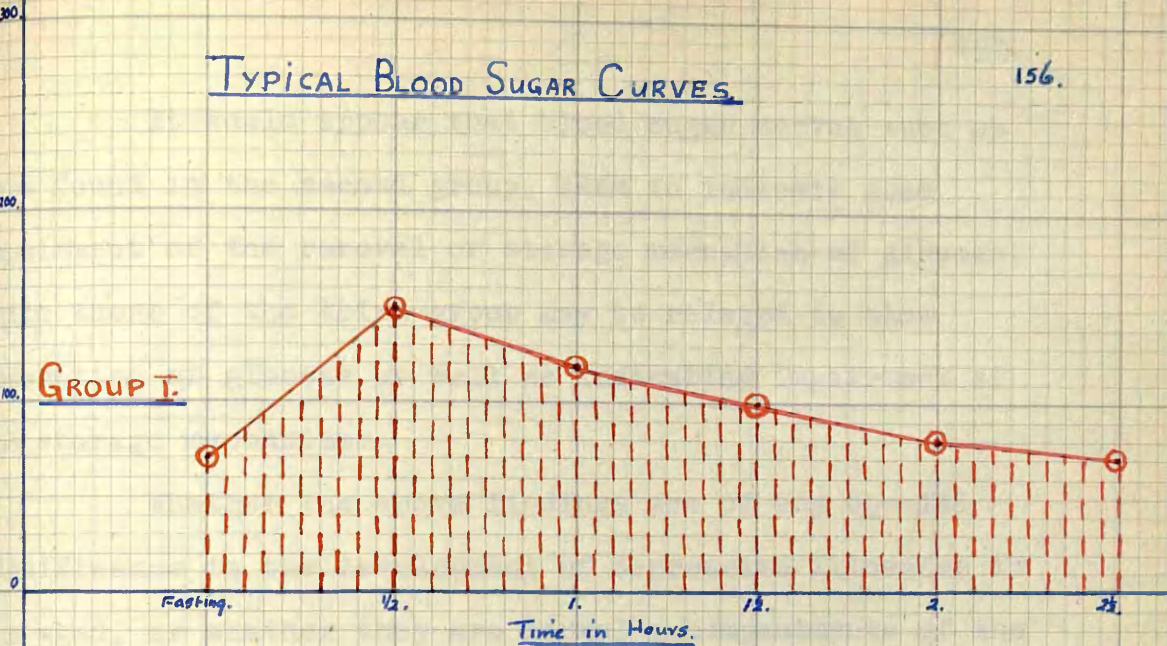
Glucose Tolerance Test :- This test was performed on all the senile admissions, and the results may be presented in three groups as follows :-

- (a) The first group included some 27 per cent of the series, and these presented normal blood sugar curves.
- (b) The second group consisted of 25 per cent of the cases, and they presented a very high blood sugar curve which did not return to the normal level after two hours.
- (c) The third group totalled nearly 50 per cent of the cases, and they presented a blood sugar curve which showed a slow rise and a delayed fall.

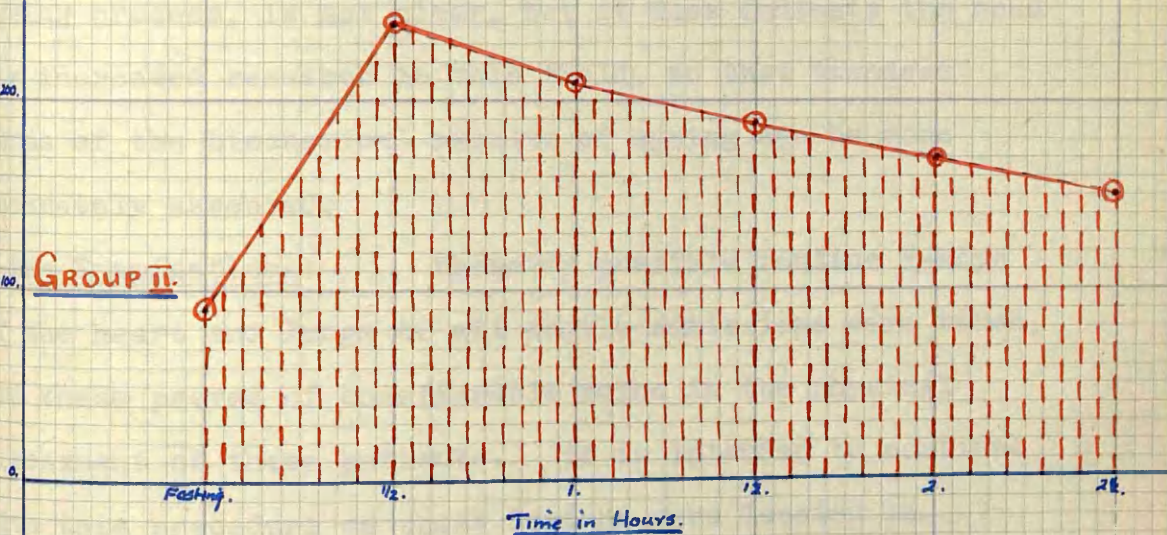
The accompanying chart on Page 156 typifies the three curves described above.

TYPICAL BLOOD SUGAR CURVES.

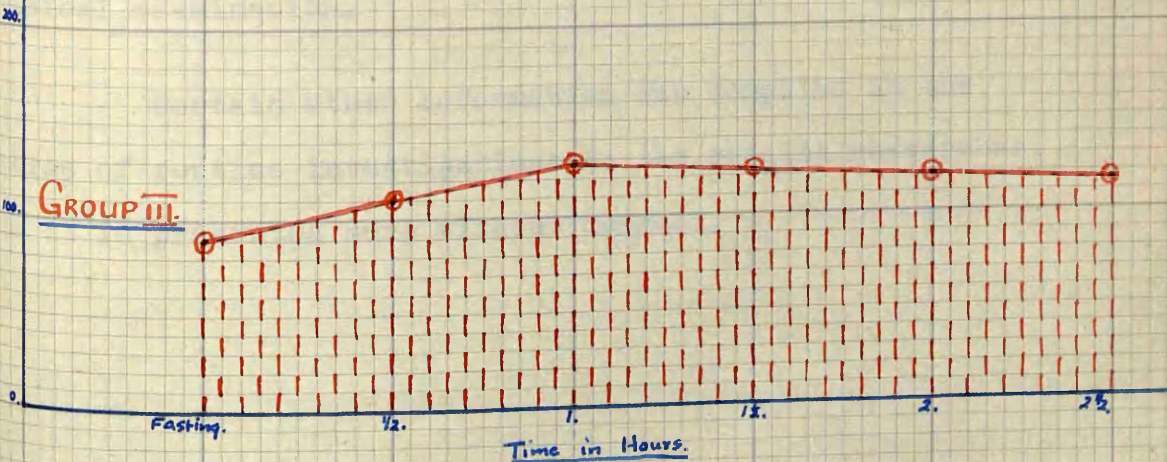
GROUP I.



GROUP II.



GROUP III.



It would appear that blood sugar curves such as were found in the second group, seem to indicate some impairment of the removal or storage mechanism of glucose, while those of the third group may be related to slow absorption of glucose as well as indicating impairment of the storage mechanisms.

Whether the above findings are of any special significance in the development of depressive illnesses in the aged, or whether they are normal accompaniments of the ageing process, is not clear, but it does indicate the need for increased research in this field, so that standard norms of the biochemical results of ageing can be more accurately assessed.

X-Ray Examinations:- Whenever possible routine X-Rays of the heart and lungs of all senile admissions were taken, and these proved of considerable value in the physical assessment of these patients. It is intended to continue with this procedure as chest lesions were located in several cases who presented no signs and symptoms on routine physical examination.

Certain other information was compiled in the course of routine investigations in the present researches, and it is presented here without comment.

1. Listed Occupations of the Entire Series.

| | | |
|--------------------------|-------|-------------|
| Gardeners. | ----- | 22. |
| Clerks. | ----- | 13. |
| Labourers. | ----- | 12. |
| Engineers. | ----- | 12. |
| Greengrocers. | ----- | 9. |
| Painters. | ----- | 6. |
| Farm Labourers. | ----- | 3. |
| Motor Mechanics. | ----- | 3. |
| Cleaners. | ----- | 3. |
| Printers. | ----- | 3. |
| Tea and Coffee Planters. | -- | 2. |
| Farmers. | ----- | 2. |
| Builders. | ----- | 2. |
| Bricklayers. | ----- | 2. |
| Sea Captains. | ----- | 2. |
| Schoolmasters. | ----- | 2. |
| Salesmen. | ----- | 2. |
| Police Officers. | ----- | 2. |
| Woodworkers. | ----- | 2. |
| Miscellaneous. | ----- | <u>14.</u> |
| | | <u>118.</u> |

The miscellaneous group includes professional men, business men, and shopkeepers of various kinds.

II. Marital Status of the Entire Series.

| | | |
|----------------------|-------|-------------|
| Married. | ----- | 70. |
| Separated from wife. | --- | 5. |
| Widowers. | ----- | 28. |
| Single. | ----- | 15. |
| | | <u>118.</u> |

III. A review of the causes of death among the patients who died in the course of these researches may be of interest.

| <u>Certified Cause of Death.</u> | | <u>Number of Cases.</u> |
|---------------------------------------|---|-------------------------|
| Cardiovascular Disease. | - | 9. |
| Cerebral Thrombosis. | - | 3. |
| Chronic Bronchitis. | - | 2. |
| Bronchopneumonia. | - | 2. |
| (a) Uraemia.) | - | 1. |
| (b) Chronic Nephritis.) | | |
| Cerebral Arteriosclerosis. | - | 1. |
| Carcinoma of Lung. | - | 1. |
| (a) Haematemesis.) | - | 1. |
| (b) Gastric Ulcer.) | | |
| (a) Cardiovascular Degeneration.) | | 1. |
| (b) Paralysis Agitans.) | | |
| (a) Cerebral Haemorrhage.) | - | 1. |
| (b) Arteriosclerosis.) | | <u>22.</u> |

A P P E N D I X I I .

Containing the abbreviated Case Histories
of fourteen selected patients.

-----oOo-----

CASE 1.

Mr. J. D. (Age 66 years). Married: Lives with wife.

Admitted: 23.10.52. Occupation: Civil Servant (retd.1939)

Diagnosis: Involutional Depressive State.

Physical Condition: Admitted in very poor health. Refusing food for some weeks - had lost much weight. Skin dry and atonic; tongue coated, fissured. B.P. = $\frac{186}{110}$

- - - - -

Always a worrying over-anxious type. Retired from work shortly after outbreak of war in 1939 in order to get away from the London area and the risk of bombing.

Present illness dates back about 3 months.

Became gradually more self-absorbed, depressed and hypochondriacal: developed visceral delusions and refused his food: very agitated and threatened suicide: insomnia: loss of weight.

On admission he was dull, retarded and refused to discuss his affairs: speech rambling and slightly confused: claimed bowels blocked so refused food (had to be tube-fed): resistive and uncooperative: deluded and without insight: required regular supervision - sedation: potentially suicidal.

Treatment: Given a course of intravenous Nicotinic Acid and "Becosym" and although this effected some improvement it was not enough and was supplemented by Electric Convulsion Therapy under "Scoline" and Sodium Pentothal. The response was excellent.

Discharged "Recovered" 31.12.52.

He was then very well indeed and his physical condition was greatly improved. Has remained well since.

Weight on Admission - 7 st. 12 lbs.

Weight on Discharge - 8 st. 4 lbs.

- - - - -

CASE 2.

Mr. T. H. V. (age 67 years) Married: Lives with wife.

Admitted: 21.7.53. Occupation: Jobbing Gardener.

Diagnosis: Involutional Depressive State.

Physical Condition: Fair. Some loss of weight. Vision faulty and hard of hearing. B.P. = $\frac{154}{86}$

Has always been a healthy man and had no serious illnesses of any kind up to two months ago. He then wrote a vindictive letter to the Labour Exchange accusing another man of not paying his insurance stamps. Since that time his condition has deteriorated steadily and he has become increasingly worried and depressed. He is quite unable to account for his actions and has become very agitated.

Unable to sleep or eat and imagines the police are after him, etc., No confusion, disorientation or memory impairment. Finally so agitated and potentially suicidal that he was certified and brought into hospital. On admission he was extremely agitated and depressed. Kept repeating his story and appeared to be in a state of abject fear. Visceral delusions present. Complained of insomnia and

took very little food.

Treatment: Given a course of intravenous Nicotinic Acid and "Becosym" supplemented by Electric Convulsive Therapy under "Scoline" and Sodium Pentothal. Rapid improvement.

Discharged "Recovered" 17.9.53.

Then very well and physically much improved. Has remained well since.

Weight on Admission = 12 st. 12 lbs.

Weight on Discharge = 13 st. 6 lbs.

CASE 3.

Mr. D. B. (Age 64 years). Married. Lives with wife.

Admitted: 6.9.52. Occupation: Schoolmaster (retired).

Diagnosis: Involutional Depressive State.

Physical Condition: Moderate. Some loss of weight.

B.P. = $\frac{134}{78}$ Emphysematous chest.

Had been a fit and healthy man up to six months ago, when he began to worry about financial matters and then about his physical condition. Finally became very depressed, agitated and potentially suicidal. Was persuaded to enter hospital as a voluntary patient for treatment.

On admission he was extremely agitated, depressed and suicidal. Felt hopeless about everything. Unable to eat or sleep. Resistive and uncooperative.

Treatment: Given a course of intravenous Nicotinic Acid

and oral "Becosym", supplemented by Electric Convulsive Therapy under "Scoline" and Sodium Pentothal. Improved steadily.

Discharged "Recovered" 17. 1. 53.

Was then greatly improved mentally and physically.

Weight on Admission - 8 st. 6 lbs.

Weight on Discharge - 9 st.

- - - - -

CASE 4.

Mr. P. S. (Age 67 years). Widower. Lives alone.

Admitted: 23.2.52. Occupation: Gardener (retired).

Diagnosis: Reactive Depressive State (severe and suicidal).

Physical Condition: Appendicectomy 1917. Rheumatic Fever 1947. Stone removed from bladder 1950. Vision failing R. Eye. B. P. = $\frac{140}{80}$

No history of mental illness up to 2 years ago when his wife was killed in a car crash and soon afterwards he was compulsorily retired from his work as a gardener with the National Trust. These two events broke him up completely and since then he has been on his own, leading an aimless existence and becoming increasingly depressed. He also began to suffer from "giddy attacks" and to wear dark glasses all the time "to keep my eyes from watering". He has been sleeping badly, his appetite has been poor and he tended to avoid company. Finally he felt that life was not worth living and attempted suicide by taking 100 Aspirins. After his recovery he agreed to come into

hospital as a voluntary patient.

On admission he was extremely depressed and emotional, full of self-pity and felt he had nothing to live for. Still potentially suicidal. Unable to sleep.

Appetite poor and very asocial. Required constant supervision. No confusion, disorientation or memory impairment.

Treatment: Given a course of intravenous Nicotinic Acid and "Becosym", supplemented by Electric Convulsive Therapy under "Scoline" and Sodium Pentothal. Excellent response, and for some months he continued to be usefully employed in the hospital gardens until work and lodgings were found for him.

Discharged "Recovered" 25. 2. 53.

Bodily health then very good. Has remained well since.

Weight on Admission - 11 st. 7 lbs.

Weight on Discharge - 12 st. 4 lbs.

- - - - -

CASE 5.

Mr. E. C. P. (Age 74 years). Widower. Lives with housekeeper.

Admitted: 7. 4. 52. Occupation: Joiner (retired).

Diagnosis: Reactive Depressive State.

Physical Condition: No serious illnesses up to a year ago when he developed a large carbuncle over the sacral region. He was in hospital for some months and finally the carbuncle was excised. A large raw area (about 20 sq. inches) was

left and someone told him it would never heal. B.P. $\frac{196}{100}$.
 Huge septic ulcer crater on back.

Became very depressed some weeks prior to admission as he thought his back would never heal and he would have to spend the rest of his life in bed. Unable to eat or sleep and exhibited mild confusional features. Was agitated and restless and as he was regarded as potentially suicidal he was admitted to mental hospital on a temporary certificate.

On admission he was depressed and uncooperative. Realised he was in a mental hospital and felt resentful. Unwilling to discuss his case but felt hopeless about the future and wished he was dead. Appetite poor. Mildly confused and looked rather toxic. Required constant nursing care and supervision.

Treatment: Started on a course of intravenous Nicotinic Acid Therapy and "Becosym" together with large doses of Penicillin and local treatment to his back. His mental condition improved steadily and his back slowly began to granulate up.

Discharged "Recovered" 12. 7. 52.

He was then mentally clear, alert and cheerful, his carbuncle was completely healed and his physical condition much improved. Has kept well since.

Weight on Admission - 9 st. 3 lbs.

Weight on Discharge - 10 st. 7 lbs.

- - - - -

CASE 6.

Mr. J. B. (Age 65 years). Single: Lives in lodgings.

Admitted: 19. 6. 52. Occupation: Chef.

Diagnosis: Reactive Depressive State.

Physical Condition: Admitted in plaster jacket with a history of an injury at work nine weeks before, resulting in a prolapsed intervertebral disc. Some evidence of malnutrition and loss of weight. He was admitted with a history of depression of two months' duration, dating from shortly after his accident. Apparently he went back to work too quickly, against medical advice and temporarily lost the power of his legs. Following this he was put into plaster and became increasingly worried and depressed.

Went off his food and was unable to sleep at night without sedation. Became increasingly agitated and difficult. Excited outburst in the ward led to his admission to mental hospital as a voluntary patient. On admission he was depressed and agitated. Appetite poor. Insomnia.

Worried about himself and apprehensive about the future.

Treatment: Started on a course of oral Vitamin-B Group therapy, together with reassurance and psychotherapy.

Soon settled down and improved steadily.

Discharged "Recovered" 16. 7. 52.

Was then much brighter mentally and improved physically. Had to wear plaster jacket for a further month and then return to work. Has kept well since.

- - - - -

CASE 7.

Mr. H. B. (age 74 years). Married. Lives with wife.

Admitted: 21. 5. 52. Occupation: Gardener (retired 1946)

Diagnosis: Recurrent Depression.

Physical Condition: In poor health: appetite poor and had lost weight. Skin dry and atonic. Tongue red and moist. Evidence of arteriosclerotic changes. B.P. $\frac{180}{90}$

Mental Condition: On admission he was depressed, dull and retarded: restless and agitated: had ideas of unworthiness: asocial and showed some memory impairment: mildly confused and gave a poor account of himself.

There was a history of a previous "nervous breakdown" in his youth and of a depressive attack in 1947, soon after his retirement. His relatives gave a picture of a rather weak and inadequate personality, very dependent on others, and unable to cope with his difficulties on his own.

Treatment: Given a course of intravenous Nicotinic Acid and oral "Becosym" and improved steadily.

Discharged "Recovered" 22. 6. 52, and was then very much better, both physically and mentally. Has remained well since.

Weight on Admission - 6 st. 8 lbs.

Weight on Discharge - 8 st. 1 lb.

- - - - -

CASE 8.

Mr. R. J. S. (Age 62 years). Married. Lives with wife.
Admitted: 16. 7. 53. Occupation: Builder (own business).

Diagnosis: Recurrent Depression (severe and suicidal).

Physical Condition: Admitted in very poor physical state.

Appetite poor and much loss of weight. Tongue dry and
 fissured. Skin loose, dry and atonic. B.P. $\frac{140}{90}$

History of recurrent attacks of depression during
 the past few years, mainly associated with his business
 worries. Twice previously in mental hospital and responded
 to E. C. T.

Present attack started some weeks ago when he
 began to worry because he felt he had taken on more work
 than he could cope with. He became increasingly agitated
 and depressed, thought the whole business was in a mess
 and that he faced bankruptcy. He was unable to eat or
 sleep and felt sure the police were after him. He was
 also of the opinion that certain articles in the newspapers
 referred to him and that he had to face the music.
 Potentially suicidal for a week prior to admission and
 could not be left alone.

On admission he was extremely agitated and
 depressed and felt hopeless about everything. Visceral
 delusions and ideas of reference. Refused his food and
 had to be tube-fed. Full of self-pity. Unable to sleep
 and required constant observation and sedation.

Treatment: Given a course of intravenous Nicotinic Acid

and "Becosym", supplemented by Electric Convulsive Therapy and "Scoline" and Sodium Pentothal. Response excellent. Discharged "Recovered" 12. 8. 53. Bodily health then much improved. Has remained well since.

Weight on Admission - 9 st.

Weight on Discharge - 9 st. 12 lbs.

- - - - -

CASE 9.

Mr. H. W. G. (Age 71 years). Married. Lives with wife.

Admitted: 17. 1. 52. Occupation: Painter (retired).

Diagnosis: Recurrent Depression (Suicidal).

Physical Condition: Bodily health poor. Thin and underweight. Chest emphysematous. Skin dry and atonic.

B.P. = $\frac{150}{80}$

There was a history of depressive illnesses in 1918 and again in 1930. The present attack commenced two months ago and culminated in attempted suicide by hanging.

On admission he was agitated, depressed and suicidal. Appetite poor and unable to sleep. Suspicious and full of ideas of unworthiness. Strong guilt feelings. Some slight memory impairment present. Mildly disoriented. Was convinced the police were after him for illegally drawing two pensions (quite erroneous).

Treatment: Started on a course of intravenous Nicotinic Acid together with oral "Becosym", supplemented by Electric

Convulsive Therapy under "Scoline" and Sodium Pentothal.
Improved steadily on this regime.

Discharged "Much improved" 7. 5. 52.

Has remained well since on maintenance doses of
Vitamin-B Group.

Weight on Admission - 7 st. 8 lbs.

Weight on Discharge - 8 st. 9 lbs.

- - - - -

CASE 10.

Mr. G. O. (Age 62 years). Married. Lives with wife.

Admitted: 30. 3. 51. Occupation: Painter.

Diagnosis: Manic - Depressive State.

Physical Condition: Nothing of note save some loss of
weight, red tongue and dry skin. B.P. $\frac{130}{80}$

History of recurrent depressive attacks since
1928, with periods in mental hospitals as follows -

I. 1928 - some months: II. Dec. 1934 - May 1935:

III. 1937 - some months: IV. Feb. - May 1938:

V. Aug. 1939 - May 1940: VI. March - July 1945:

VII. Oct. 1947 - Mar. 1948: VIII. March - June 1948.

Present attack commenced some weeks prior to
admission. Became increasingly depressed, agitated and
emotional: very retarded and gave a poor account of
himself: apprehensive and asocial: slight memory impair-
ment (? retardation): not confused, disorientated or
hallucinated: self-centred and hypochondriacal: appetite

poor and unable to sleep.

Treatment: Given a course of intravenous Nicotinic Acid and "Becosym", supplemented by Electric Convulsion Therapy under "Scoline" and Sodium Pentothal. Rapid improvement.

Discharged "Recovered" 14. 2. 52. Physical condition then very good and his weight had increased from 8 st. 5 lbs. to 9 st. 4 lbs. Has remained well since.

- - - - -

CASE 11.

Mr. J. F. K. (Age 73 years). Married. Lives with wife.

Admitted: 20. 4. 53. Occupation: Retired boxer and bookmaker's clerk.

Diagnosis: Manic - Depressive State.

Physical Condition: Poor. Eczema of face, scalp and

hands: considerable loss of weight: tongue red and

fissured: skin dry and scaly. B.P. = $\frac{190}{80}$

History of mood swings for many years - hypomania to acute depression. Condition worse in past few years and he has been in mental hospital three times in the past two years with attacks of depression of short duration. Does not get on with his wife and is unhappy at home, as his wife tries to restrict his alcoholic habits.

States that the skin became irritable on his face and scalp a few weeks before admission (condition appears to accompany all his depressive attacks): unable to sleep and became depressed and emotional: appetite poor and he finally

attempted suicide by taking an overdose of Sodium Amytal capsules. Taken to local hospital for gastric lavage, etc, and then advised to enter Brookwood as a voluntary patient.

Emotional and depressed: agitated and keeps scratching face and scalp: full of self-pity: Insomnia: appetite poor: no memory impairment, confusion or dis-orientation: no delusions or hallucinations.

Treatment: Given a course of intravenous Nicotinic Acid and "Becosym", plus sedation and local treatment to skin. Rapid improvement in physical and mental state.

Discharged "Much Improved" 16. 5. 53, at his own request. Very well, and his skin condition had cleared up completely. Has remained well since.

Weight on Admission - 9 st.

Weight on Discharge - 9 st. 5 lbs.

- - - - -

CASE 12.

Mr. A. P. (Age 84 years). Widower. Lives with daughter.

Admitted: 12. 5. 53. Occupation: Gardener (retired).

Diagnosis: Senile Depressive State.

Physical Condition: No serious illnesses until November, 1952, when he had Pneumonia. Has never really got over this. Chest emphysematous: severe degree of anaemia: considerable loss of weight. B.P. = $\frac{170}{80}$

No history of previous mental illness, but

information from relatives suggests a rather paranoid personality.

Had Pneumonia in November, 1952, and was admitted to Kingston General Hospital. He has never really picked up and has become increasingly depressed, thinking everyone was against him and that his relatives wanted to be rid of him. Has been unable to sleep and began to allege that the nurses in Kingston Hospital tried to poison him. Also suspected his relatives of trying to poison him and finally became so agitated and difficult that he was admitted to mental hospital as a temporary patient.

On admission he was agitated and depressed. Suspicious of everyone and mildly confused. Refused food, alleging that it was poisoned, and complained bitterly about his relatives and the nurses trying to put him out of the way. Restless and unable to sleep. Required observation and sedation. No insight. Slight disorientation, and memory slightly impaired. No definite intellectual deterioration.

Treatment: Given a course of oral Nicotinic Acid and "Becosym", nourishing diet and a course of Liver injections. Steady improvement in mental and physical state. Blood picture normal. Appetite good. Sleeping normally.

Discharged "Much Improved" 9. 9. 53.

Bodily health then very good. Has kept well since.

Weight on Admission - 9 st.

Weight on Discharge - 9 st. 10 lbs.

- - - - -

CASE 13.

Mr. W. H. (Age 76 years). Married. Lives with wife.

Admitted: 16. 6. 52. Occupation: Grocer (retired 1947).

Diagnosis: Senile Depressive State.

Physical Condition: No serious illness until July 1951, when he had "a slight stroke" with transient R. Hemiparosis. Condition poor on admission. Pale and thin: lost much weight: tongue red and fissured: skin lax, dry and atonic. B.P. = $\frac{160}{76}$

According to his wife there has been a gradual deterioration in his mental condition since he retired in 1947. After the vascular "incident" in July 1951 he became more and more depressed and emotionally unstable. He worried about everything, went off his sleep and his appetite deteriorated. His attitude towards his wife changed for the worse and prior to admission he actually attacked her, thereafter making a suicidal attempt with a safety razor. Admitted to mental hospital as a certified patient.

On admission he was very depressed and emotional. Full of self-pity and felt he had nothing to live for. Unable to sleep. Restless and agitated. Required constant supervision and sedation.

Treatment: Given a course of intravenous Nicotinic Acid and "Becosym", plus a nourishing diet. Made a steady and uninterrupted recovery.

Discharged "Much Improved" 16. 11. 52. Physical condition very much better. Appetite good and sleeping

well. Has remained well since.

Weight on Admission - 8 st. 5 lbs.

Weight on Discharge - 9 st.

- - - - -

CASE 14.

Mr. M. F. B. (Age 87 years). Widower. Lives in a hotel.

Admitted: 25. 1. 53. Occupation: Retired Coffee Planter.

Diagnosis: Senile Depressive State.

Physical Condition: He was in senile health on admission.

There was a vague history of gradual deterioration in his condition since his wife's death 4 years before, and of a ? "slight stroke" 2 years ago. B.P. = $\frac{160}{90}$

He was a man of good education and intelligence and comfortable means. Had become increasingly depressed, irritable and difficult during the past few months. Noisy and restless at night.

On admission he was mildly depressed and full of self-pity. He gave a detailed but rambling account of his past history, but his memory for recent events showed some impairment. Had no idea why he came here, or how he got here. Vaguely deluded, persecuted and suspicious. Restless and noisy by night and unable to sleep without sedation.

Treatment: Put on oral Nicotinic Acid and "Becosym" and improved steadily. Became cheerful and lost his delusional ideas. Memory improved.

Discharged "Much Improved" 12. 3. 53.

Was then much improved mentally and physically and returned to his hotel to live.

- - - - -

BIBLIOGRAPHY.

- (1) WATTS, C.A.H. (1947), "Endogenous Depression in General Practice." British Medical Journal, London.
- (2) "The First Report by the National Advisory Committee on the Employment of Older Men and Women." (October 1953). H.M.S.O. London.
- (3) LONGFELLOW, H.W. (1807-1882). "Morituri Salutamus", 1,238. London.
- (4) BACON, R. (1683), "The Care of the Aged." London.
- (5) SHAKESPEARE, W. (1598), "As You Like It." London.
- (6) SHAKESPEARE, W. (1604), "King Lear." London.
- (7) FLOYER, J. (1724), "The Art of Preserving Old Men's Health." London.
- (8) HILL, J. (1771), "The Old Man's Guide to Health and Longer Life." London.
- (9) HUFELAND, C.W. (1797), "The Art of Prolonging Life." London.
- (10) BERNARD, T. (1816), "Comforts in Old Age." London.
- (11) SALGEUS, J.A. (1826), "Rules for Preserving the Health of the Aged." London.
- (12) CARLISLE, A. (1838), "Practical Observations on the Preservation and Prevention of Disease." London.
- (13) EVANS, C.W.de L. (1885), "Can We Prolong Life." London.
- (14) HUMPHREY, G.M. (1889), "Old Age." London.
- (15) WEBER, H. (1903), "On the Means of Prolonging Life." London.
- (16) CRIGHTON-BROWNE, J. (1905), "The Prevention of Senility and a Sanitary Outlook." London.
- (17) METCHNIKOFF, E. (1908), "The Prolongation of Life. Optimistic Studies." London.
- (18) THEWLIS, M.W. (1919), "The Care of the Aged." New York.

- (19) SCHMIDT, P. (1931), "The Conquest of Old Age."
New York.
- (20) WARTHEN, A.S. (1929), "Old Age. The Major Involution."
New York.
- (21) KORENCHEVSKY, V. (1949), "The Problem of Ageing."
London.
- (22) THOMSON, E.N. (1949), "After-Care of the Aged Sick."
London.
- (23) FARIS, R.E.L. and DUNHAM, H.W. (1939), "Mental
Disorders in Urban Areas. An Ecological Study
of Schizophrenia and Other Psychoses." Chicago.
- (24) DUNHAM, H.W. (1945), "Sociological Aspects of Mental
Disorders." California, U.S.A.,
- (25) ROWNTREE, H.S. (1947), "Old People. Report of a
Survey Committee on the Problems of Ageing and
Care of Old People." Nuffield Foundation. London.
- (26) SHELDON, J.H. (1948), "Social Medicine in Old Age."
Oxford.
- (27) GOLDSCHMIDT, H. (1946), "Social Aspects of Ageing
and Senility." London.
- (28) JOHNSON, W.M. (1947), "Old Age. A Public Health
Problem." Minneapolis, U.S.A.,
- (29) ROBINSON, V. (1931), "The Story of Medicine."
New York.
- (30) HENDERSON, D.K. and GILLESPIE, R.D. (1946),
"A Textbook of Psychiatry." London.
- (31) CASTIGLIONI, A. (1947), "A History of Medicine."
New York.
- (32) CONNOLLY, J. (1856), "The Treatment of the Insane
Without Mechanical Restraint." London.
- (33) HENDERSON, D.K. and GILLESPIE, R.D. (1946),
"A Textbook of Psychiatry." London.
- (34) MALAMUD, W., SANDS, S.L., and MALAMUD, I. (1941),
"Psychosomatic Medicine," 3, No.4. Chicago.

- (35) HENDERSON, D.K. and GILLESPIE, R.D. (1946),
"A Textbook of Psychiatry." London.
- (36) KRETSCHMER, E. (1925), "Physique and Character."
London.
- (37) KIRCHHOF, J. (1944), Quoted in article on "Depression"
by Lewis, A. in The Journal of Mental Science.
London.
- (38) ROTH, M. et al. (1952), "Problems in the Diagnosis
and Classification of Mental Disorder in Old Age."
London.
- (39) SHAKESPEARE, W. (1599), "As You Like It." London.
- (40) ROTH, M. (1952), "Discussion on the Differential
Diagnosis of Early Dementia." Proceedings of the
Royal Society of Medicine, London.
- (41) HIMWICH, H.E. (1940), "Cerebral Carbohydrate Meta-
bolism Deficiency during Deficiency of Various
Members of the Vitamin-B. Complex." Philadelphia.
- (42) JOLLIFFE, N. (1941), "Treatment of Neuropsychiatric
Disorders with Vitamins." Chicago.
- (43) SPIES, T.D. et al. (1943), "Emotional Disturbances in
Persons with Pellagra, Beriberi and Associated
Deficiency States." Chicago.
- (44) EVANS, V.L. (1943), "Convulsive Shock Therapy in
Elderly Patients." Baltimore.
- (45) MAYER-GROSS, W. (1945), "Electric Convulsive Therapy
in Patients Over Sixty." London.
- (46) WILBUR, C.B. and FORTES, A. (1947), "Convulsive
Therapy in Patients over Seventy Years of Age
with Affective Disorders." Baltimore.
- (47) MYERSON, A. and MYERSON, P.G. (1947), "Prefrontal
Leucotomy in the Depressive States of Old Age."
Boston.
- (48) DAVIDOFF, E. et al. (1943), "The Treatment of Involu-
tional Psychoses with Diethyl Stilboestrol."
New York.
- (49) HORSLEY, J.S. (1943), "Narcoanalysis." London.

- (50) SLATER, E. and SARGENT, W. (1944), "Physical Methods of Treatment in Psychiatry." London.
- (51) JOLLIFFE, N. et al. (1940), "Nicotinic Acid Deficiency Encephalopathy." Chicago.
- (52) SYDENSTRICKER, V.P. (1941), "Clinical Manifestations of Nicotinic Acid and Riboflavin Deficiency." Chicago.
- (53) ARING, C.D. (1945), "Vascular Diseases of the Nervous System." London.
- (54) MEDLICOTT, R.W. (1945), "Nicotinic Acid in the Treatment of some Psychiatric Disorders." New Zealand.
- (55) HARDWICK, S.W. (1943), "Pellagra in Psychiatric Practice." London.
- (56) WASHBURN, A.C. (1950), "Nicotinic Acid in the Treatment of Certain Depressed States." Chicago.
- (57) HARRIS, C.R. (1950), "Electronarcosis. A Safe Technique for Routine Administration under Anaesthesia and Eulissen." London.
- (58) CLEGHORN, R.A. et al. (1950), "A Study of the Effect of Pituitary A.C.T.H. in Depressed Patients." Montreal, Canada.
- (59) HARRIS, A. (1951), "The Treatment of Depression by Dinitrile Succinate." London.
- (60) MALL, G. (1950), "Experiences with Prostigmine Treatment of Involutional Psychosis." Berlin.
- (61) DELGADO, H. et al. (1950), "Treatment of Depression and Agitation by Desoxyephedrine Hydrochloride." Lima, Peru.
- (62) BÜSSOW, H. (1951), "Substances with Cortisone-like Effects in Endogenous Depression." Berlin.
- (63) WATTS, C.A.H. (1953), "Acute Psychiatric Illness. Treatment by Vitamin-B Complex." London.
- (64) GOLDBERGER J. and TANNER, W.F.A. (1924), "A Study of the Treatment and Prevention of Pellagra." Washington, U.S.A.,
- (65) ELVEHJEM, C.A. (1940), "Relation of Nicotinic Acid to Pellagra." Baltimore.

- (66) SPIES, T.D. and BUTT, H.R. (1942), "Vitamins and Avitaminosis," from "Diseases of Metabolism." by G.G. Duncan. Philadelphia.
- (67) WORTIS, H. (1941), "Some Nutritional Aspects of Brain Metabolism." Psychiatric Quarterly, 15, 693. New York.
- (68) CALDWELL, W.A. and HARDWICK, S.W. (1944), "Vitamin Deficiency and the Psychoses" from "Recent Progress in Psychiatry." London.
- (69) HIMWICH, H.E. et al. (1940), "Cerebral Carbohydrate Metabolism during Deficiency of Various Members of the Vitamin B- Complex." from American Journal of Psychiatry." Philadelphia. U.S.A.
- (70) SPIES, T.D. and ARING, C.D. (1939), "Vitamin B Deficiency and Nervous Disease." from Journal of Neurology and Psychiatry." London.
- (71) JOLLIFFE, N. et al. (1940), "Nicotinic Acid Deficiency Encephalopathy." Journal of American Medical Association. Chicago.
- (72) SYDENSTRICKER, V.P. and CLECKLEY, H.M. (1941), "The Effect of Nicotinic Acid on Stupor, Lethargy, and Various Other Psychiatric Disorders." American Journal of Psychiatry. Baltimore.
- (73) WRIGHT, S. (1952), "Textbook of Applied Physiology." London.
- (74) HARROW, B. (1950), "Textbook of Biochemistry." Philadelphia.
- (75) PRESLAND, R. and PALMER, H. (1950), "Comparative Value of Curarising Agents with Special Reference to Convulsive Therapy." Dunedin, New Zealand.
- (76) PROUT, C.T. and HAMILTON, D.M. (1952), "Results of Electric Convulsive Therapy in Patients over Sixty Years of Age." New York.
- (77) LEVY, S. (1952), "The Value of Electric Convulsive Therapy in the Aged with Special Reference to Combined Coramine-Electroshock Therapy." Washington, U.S.A.

- (78) FURTADO, D. et al. (1949), "Experimental Study of the Vasodilating Action of Nicotinic Acid and its Derivatives." Lisbon.
- (79) ARING, C.D. (1945), "Vascular Diseases of the Nervous System." London.
- (80) FURTADO, D. et al. (1949), "Experimental Study of the Vasodilating Action of Nicotinic Acid and its Derivatives." Lisbon.
- (81) Report of the Ministry of Health for 1952, "On the State of the Public Health." (October 1953). H.M.S.O., London.
- (82) WATTS, C.A.H. (1953), "Acute Psychiatric Illness. Treatment by Vitamin-B Complex." London.
- (83) ARING, C.D. (1945), "Vascular Diseases of the Nervous System." London.
- (84) FURTADO, D. (1949), "Experimental Study of the Vasodilating Action of Nicotinic Acid and its Derivatives." Lisbon.
- (85) LEVY, S. (1953), "Pharmacological Treatment of Aged Mental Patients in a State Mental Hospital." Chicago, U.S.A.,
- (86) Report of the Ministry of Health for 1952, "On the State of the Public Health." (October, 1953). H.M.S.O., London.
- (87) THEWLIS, M.W. (1919), "The Care of the Aged." New York.
- (88) KAPLAN, O.J. (1945), "Mental Disorders in Later Life." London.
- (89) STIEGLITZ, E.J. (1949), "Geriatric Medicine." London.
- (90) "The First Report by the National Advisory Committee on the Employment of Older Men and Women." (October, 1953). H.M.S.O. London.
- (91) Special Enquiry, "As Old As You Feel." Televised by the B.B.C. from London on 15.1.54.