Thesis on
"Old Age, its Pathology
and Treatment."

April 1901.

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by Askbourne
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As Medical Officer of Health to the Ashbourne Rural District Council I have been much struck when examining the death certificates by the frequency of such terms as Old Age, Senility, Decay of Nature to give as the cause of death, and this fact, along with the large number of aged people that I come across daily in the course of my work has lead me to look more fully into the subject than I had previously done — it is a common saying among the laity of the district that "if it was not for the public-houses, nobody would die of anything but old age." If we take the five years 1895-1899 inclusive we find that in an average population of 10,791 we get 60 deaths (29 male, 31 female) registered as due to Old Age alone, equal to an annual rate of 1.112 per thousand living as compared with 0.931 the average rate for England and Wales during the same period. If we add to these the deaths where Old Age is given as one cause of death (63 secondary diseases or symptoms is added) we find the number increased to 262 (129 males, 133 females) equal to an annual rate of 2.353 per thousand living. Of these Life Tables of the Registrar-General.
262 deaths (2 males 5 females) died before the age of 70, their average age being 66.8 years, their actual ages being 62 ( Cause of death "Vascular Heart Disease, Semic Disability"), 69, 69, 67, 66, 68, 67. Three of them were due to Old Age, simply, all being females of ages 69, 69, 67.

It would therefore appear that the great majority of deaths from Old Age occur after the age of 70 and from this reason in the statistics I give I have only taken deaths among persons of 70 years upward. Strictly, however it is quite impossible to fix a certain age as being that of Senility as this condition depends on the personal equation and not on any actual number of years - as Cazalis says, with some truth as I hope to prove not absolute truth, "One is of the age of his arteries."

In studying Old Age the first thing one notices is the paucity of literature on the subject, especially English literature. Some good work, with careful observations, has been done, in France by such distinguished physicians as Pichard, Landez, Beaudoins, Rozan, Crusellier, Tournaire, Miechambre, Burand, Fandé, Cruq, Beau, Glicette & Chareau, chiefly read in the Bapetiere Hospital, Paris, and Dr. Tissier at Marseilles; also in Germany by Canslott, Seitz, Mettenhemier; but in Britain few beyond Raper, Symonds, Day, Macleachland, Balfour & Humphry, Wrede.
3.

Also noted that the advice is rarely acted on. Often the advice is disregarded, and the patient makes no effort to improve their health or lifestyle.

Medical treatment is prescribed, but adherence is often poor. The patient is expected to follow the prescribed treatment, but compliance is often lacking.

Great opportunities for improvement exist. Continuously reviewing the patient's condition and adjusting the treatment plan is crucial.

In conclusion, the lack of adherence to medical advice is a significant issue in public health. Effective communication and education are crucial in improving adherence and patient outcomes.
I recognize three, growth, maturity, senility, and these it is impossible to divide absolutely, so as to change from maturity to senility, for each stage glides imperceptibly into the following one. From the amorphous Black sphere to fully developed Manhood I on through senility to the physiological death from old age.

That death is a necessary outcome of life is evident, for all living matter must maintain itself by taking assimilating nutriment from outside (thus differing from inorganic matter), and it also has the power of producing directly, or indirectly, other living matter of its own nature. So that if death did not take place naturally, life must at least be extended out of the organism from famine — further if death did not put an end to life the struggle for existence would be constant, a life would only be granted to the organism with the greatest brute strength; this organism would constantly have the upper hand. Knowledge that the struggle must go on everlasting by unless life be interrupted by some other organism of greater strength, and at the same time would feel its functioning powers setting weaker as it advances.

We must still confess however to not knowing what life really is; we know that it consists in the continuous adjustment of internal relations to external relations, but this tells us neither the conditions necessary for life nor...

Herbert Spencer, The Principles of Biology - Vol 1, p.300.
than what life is and carries us no further than
the ancient idea of vital force.

Senescence then is the period of life during which
the organism passes from its fully mature state to its
physiological death, this death being both necessary
and desirable; during this stage certain changes take place
resulting in loss of functioning power in the various com-
ponent cells & lay up the organism open to special dangers
from both external & internal influences; and it is these
influences that the physician is called on to guard against
and counteract as far as possible so that death may
come neither before its time nor in any irregular manner.

To fully appreciate the organic & functional changes of
old age it is necessary first to glance at the subject from a
biological point of view, looking on man as an organic com-
ponent consisting of innumerable inferior organisms, each
with its own structure & function. In addition to the fact
that living matter is essentially unstable, Salzmann points
out that it also has a power of attraction (pouvoir d'amour)
by which it can reproduce itself, a particle itself how-
ever being necessarily detached & this particle affecting
the surrounding medium in such a way (by its power of
attraction) that a new living being is produced. Similar
is the original - but living matter is also distinguished by

Salzmann - Essai Sur la Vie & la Mort.
As instability, that is, the constant chemical changes going on in it, leading to loss from wear and tear, this loss must be repaired from outside, so we have the assimilating powers added. This gives us the simplest sapent cell, but this cell multiplies by its power of attraction— we get several cells each of which may gradually assume special functions if its own. We find, however, that as the functions become more specialized, higher the power of resistance to external influences becomes weaker, the power of reproduction of its kind is lost. The assimilative power is diminished along with the others, but the cell has a store of reserve energy to fall back on, while this lasts life is continued by the cell is now in a state of senescence—finally, this reserve gives out, the cell passes from a condition of life to one of death, its place functions being assumed by another cell developed in the same way from the more primitive cell.

Thus we get more developed from one every once cell, which by division gives rise to many simple cells, with intense powers of instability, attraction resistance; but these cells become specialized in course of development, forming the noble elements of physiologists, and so gradually lose their alone powers. The power of reproduction being lost, these cells becoming worn out, it follows that the whole compound organism must die.
Thromes as a Cause of Senility.

Many theories have been put forward to explain the cause of old age, among which we may mention:

1. Réveillé-Panis first proposed that senility depended on the changes which occur in the respiratory apparatus; these changes diminish the functioning power of the lungs, hence the blood is not oxygenated as it should be & the various tissues fail to receive an adequate supply of nourishment under degeneration as consequence. But this theory may rightly be objected to on the grounds that although the changes in the respiratory system are usually present in advanced age, they are not constant, so they are pathological.

2. Hamilton & Montgomery carried the above theory a stage further back, pointing out that the respiratory changes were due to ossification of the cartilages. Hume & in the various parts of the skeleton, these change interfering with the free action of the lungs, & hence again these changes in the cartilages are not constant & indeed Sir George Humphry invariably found the cartilages soft in old persons on whom he performed post mortem examinations.

3. Regel referred the change in the effect of the nerves system saying that the nerves power of the heart is less; hence

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1 Réveillé-Panis - Traité de la Vieillesse - 1853.
2 Humphry - "Old Age" - p. 22.
3 Regel, Article on "Age", Cyclopedia of Practical Medicine - 1842.
the circulation is feeblen & condensation of tissue is the result. Symonds' criticism this view, suggests that it is the vitiated condition of the blood which causes the weakened action of the heart, the vitiated condition of the blood depending on the preceding changes, the change in the blood & the altered tissue changes throughout the body; or if the change is nervous then it is due to changes in the nervous tissue itself – and these nervous changes must be themselves explained. No explanation is offered for them unless they also depend on the vitiated blood which brings us back in a circle to where we started from.

iv. One of the more recent theories that which is probably most extensively accepted at the present time is thatbuild depends on scleroses of the various organs, which is almost always (here again we cannot say absolutely always) present in the aged. It is generally accepted that arteriosclerosis frequently causes scleroses by cutting off the blood supply, but two being so frequently found combined in the aged has led to the conclusion that build depends on this arteriosclerosis. But surely this again is a case of the cause being mistaken for the effect, is it not much more likely that the arteriosclerosis is the result of build and not vice versa? build the result of arteriosclerosis.

1. Symonds, Article on "Age", Cyclopedia of Anatomy & Surgery, p. 79.
the theory stating that obliteration endarteritis attacks the
smallest blood vessels, thus cutting off the blood supply to
the organs - causing atrophy & sclerosis of them. The
cause of the endarteritis he states to be the vitiated condition
of the blood, but he fails to explain the nature of this
vitiation - there is no doubt that endarteritis may be
to caused by a toxic condition of the blood, but at present this
explanation of the occurrence of suche changes is incomplete.

1. Altheus considered that the essential change occurred
in the neural nerve, insoluble occurring as a result of
arteriosclerosis - he considered the changes similar to those
described by Hodge as a result of poisoning by phosphorus
lead or arsenic - the body of the nerve cell was found to swell,
the chromatophil substance underwent peculiar disintegration,
the spindles losing their striped appearance &aining power,
at the same time the neighboring neuroglia was found
to proliferate - it was found that all those changes might
be reversed from provided the nucleus was undamaged.
In Hodge's Altheus found that the same changes took place
but that they went further, the nucleus being destroyed
the neurone being replaced by neuroglia. The fault
with this theory is that the changes are attributed to arterio-sclerosis
but the origin of the arterio-change is not explained.

vi. Boy-Teissier bases his theory on biological proofs. He too asks the subject as he did for some time. I considered the theory my own, but while writing this thesis I have come across Dr. Boy-Teissier's most excellent article, and I was with mingled feelings of pleasure and disappointment that I read it, pleasure at the general excellence of the paper and disappointment at finding my views already published by someone else. We have seen above that as life progresses from the blastosphere onwards, the cells gradually become differentiated into groups with special functions, and that all these varying parenchymatous elements really spring from the same origin. The connective tissue cells are the simplest in the mature person and resemble the original blastodermic elements, retaining their intense power of attraction, resistance, invasibility. Sabatier speaks of the connective tissue as post-embryonic blastoderm + insulis in its function being the same. As a cell gains some special function whether secretory, motor, nervous or otherwise it gradually loses its other functions, being unable to repair itself or reproduce itself and dies its place is taken by another cell which has passed through the same stages of development as itself. At the same however sooner or later, when the ability of connective tissue cells fails, or

1 Boy-Teissier. "Old Age," Twentieth Century Practice of Medicine, Vol. 7.
2 Sabatier. Essai sur la Vie et la Mort.
they are incapable of reaching the highly specialised form re-quired of them; the parenchymatous cells fail in the connective
tissue cells take their place, causing a form of Sclerosis com-
comitant with this change the stage of senility sets in-
the effect of this deficiency of parenchyma is to reduce the function-
al activity of the organ or organs concerned to some extent. As this
failure of function appears the stage of Senility is reached-
Similar changes are going on throughout all the organs
structures of the body. But, other things being equal, the re-
lations between the functions of the different organs is
maintained.

Anatomy and Physiology of Old Age.
The characteristic anatomical feature of Old Age is Atrophy
of the essential elements. All this may be added a physiological
Sclerosis which Boy-Scianer distinguishes from pathological
Sclerosis by the name Neirosis. We have seen above
that as a cell gains specialised functions its non-natural
functions diminish in power, so it is further found that it
is the power of assimilation that first fails — failure of
assimilation means lack of nourishment and so still more
rapid failure of all the functions with shrinking of the
mitochondria in the cell, that is Simple Atrophy. This con-dition
is specially well seen in the muscular cells, these being
found diminished in size but practically unaltered in structure.

We have also seen that the connective tissue cells lose their
power of becoming so highly specialised that they only serve
as forming fibrous tissue instead of glandular or other
special cells; further fibrous tissue has a tendency to con-
mize so that it is evident that from a combination of these
changes the whole renal organs tissue diminish in
size. Some of the cells pass beyond the stage of Simple
Atrophy, the contents becoming granular, the nucleus of
the cell envelope, being discharged or gradually absorbed.

The more specialised the function of the cell the more
rapidly do the assimilative digestive powers diminish,
shortly after the cells pass beyond the stage of Simple
Atrophy. The function of the highly specialised cells
of the brain, while the less highly developed cells of the
digestive and excretory systems retain their full powers
for much later periods.

With the loss in number and size of the renal elements
it is evident that the functions of the whole organ or organs
affected must diminish in power. From the aged we find
all the natural functions diminished. Experi-
ence, however, the organs are affected pari passu and a due relation
is kept up between the various functions while continu-

Alto Weber: Handbuch Der allgemeinen und speziellen Chirurgie (1922)
easily understood unless this close relation be supposed by disease. As illustrating the relation kept up between the changes in the various functions of the body we may consider the joints - here as age advances we feel loss of mobility, but this is seen like a safeguard really when we consider that there is also weakening of the muscles which control the joint, keep the two bones in position.

These senile changes however may be seriously modified by disease, becoming then pathological; they themselves are also found to modify the course of ordinary disease & may be the direct cause of disease - for with the loss of power of assimilation we get imperfect removal of waste products with all the consequent liabilities to auto-intoxication; and further, senile changes in one organ, say the kidney, may produce general effects in the whole system, actual disease in other organs.

As soon as the assimilating power has fallen so low that repair cannot fully make up for wear & tear, senescence is fully established, becomes more accentuated from day to day, till gradually the functions are lost altogether, the organism passes into a state of death. I cannot do better than quote Dr. Leers' description of death from Old Age: - 'the greatly diminished functions permit of very limited movements; the digestive organs have
almost no work to perform, and the appetite seems to have disappeared; haemoptysis, which has become almost useless, has no longer need of a more rapid or prolonged contact of the blood with oxygen; the respiratory movements are therefore reduced in number and in intensity; their retarded rhythm conveys no idea of respiratory distress or of struggle for air; the examination of the heart shows regular pulsations, diminished as regards their intensity, and also, though less evidently, as regards their number; we feel actually that the heart has itself also nearly exhausted its efficient of contractile power that it still contracts, no longer in order to perform a role which is henceforth useless without effort, not because simply these are still remaining in it some traces of its functional power. And all this takes place without effort, without noise, without resistance, because there is neither struggle nor reaction." Rose indeed must be such cases of death from true general old age, much more frequent is it to find the changes more pronounced in one organ than another, and with resulting special symptoms, and we find people dying rather from old age of heart, kidney, brain etc., if not from some concurrent disease.
Unnatural Old Age.

Old Age may be unnatural either from being induced prematurely or by being complicated by pathological conditions; and indeed is it to find uncomplicated Old Age, in this country at all event, whatever it may be among less civilized races.

Civilization in itself is calculated to prolong the average length of life as sympathy and fellow feeling are developed to the young care for to cherish the old, instead of leaving them to their own resources as in the lower animal world—and in this Twentieth Century competition is so keen and general methods of living so rapid that Senescence is hastened—people are worn out bodily, mentally before they reach a pipe old age—

The natural period of life has been variously estimated:

Roper Brown states that the natural length of life was eight times the period taken to attain perfect maturity; while Fouques says it should be five times the period taken from maturity of the employees complete; but we now know that some epiphyses (e.g. Clavicle & Vertebra) do not unite until the frame is 25 to 30 years of age.——

Buffon suggested that length of life depended on length of gestation, but though this is true for some animals e.g. rabbit, cat, dog, it is not true for others e.g. horse.

Bennett gives the normal human life as 90-100 years.

1 Fouques — H. de Longévité Humaine — 1860.
2 Fray's Anatomy — Elements of Anatomy — pp. 196, 117.
3 Bennett — The Elements of Eupaton — 1586.
As a rule the change begins to be appreciable in many between 50-55 years of age, and from that time onwards it is usual to find symptoms of failing energy becoming more marked. About this age it is frequently found that a firm bend to some degree of convalescence, due to imperfect evacuation of the blood resulting in fatty degeneration, but later this generally disappears, the fat being absorbed, giving the thin appearance of typical old age. About now too the joints begin to feel stiffer and the muscular energy, fails till the time 60 is reached, recovery power after fatigue is found to be slow and deficient. It is this reduction of nervous muscular power that gives the surest indication of approaching senility, the loss being due in the first place failure of the nerve cells rather than any change in the muscle tissue.

Sir Henry Holstyn in 1813 described what he calls "Pneumorrhoeic Disease", stating that it was a special disease that simply decay, as men were often found to rally from it. It describes it as "a feeling away of the flesh in the decline of life without any obvious cause of exhaustion, accompanied with a quicker pulse than natural, and an extraordinary alteration in the expression of countenance." The disease comes on gradually, no special complaint is made but the patient becomes thinner, his more easily fatigued than previously; the
Appetite is impaired, the patient is restless at night, and repeated by what sleep he gets, the face is exanthematous or may be elevated, the tongue white. There is often pain in the chest, head, and legs, and drows. The urine is passed in full quantity, but the bowels are sluggish. The stiffness is complainied of, and "pneumatic" pain in the course of the nerves. The digestive functions fail, & general anæsthesia follows; but is often accompanied by exaæmia + amnæria; the mind grows torpid and indifferent to outer things. The patient usually sinks - he may however gradually recover, but the energies of the frame are never the same again, nor does the countenance recover its old expression. It is usual to have other complications added - the disease usually shows itself between the ages of 50-60 yrs.

D. Henry Kennedy of Dublin described the same condition in 1844, occurring in younger people. He found it "by no means infrequent between 20 & 30," & found that the pulse-rate was not increased from first to last. The urine was diminished, pain in the head was a constant symptom, and periodic in character.

The disease was described as anxiety or mental trouble, and usually, but might also follow a shock, accident, or of intercourse or marriage late in life. Kennedy found it last from 4 months to 2 years, usually about 9 months.

These descriptions however bear very much to those of old age without special localising symptoms. The only treatment found of any use was the general treatment to be later described smoked out to all aged persons showing signs of failing energy. Also how often do we find the usual "breakdown" of the aged brought on somewhat suddenly as a result of some great mental trouble.

Circumstances Affecting the onset of Old Age.

What are the causes of this premature senility? In such questions as this the statistics collected by Sir Rev. Humphry are the most useful we have. In 1870 a 'Collective Investigation Committee' was formed by the British Medical Association to enquire into Old Age among other subjects. Sir Rev. Humphry of Rawbridge was entrusted with the subject of Old Age, and sent in reports which were duly published in the 'Collective Investigation Records' as a supplement to the British Medical Journal. He later elaborated the matter published in book form, entitled "Old Age" in 1887. Humphry found that the conditions necessary for longevity were interest, good quality endurance, steady persistence, nutritive force, and a good proportion in balance between the several organs - each organ must be sound in itself and its function must be in proportion to the functions
of the other organs. Further there must be freedom from exposure to accidents & causes of disease. This found that more women than men live to old age; more boys are born than girls, but the ratio is reversed in the first year of life, it undergoes steady reduction in favour of the females to the end of life. The majority of the cases investigated showed that they came of long-lived families (showing sound family constitution), had enjoyed good health, good appetites & good digestions, they had been moderate or small eaters, usually not taking much flesh meat, temperate in use of alcohol or soft drinks. The converse of each of these points makes the advent of old age, really by causing disturbance of the nutritive faculties.

Other persons appear to live more rapidly from the first, the functions being phenomenally active. Skin, it may be, combined with the efficient stamina, lead up to precocity in youth, & premature senility or early - "Such is usually the condition of dwarfs who generally die at an early age, bearing all the ordinary marks of extreme old age."

Premature senility is also induced by disease of the various diseases, even if death do not take place early from disease; especially is this the case with persons of the senilious constitution, when all the vital functions suffer from a lack of energy.

Of diseases acquired during life some, like Syphilis, may...
Cause permanent hindrance to nutrition from the first, others
like intermittent may do so, but more generally kill by
local disease before old age is reached - Others again leave
some permanent effect the gravity of which is only fully
appreciated some time after the disease is apparently
cured: this condition has been extremely often seen during
recent years as a sequel of influenza.

Chronic poisoning from alcohol, lead to, and injurious
diet, either in quantity or quality, are active causes of pre-
mature senility, as are also affections of the nervous system,
now so common, further, perhaps definite organic lesions
 Examples: Epilepsy, Insanity.

Drysdale has called attention to the great preventable mortality
among the poor classes from bad living, bad shelter from cold, etc.

Stated Anatomy & Pathology of Old Age.

We have already seen that the organs of old persons are
much less able to resist disease than those of adults, and
that the senile changes may themselves induce disease. It is
this latter fact that has largely been overlooked by writers
on the subject of old age, hence the descriptions we get are
really those of the average old man with the most usual
pathological conditions added; it is this fact also that explains
the very different views that different writers may hold on

Drysdale - On the Influence of Their Circumstances on Longevity

the same subject. As an example of renal changes widening disease we may take the Nephritis described above, which when it affects the renal vacuum as it so frequently does, may cause an arteriosclerosis, which in turn diminishes the blood supply to various organs, so assisting there to the renal changes stated further, and also by impeding the blood flow calls for increased activity from the heart, with resultant hypertrophy of that organ.

Before dealing with specialized disease in the aged, therefore, it will be well to note the most usual conditions, pathological and physiological, as they occur combined.

We have seen that atrophy goes on in all the organs equally if health is maintained but this normal condition may be disturbed if one organ be in a pathological condition, e.g. arteriosclerosis causing hypertrophy of the heart, or the cells in addition to atrophy may undergo one of the specific forms of degeneration:

1. Albuminous or Hyaline Degeneration may affect any of the tissues. The cells enlarge and are seen to contain albuminous granules which may obscure the nuclei; the cell may rupture into contents be expelled as detritus, which gradually becomes absorbed. The tissue affected increases in volume but transparent becomes opaque.

2. Fatty Degeneration is the most frequent form, may be

Vide supra. Vol. II.

fatty from the first or may follow hyaline form. This usually
the result of defective nutrition; it is first seen as small
droplets that in the cell around the nucleus, these droplets
increase in number and size, may fuse to form one droplet
filling the cell, but usually remain separate, each being
surrounded by an albuminous coat. 2

iii. Calcareous Degeneration may affect any tissue but
was especially dead tissue e.g. ligation, or any degenerated
tissue, is hence very common among the aged. It com-
pens a deposit of lime or magnesium salts (chiefly carbonate
phosphate of lime), at first having the appearance of fine
granules but as the deposit increases forming a continuous
pellicle. Tulamor has shown that if there be calcification
we must first have a special modification of the Connective
tissue, so that calcareous degeneration is not purely Speede
as sometimes stated, but only occasionally so.

iv. Fibrous Degeneration or Sclerosis is hardly a degeneration
in the same sense as the above forms, these affecting the essential
cells, while sclerosis is rather a change in the Connective
tissue, consisting in an increase of fibrous tissue. It is the
commonest condition found in the aged and may occur in all

2. Coates. Med. p. 188
the tissues and organs - it usually depends on defective nutrition to follow arteries, which may itself be due to toxic influences from the blood, it being vitiated from imperfect oxygenation, from accumulation of waste products. I have above referred to the physiological condition described by Boyer as "fascia", where the connective tissue cells from fibrous tissue instead of the more highly specialised cells - it is evident that if this "fascia" affects the vascular system, as arteries we get a thickening of their walls with obstruction to the blood flow + further atrophic + fibrous changes in the tissues supplied. Boyer considers this "fascia" the only cause of "renal atrophy" + points out that autopsies on the aged may show sclerosis + atresia + pathological changes being excluded) are of little importance, producing little organic change, even permitting a regular functioning of the economy - further that "generalised atresia" is not found proportionate to the age + is not the cause of renal "failure."

It is probable that each of these various degenerative effects on the functions of the various organs in its own particular manner, and the different forms overlap so much that the effects are

3. Vidi Supra, Vol. 11.
indistinguishable, at any rate, from present methods of Clinical Investigation.

What are the conditions most frequently found in persons of advanced years?

"Nothing is more obvious in the condition of the aged as compared with the young than the differences noted between the fluids and the solids, the former being remarkably deficient both in the brain and the blood."

**Culinary System.** The mucous membrane, secreting the fluids, gradually atrophies, becoming thinner and the gums are white and parched in color, the epithelium hard from chewing; the gums recede from what teeth may be left. The tongue is like flabellum from loss of nervous muscular power - the salivary glands are little altered, the increase in saliva being only apparent and real, the thickening of the saliva so that even new water being due to increase in amount and the altered form of the mouth, muscular relaxation and debility with diminished excitability by sympathy. The teeth are lost from atrophic changes in the jaw bone and from disease in the teeth usually. Symphorpy found the average number of teeth lost 1.2 in men and 1.5 in women between the ages of 80 and 100. The muscular walls of the intestines become wasted from leading to atrophy, the mucous membrane is pale.

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Simpson. 1901, p. 77.

Rogers. 1911, p. 36.
from fatty degeneration of the capillary network, the cells and
无数 fat-filled cells disappear or diminish in size & number,
and the lastest vessels are much fewer in number. The
liver diminishes in size and weight, the weight of the
male liver (upwards) being in males 44.01 oz and in
females 34.0 oz as compared with 58.0 oz and 53.51 oz
respectively, in men & women from 30 to 40 years of age.
The condition of the liver has been specially studied by Boyd
Jessem, who describes the main forms, the non-fatty and
its fatty—i.e., in the former the general appearance is un-
altered except for the superficial lobules in contact with
Glisson's capsule—here are found fibrous bundles shotting the
substance of the lobule is separating & hugging the hepatic
cells— in addition to this, larger bundles separate the
various lobules, there is also marked fibrosis of the portal
spaces, stenosis of the vessels, with thickening of the veins—
the connective tissue lesions do not spread round the vessels
but remain localized forming fibrous plaques with distinct
borders—the hepatic cells an constant atrophy: in the
female
1

or two of fatty cells, and then a peripherale layer of healthy cells, thus differing from the ordinary fatty livers, where the fatty cells occur either around the central vein or at the periphery. Here again the hepatic cells are atrophied. The gall-bladder is thickened often adherent to the liver may be calcified. It often contains gall-stones though we rarely see hepatic bile in the aged. The bile is almost ni amounct and the liver contains more cholesterin, a favorable condition for the formation of calculi. 2 The pancreas is absorbed and often fatty.

Homoiopteric Spleen - the spleen is found to be greatly absorbed. Also the lymphatic glands diminishing in size and weight and many of the glands disappearing altogether. It is noticeable that the lymphatic ductless glands, so large in youth during their most active period, now must mark atrophy when general growth ceases. Rolleston reports a post-mortem examination of a centenarian, male at 107, death due to acute pleurisy, where the spleen weighed 293; no mesenteric glands were visible. Macauley reports a case where the spleen was enclosed in a seriligenous envelope. Boyd gives the average

2. Boy, Tenser. Ibid. p. 505
3. Nagel. Ibid. p. 37
4. Rolleston. Scientific Papers 1st Dec. 111
weight of the spleen in persons upwards of 80 years as in males 4.27 lbs., females 3.46 lbs., as compared with 7.12 lbs. and 6.13 lbs., respectively, in persons between 30-40 yrs. Its tissue is firmer than flabby, on section we find that most of the lymphatics have abscorbed or disappeared, the pulp appears resemble a man of connective tissue penetrated with vessels.

The blood is more watery in old age, the solid constituents being diminished, especially the corpuscles:

<table>
<thead>
<tr>
<th>Table of the Composition of Blood (Denis).</th>
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<tr>
<td>1000 parts of healthy blood — males —</td>
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<tr>
<td>Age</td>
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<tr>
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<tr>
<td>25</td>
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<td>70</td>
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<td>80</td>
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1000 parts of healthy blood — females —

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<th>Age</th>
<th>Water</th>
<th>Solid Residue</th>
<th>Haem.</th>
<th>Red. Corp.</th>
<th>Albumen</th>
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<td>133.4</td>
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Snirn quotes Bequezel and Rodies as saying that Cholesterol increases progressively after 40 or 50 years of age — that is, there is decrease in specific constituents increase in fatty and aqueous matters. Leichtbuensthai states that the hydrophobic oil is always increased in amount after 60 years of age — the arterial blood which is darker in colour than

1. Boyd, 2d Ed.
in the adult from imperfect rotation in the lungs. The
blood is stated to coagulate more rapidly than in the adult
but Symonds notes that the coagulum is not so firm as that
of the adult. Richardson drew attention to the fact that
unprolonged death from old age without obvious disease
is common to find fibrinous coagula deposited, the development
of these depending on the condition of the respiratory system—
if respiration be free and blood well mixed the coagula will be
from large attached to the vessel wall but if respiration
be difficult for some time before death the coagula will be
less compact, imperfect less securely attached.

Circulatory System. This system shows the most
important changes from a clinical point of view, the usually
pathological condition of the heart and blood vessels influencing
each organ of the body. Modify its changes. The change
in the arterial walls is the first to be noticed on physical ex-
amination as a rule, the walls lose their elasticity, be-
becoming more rigid, the muscular and elastic layers be-
ing one muscle by muscle until complete degeneration,
coming more fibrous. This rigidity of the arterial walls
causes them to yield more slowly to the impulse of the blood

1. Symonds.—Str. p. 77.
2. B. W. Richardson.—The Cause of the Coagulation of the Blood, p. 87.
   Symonds.—Str. p. 77.
Stream fasketion is also slower and to complete, hence the entrance of the blood into the capillaries are slow to become intermittent instead of constant, the blood pressure falling in the capillaries rising in the arteries, from accumulation of blood. At the same time from the arteries ceased the blood is not required in such quantity, this fact along with the fall in blood pressure allows many of the capillaries to wither. The veins are found more dilated their walls thinner than in youth, this may be explained in part by the fact that in youth youth is going on calls for a large supply of arterial blood, in part by the fact that there is a smaller amount of connective tissue in the venous walls than in the arterial. In youth the arteries veins contain about equal portions of the total blood, but in old age the veins contain twice as much as the arteries. These facts also explain the greater frequency of venous thrombosis in old age, a arterial in youth.

The condition of the arteries, its effect in raising the blood pressure, calls on the heart for greater work—the normal heart always having a store fund of potential energy responds to the call and gradually its walls become hypertrophies. Balfour states the heart has long been

1 Balfour. _The Senior Heart_ p. 15.
2 Roget. _Ibid._ p. 38.
3 Balfour. _Ibid._ p. 42.
Known to be hypertrophied in all old people." - Bigot suggests
this view states that the hypertrophy is mainly limited to the
left ventricle but it may also affect the right. Macleachlan
found that the heart retained its size if it does not actually increase
in dimensions. Others believe that the heart does not as a rule
participate in the general atrophy of the body but rather increases
in dimensions in volume. Chevrel says that the heart follows
the usual law of atrophy; that it "may even undergo a real
hypertrophy in some old people." These many various opinions
will illustrate the point mentioned above, that most writers
on old age have studied pathological pathological and physiological
for rare are the opportunities of seeing pathological old age.
I have found the heart changes almost constant, but varying
in proportion to the arterial changes. I prefer to consider
them pathological as Chevrel does. Boyd found the
heart weight from 11.36 in males 30-40 to 12.13 in males
80 years upward; 9.45 in females 30-40 to 10.27 in females
over 80 years of age. Clendenin found that the seminal
heart exceeded the normal average in weight by about 1/2 of.
the average weight in males under 60 yrs of age (excluding cases of Mitral and Aortic lesions) being 94.3, in females 7.3.
while above 60 yrs the male heart averaged 117.3, female 92.3.
Bizz 
points out that the auricular ventricular orifices progressively enlarge, but that the arterial orifices enlarge equally only till middle life, after which the aortic orifice enlarges more rapidly than the pulmonary.
while patches are often found in the heart in old age, some of which Bizz considered senile heart inflammation, but they are probably all inflammation.
as suggested by Paget whose view was also accepted by 
Rokitansky - they can usually be dissected off as a false membrane.
saltatory changes are very common in the surrounding tissues, the change being almost constant, according to Charcot. Atrophies of the coronary arteries is common, but this tissue present in the capillaries supplying the heart, while as the other capillaries do, leading to diminished nourishment of failure of the organ.

Respiratory System - The cavities of the larynx become dilated as age advances, always in Belli, Shannon &
proportional till (Rokitansky) - the walls of the larynx become more rigid, till the extent of the cavity causes the deeper or early
disappear, while as age advances still further, the pneuma plethora

beneath contractile tissue with the muscular weakness
in the mouth and throat cause the voice to become hoarse and 
the involuntary movements of the face and the absence of the teeth,
the disproportionate size of the face and the
falling of the cheeks. On account of the change in the
structure the cheek becomes flattened externally at the upper portion,
the middle vertebrae cartilage permits the cause of
the cheek cavity - as the shrinking of the intervertebral cartilage
is more evident in the anterior portion we have a forward
curvature of the spine produced so that the cheek cavity is
diminished in each direction - The lips are smaller
than in the adult, but the weight is only slightly reduced.

Even as increased - this increase in weight may be
accounted for by the large amount of secretion usually found
in adults, liarm the large amount of foreign matter which
is daily increased.

Boyd gives an increase in males of decrease
in females. Males, 700 pounds average 54.76 lbs., females 35.48.
Between 30-40 yrs males 52.76 lbs., females 36.38. The lips are
often surrounded by a considerable amount of clear fluid.
The lining tissue gradually assumes an amorphous appearance,
from a film of the alveolar epithelium that is the furrow of the
neighboring air cells facing. Lemnec says: "In all subjects
the lungs present remarkable characters, the calibre of all

1. Boyd: 1812

2. Lemnec: Disease of the Chest - St. Peter's Hosp. 3rd Apr. 1848.
their vessels seems diminished, they become in some sort ex

nanginous; the partitions of their air cells appear thinner than

natural, in which their substance rendered more rare, be-

comes less elastic. This yields to the atmospheric pressure on

the opening of the body, they are found to occupy not more than

one third of the cavity of the pleura. Hornemann & Dechambre

made a special study of these lungs, chiefly in connection with

pneumonic, confirmed Kerni's observations & described 3

types of pneumatic lung.

1. Inflamed fleshly ligaments to people with expansmolllarar

empiaille-lungs scarce, posterior chest being opened. Other

ashy grey with deep black spots - thence the heart & head vessels

hidden by expanded lung, pleural cavity dry, deeper little from

abdominal - peritoneum distinct on pressure. If there is

lateral flattening of the chest we find the interlobar pessure

ventilated so that one lobe of the left lung is directly in front and

the other behind, whilst on the right side the middle lobe projects

downwards. The lower lobe becomes elevated behind it, so as

from the posterior fourth or more of the summit of the organ

(then an apparently apical pneumonic may really be

situated in the inferior lobe) - On section small holes are

found united by masses of air spaces are larger than

indirect but regular, isolated & distinct - the blood vessels

can be traced in the air cells.

1 Hornemann & Dechambre. Archiv fur de Medizin 1855.
In contracted chests, soft parts are flabby and wasted, the types of dust smaller, lighter than can be distinguished only imperfectly. There is abundant fluid in the pleural cavity, black spots thyme are more evident on the surface of the lung - crepitation is more evident and moves more diffusely than indirectly. On section the air cells are found to be more rounded, but elliptical, the vessels elongated less numerous, the air cells are deformed but still isolated.

Of the lung are wasted into crumbled up masses, surface irregular, pressed close to the spine - large amount of serous fluid in pleural cavity - lungs appear lividly flabby have lost their normal form may be larger at the summit than the base. The lobes are sometimes very united by a thin sheet of pleura lining them as it were floating. Respiration scarcely increases their volume, very light, respiration dull and prolonged. On section the lungs are found spongy, resembling a tube network, there are few blood vessels to the lung dull lobular division is effaced.

These different types should rather be looked on as different stages in the same change - the collection of fluid in ex.

Planed by the fact that the thoracic wall cannot contract the same extent as the lungs. From the above changes it is evident that the act of inspiration becomes more difficult, inspiration depending chiefly on the diaphragm - in account of the curvature of the spine.
The scaleni and sternocleidomastoid muscles become useless unless the head be thrown back during inspiration — the curvature of the spine also causes relaxation of the abdominal muscles so that forced expiration is more difficult. The lungs have lost much of their elasticity, the area of the membrane exposed to the air is much diminished, hence we don’t get so much air changed with each inspiration, so the vascular area is also diminished the blood does not become aerated as freely as in the adult. It follows therefore that we do not have so much aqueous vapour given off from the lungs. This fact increases the tendency to bronchial constriction, so often found in the aged. The breath is often noticed to have a peculiar smell, owing to the distinctly ammoniacal smell. Roget explains this fact by the diminution of the sweating power, less animal matter being lost from the skin: the more from the mucous membranes.

**Integumentary System.** The skin becomes much thinner, especially in its papillary layer; the papilla becoming less distinct. Tendons disappear altogether on account of loss of fat, the skin becomes wrinkled and the withering up of the capillaries causes the skin to lose its pinky appearance. The epidermis becomes dry, through atrophy of the sweat and sebaceous glands. The hair

becomes much less amount is very deficient in pigment.  

This fall up of the hair is not the same as that so often seen 
in the adult after acute diseases, in the former case the 
hair root is destroyed with obliteration of the canal, while 
in the latter the bulbous capsule is partly destroyed.

**Urinary System.** Chavel states that the kidneys 
maintain their normal size in old age. Boyd's researches to 
prove this, however, that the kidneys share the general atrophy of 
the other organs, the weight in persons over 80 years of age being 
reduced from males from 11.35 oz to 3.25 oz and in females from 
10.34 lb to 6.36 oz, as compared with persons from 30 to 40 years old.

The atrophy of the muscular coat of the bladder allows that organ 
to become easily over-distended, and its expulsive power 
is also diminished. — The prostate gland in the male is 
formerly enlarged, but hence often found to be atrophied 
with thin hypertrophied and thus regarded as the true 
Seret change — as erroneous it does not lead to specific 
symptoms attention is not drawn to the fact and it is over 
looked. The urine is less concentrated, less rich in 
urea, more acid & fixed salts (chiefly phosphates, Chlorides of Sodium, 
Alkaline Sulphates & phosphates) but is more turbid from 
increase of mucous epithelium to form & degenerate.

2. Boyd. Ibid.
specify more rapidly. Senator gives the following table showing the differences between the urine of adult life and that of old age: -

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>Maximum</th>
<th>Minimum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adults</td>
<td>452</td>
<td>509</td>
<td>557</td>
</tr>
<tr>
<td>Old</td>
<td>125</td>
<td>189</td>
<td>60</td>
</tr>
</tbody>
</table>

Forced Salts -

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>Maximum</th>
<th>Minimum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adults</td>
<td>260</td>
<td>378</td>
<td>153</td>
</tr>
<tr>
<td>Old</td>
<td>124</td>
<td>157</td>
<td>94</td>
</tr>
</tbody>
</table>

The fact that in the amount of urine excreted is explained by the comparative small tissue change (asymptomatic) going on in the glands as compared with the young & adults.

Reproductive System. General atrophy of the female organs occurs, the testicles or ovaries being often only represented by a small mass of fibrous tissue. The testicle may and often does preserve its function in old age, but the ovary has usually lost its function before the other female changes are marked. In the female, it is not uncommon to find the uterus, which may be reduced to a cartilaginous mass, prolapsed. The seminal fluid is clearer than in the adult and smaller in quantity & contains few or no spermatogonia.

Nervous System - The brain matter is often found adherent to the skull, the medullary bodies increased in size & may project through the dura mater. A hair growth often appears thickened & the skin is less vascular - the subarachnoid fluid is ni-
creased (taking the place of the shrunk brain) and the ventricles are often treated. The brain shrinks especially in the frontal region the convolutions are formed the flattened - the gray matter is thinner the whole brain feels firmer - contains less blood - According to Boy the male brain loses 2.36 oz. - The female 3.32 oz. in weight. The arteries at the base of the brain are thickened very often arteriothrombi, but the mitral 

support is kept up until late in life so the internal cardiac valves retain their elasticity and calibre (Balfour and Hyde Stead). It has been known by Virchow that the nervous tissue predominates over the essential nerve cells but that it becomes permeated by 

amyloid bodies (atrophie degeneration). It has also pointed out the frequency with which we find calcareous degeneration of 

the parenchyma especially if they be suddenly deprived of their 

vascular supply. I have described above the changes which 

Athens considered the essential changes of HD take (vide supra too.).

The changes in the eye consist chiefly in flattening of the 

cone in many cases the formation of an "iris "remains mild 

its margin, this being due to atypical degeneration of the 

cone cells fibrils. The iris becomes becomes paler (the pupil 

more contracted), the pigment of the choroidal membrane is

1. Balfour, Stead, 1845.

2. Balfour, Stead, 1845, p. 22.


diminished, the lens becomes flattened and assumes a yellowish tinct. The aqueous and vitreous humors diminish in quality, the lacrimal puncta may become obstructed causing a flow of tears on the cheek.

In the ear the ossicles tend to become fused into one bone and there is often a long deposit formed in the mastoid cells. The tympanic membrane is dry and thickened, and the wax is diminished. The fluid in the inner ear is less in amount.

In the nose the Schlechtner membrane is drier than in the adult, secreting less moisture. The flow of tears into the nose being often obstructed, hence the smell is diminished from local causes as well as the central nervous channels.

Taste is not as acute in the aged as in the adult. But it is retained longer than most of the other special functions. The deficiency is partly due to the drier condition of the mucous membrane and partly to the diminished power of smell. The special senses are also diminished in power from atrophy of the special nerves themselves.

Sight is diminished partly from the dryness and hardening of the skin and partly from general retardation in the function of the nervous system.

The intellect may remain good at the end, though failure in memory (especially for recent events) is one of the earliest signs of old age. The intellect is the last function to reach...
full development, truly does it as the body requires to face further as life is prolonged, one is always gaining further practical experience, of the benefit of exercise. The intellectual process is well shown in some of the most noted men of our country, who have done good talking work after they reach well to considered to have reached old age. The long memory for recent events is due to the impression made on the central brain being greater, also to the diminution in the power of attention.

Locomotor System. The changes in the skeleton are perhaps the most appreciable in the body. There have been made a special study of by the late Sir George Humphry, the bones through not changing much in size, shape become thinner, lighter, weaker, the animal matter gradually joining, way is mineral, the nutrient foramina becoming contracted and it may be obliterated. The suppressed growth that has been going on throughout life may continue more slowly, but absorption is always going on from the interior of the bones. More especially in the cancellous or most vascular parts, the marrow spaces becoming larger from absorption of the bony layers—the bone matter may become, in places, become more fatty. It is thus seen that the changes weaken the bone and the being more marked in the cancellous portions, we have here the explanation of fractures being more frequent near the ends of the long bones.
in the aged than in adults. The effects of this change are most frequently shown in the neck of the femur, where the strength of the part depends on the peculiar arrangement of its bony layers; this arrangement being disturbed by the above change, accounts for the weakness of the part.

Alteration takes place earlier in women than in men, this fact, attributes this fact to the earlier cessation from active work in the former, less out-door exercise, as well as the naturally greater tendency to diffuse degeneration in women. These facts must be noticed in considering the greater frequency of fracture of the neck of the femur in women, as well as the fact that the neck of the bone makes a smaller angle with the shaft in women than in men.

The skull as a rule becomes thinner lighter like the pelvis of the sexes together, the cellular tissue between the tables being removed, but Humphry points out that in some cases there is distinct thickening of the skull, especially in the Calvarium, this depending on diminished pressure from the brain and consequent growth of the blood.

2. Humphry, Old Age p. 16.
are commonly obliterating, first in the lower, lastly in the upper

premolar.

The jaw bones being so largely composed of cancellous tissue,
like the female changes more markedly, this fact having long
been taken notice of in judging of the age of a person at death
from examination of the skeleton only. The absence of the
cancellous tissue leads to the loosening of the teeth. The falling
out of them. The cases collected by Humphry show the change
in the female in women than in men—among men over 50 years
of age the average number of teeth was found to be 6, in women
only 3. Of the men 25 per cent. had no teeth while of the women
23.2 per cent. were without. It was also found that the teeth
left the upper jaw earlier than the lower jaw. The molars or
premolars appear earlier than the incisors. Hummerry reports
that the teeth of the male cancellous portions of the bone
first. In time there is hardly a trace of the alveolar
sockets left. So complete is the absorption that the teeth having
fallen out, the section of the muscles in chewing is altered, causing
the body of maxilla of the lower jaw to be in line with a straight
line. Hence the aged lower jaw comes to resemble the infant,
in shape, but apart from this, there is no essential
difference that the infant jaw has, an alveolar process
which the aged jaw has not.

The spine comes to be curved forwards, this change depending
largely on muscular weakness. The spinal process depending

1 Wright. Phal. p. 36.
on the action of the muscles of the back) but also from each
an absorption of the bodies of the vertebral intervertebral cartilages,
this absorption being more evident anteriorly than posteriorly.
The drying of the intervertebral cartilages affects the spine
become much more rigid.

The medullary cavities are enlarged throughout the long bones
the marrow itself is found. The wise of the concurrence of all.

The cartilages of the body tend to atrophy, but not to such an extent
as the loss in height in old age depends partly on
absorption of cartilage (especially the intervertebral) but more
still in the atrophy referred to above. As a rule the cartilage
remains soft, but it is very liable to undergo calcaneous
degeneration. Humphry has invariably found the cartilage
cartilages soft in old people in whom he has had an opp.
portunity of making an examination after death." Macc
shelden states that the true ribs are wholly ossified in many
of the cases over 60 years of age, and after that age the first 5
seems are always ossified.-Symonds finds scarcely any
trace of cartilage between the ribs terminus in old age.

The joints become stiff as age advances, from the hardening of
the films of the fluid's tissues, and the synovial fluid becomes less in quantity,
the ligaments dry, hence, less elastic. This stiffness of the

Joints in the elderly are so far that the weakening of the muscles (from atrophy, loss of nervous power) renders them unable to control very loose joints.

The muscles become atrophied, pale-coloured, and flabby, and are found to respond more slowly to stimuli. The muscle cells under simple atrophy have very sparse branching and degenerate, leading to weak action even paralysis.

It is observed that the irregular action of the muscles in the aged is generally accompanied by a deterioration of their substance, indicated by greater paleness and the assumption of a light yellow colour as if an approach was made to their conversion into subcutaneous matter (fatty degeneration).

It remarks that this change is more commonly observed to take place in the deep-seated muscles of the back, which occupy the longitudinal spaces between the processes of the vertebrae, and that in this it does not affect the muscular system generally but only a small number of isolated muscles.

The same phenomenon has been noticed in muscles that had long been paralyzed.

The tendons contract contain less synovial fluid so that movement is more difficult and may be painful.

Diagnosis and Clinical Examination.

In observing illness among the aged, the first thing that strikes one is that the symptoms may be very mild in the presence of severe almost surely fatal disease. For instance in such cases as pleurisy or peritonitis, where in the adult pain would be a marked symptom, in the aged there may be little or no pain. Vomiting is also much less frequent in brain, kidney, liver or disease. It may be entirely absent even when the stomach is found to be organically diseased, e.g. Cancer. Disease of the kidneys is no doubt often overlooked as the urinary symptoms may be slight. I have three proofs considerable albuminisation where there were no symptoms pointing to the kidney being at fault. Another patient came periodically, called to on account of retention of urine, not in account of any pain caused though the bladder may be greatly distended, but simply because he has not passed water. Charlie's Mackelchan both positive collier pneumonia as being especially liable to miss no distinct sign of its presence, the patient being apparently in usual health, but death suddenly takes place and the autopsy reveals the condition of the lung. This want of symptoms is ascribed by Charlie, as by most other writers in the subject, to independence of the organs — "the organs.

2. Mackelchan, Mind, p. 36.
remain in some degree independent of one another; they suffer separately from one another, & the different lesions of which they may be the seat scarcely influence the economy as a whole — but as Chard points out, if we examine an aged person in the febrile state (taking the temperature in the axilla) we find the fever runs the same course as in the adult suffering from the same disease — This lack of symptoms would appear to be due rather to the natural peculiarities of the functions of the sensory nerve apparatus including expression of pain, rather than to any "independence of organs." We have seen above that all the vital functions are diminished. Distended, or sensation is not exempt from the pulse — How different is this condition from that in young children where slight disease may give rise to most alarming symptoms, the nervous system in children being as much more active & sensitive.

Diagnosis is further complicated by the fact that several chronic diseases may co-exist for long periods & cause some modification of each other — further allowance must be made for change in the various functions due to College alone, and for changes in topographical anatomy.

Previous History — The aged are generally found to be one of a poor healthy stock, often giving a history of...
many age-relatives. Humphry found that 53 percent had been in comfortable circumstances, 35 percent had been "poor" and only 10 percent "affluent." The comparatively meek projection of "affluent" persons is probably due to errors in diet and to greater wear and tear especially of the nervous system. At the annual meeting of the British Medical Association in 1887, Drysdale read a paper pointing out the clear advantages those in easy circumstances had, over the poor from the point of view of mortality. He however studied the deaths among adults, finding that among persons 60-85 years of age at death, the death rate among those in easy circumstances was 8.3 per thousand, as compared with 18.7 per thousand among the poor. Russell found that in England and Wales in 1874 the mean age at death among the richer classes was 33.6, while Richardson & Chadwick found the mean age at death among the working classes in Lambeth 29.2 yrs. When we compare these figures with Humphry's it is evident that although the affluent may live to a fair age, some form of disease must end them 93 before reaching extreme old age, the commonest class of disease at that time of life is of the digestive system. As bearing out this suspicion we find in Humphry's report that of the aged only 15 percent were "large" eaters while 20 percent were "small" eaters and

Humphry, Old Age. p. 126.

and 61 percent had been "average." Also 53 percent had been accustomed to ½-1 lb of meal a day, while 38 percent took less than this and only 5 percent more—15 percent had taken no alcoholic drinks throughout the whole or greater part of their lives, 40 percent had taken "a little," 33 percent "moderate," that is one or two pint of beer daily, and less than 9 percent had taken more than this daily—thus we see that moderation in all forms of diet is the most desirable condition.

Then is often a history of severe illness, but in these cases full recoveries have taken place.

The height diminishes with advancing years, chiefly from the anterior curvature of the spine alone alluded to, along with atrophy of the cartilages. Humphry reckons the loss in height due to these causes to be 2 inches; Roberts found that the maximum height was attained about the 25-25 year, main anime till the 30 year then fell away till the 70 year when the individuals has lost 3 inches. The Anthropometric Committee found on exploring large numbers that the curve of height continued to rise till the 70 year, at which age the investigation stopped. The explanation of this continued rise to 70 is that the smallest and weakly ones die before that age. This also is borne out by Lee. Humphry who found that the average height of the

1 Vide supra. Vol 32.
men examined (80-100 yrs) was 67 inches, 69 the women 62½ inches; so that it is evident, on adding the 2-3 inches for decrease in height, that these persons were above the average height, while Roberts figures for the average English man of all classes as 67½ inches and for women 62½ inches.

The weight decreases with the height, the average of Humphry's men being less than 11 stone 4 of women 9 stone 1, which would be considerably below the average for persons of their size. Quetelet states that in Britain both sexes lose about 6-7 kilogrammes (12-14½ lbs) of their weight and 7 centimeters (2-7 inches) of their height.

Temperature. Chaucer finds the average temperature in the aged very little from that in the adult, the rectal being 98-9°F. 100-4°F, that in the axilla being a little less or sometimes a little more than 1-8°F less than these. It was found by Wunderlich that from the 60-year onwards, the temperature gradually rises, and "about the 70-year the mean temperature approaches that of infancy." The temperature of the aged therefore in health is the same as in the adult if estimated per rectum, but the axillary temperature is somewhat lower.

2. Relini. Ibid.
4. aer. ibid. p. 225.
lower. This lower axillary temperature is accounted for by the
smaller changes in the skin, its glands, its diminished
vascular supply; these conditions causing a diminished
loss of heat, and compensating for the loss of normal heat due
to cessation of growth, general inactivity of the organs and
 tissues. In disease it is usual in the aged (as in all
debilitated persons) to find the temperature about 1-1/2° lower
than would be expected in the average adult suffering
from the same disease, and this change appears to be noticeable
between 40 and 50 years of age. Wunderlich, p. 20, for sale
pay that given the disease and the course of the temperature
one can diagnose the age with tolerable certainty.

As a rule the temperature in the aged is more sluggish and
less susceptible to sudden changes than in younger persons, and the aged are on the other hand much ad-
dicted to collapse temperatures, and in them these often
sink to a very low level. Temperatures of 105.6° and
95° (per rectum) are both signs of great gravity.

**Alimentary System** - In making the physical ex-
amination of an aged person we must remember that the
tongue is naturally drier than in the adult, and the thin-
ness of the abdominal parietes allows of a freer examination
of the abdominal organs, unless the intestines be distended

---
By flatulence - the liver is diminished in size and the gall bladder often contains calculi that may be felt.

Digestion being deficient from want of teeth, the various digestive fluids being defecited from a supply of glands, we find that usually the digestive process is not properly carried out. The muscular weakness of the stomach and intestines lead to frequent constipation & flatulence, with all the bad effects from absorption of toxins from the bowel.

The bile being thicker than usual we lose some of its aperient & antiseptic action. There is also less absorption, the many of the lacteal vessels & mesenteric glands disappear.

There is often marked loss of appetite, but this is not to be expected in too much as, from the having ceased, so much nourishment is not required.

**Hepatic System** - we must allow for the usual anemic appearance & with the diminished area of splenic dulness. Although the lymphatic glands are diminished in size, they are often more easily felt through the thin wasted skin of the aged.

**Circulatory System**. We usually find the area of relative heart dulness increased, it may be stretching to the lower border of the sixth rib, and the apex beat may be felt in the sixth intercostal space. The supraventricular dulness is usually diminished from the overlapping of the emphragnostic lump, generally lies about over the fifth rib, internal
The parasternal line. This increased dulness is due to dilatation and hypertrophy of the heart, combined, and to the result of the changes mentioned above. The heart sounds are normally found unchanged on auscultation, or if anything a little louder than in the adult—the first sound especially is apt to be found louder and somewhat lengthened, but no murmurs are here detected. It is very common to find irregularity of rhythm and strength, apart from any structural change. Of the two intermissions the more frequent is the second. Lewis points out that this irregularity of action is irregular, the heart missing a beat periodically so as to form a sort of which it provides. Should the intermission become irregular, it is a sign of threatened asystole—this patient also begins to complain of dyspnea on exertion and what Balfour calls "intercostal anxiety," and chest pain, but the patient now becomes aware that he has a heart. According to Macleod, these irregularities of heart action occasionally disappear under the influence of inflammatory disease remote from the heart, in turn with the subsidence of the inflammatory action. This would seem to show that the intermissions were

2. Vide supra Vol. 29.
due to deficient stimulus or nervous excitement, but on the
other hand we find that digitalis (a pediatric of the heart) will also prevent these uttermisions. Balfour ascribes the irregularity of the nerve influence, namely, the interference of the sinus and ventricular rhythms with each other; due to excitement of the Vagus — Excitation of this nerve chiefly affects the sinus and auricles than little effect in the ventricles, so that the ventricles lead independently of the sinus venosus and auricles — Irregularity in the strength of the beats is a common accompaniment of the arrhythmic condition. This is explained by the fact that now often the impulse from the auricle corresponds in time with the ventricular impulse & causes an extra full beat. At all ages auricular especially in its haemodynamic form, is very apt to cause this irregularity of the heart action, and we have seen alone that the blood of the aged is always more watery than that of the adult — the poor quality of the blood means that the heart does not get its due supply of nourishment & calls for increased action through the sympathetic nerve (adrenergic branch of the sympathetic) for the cardiac muscle not being well supplied nourished, cannot respond to the accelerated action of the sympathetic action of the Vagus (the parasympathetic nerve) is called which weakens the auricular contraction.
Lessens the stimulus from the auricles to the ventricles, and diminishes the excitability of the ventricles. If the inhibit is strong we have the ventricular auricular rhythm separate although each may be regular in itself. The myocardiun being liable to degeneration with blood supply becomming inefficient, it is liable to dilatation of culture, and the condition of the organ is one of the most important points with regard to prognosis.

The pulse is affected in age in aroinion of the loss of elasticity in the walls of the aorta larger arteries, the blood stream being less continuous therefore making the radial pulse more sudden in its onset. Huxley 2 points out that the wave of blood travel through the aorta is larger in old age than in the adult, hence if the aorties are healthy the pulse feels stronger than in the adult, and it is often found that the radial aorty is healthy, hence the apparently stronger pulse as often observed in the aged. At all ages cold powerfully affects the volume and strength of the arterial pulse, diminishing both, but more especially is this noticed in old people, therefore in examining the pulse it is well to take that view which has been under the bed clothes longer.

2. Broadbent in The Pulse. p. 266. (1840)
In every case the partial pulse should be compared with that of the heart as a whole, and it is often found that some of the cardiac contractions are too feeble to make their un-
pulse appreciable at the periphery; then as judged from the partial pulse alone it might appear that there was
absolute intermittent action of the heart, whereas the action might be regular in rhythm but irregular in
force. Authorities differ considerably in their statements
as to the average frequency of the pulse in the aged. Humphry
found it to average 73-74 in men and 78-79 in women—Landrè
found it at 79 in 58-year age & between 80-90 yrs more
than 85. Hoveman & Dechambre state that "It is in old
age that the pulse presents extremes of slowness or of
frequency, but the first is the exception, the second is the
rule"—Boy-Lecein "on the other hand finds the average
adult pulse rate at 68" and that in children seldom more
Rogef found that the least healthy had not exceeded 30—more sometimes less than that. 5
than 72 per minute. Of 100 observations in 15 different
persons aged 70-93, when in their usual health it found
the average to be 77.4. Humphry's investigations proved
that most old people had been above the average kept to in
adult age, so it has often been noticed that the pulse is
less frequent in tall persons. In febrile disease the

1 Humphry
4 Boy-Lecein. 2 edit. p. 515.
5 Roget. 2 edit. p. 209.
pulse in old age is generally found to be less rapid than that of the adult, especially in the early days of the disease. The pulse is often found to be about 80-90 while there is considerable rise of temperature; the fewer the fever lasts, the more frequent does the pulse become. Nearly does an aged person recover if the pulse reach 120 beats per minute.

Atherosclerosis & atheroma have been allowed for almost constantly, and the veins are very liable to become varicose, e.g., hemorrhoids.

**Respiratory System.**—The respirations become more frequent in the aged, but each respiratory movement is smaller, on account of the changes in the thoracic walls as also because the lung is rarely the seat of serious changes only; as a rule there is some pathological change added; the respiratory system being peculiarly exposed to external influences. Boyer-Tessier has found an single lung full of disseminated chronic pneumonia, the actual introduction of some foreign body. Usually the rate of respirations is from 22-24, Humphry finds 20 for men, 22.5 for women, but they become much more rapid in the presence of fever and may get up to respiration a minute with little or no thoracic change to account for it; the reason being that the movements are small, and

Humphry. Ibid. p. 344.
so must be more rapid & allow of the requisite oxygenation of the blood. The lungs become more or less emphysematic, and the secretion is usually increased. In pneumonia the note is higher in pitch than in the asthma, the rattle becomes thinner & the lung more ruminant. In auscultation the sounds are more or less emphysematic. The lungs must be closely watched in every case of illness which approximates an aged person. When as edema or hypostatic congestion is very apt to supervene from the recumbent position. During sleep a form of breathing somewhat resembles Cheyne-Stokes breathing is often observed. The respirations gradually diminish in intensity, come to a stop, a pause of surprising length follows, but breathing is resumed with a snort and continues more vigorous for a time — there is not the gradual rest following on the pause which is found in Cheyne-Stokes breathing.

Integumentary System — The skin has a dry feeling from atrophy of the sweat glands. Breathing can hardly be induced by any amount of heat or exercise. Pethypia is not generally fatal in their disturbances. Inflammatory conditions of the skin are very liable to go on to fungence.

Uriney System — Pethypia is generally more frequent than in the asthma — should the bladder not be

Michael Egan. Ibid. p. 9.
emptied at the proper time, distention is apt to follow from the muscular atrophy with consequent retention of urine. Great care must be taken in sterilising all catheters to used as the urine urâne is found to be more liable to septic infection than in the adult.

Nervous System. The sensory functions are all dulled and retarded, both those of ordinary sensation and the special senses. The intelligence is often poor at the end, but the power of concentrating attention is more deficient, memory is bad for recent events but may be good for events gone by - dates and names left often noticed like the first things forgotten.

Locomotory System. The changes in the bones and joints have already been described - stiffness of the latter is often accompanied by some hardening of the fibrous tissues - the so-called rheumatic pain of old age frequently depends on the dryness of the ligaments and tendon sheaths.
Disease among the Aged.

It is difficult to secure trustworthy statistics of the frequency of disease, ending in recovery, among the aged, or of the proportional frequency of any one disease. This is because of the high mortality rate among the elderly. On admission, concurrent or secondary diseases are not always considered. Experience teaches that if we consider the whole year, we get more diseases of the Respiratory System than any other, these affecting the lungs. Especially frequent are these from September to May, and at this time of the year causing the majority of deaths among old people. Next to these would come Diseases of the Circulatory System, these being followed by Nervous, Affective and Alimentary Diseases. We may, however, note that alimentary symptoms are often developed secondary to some other disease, for instance, cardiac failure.

The Aged may suffer from practically all the diseases from which younger people suffer, but many diseases, e.g., most of the exanthemata rarely affect the same person twice, thus the aged are seldom found to suffer from them, having already become immune.
In the earlier period of succourance we find chiefly hypertensive, grief, rheumatic, and neural affection; later, the venous dilatation and fluid changes in the arteries lead to degeneration of the organs + passive hemorrhages, e.g., hematemesis, melena, with development of various veins in the rectum + bladder. As the changes in the blood vessels become more marked we get apoplexy and softening of the brain.

The prognosis is always guarded in the aged, as great changes may occur in a very short time, such seemingly trivial circumstances as a fall with the temperature of the atmosphere or some slight exertion (yet proving too much for the patient in his debilitated condition) turning the apparently favourable cause of the disease in a downward direction.

When we study fatal disease we can be more definite. I have already pointed that according to my ideas on the subject, death from Old Age must be exceedingly rare, yet when we study the causes of death as certified to the Registrar General, we find a large number of deaths ascribed to Old Age; although probably many of these deaths were due to some pathological condition added to Old Age, we may be sure that the disease was obscure & therefore not recognised.

If we look at the years 1895-1899 inclusive we
The average death rate from old age during these five
years is thus 0.931 per thousand living, and in the
Ashbourne Rural District during the same period, the
average death rate from old age was 1.112 per thousand
living.

If we consider the cases only where death occurred at
the age of 70 years upwards, in the Ashbourne Rural
District during the same period, we find there were 255
such deaths, 127 males and 128 females - of these 24 males
and 28 females were stated to die from old age simply,
and 24 males and 21 females from old age with some
secondary symptom or disease added. We may
compare this condition with that found by Maclellan
at the Chelsea Hospital, where out of 845 deaths (at ages
between 50 and 90) in thirteen years only 3 were ascribed

Table A. Deaths from old age.

<table>
<thead>
<tr>
<th>Year</th>
<th>Deaths from old age</th>
<th>Rate per</th>
<th>Males</th>
<th>Rate per</th>
<th>Females</th>
<th>Rate per</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>1,000,000</td>
<td></td>
<td>1,000,000</td>
<td></td>
<td>1,000,000</td>
</tr>
<tr>
<td>1895</td>
<td>278,142</td>
<td>0.82</td>
<td>128,45</td>
<td>0.87</td>
<td>169,97</td>
<td>1.07</td>
</tr>
<tr>
<td>1896</td>
<td>261,58</td>
<td>0.75</td>
<td>111,30</td>
<td>0.76</td>
<td>150,38</td>
<td>0.97</td>
</tr>
<tr>
<td>1897</td>
<td>236,10</td>
<td>0.72</td>
<td>122,60</td>
<td>0.81</td>
<td>163,35</td>
<td>1.02</td>
</tr>
<tr>
<td>1898</td>
<td>216,93</td>
<td>0.71</td>
<td>121,48</td>
<td>0.79</td>
<td>165,56</td>
<td>1.03</td>
</tr>
<tr>
<td>1899</td>
<td>314,77</td>
<td>0.92</td>
<td>135,22</td>
<td>0.87</td>
<td>179,55</td>
<td>1.09</td>
</tr>
</tbody>
</table>

Old Age, three all being over 82 years of age. These deaths in the district during mentioned are best expressed in the following table:

Table B. Deaths from Old Age in Ashbourne Rural District, 1895–1899.

<table>
<thead>
<tr>
<th>Old Age</th>
<th>Male</th>
<th>Female</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Syncope</td>
<td>2</td>
<td>8</td>
<td>10</td>
</tr>
<tr>
<td>Heart Disease</td>
<td>1</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Bronchitis</td>
<td>2</td>
<td>5</td>
<td>7</td>
</tr>
<tr>
<td>Chronic Bronchitis</td>
<td>3</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Angina Pectoris</td>
<td>2</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>Diarrhoea</td>
<td>3</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Embolus</td>
<td>1</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Paralytic Stroke</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Paralysis</td>
<td>2</td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>Dementia</td>
<td>1</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Cystitis</td>
<td>1</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Influenza</td>
<td>2</td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>Ch. Rheumatoid arthritis</td>
<td>1</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Gangrene of foot</td>
<td>1</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Acute &amp; chronic cough</td>
<td>1</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td><strong>Totals</strong></td>
<td><strong>53</strong></td>
<td><strong>49</strong></td>
<td><strong>102</strong></td>
</tr>
</tbody>
</table>
of Cerebral Apoplexy, the letter a meaning Cerebral Embolism.

Considering all the deaths at over 70 years of age to be due to the diseases as far as possible by systems we find:

<table>
<thead>
<tr>
<th>Table C.</th>
<th>Deaths in Ash. R. Diet, with Causes</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>a.</td>
</tr>
<tr>
<td>Old Age</td>
<td>29</td>
</tr>
<tr>
<td>Disease of Heart</td>
<td>21</td>
</tr>
<tr>
<td>&quot; Nervous System</td>
<td>14</td>
</tr>
<tr>
<td>&quot; Respiratory</td>
<td>11</td>
</tr>
<tr>
<td>&quot; Abnormality of Nutrition</td>
<td>4</td>
</tr>
<tr>
<td>Influenza</td>
<td>5</td>
</tr>
<tr>
<td>Cancer</td>
<td>5</td>
</tr>
<tr>
<td>Infancy Diseases</td>
<td>5</td>
</tr>
<tr>
<td>Miscellaneous</td>
<td>8</td>
</tr>
<tr>
<td>Total:</td>
<td>74</td>
</tr>
</tbody>
</table>

Here we find that the order of frequency is not quite that suggested above for the frequency of disease in the aged, the explanation being that many diseases are recorded from, while the actually fatal disease may be added to some more chronic one. Further, the mode of certifying death, with regard to the arrangement of primary and secondary causes, varies so much with different men, that judging from the certificates only, the result must
Examining the groups of disease we can produce the following tables, the columns being the same as in Table "C".

**Table D. Diseases of the Heart**

<table>
<thead>
<tr>
<th></th>
<th>a</th>
<th>b</th>
<th>c</th>
<th>d</th>
<th>e</th>
<th>f</th>
<th>g</th>
<th>h</th>
<th>i</th>
<th>j</th>
<th>k</th>
<th>l</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heart Disease</td>
<td>15</td>
<td>1</td>
<td>16</td>
<td></td>
<td></td>
<td>12</td>
<td></td>
<td>12</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Endocarditis</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pericarditis</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Syncope</td>
<td>4</td>
<td>7</td>
<td>11</td>
<td>29</td>
<td>24.03</td>
<td>3</td>
<td>7</td>
<td>10</td>
<td>21</td>
<td>21</td>
<td>09</td>
<td>56</td>
</tr>
<tr>
<td>Dilated Heart</td>
<td>2</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stenosis Heart</td>
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<td></td>
<td></td>
<td>1</td>
<td></td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aortic Regurg</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td>1</td>
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</table>

**Table E. Diseases of Respiratory System**

<table>
<thead>
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<th></th>
<th>a</th>
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<th>c</th>
<th>d</th>
<th>e</th>
<th>f</th>
<th>g</th>
<th>h</th>
<th>i</th>
<th>j</th>
<th>k</th>
<th>l</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bronchitis</td>
<td>4</td>
<td>2</td>
<td>1</td>
<td></td>
<td></td>
<td>5</td>
<td></td>
<td>4</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Endocarditis</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fatty Heart</td>
<td>2</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ch: Bronchitis</td>
<td>3</td>
<td>3</td>
<td>6</td>
<td></td>
<td>6</td>
<td></td>
<td>6</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ch: Endocarditis</td>
<td>1</td>
<td>1</td>
<td>18</td>
<td>14</td>
<td>17</td>
<td></td>
<td>21</td>
<td>16</td>
<td>09</td>
<td>34</td>
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</tr>
<tr>
<td>Emphysema, Bronchitis</td>
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<td>1</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
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<td></td>
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</tr>
<tr>
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<td>1</td>
<td>1</td>
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</tr>
<tr>
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</table>
### Table F. Diseases of Nervous System

<table>
<thead>
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<th>b</th>
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<th>d</th>
<th>e</th>
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<th>i</th>
<th>j</th>
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<th>l</th>
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</thead>
<tbody>
<tr>
<td>Cerebral Hemorrhage in Absence</td>
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<td>6</td>
<td>1</td>
<td>6</td>
<td>2</td>
<td>12</td>
<td>18</td>
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<tr>
<td>Diphtheria</td>
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<td>Encephalitis</td>
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<td>1</td>
<td>8</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>5</td>
<td>20.3</td>
<td>114</td>
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<td>17.25</td>
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<td>Paralysis of Sensation</td>
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<td>6</td>
<td>6</td>
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</tr>
<tr>
<td>Cerebral Softening</td>
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<td></td>
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<td></td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td></td>
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<tr>
<td>Dementia</td>
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<td></td>
<td></td>
<td></td>
<td>1</td>
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</tr>
</tbody>
</table>

### Table G. Diseases of Alimentary System

<p>| | | | | | | | | | | | | |</p>
<table>
<thead>
<tr>
<th></th>
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<th></th>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Acute Gastroitis</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
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</tr>
<tr>
<td>Gastroenteritis</td>
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<td></td>
<td></td>
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</tr>
<tr>
<td>Pernicious</td>
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<td>3</td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Shanghali &amp; Fever</td>
<td>1</td>
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<tr>
<td>Stomach &amp; Bones</td>
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<td>Fall &amp; Fractures</td>
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### Table H. Diseases of Urinary System

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Table I. Deaths from Cancer

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<td>Breast</td>
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Table II. Miscellaneous Causes of Death

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<td>9</td>
<td>7.08</td>
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<td>4</td>
<td>3.14</td>
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<td>13</td>
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<td>Acute pyelitis of Kidneys</td>
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<tr>
<td>Suicide (including)</td>
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Summarising the above tables, we find that if we ignore the deaths from old age as being often unavoidable, the diseases...
most often causing death among our old people are, in
order of frequency:— 1. Disease of Failure in Action of Heart,
2. Diseases of Nervous System (largely due
to Apoplexy + other diseases partly depending on circulatory changes)
3. Diseases of Respiratory System.

Further we note that a very much larger proportion of
women die from Nervous Diseases (chiefly Apoplexy) than men
while a very much larger proportion of men than
women die from Visceral Disease. Cancer causes
death in the two sexes about equally. Chiefly affects the
Alimentary System. The two deaths from Diabetics
both occurred in males.

Special Diseases in Old Age.

The older the persons the less likely are they the found
suffering from disease, the more likely are they to be
the subjects of multiple old age. The reason of this is, that
all those with any predisposition to disease fall those
of comparing we all constitution, will probably have
died from disease before reaching extreme old age.

The Rheumatism may attack the aged before the consol
lute illness becomes more chronic + lends itself to an aesthetic
type - the rash is often indistinct being paler than that in youth - there is a special danger of pulmonary complication arising if these must be carefully guarded against - if the fever remain high for any length of time the condition of the heart must be anxiously watched.

Typhoid Fever have never seen in old age although Boyce tried finds it frequent. Macleod in the other hand hardly ever met with it over 50 yrs of age. When it does occur the onset is very sudden many of the usual symptoms are wanting. Broncho-pneumonia & septica-pneumonia frequently appear as complications & call for active treatment by heart tonics & Stimulants.

Influenza has been responsible for much trouble among our aged during the last few years. The chief feature have been Respiratory Complications and rapid decline & exhaustion.

Typhus is a common ailment in the aged and it is much more chronic course than in the adult. The usual premonitory fever & the eruption is pale in colour - it may lead to chronic ulceration of the skin & cellular tissue causing a form of Elephantiasis.

Rheumatism & Arthritic rarely appear for the first time in the aged - when present they are usually with a chronic
form. The incomplete oxidation of the blood favors the accumulation of fat; pleading the formation of free fatty acids. Chronic rheumatism leads to chronic arthritis.

Chronic rheumatism, lends to become the dry form. Shane had the best results from nephritis. It continued for several months, but bravely said that a patient will continue the treatment regularly for any length of time.

Cancer is not found very often among the aged as a cause of death, being not frequent between 25 and 65. Cancer however practically increases, but death may be due to some other cause. Kingston Fox found that if we take deaths from cancer and compare them with other causes of death, the proportion is as:

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<tr>
<th>Age-Group</th>
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<th>Females</th>
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<td>35-45 yrs</td>
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<tr>
<td>45-55 yrs</td>
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<td>2</td>
</tr>
<tr>
<td>55-65 yrs</td>
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</tr>
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<td>65-75 yrs</td>
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<td>2</td>
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<tr>
<td>75 yrs+</td>
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</table>

Alimentary System.

Thrush is very common in the aged population when the patient is much debilitated by disease. In cases

1. Regan's General Tables
D Stomach mischief we frequently find small ulcers in the inner surface of the cheeks & tongue. Simple irritations are commonly met with but traumatic cases — difficulty in swallowing may be induced by anorectises, after mucous membrane or paralysis of the muscles of the throat, if the patient sit upright the salivary glands out of the mouth, and if the head be kept back the salivary will generally find its way into the oesophagus. I have had such a case under observation for the last three years and have found no benefit from treatment.

Various forms of dyspepsia arise from the want of muscular tone & secretions of the stomach. Sometimes strong stomachics may be useful in these cases combined with astringent treatment of dyspepsia in the direct. Hofmann's digestives are often of great service.

Irritation & Constipation are frequently met with as a sequel of muscular atony & deficient secretions, these in turn set up a general auto-intoxication -- cerebral congestion.

The liver is not especially liable to disease unless there be a habit of excess in alcohol. Biliary Calculi are frequently found but rarely give rise to any symptoms. Chirac found biliary gravel one of the most frequent af-
fections at the Salpêtrière, but points out that it is often difficult to recognize any symptoms of bile. "The most
we find is a little bloody feeling in the region of the liver.

Some sickness, slight jaundice, albumin in the urine,
some symptoms which are more apt to lead us into error
than to enlighten us in the nature of the disease. Chassé
explains this phenomenon as due to absence of sympathetic
reaction. Roy-Lerminé, however, points out that定位
produces a tendency to calculus formation, the bile
being thicker containing more cholesterol. This is in
accordance with the general rule of camera changes that
a true relation be kept up between the various functions
that no disturbance should be caused.

Circulatory System

The heart is the most important organ in the body from
a prognostic point of view. The myocardium is very liable
to undergo degeneration, chiefly fatty, so is liable to dilatation
and may suddenly fail in its action. Heart failure in
the aged is to be treated on general principles, digitals or
Hyoscine being found the most useful drugs.

The aorta is affected so frequently that with affects all the
organs, whereas the blood pressure is much raised. I have found
benefit from the administration of a side of haddock in
the effect, and the depressors must be carefully watched. It is
well to give albumin along with the salts, Savile.

1 Roy-Lerminé, 3d, 572.

Consider the changes muscular ("hypermyotonia") that
form benefit from fibrillar cemic.

Vascular heart disease persists in old age, but calls for
specific treatment beyond that of the adult.

Respiratory System

When we consider the anatomical changes in the lungs
it is evident that they are peculiarly liable to disease.
Bronchitis is probably the commonest affection; it may
start in an acute form, but is very liable to become
chronic, to show fresh exacerbation on little provocation,
along with the bronchitis we have emphysema and dilatation
of the bronchi with constant excessive secretion. Further
the condition of the heart favors stagnation of blood in
the lungs, in previous congestion, and acute pneumonia;
from defective work of the kidneys is a frequent cause
of complication of bronchitis. There is always a chance
of the bronchitis spreading to the smaller tubes, constituting
"capillary bronchitis," and this condition is much more
devastous than if the disease be limited to the larger
tubes. The breathing becomes much more difficult, so
the patient can only get his breath setting up. The
pneumonia of severe cough almost choke him, vioation
of the blood is intensified with, the patient becomes marked
cyanotic, and nervous congestion occurs in various
parts of the body.
Pneumonia is often very insidious in its onset and is one of the most serious illnesses from which the aged suffer. There have been cases reported by Church & Maclellan, where persons died suddenly when apparently in their usual health. At autopsy, the lung showed advanced pneumonia. The patient often makes no complaint beyond being a little out of sorts, there may be no cough or pain. The usual febrile symptoms may often be noticed however the respirations soon increase in frequency. There is rarely a definite initial rigor although cough is a fairly constant symptom. It may be absent altogether. The expectoration has not the usual "rusty" appearance but consists of a little thin mucus that may or may not even be blood-stained. Pain in the head is a very constant symptom. Prognosis is always very grave. Treatment is the same as in the auricular and stimulants are practically always required. Convalescence is prolonged and there are several times seen relapses following on the patient getting up too soon.

Broncho-pneumonia is as serious or more serious than lobar pneumonia, exsanguination from the lungs being often associated with it, leading to renal dysfunctions. In many 

This treatment is peculiar from the first with digitalis and alcohol.
Integumentary System. Bu|ngola|u|s is one of the most annoying troubles of the age—it consists in an eruption of unpigmented papules chiefly on the shoulders, back, and sometimes the legs. There is great itching which causes the patient to scratch the affected part, causing abrasion of the surface. Very often these cases seem to depend on some toxin circulating in the blood. Any diathetic tendency should be carefully enquired into. I have tried Carbolic Acid Lotion (1 in 10) as permeable as anything. Bedredule should be looked for if present. Destroy by the application of ammoniated mercury ointment, lightly smeared on the skin, to destroy the parasites, and at the same time not to cause too much absorption of mercury.

This process is usually attended by severe neuralgic pain which may persist for many months. Quinine has been found as useful a drug as any with the addition sometimes of bicarbonate, preferably given hypodermically in the painful region. Sometimes the vesicles are found to contain dark blood-stained fluid, and the skin beneath may be gangrenous.

Erythema is usually of the chronic type, but may also be vesicular—purulent forms are rare in the aged.

Urinary System.

The renal changes in the kidney render the aged very
lively to suffer from uraemia, rarely in its acute form, but usually chronic. Cerebral headaches, vertigo, dizziness, proritis or pulmonary congestions - hence the importance of routine examination of the urine, & the adoption of a reduced diet on the least indication.

Cystitis is more common in the aged, the urine frequently retained in the bladder until decomposition begins. Vesical calculi is common. Prostatic fluid is often excessive.

Venereal Disease, does not differ from that in the adult except that there is a greater tendency for a Chancroid to become gangrenous. Gonorrhea is less acute than a slower course.

Syphilis is a serious disease in old age, the Chancere often becoming gangrenous. The secondary manifestations of the disease are irregular in their appearance, but are quickly followed by the tertiary signs.

Nervous System.

The only diseases of the nervous system calling for special mention are Apoplexy, Softening of the Brain, Dementia & Paralysis Agitans.

Attention has already been called to the frequency of Apoplexy as a direct or indirect cause of death, and this frequency is not to be wondered at when we consider the changes in the blood vessels - it is very common to find military
aneurysms and usually very commonly depend
on rupture of one of these aneurysms. The disease
is much more common in women than men.
Oedema of the brain is generally due to derangements
in its usual blood supply, the cerebral arteries.

Semicr dementia begins via very insidious manner,
tends to diminish the power of understanding,
loss of memory, slowness of perception.

Paralysis Agitation is usually a disease of old age
but may begin any time from 10 onwards. It usually
begins in separate attacks with an interval of
freedom from shaking between, but the interval is
gradually shortened until the shaking becomes constant.

I have a patient under observation aged 76 (female)
who had her first attack four years ago. Between
the first and second attacks she had an interval of
nearly five months, but now she rarely goes a
month without.

There is an epileptic form convolution sometimes
met with, which however usually depends on heart
failure. I have had two such cases, both females.
Both had previously been treated with Brandy of
Potassium without any benefit but rather the reverse.
An occasional course of cardia is kept the
attacks well in accordance, one of the patient's living
the age of 99. She then went away on a visit
and died during one of her "fits" - what the treatment was
that occasion was I am not able to say. Similar
cases are mentioned by Balfour.

**Intercurrent** is far from being as rare
among the aged as was at one time supposed.
It is much commoner in persons over 60 than in
those between 30 & 50. It may affect not only the internal
organs (e.g. lungs) but also the joints, bones, spinal, lymph,
and other tissues just as in the young. The characters
are the same as in the young, but the question of
Diagnosis is a formidable problem from a cancerous
one, now arises. The main points in favor of cancer
are its severe spontaneous pain, greater firmness of
depth, and rapid growth. Sarcoma grows
much more slowly in the aged than in the young.

In treating Sarcoma, careful attention lies
in the complications likely to arise from keeping the
patient in bed. Humphrey has pointed out that the recovery
process in the aged are remarkably good, keeping [word illegible]
speedy if anything can be avoided.

1. Balfour, Deline Beach, p. 92.
General Care of the Aged.

There is often great difficulty in getting the friends of our aged patients to pay proper attention to them, and complaints being put down to "age" and being considered therefore as ills to be borne in the natural course of events—many of these ills may however be much modified by attention to small every day matters. What the aged want is quiet & regularity in all things—The general rule is to moderate the various influences which diminish or disturb the activity of metabolism.

The various functions of the body become more impaired as age advances, it is important that old people should not be exposed to sudden changes in habits or surrounding conditions, both of temperature and humidity. The more equal the climate the more comfortable will be the closing years of life—there should be no exposure to extremes of temperature hence one advantage, where circumstances permit is getting our old people away to a warmer climate than that of this country during winter & spring—a further advantage is that out door exercise can there be kept up with much more regularity.

The majority of our patients however cannot be sent to South France or Egypt for six months out of the twelve, and therefore the constant attention to details of...
treatment, become of still more importance — many of them even if able to take exercise, it will be necessary to keep indoors on account of their extreme liability to perforating troubles — it is thus of great importance that houses should be built in a dry situation and rooms were to be well ventilated — a temperature of 60° F is sufficient for the day time, but as old persons generally complain of cold at the night it is well to raise the temperature of the room during sleeping hours to about 65° F — in all cases separate rooms for day and night use should be insisted on. Night-time proves more fatal than day. Time and a few days sudden fall carry away many old invalids!

When possible daily walking exercise should be taken, outdoor if the weather allow, failing this carriage or walk, chair exercise out of doors & general massage of the muscles with passive movements of the joints — this muscular exercise increases metabolism, stimulates the circulation & assists the removal of waste products. The actual amount of exercise will depend on the strength of the subject and on his previous habits — it should always be kept in mind that the onset of exhaustion must not be allowed to happen, that the efficient of resistance being reduced fatique follows closely on exertion.

In the Aged we have not much grip on hence the amount of annual heat generated is not so great, this diminution being intensified by the decreased respiratory action — muscular movements. It is therefore imperative to maintain a proper degree of warmth. The feet must provide extra clothings of woolly nature (wool being a good heat conductor) for the worn over the skin — especially at night having to the aged complaint of cold — so should be thoroughly warm on going to bed. It is well to give a foot stimulating brisk like ’Wood’ or Leih’s Extract of meat on getting into bed cold feet must be especially guarded against. All clothing should be light and warm so arranged as not to interfere with perspiration or other movements.

Attention must be given to the skin which becomes dry from atrophy of the sweat glands — tepid bathing or soaping followed by gentle friction of the skin should be carried out at bed time each night if possible in the morning too. I find this one of the most difficult orders to be carried out on account of the poor idea in people’s minds, especially those of the working class, that the patient will ‘catch the cold’ — the addition of a little vinegar to the water makes it a stronger more refreshing. The secretion of urine being often
diminished in quantity, the functioning of the skin is useful in easing the work of the kidneys also.

Diet requires especial attention - as a rule our old people are encouraged to eat too much; people forgetting that the nutritive function is diminished in old age, only sufficient food should be given to replace the wear and tear continually going on, so long as the patient retains his weight; the area exercised is in proportion to the food taken; the amount is satisfactory. The teeth, as a rule are few in number; useless artificial ones are supplied, the food must be prepared so as to save the cutting action of the teeth; in spite of the preparation by mastication, mastication must be encouraged for the sake of the stimulus it gives to the salivary glands. The atrophied condition of the glands of the stomach lessens the digestive power, so that the food must be carefully selected and cooked. Twice cooked dishes such as stews or pies agree well, largely because of the increased tenderness allowing of more thorough mastication. Humphry points out that as age advances the desire for animal food diminishes; I have found that although these is often a disinclination for solid meat, meat soups or broths are well taken, the objection to meat being very

Humphry, Old Age, p. 122
When the inability to chew is

The most suitable meats are whole fish, poultry (excluding fowl & duck) & mutton - all preserved meats & very fatty meats should be prohibited, although I know an old lady of 84 who takes frizzled bacon for her breakfast every morning - when a couple of years ago she had influenza with marked gastrin symptoms her daily request was that she should have bacon for her breakfast; when at last, though with some misgiving, I gave my consent I must admit that her convalescence became more rapid, and the same thing happened last summer when she suffered from Bronchitis with Heart failure.

The fluid should be limited as the secretions are less in quantity, if further the liquid taken dilutes the gastric juice which is often already too weak.

Broth is usually well borne & often forms the most important part of the dieting - it is often better taken if a little self-free water be added, especially in persons liable to respiratory troubles, where there is often an increase in the amount of mucus about the pharynx.

Eggs may be taken raw or slightly cooked, either boiled or poached.

Vegetables of the cabbage type classes should be avoided because of the flatulence they are liable to
cause, but well cooked old potatoes, carrots, turnips & vegetables should be used.

Dairymen's foods may be used but in moderation and do not indefinitely as it is often done. Pasty, cheese rich puddings must be forbidden.

Cooked fruits & raw nuts & fruits may be given with advantage.

As to alcohol it is best to guided by the previous habits of the individual, it is not well to change any habit abruptly. Alcohol may often be desirable but its indiscriminate use is not unattended with danger. It excites the vasomotor function, hence are seen that normally all the functions are changed in relation to one another - it is therefore unwise to excite one function more than another.

With regard to meals, it is best to have the main meal in the middle of the day where circumstances permit. Juice breakfast may be taken at 8 a.m., a glass of warm or cup of coffee with plain biscuit about 11 before exercise, dinner at 1 p.m., plain tea at 5 & light supper at 8. In the early hours of the morning a small meal, e.g. a glass of milk & biscuits should be taken. Heavy meals in the evening should be avoided as digestion excites the circulation, raises the blood pressure & increases the risk of auto-intoxication.
On account of the diminished digestive powers partially
predigested foods may be made use of occasionally,
E.g. Benger's food - Valentine's Extract of Meat or
Brands Essence of Beef I have also found useful,
the bulk required at a time being small.

Sleeplessness is often complained of by the aged
though doubting the degree if it is usually exaggerated
as a rule sleep occurs in the early part of the night;
but the patient wakes early and stays about as if that
a lady patient of mine aged 80 yrs constantly tells me
that she has not closed her eyes all night, or for a
week or more; as a matter of fact I have often on
such occasions wakened her by my entrance into the
room. The question of sleep can usually be best
gauged by the appearance of the patient, the rested
look of her eyes otherwise.

Dr. E. Humphry found that only 9 per cent of persons between 80-100
were classed as bad sleepers, 64 good and 27 moderately
good - the average period of sleep was 73 hours, but
we should order ten hours at least in bed, the quiet
rest to warmth being of assistance, while the
recovery of the aged tissues after exhaustion is slower
than in the young. In many cases of sleeplessness
all that is required is to provide that some light

Humphry, 1859, p. 146
refreshment has taken in the night, sleep often quickly following on the meal. Where this fails, 
bathe the feet and legs in warm water at bedtime, 
and gentle massage. Passive movements of limbs 
may be tried—in other cases more especially 
those of nervous irritability— I have found gentle 
massage of the face and head beneficial. Very 
often cold feet are at the root of the trouble when 
the application of artificial warmth, streaming 
of hot water, relieves the condition; Rheumatic 
pains are often stated to be the cause.

Mentally excitement in the evening affects different 
persons in different ways—as a rule a quiet passive 
evening induces sleep more than an exciting 
one. But I know many old gentlemen who cannot 
sleep without a game of whist. In this evening, 
another necessary condition being that he should 
win his game arrangements are usually made accordingly. Avoid medicinal treatment 
as far as possible in these cases of insomnia but 
when simpler methods of treatment fail, drug treatment 
for a short time often allows the patient to regain the 
habit of sleeping.

The gradual decline in the mental and physical 
faculties deprives the aged of many occupations
and calls for entertainment from the friends in the form of reading aloud, conversation, games, to stimulate the receptive faculties, pique exercising the brain being most beneficial paling as it is short of exhaustion. Have a patient, a retired schoolmistress aged 79 yrs, who finds she cannot read as continuously as formerly although she is still a wonderfully good conversationalist—being often alone she found time hanging heavily in her hands until she began to play the game of "patience" which has since whizled away many a long hour.

From the failure in eyesight hearing the people are more exposed to accidents in everyday life so extra care must be taken. Guard against such seemingly trivial matters as stairs falling that may be tripped over— as pointed out above, the bones become peculiarly liable to fracture by mere long confinement in bed with its pains of debility, possibly fatal hypertrophy pulmonary affection.
Medicinal Treatment of the Aged.

We must remember especially in using powerful drugs that absorption and reaction are delayed in the aged, hence must not repeat strong doses too frequently.

Of all drugs perhaps the Vaso-dilators, (boluses and tablets,) are the most useful. The nitrite of Potassium is however rather depressing and should be used with caution. It is best preserved with Ammonia for better diffusion.

In the restlessness as often noticed both by day and night, there since for marked benefit from the use of Nitro-glycerine 3 to 15 gr in tablet as recommended by Dr. Clement Birkes.

Of narcotics the safest are the Bromides - next to them Arsenic and Sulphur. Paraldehyde is useful but gives the breath a most disagreeable smell for a day after. Chloral is too depressing to the heart for routine use.

Morphine have little effect on the Mind and are to be replaced partially by bromides.

Of Intr. Quinine, Perphenine and the better Strychnin are the most useful.

Injunctio should only be given in less powerful doses as great depression sometimes follows.

Alcohol & Salol are useful for speedy action &
don't cause excessive exhaustion. Pepsin & Jalloco
is useful to produce a watery motion with the idea
of reducing collections of serous fluid.

Serpis is one of the most useful drugs we possess,
its effect on the heart being more lasting than that of
Phosphorus, but to produce speedy effect Phosphorus
is better.

Lepasin & Sauvage's fluid are useful to aid digestion.
Mr. Brown-Séquard introduced the subcutaneous
injection of a watery extract of testis of a dead mummie-
pig, the extract being filtered through a Pasteur filter
(milligram was injected daily. He first experimented
on himself with marked benefit, the fatigue & other symptoms
common in old age disappearing for a time. This treatment
has since been tried by other men to recommended by
many.

Althaus suggested the use of the constant galvanic
current of the brain, especially the Vaso motus center in
the bulb - he claimed that the treatment retarded arterio-
sclerosis & the evolution of the central neurones; the patient
after a week or two looked 5 or 10 years younger. Althaus
pointed out that the treatment must be faultlessly applied.

and few other men if any have acquired this skill.