

## A British Medical Association Lecture

ON

THE SIGNIFICANCE OF A RAISED  
BLOOD PRESSURE\*

BY

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My subject is one of very general interest and also of considerable practical importance, if for no other reason than that a large number of our patients at or over middle age present a raised blood pressure. No one can now afford to be indifferent to the problems associated with variations in blood pressure, for a high pressure is an abnormality which always demands investigation, supervision, and careful treatment. There is a danger that patients may take the variations in their blood pressure too seriously, and it is well to remember that the blood pressure is only one factor in the circulation, and that it must be carefully correlated with the other physical signs and symptoms manifested.

An abnormally high blood pressure indicates some underlying psychological or pathological abnormality, and an attempt should always be made to interpret it in terms of pathology, and finally in terms of prognosis.

The blood pressure, constantly fluctuating within certain limits, rising and falling to meet the changing needs of life, is the resultant of several factors. There are the frequency and the vigour of the ventricular systole, the distension of the arteries which grasp the blood, and a varying peripheral resistance. More prone to develop in middle age, high blood pressure is not infrequently encountered in the young; it is helpful, therefore, to classify the patients into a few groups.

## THE TYPE OF PATIENT

High blood pressure may be latent, causing no symptoms and discovered accidentally in a patient otherwise healthy.

Then there is the thin, spare, sallow, highly strung individual, often nervous, active, and self-opinionated—a neurasthenic with a tendency to constipation and a coated tongue. As a contrast there is the sthenic type: florid, stoutish, muscular, with a vigorous mentality, great driving power, an excellent appetite, a good digestion, and a clean tongue—the man who takes it as a personal affront when he is loaded or refused for life assurance. And, finally, there is the menopausal group, in which the chief etiological factor is probably a dyscrinism, characterized by vasomotor instability, an increase in weight, an obesity hard to dispel; in this group there is a steady increase in the blood pressure, which may slowly subside in the late fifties.

## METHOD OF ESTIMATION

The reading of the blood pressure should be taken without fuss and as casually and unobtrusively as possible, and no unnecessary importance attached to the actual recording, and as little as possible said about the findings to the patient. To take a blood pressure reading is simple enough, but my impression is that in some instances the technique is not satisfactory, and the records, especially of the diastolic pressure, are unreliable. This is unfortunate, because the diastolic pressure is of undoubted clinical importance.

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*The Diastolic Pressure*

In Great Britain the diastolic pressure is usually taken as that point at which there is a sudden marked diminution in the intensity of the sounds on auscultation of the brachial artery—normally about 70 to 80 mm. Hg. An increase in diastolic pressure signifies that with each systole a greater expenditure of energy is required to force open the aortic valves. The permanent load on the heart and arteries is greater than normal. The result is an increase in the size and power of the left ventricle, and it is this strain which may be ultimately responsible for the cardiac failure. The end-result of persistent increase in the diastolic pressure is cardiac defeat. The diastolic pressure is increased by any cause which augments peripheral resistance, either vasoconstriction or actual pathological changes in the arterioles, and it is so intimately related to the elasticity of the arterial walls that it is worth while to refer to this in a little more detail.

*Importance of Arterial Elasticity*

Elasticity is a characteristic of all arteries, but it is a dominant feature of the aorta and its main branches. During life the elasticity of any artery depends on two factors—its structure, and the pressure exerted on it by the contained blood. In any given artery the latter is a varying factor, and with an increase in the diastolic pressure there is a rapid decrease in arterial elasticity, and an inevitable and corresponding increase in the amount of energy required from the heart.

It is well to remember that in the "make-up" of an artery there are two materials—an elastic, and a relatively non-elastic. With the ejection of blood from the ventricle the elastic element in the aorta first comes into play, and later, when the artery is well stretched, the non-elastic is in evidence. It is clear, then, that a normal artery is much more elastic at low pressures, and becomes more rigid as the pressure rises. It must be equally clear that an artery acts with optimum efficiency at a pressure which allows full play to its elasticity. The relationship between arterial elasticity and blood pressure is therefore of the greatest practical importance. With a rise in diastolic pressure there is a rapid diminution of elasticity, the artery approximates to a rigid pipe, and the work of the left ventricle is increased.

The reason for the extra work required from the ventricle is to be found in the fact that with a low diastolic pressure the elastic artery accepts comfortably the blood discharged from the ventricle, whereas when the diastolic pressure is high the aorta is already stretched and relatively inelastic, and it takes a very powerful systole to produce any further distension. At even extremely high pulse pressures (for example, with blood pressure 200/120, a pulse pressure of 80) the results of each systole are poor.

A high diastolic pressure means a diminished ventricular output per beat. The aorta yields only with difficulty, and even with a much increased heart rate the output per minute falls below the requirements of the body, and anoxaemia is imminent.

At the risk of repeating myself, I would remark that the greater elasticity of the arteries at the lower diastolic pressures is of the utmost value in preserving the heart from undue strain. The aorta acts as a shock absorber, for the arteries are more than tubes. The larger arteries—the aorta and its main branches—are elastic reservoirs, and this elasticity is of importance in saving unnecessary and wasteful effort on the part of the ventricle. The elasticity of the aorta enables rapid distension to take place, followed by slow collapse, and the more elastic the aorta the less the ventricular force required.

An elastic artery saves the heart ; it grasps the blood comfortably. Conversely, any factor which diminishes the elasticity increases the work of the heart, and ultimately the output per minute ; and the most potent adverse factor is a high diastolic pressure, which causes the arteries to become rigid, inelastic pipes. Hence the reserve power of a heart with high diastolic pressure is necessarily very small, and one finds that dyspnoea is usually induced with the slightest effort. Dr. J. C. Bramwell<sup>1</sup> discusses this subject at length, and has shown that the volume elasticity of the arteries is halved between the ages of 10 and 60.

The systolic and diastolic pressures having been recorded, the heart rate and rhythm should be noted at the same time, and also the presence or absence of arteriosclerosis. That gives the complete picture.

#### *Systolic Pressure*

In most individuals, as the pressure in the armlet diminishes, each systole is represented by a sound heard from the upper systolic pressure to the diastolic point. Sometimes, however, the sounds, from being sharp and defined in the upper range, fade out as the armlet pressure falls, to reappear as further air escapes. This silent gap may give rise to a faulty reading if the observer only picks up the sounds when they reappear after the gap. In a patient whose systolic pressure is 200 there may be a silent gap from 180 to 160 ; and unless this is recognized a blood pressure of 160 will be recorded as the systolic pressure for that patient. This mistake can be avoided by verifying the systolic pressure as judged by auscultation with that obtained by palpation of the radial pulse.

#### THE NORMAL READING

There has been a tendency to take as normal a reading definitely too high. It is not uncommon to find the age plus 100 accepted as within normal limits—that is, 160 for a man of 60. This is undoubtedly incorrect. The following<sup>2</sup> is the average of a very large number of records of blood pressure of apparently normal healthy individuals :

Age	Systolic	Diastolic	Age	Systolic	Diastolic
20	120	75	50	130	83
30	123	79	60	135	85
40	126	81			

These figures may be accepted, but it must be remembered that in every individual fluctuations in pressure are constantly taking place under the varying conditions of life, and that even when the record is made with everything in favour of a normal reading it is almost impossible to eliminate all adverse or disturbing factors.

With uniform conditions, a body at rest, and an easy mind, the arterial pressure should approximate to the above standard, and, if it diverges markedly repeated estimations should be made. Fluctuations are marked and characteristic in the earlier stages of hyperpiesia. With advancing years the blood pressure becomes less labile and the fluctuations slower ; the fall after a rise is delayed. The compensatory mechanisms are at fault.

#### *Blood Pressure and Exercise*

Physical effort is one of the most common causes of a rise in arterial pressure, and this rise is a necessity during exercise, for with muscular effort the blood flow through the muscles in action is greatly increased, and to maintain this increase the output from the heart is doubled

or even trebled, and the splanchnic vessels are constricted. As a result the pressure rises, and the active muscles are adequately flushed with oxygen-bearing blood. The increased activity of the heart demands a more liberal supply of blood, and this can only be obtained by a higher pressure in the aorta, for the coronary blood flow is largely dependent on aortic pressure. It is agreed that a "high arterial pressure is essential for the efficient performance of muscular work." It is probable that the higher the work the higher is the pressure.

In the man out of training or engaged in some work with which he is not familiar, the rise in blood pressure tends to be greater than in the man working equally hard at a congenial and accustomed task.<sup>3</sup> As Meakins and Gunson showed, there was an average rise of 31 mm. Hg. in the systolic pressure half a minute after walking briskly up a single flight of thirty steps ; with more strenuous effort a much greater pressure would be reached. Congenial exercise, moderate in degree, in a man under training, after causing a rise in pressure which begins abruptly with the onset of effort, tends to lower the pressure slightly, and proves of benefit. Sir Clifford Allbutt found that "a few weeks of mountain climbing or a cycling tour" was always followed in him by a "lower range of blood pressure, lasting some weeks." I think that there can be no doubt that carefully regulated exercise is one of the most valuable elements in the treatment of patients suffering from high arterial pressure.

Rest, as one would expect, lowers pressure. The call on the heart is diminished, the muscles are relaxed, and the mind tranquil.

#### *Variations During Sleep*

Sleep is even more potent, and there is a drop of 20 mm. Hg or more during undisturbed slumber. The greatest fall is noted within the first two or three hours, and from this point the pressure gradually waxes. During sleep the heart's action and the respiratory movements are slowed, and the general musculature is relaxed and metabolic activity is reduced, with a corresponding lowering of temperature ; but, as Professor MacWilliam<sup>4</sup> pointed out in 1923, this applies only to undisturbed peaceful slumber, and in a most interesting communication he directs attention to the cardio-vascular vagaries which occur when sleep is fitful and disturbed by unpleasant dreams. In disturbed sleep the circulatory changes are sometimes very definite and pronounced. There may be "extreme rises in blood pressure," and increased heart action, which persist for some minutes after waking.

The cardio-vascular response to somatic or visceral afferent impulses is in the nature of either an increase in the rate of the heart or a rise in the blood pressure brought about by splanchnic constriction—one or other, or both combined. There may be an acceleration of the pulse with little if any rise in pressure, or the action of the heart may be forcible and the cardiac thrust heaving and vigorous, in response to a great increase in arterial pressure, and the patient may waken to find his heart beating rapidly and forcibly. Professor MacWilliam records one case in which, during a dream, the systolic pressure rose from 130 to 200. To quote from his article :

"The suddenness of development of the functional disturbances in blood pressure, heart action, etc., in the dreaming state is an important feature. As is well known, most dreams are of very brief duration as regards the actual time occupied, a number of seconds or a very few minutes often sufficing for a dream which is subjectively a long and complicated one—for example, an apparently long and varied dream has been recorded as running its course between the beginning and the ending of a clock striking midnight. The

associated functional disturbances may thus be set up with unusual abruptness, as compared with the waking state—as, for instance, in ordinary muscular exertion. It follows that there is little or no time for the coming into play of the various adjustments and compensations in the circulatory and respiratory systems, etc., that are operative in muscular exercise; in the latter the rise of arterial pressure is checked by gradual dilatation of the vessels of the skin and the working muscles, while the heart accommodates itself with the aid of increased coronary blood supply, etc. Thus the blood pressure rise in certain dreams may be both large and steep in ascent. The call on the heart, through its nervous apparatus, etc., may also be a sudden one."

It must have occurred to most of us that it was difficult to understand why cerebral haemorrhage should occur during sleep, when the blood pressure should, if anything, be lower than during the waking hours. And the same difficulty manifests itself in the case of anginal attacks other than those due to coronary thrombosis—seizures which in the daytime may have been induced only by effort or emotional disturbances. Professor MacWilliam has, I believe, supplied the answer. At any rate, sleep can no longer be viewed as a certain haven of peace. The cardio-vascular mechanism is even then liable to be taken suddenly by storm, and, if there be a disease, or a flaw in the arterial tree, disaster may follow.

*Effect of Psychological States*

On discovering a raised blood pressure we have to form some idea of its significance, and the first essential is to eliminate the possibility of any transient ephemeral rise due to nervousness on the part of the patient, and then to determine how far the cause may be psychical. Such factors as persistent worry, dread, or fear should be sought for. "Mental pain and physical passivity," the characteristics of melancholia, invariably induce a raised blood pressure, in marked contrast to the relatively low arterial pressure present in neurasthenia and in the active maniacal state.

Neurasthenia, characterized by low spirits, depression, irritability, and mental fatigue, does sometimes occur in patients suffering from those pathological conditions causing or associated with high pressure. When this happens there is a fall in the average pressure of such a patient, and it is found that as the indications of neurasthenia diminish the pressure rises. The waxing and waning of the pressure tends to run parallel with the variations in severity of the neurasthenia. When, however, improvement in the neurasthenic symptoms coincides with a drop in pressure it is reasonable to infer that the patient is not a true neurasthenic, but rather a case of hyperpiesia presenting symptoms simulating neurasthenia.

There are other and less important factors modifying the arterial pressure in a physically sound patient, but it is unnecessary to mention them.

What significance are we to attach to the presence of a raised arterial pressure? The great difficulty in arriving at an opinion on this is increased when the rise is not excessive, reaching only 30 or 40 mm. Hg above the normal average—that is, 160 to 170 in a middle-aged man or woman. When the pressure runs to 200 and over, its adverse significance cannot be mistaken. Bearing in mind the points we have already discussed, the first step is to eliminate as far as possible any transient rise due to excitement, emotion, fear, or other similar cause, and an attempt should then be made to determine whether the patient is the victim of persistent worry and anxiety in his home or in his business, and whether he is overloaded with responsibility and cares.

CARDIO-VASCULAR RENAL DISEASE

Having eliminated a psychical cause, we have then to differentiate between a high pressure due to frank renal

or cardio-vascular disease, and that of so-called essential hypertension or hyperpiesia, hoping that we may be justified in the latter diagnosis, for the outlook is then more promising, and there is a fair prospect of a satisfactory response to treatment.

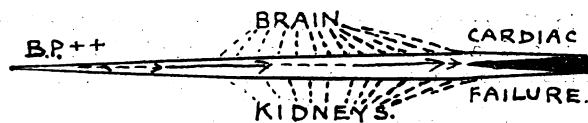
The urine should be examined for evidence of nephritis, and tests for the estimation of the renal efficiency carried out. Positive findings are of value, but, unfortunately, the extent of the renal damage must be considerable before there is a measurable increase in the non-protein nitrogen of the blood or a clear depreciation in the concentrating power of the kidneys.

The first object is, then, to classify the patient under one of three heads—namely: (1) hypertension due to psychical influences; (2) hyperpiesia, characterized by high blood pressure with no essential primary renal involvement, but presenting some degree of cardiac hypertrophy and arterial disease; and (3) a renal group—chronic disease of the kidneys in which the high blood pressure is a secondary manifestation.

PROGNOSIS

There is something dramatic and ominous in the steady diminution in the expectation of life accompanying a rise of blood pressure, revealed by a scrutiny of the figures published by insurance companies. This is more marked when the rise in blood pressure is accompanied by obesity; the expectation of life is then still further diminished.

The normal termination in a case of persistent hyperpiesia is cardiac defeat. This is inevitable unless life is cut short by intercurrent disease, some cerebral accident, or by renal complication.



The life-history of the hyperpietic.

Another factor in the prognosis worthy of note is the significance of the age of onset of the hyperpiesia. It is most serious when it appears during the middle period of life, between the ages of 40 and 50.

If the two following tables are compared, the significance of the age of onset becomes apparent, the ratio of actual to expected deaths between the ages of 40 and 49 being 2.21 to 1, while the ratio between the ages of 50 and 65 is only 1.40 to 1. In the first table the 2,634 cases are arranged according to the degree of hyperpiesia; in the second, according to age groups.

TABLE I

Cases	Blood Pressure	Ratio of Actual to Expected Deaths
(a) 1,456	+10 to +16	1.35 to 1
(b) 824	+17 to +23	1.88 to 1
(c) 354	+24 to +30	2.14 to 1

TABLE II

Ages at Entry	Cases	Actual Deaths	Expected Deaths	Ratio of Actual to Expected Deaths
15-39	919	13	11.3	1.15 to 1
40-49	979	53	24.0	2.21 to 1
50-65	736	51	36.3	1.40 to 1
	2,634	117	71.6	1.63 to 1

There is frequently a well-marked familial tendency towards high blood pressure. The knowledge that such a tendency exists in any family justifies the practitioner in recording the pressure, when opportunity arises, in the younger members, so that the first deviation from the normal may be noted, and an attempt made to control the degenerative process. The importance of this is illustrated by the following two cases.

A. H., aged 60. Blood pressure 280/120 mm. Hg; pulse rate 96. Father dropped dead at 46. Both grandmothers found dead in bed at 66 and 64.

Mrs. D., aged 50. Blood pressure 255/130 mm. Hg; pulse rate 90. Father died of stroke at 64. Mother died of stroke at 74. Two sisters died at 45 and 48, both of strokes.

Fluctuations in the pressure are characteristic of the earlier stages of hyperpiesia, and are of favourable significance. Later, when the arteriolar and arterial damage is marked, there is much less tendency to variations. In the advanced cases, if the systolic does fall to any extent below the optimum, it generally indicates myocardial weakness, and is evidence of cardiac failure. The diastolic rarely changes materially, and thus a fall in pulse pressure is an adverse sign, and is generally accompanied by clinical manifestations of cardiac failure and distress, such as an increased liability to dyspnoea, an alternating pulse, a gallop rhythm, or angina of effort. One or more of such signs is ominous.

#### *Auricular Fibrillation*

The future is still further jeopardized by the advent of auricular fibrillation, and some of the most dramatic instances of acute cardiac failure are caused by the onset of fibrillation in a patient with marked hyperpiesis. Extreme dyspnoea, accompanied by a sense of constriction in the chest, the skin bedewed with sweat, ashen colour, and a rapid disorderly action of the heart—such are some of the characteristics of the attack. Death may occur in a few hours, or the heart may gradually accommodate itself to the new load, and life may be maintained, though at a much lower level of effort. When fibrillation of the auricle has established itself the expectation of life is very definitely lessened. The acute urgent symptoms described above are those of left ventricle distress; later in the course of the disease congestive failure develops.

#### *The Gravity of Infections*

The wider my experience of the life-history of the hyperpietic the more I have been impressed by the importance of infectious illnesses—for example, such transient toxæmias as influenza and tonsillitis.

The first serious depreciation in cardiac reserve and the earliest record of anginal pain are frequently clearly related to a transient toxæmia. The myocardium was hit, and has lost its power of recovery. The practical bearing of this lies in the recognition of the importance and significance of a toxic illness in such patients, and of the necessity for a prolonged convalescence with the administration of haematinics and general tonics.

It is often difficult to convince the active, vigorous hyperpietic that a sharp short attack of influenza is undoubtedly for him a serious matter, and that he must save his myocardium and give it time to recover before resuming his usual activities. Neglect of this advice is often followed by disastrous and irremediable results.

#### TREATMENT

I am quite aware that, interested as you are in the pathogenesis and prognosis of high blood pressure, you are probably more interested in the management and

treatment. Unfortunately, the opportunity for treatment generally arises when the high blood pressure is well established. In any case, the preliminary is a careful and detailed examination and cross-examination—the latter being the more important. It is essential to discover the responsible etiological factors. Heredity, habits of life, diet, the existence of overwork, mental strain, worry, embarrassments (either matrimonial or financial) must be investigated. You must know your man before you tackle his malady.

It is dangerous, not only for the patient's peace of mind, but also for the doctor, to focus attention too persistently on the sphygmomanometer readings. Since a rise in blood pressure is for many patients a compensatory phenomenon, it is obvious that some attempt must be made to determine the optimum pressure in each individual, and not to attempt to reduce it below that level by drugs or drastic remedies. There is some truth in the saying that the greatest danger to a man with a high blood pressure lies in its discovery, because "then some fool is certain to try and reduce it."

#### *General Measures*

In the later stages more can be done by careful revision of the mode of life, undertaken with the active co-operation of the patient, than by any drugs prescribed for the specific purpose of lowering the pressure. If the patient is in the early or pre-sclerotic stage, or if the cardio-vascular damage is not advanced, the response to treatment is much more satisfactory, and a great deal can then be done if he will pay the price. When feasible, as a first step in treatment, it is well worth while to order the patient to bed for a few weeks, and at the same time to prescribe a mixture of bromides, or bromide and chloral, with the object of diminishing restlessness and irritability. When the nervous factor is dominant, rest will probably bring about a material fall in the pressure, and those with cardiac symptoms will certainly be benefited. This will afford an opportunity to observe your patient, and to determine in what way and to what degree his manner of life should be modified. Then get him off to the country or to some spa for a month's quiet holiday.

High blood pressure is often the penalty of success—a success the result of continuous hustle and mental strain. The successful man does not walk, he rides. His meals tend to become richer. His friends take advantage of his efficiency; flatter him and impose upon his good nature; and accordingly he is a member of this and that committee, is treasurer of one society and secretary to another, so that the load he has to carry is considerable. While at rest and in the hands of his doctor he must be made to edit the list of his duties and responsibilities, and cut out everything that is not essential to his happiness or his financial stability, so that when he returns to work he has shed that which was irksome and unnecessary. This short period of rest also offers an opportunity for investigating any and every possible source of infection, and it is well to deal with any such focus and to make sure that the teeth are sound and the gums healthy.

In so far as it is possible to remove causes of worry and anxiety, this should be done; occasionally in suitable cases psychotherapy may yield valuable assistance in restoring psychic rest.

To begin with it is wiser not to prescribe drugs, but rather to note the effect of general treatment. Exception may be made, however, in the case of restless and excitable patients; then bromide, or bromide and chloral, is valuable; salines and—if necessary—a simple stomachic may be given with advantage.

### Regulation of Diet

The diet will require supervision, especially in those who are well above the normal in weight. Every unnecessary pound in weight adds to the load the heart has to carry.

The first essential is to diminish the intake. As one patient put it, after a heart-to-heart talk, "It seems to me that I must keep my head out of the nosebag." I do not believe it wise to give the patient detailed instructions as to diet. He should grasp the main principle—namely, that the diet must be simple, wholesome, and small in amount. "No second helping" is a good rule, and he will do well to remember that "a good cook may be more dangerous to a man in health than a bad doctor when he is sick." He must keep an eye on the scales. If the weight keeps up, the intake of food must go down.

He will probably find it easier to eat less if he takes his meals with a minimum of fluid. Water can be taken on rising, and again before retiring. The starches and the fats should be eaten sparingly, and it is probably wise to refrain from a diet rich in extractives. Gravies, soups, rich stews, and hashes should be avoided, especially when there is evidence of renal damage. Fresh fruits, salads, lettuce, celery, vegetables, milk, and honey should find an honoured place in the menu; and fish, cold boiled bacon, lean ham, and chicken may be allowed. Butcher's meat should be eaten moderately, and beyond the salt used in cooking none should be taken. Alcohol is better deleted from the diet, and any excess in tea, coffee, and tobacco avoided. The diet should be such that the patient likes what he eats, though it is obvious that he should not be allowed to eat just what he likes.

As someone has aptly said, "In few conditions are both the dish of herbs and contentment more essential, or the stalled ox and strife more injurious."

When possible, an occasional day in bed is helpful. In the more advanced cases, with indications of commencing cardiac failure, it is invaluable. During that day the patient should drink plenty of water, lemonade, orangeade, barley water, raisin tea, or weak tea, and refrain from solid food, with the exception of a few biscuits and honey, or an apple.

### The Use of Drugs

Drugs, although of secondary importance, have their honoured place in treatment, more especially in the earlier stages. Later they are useful in treating various distressing symptoms—cardiac, cerebral, or renal. The benefit to be obtained in the earlier phases from bromide has already been mentioned, and it is of great service in menopausal hyperpiesia. Mercury, as a blue pill, or a dose of calomel, followed the next morning by a small but concentrated dose of saline, is undoubtedly of benefit. Such a pill should be taken once a week and the saline every morning—not to procure free purging, but one loose rather watery motion each day. Iodine and the iodides are still popular and widely prescribed, either in very small doses, such as 1/10 grain of the iodide, or in the larger dose of 10 grains. Iodine is acceptable either as collosol iodine or as the tincture—five to seven drops of the latter stirred up in an ounce or two of milk is not unpalatable, the small fraction of potassium iodide in the British tincture being an advantage rather than otherwise. If iodism is produced then the French Codex tincture can be used. The myocardium suffers from the toxæmia accompanying any infective illness, especially influenza, and during convalescence (which should be prolonged) hæmaturics are essential—simple iron preparations with or without arsenic.

There are three drugs which have come more prominently into notice in the last few years: luminal, acetyl-

cholin (acecoline, pacyl), and the sulphocyanates of potassium and sodium. Their tendency is to lower the blood pressure, and their action is evanescent. They are more likely to be of service in the earlier than in the later stage, before gross pathological changes have taken place. Luminal has, in addition, a helpful sedative effect. The sulphocyanates are prescribed in doses of 1½ to 2 grains three times daily after food, the dose being increased gradually day by day. I question whether the nitrites are of any value, except to bring about an immediate and temporary lowering of the pressure.

It is well to remember that the blood pressure is constantly varying both in health and in disease, and that, within certain limits, the normal has been established. When the figures pass beyond this normal there is a corresponding diminution in the expectation of life. It is therefore a physical sign worth investigating in every patient, especially when there is a known familial tendency to cardio-vascular disease. There is here a wide field for study, more particularly for the general practitioner.

### REFERENCES

- <sup>1</sup> Bramwell, J. Crighton: *Quart. Journ. Med.*, 1924, xvii, 67.
- <sup>2</sup> Hunter, A., and Rogers, O. H.: *Trans. Actuarial Soc. Amer.*
- <sup>3</sup> Cotton, T. F., Rapport, D. L., and Lewis, Thomas: *After-Effects of Exercise on Pulse Rate and Systolic Blood Pressure in Cases of "Irritable Heart," Heart*, 1917, vi, 4.
- <sup>4</sup> MacWilliam, J. A.: *British Medical Journal*, 1923, ii, 1196.
- <sup>5</sup> *Trans. Actuarial Soc. Amer.*, 1926, xxvii, 2, 76.

## MESOTHELIAL REACTIONS IN CHILDHOOD\*

BY

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I confess I find it a difficult thing to choose an appropriate subject for a lecture such as this. It is a privileged opportunity to address a gathering of men who are engaged in general practice, and I would like to justify that opportunity by presenting to you a subject which will be both interesting and helpful. It is in that very ambition that my difficulty lies, for I would like to leave the beaten tracks of stereotyped subjects and venture into fields that are as yet but little understood and largely unexplored. I know that when we leave the broad highway our footsteps often tread on sinking sands, and the foundation that we fondly thought was firm and sure may crumble into fragments when we rest upon it. None the less there is an interest—an adventure—call it what you will—in venturing into new territory, and in a very small and modest way the subject I propose to present to you may be said to justify the description, so alluring to the mind of the average man, of "terra incognita." If by these introductory remarks I seem to weave a veil of mystery where no secret really lies, it is because I appreciate that what I have to say is based, in part at least, upon hypothesis, supported, it is true, by a certain measure of experimental evidence and a framework of clinical observation. The purpose of my paper is to present to you certain reactions of the mesothelial spaces of the body, and more especially of the great mesothelial space—the peritoneal cavity.

### A CASE HISTORY

Some months ago a boy of 6 years was admitted to the Edinburgh Royal Infirmary. The summary of the case history was as follows: Ten days before admission he complained of a sore throat, there was a rise of temperature with general illness, and a diagnosis of acute tonsillitis was made. Four days later, under appropriate treatment, the local infection subsided, and the boy appeared to be convalescent,

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