HYPERTENSION IN WOMEN:—A CLINICAL STUDY.

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In the present communication it is not proposed to offer any evidence of the relative incidence of the condition of hypertension in the two sexes, but merely to portray the clinical picture of the condition as observed in the female, and to give some idea of the duration and mode of termination of the disease.

The study concerns 170 cases of hypertension in women where the systolic blood pressure was estimated at 200 mm. Hg. or more, the average systolic being 209 mm. and the average diastolic 117 mm. The cases have been observed over a period of from one to eight years. Patients with valvular or renal lesions have been excluded. The majority of the women have attended the Out-Patient Clinic of the Hospital, where the various investigations have been carried out.

Frequent blood pressure readings were recorded in most of the patients, and during the investigation 50 women showed a tendency for the blood pressure to rise, whereas in 38 the pressure remained stationary. As regards a fall in blood pressure, there were 34 cases in whom the systolic pressure fell below 200 mm. Hg.; in the other 15 the pressure declined but never reached a figure of less than 200 mm.

One of the pitfalls frequently encountered in taking a blood pressure reading in these patients, is the "silent period" heard when using the sphygmomanometer. With a patient who has, for example, a reading of 220/120, there may be a "silent period" between 160—200, and there is a danger of the higher reading not always being recorded. John Hay,1) refers to this "period" and the fallacies that may arise as a result of not recognizing it. Several of the patients in this series exhibited this phenomenon.

Age incidence. The fact that these changes occur about the time of the menopause is hardly surprising, but that they are always due to this factor does not necessarily follow. So much has been said and written on menopausal hypertension that this variety might be considered a disease sui generis. It has also been repeatedly stated that it is evanescent. However true it may be that a raised blood pressure occurring at the menopause may be evanescent, in the present series of cases, in which the average age was 55.6 years, it has been found that once over 200 mm. Hg., there has been little going back. This experience agrees with that of Blackford, Bowers and Baker.2) Only one case in my series of 170 showed a fall in blood pressure at the onset of the menopause.

Obesity. The frequency with which this was found, viz., in 105 patients, or 62% of the total, was so great as to make it almost a part of the syndrome, though in a few cases it was conspicuously absent without them presenting, however, any other departure from the usual conformity of the disease.

The effect of the amount of bodily exertion on the work demanded of the heart offers indeed a considerable problem. It is possible that if the ordinary individual were habitually to carry about the difference between his own weight and that of some of these individuals, e.g., 17 stones, it might have a profound effect on the
circulation, particularly when it is remembered that this increase in weight, and therefore in work, is constantly and always present, and hampers even respiration by night as well as by day.

**Renal Disease.** The exclusion of renal defects as the causative agent of the hypertension has proved a great difficulty, and for two reasons—(1) because it is difficult to find tests of renal function which are altogether satisfactory, and (2) because it is held that some form of renal inadequacy is almost certain to exist in the advanced stages of the disease, as a secondary result of persistent hypertension.

The following points have been used to form an estimate of the renal condition:—

1. The specific gravity of the urine from time to time.
2. Examination of the centrifuged or sedimented deposit for casts.
3. The blood urea starving level.
4. The response to 15 grammes of urea, given starving as measured by the urea concentration produced (Maclean's Urea Concentration Test).

As will be seen later, the condition of the ocular fundi could not be used as a sign of renal defect, for the changes found were not typically those of renal disease, nor did they carry with them the same prognostic significance.

When definite renal defects were discovered, and where the past history of the patient indicated that renal disease was likely to be the primary cause of the hypertension, these cases were omitted. In doing this many cases were excluded in which the primary hypertensive effect was quite possibly the real explanation, but it was desired to keep within the bounds of hypertensive disease for which no other explanation could be found at the time of the first observation. In the cases examined the average blood urea was 34 mgms. per 100 cc.; the urea concentration maximum was 2.5% and only in 10 cases was there albuminuria.

**Vascular Disease.** If the difficulty of excluding primary renal changes was great, vastly greater was the difficulty of excluding primary vascular disease.

The study of these patients has opened up so many and various questions, that no attempt can be made to answer them all. Only such practical points as have arisen in the course of the work can be attended to.

Thickened vessels are so frequently referred to that the diagnosis would appear very simple, yet an appreciation of real thickening in the presence of high blood pressure readings, is by no means easy. It has been found of value to examine the radial vessel after the pulse has been obliterated, by raising the pressure in the sphygmomanometer cuff above the known systolic pressure. The radial vessel should then be difficult to identify.

Are tortuous vessels also always thickened?

The hard tortuous nodular vessels of grave arterial degeneration of the decrescent type were not seen amongst these cases (only fifty-seven of them showing
thickened arteries by palpation) nor would they have been included, yet there were certain positions in which a tortuous loop in the vessels was frequently found, for example at the root of the neck and the fold of the elbow. The majority of these patients, however, were obese, and therefore digital exploration of any peripheral vessel was by no means easy.

In order to estimate the relationship between arteriosclerosis and high blood pressure, fifty cases were selected at various ages, mostly senile, as well as a number of hemiplegics, where the vessels were easily felt and appeared to be definitely thickened. The blood pressures were taken and recorded. The following figures were obtained, from which it is manifest that some factor other than mere thickening and degeneration of vessels must exist to explain the raised blood pressure in some of the cases, and its complete absence in others. We recall here the view expressed by Janeway\(^3\) and also by Turnbull\(^4\) and others, that arterial thickening is the result and not the cause of hypertension.

### NORMAL.

<table>
<thead>
<tr>
<th>Sex</th>
<th>Blood Pressure</th>
<th>Vessel Thickening</th>
<th>Vascular Degeneration</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>nil.  +  ++  +++</td>
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<tr>
<td>Female</td>
<td>low</td>
<td>2     1     1     0</td>
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<td></td>
<td>medium</td>
<td>3     3     1     1</td>
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<tr>
<td></td>
<td>high</td>
<td>3     3     0     2</td>
<td>25%</td>
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<td>low</td>
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</tr>
<tr>
<td></td>
<td>medium</td>
<td>0     3     3     2</td>
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</tr>
<tr>
<td></td>
<td>high</td>
<td>0     0     2     3</td>
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### HEMIPLEGIA.

<table>
<thead>
<tr>
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<th>Vessel Thickening</th>
<th>Vascular Degeneration</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>nil.  +  ++  +++</td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>low</td>
<td>0     1     0     0</td>
<td>50% (B.P. + 50%)</td>
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<tr>
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<tr>
<td></td>
<td>high</td>
<td>1     0     2     0</td>
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<tr>
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<td>87% (B.P. + 13%)</td>
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<tr>
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Haemorrhages again offer an unsolved problem. The relation of menorrhagia at or about the menopause in the hypertensive state, is a large question in itself to the study of which some contributions have already been made. But it is the intracranial vascular calamities which offer the greater problems. Are these to be regarded as definite haemorrhages? In those cases in which they occur in mild form, and with rapid recovery, has actual hemorrhage taken place—or is the condition really sudden thrombosis in degenerate vessels or even a transitory oedema?
The reputed association between high blood pressure and cerebral haemorrhage, which is liable to be assumed whenever a sudden cerebral catastrophe occurs in a patient who has not been under medical supervision before, would hardly appear to be supported by its incidence in this series as there were only seven cases found. Careful observation of the actual blood pressure at the time of, and after recovery from undoubted cerebral haemorrhage does not show that in all cases a raised blood pressure exists.

On the other hand, although the cerebral vessels are known to have an arterial wall of much less thickness than that of the limb vessels, yet, embedded as they are in the semi-fluid mass of brain tissue, suspended in the cerebro-spinal fluid and enclosed in the rigid calvarium, they are better protected than any other vessels of the body against the effects of a sudden rise in arterial pressure. It therefore seems probable that the larger factor in the production of intracranial disasters may be disease of the vessels rather than a rise in pressure.

There still remains the question as to what changes in the arteries may be anticipated as a direct result of the long continued maintenance of pathologically high blood pressure. In the present investigation patients have shown a remarkable development of arterial loops, tortuous on a coarse plan, which can alone be explained by active and definite increase in arterial length. Further, digital exploration has created the impression that there is also a definite increase in calibre, and a demonstrable dilatation of the whole arterial tree.

Persistent hypertension has been said to cause arterial fibrosis within short periods of time, but in the course of this study, the conclusion has been reached that definite thickening and hardening of the arterial coats is not a frequent accompaniment of hyperpiesis; indeed, in only twenty-five of the cases could a definite arteriosclerosis be said to exist as shown by examination of the retinal vessels.

Cardiac Condition. The condition of the heart undoubtedly forms the main issue in hypertensive disease and Allbutt(5) originally pointed out that it is "cardiac defeat" which finally terminates these cases. It would appear true that the size of the heart gives a measure of the duration of the condition, and the stage to which it has reached, though a clinical determination of cardiac size is not always easy on account of the frequent and extreme obesity. For this reason X-ray examinations were made of all patients and of these 86, or 50.5%, showed definite cardiac enlargement. The sounds of the heart were sometimes much altered, and it was often possible to make an opinion from auscultatory signs. The first sound was frequently as rough, prolonged and impure as to suggest early mitral stenosis, and indeed such a diagnosis had actually been made in some of the cases. It is supposed that this change in the first sound is due to the very large mass of muscle in action. The well-known accentuation of the second sound was encountered very frequently, particularly in the aortic area.

When cardiac failure begins, oedema of the feet and shortness of breath on exertion are the most usual signs. When these occurred they were not accompanied by any drop in the blood pressure, in fact there was some evidence to show that
the pressure still continued to rise. When a critical drop in the pressure did occur, a disaster was imminent, as is shown in the following illustrative case:—

Female, age 45.

Sept., 1934. Attended clinic complaining of dyspncea and palpitation on effort; duration 6 months; also nausea unrelated to food. No dizziness or headaches. Some polyuria. No tremor.


Sept. 21st, 1934. B.P. 240/150. Blood urea: 45 mgms. per 100 c.c’s blood.


*Post-mortem Report.*

Heart: Hypertrophy of left ventricular wall 2 cms. thick; no valve lesion. Pericardium: Serous pericardial layers stuck together by laminated fibrin (recent), easily stripped; no pericardial fluid.

Coronaries not enlarged; mouth of right coronary stenosed by atheroma, rest of coronaries appeared normal—not dilated. Aorta: Yellow atheroma throughout, most marked in abdominal aorta; endothelium intact throughout; process appears recent; very little fibrous thickening. Weight of various organs: Heart with aorta 38 ozs.: kidneys 12 ozs. (left 6\(\frac{1}{2}\) ozs. right 5\(\frac{1}{2}\) ozs.); healthy except for slight granularity. Liver: 56 ozs., nutmeg in character. Thyroid: 5 ozs., colloid adenoma.

Lisa(6) examined ten cases of hypertension, and found that the myocardium showed many small scars with no other gross changes. Microscopically very numerous necrotic foci were found—more frequently in the left ventricle and interventricular wall.

It is just possible that there may be some association between these findings, and the transient hæmorrhages, and that in this way may be found an explanation for the damage to the Bundle of His.
A change of cardiac rhythm is not uncommon, and four patients developed such a change while under observation, when the normal rhythm was replaced by that of auricular fibrillation. Even under so profound an alteration, the blood pressure still remained at its high level. Allbutt\(^9\) remarked on this, as also more recently John Hay\(^4\). The satisfactory determination of systolic and diastolic pressures under conditions of fibrillation is of course impossible by the palpatory method, for very few beats record the same pressure, and consequently recourse must always be had to the auscultatory method.

In order to verify the fact that the blood pressure does remain high when fibrillation supervenes, the blood pressure readings in all examples of auricular fibrillation in the Clinic were reviewed, and it was found that they could be divided into two groups. In the one group, that in which a history of acute rheumatism existed, the blood pressure readings were almost uniformly only slightly raised, whereas in the other group comprising the cases in which no satisfactory rheumatic history could be elicited, the blood pressure was very high—usually over 200 mm. Hg. Of thirty cases of both sexes taken at random, eighteen had a rheumatic history with low blood pressure, ten had no rheumatic history (except one) with high blood pressure, and three had a moderately high blood pressure with a rheumatic history.

The relative frequency of fibrillation in the two sexes shows so large a preponderance of females, as to suggest that the frequency of hypertension in women is quite likely to be greater than in men, and further, spasmodic fibrillation seemed to be unduly common in hypertensive cases, as compared with the rheumatic group.

Many authors have referred to the great frequency of ventricular extra systoles in hypertension, and these were frequently heard, and often recorded. In studying the graphic records, however, one did not find extra systoles appearing in the tracings with any greater frequency than in those of other cardiac lesions.

**Electrocardiography.** The frequency of left sided preponderance or dominance was very striking, and was the outstanding feature in the electro-cardiograms of these patients; \(124\) demonstrating the left, as contrasted with only 5 cases of right dominance.

The hypertrophy of the coronary vessel necessary to nourish a greatly hypertrophied ventricular muscle, must be of a high order, and one might have expected to find at least a secondary coronary sclerosis, yet it seldom presented itself in recognizable form, either in the clinical history or in the electro-cardiogram.

Myocardial damage was shown in 30 cases, by a spreading and splitting of the Q.R.S. complex, and occasionally by inversion of the "T" wave in Lead II. A further 25 cases developed signs of myocardial insufficiency under observation.

One of the early signs of the effect of hypertension on the heart appears to be inversion of the "T" wave in Lead I. Twenty-two cases showed this feature and six more cases a biphasic reaction. This "T" inversion in Lead I is also one of the early signs of right bundle branch block; there were nine cases of this condition, four of which developed during the period of observation. Apparently bundle branch block is one of the late stages of hypertension, as is also auricular fibrillation, which developed in four of these cases while under observation. In three of them it was spasmodic.
Radiology. The radiological measurement of the heart has not been done since there was no access to suitable apparatus for the purpose. The pencil outline method in use in Vienna appears to be one which could be used with advantage much more frequently than is actually the case in this country, and would effect a very material saving in photographic material. In the absence of definite measurements it is difficult to speak of the grade of aortic dilatation observed, yet in a very large proportion of cases this appeared to be present and since all the X-ray examinations were done under the same conditions, it is presumed that at least some value could be allowed to such an opinion.

Aortic Murmurs. The development of an aortic valve leak during the period of observation, an event which from the nature and progress of the primary lesion would not appear unlikely, has only twice been observed in this series. The recognition of such an event, however, is notoriously uncertain, and the large pulse pressure frequently suggests it, although it cannot be confirmed by any regurgitant audible murmur. The collapsing character of the pulse is often a striking phenomenon, as also the marked throbbing of vessels in the neck, arm, and abdomen. Of the last named one patient had a large palpable, throbbing vessel in the splenic area which could be heard on auscultation.

Right Sided Carotid Pulsation or "Neck Throb." It has been thought that childbearing may possibly have some relationship to the remarkable throbbing in the neck so frequently observed in these patients. Cabot(7) remarks on the "pounding" of the neck arteries, which appears much more commonly in women than in men in this disease, and, indeed, until recently, no case had been observed in a man where the question of right sided carotid aneurysm seriously arose, whereas in several cases in the women in my series, this was the reason why they had been sent to Hospital. 110 women in this series had pulsation at the root of the neck on the right side, while eight had it to an enormous degree.

The average number of children per patient in this group, viz., 5.6, is, however, probably no higher than the average for the social class from which these patients were derived, and there were 15 who had never borne any children.

In this connection it may be remarked that the anatomy of the upper thoracic operculum may possibly offer an explanation. Laxity of abdominal musculature, following upon repeated pregnancies, may permit of a certain amount of sagging of the thoracic cage in women, thus allowing the episternal notch to sink, and so expose more of the great vessels in the neck than is normal. In men, with the tendency for the thoracic cage to become fixed in a more or less inspiratory position as life advances, there is the opposite tendency for the great vessels to be enclosed more deeply in the thorax. An attempt was made to demonstrate this, by measuring the level of the episternal notch against the bodies of the thoracic vertebrae in X-ray films. However, no very definite difference was demonstrated in those who had a marked neck throb, as compared with those who had not, and it was finally concluded that this appearance of neck throbbing, although due in part to stretching of the vessels, was in large part caused by the high blood pressure.
Brown and Rowntree\(^{(8)}\) have recorded five cases of right sided carotid pulsation in women, all of whom had a systolic blood pressure of 200-280, and a normal renal efficiency. Retinal changes were present in two of the cases, and one case showed inversion of the "T" wave in Lead I of the electro-cardiogram. These authors attribute the throb in the neck to:—(1) lengthening of the carotid and aorta; (2) elongation and dilatation of the aortic arch with elevation; (3) buckling of the carotid which is now too long for its course. They claim that it is never seen in men. However, in the course of this investigation, one very definite example was seen in a man with a high blood pressure.

**Retinal Changes.** The discovery of retinal changes in these cases always led to the suspicion that some considerable renal damage must exist, though no renal changes were demonstrable in most of the cases in which such haemorrhages were found. Twenty of them had retinal haemorrhages, and six retinitis.

These findings did not appear to carry with them a serious prognostic significance, as several cases are known to have recovered from them and also to have shown them for over three years. McAlpine\(^{(9)}\) has referred in greater detail to this aspect of the disease. There appeared to be no association between these changes and a positive Wassermann reaction.

**Bronchitis.** Twenty-one of the patients were subject to attacks of bronchitis, in which there was a marked tendency to expiratory bronchial spasm. It was thought that in most of these cases it was really the first evidence of cardiac defeat, and that rest in bed for two or three weeks was the only correct treatment. However, the period of observation is not yet long enough to enable one to verify this tentative opinion.

One patient with right bundle branch block has had recurring attacks of acute pulmonary oedema. When written for in April, 1935, she replied that she was still having attacks but that they were less severe than they had formerly been.

**Rheumatic Pains.** Mild aching pains, especially in the limbs and back, were mostly commonly complained of, and usually attributed by the patients themselves to some mild form of chronic rheumatism. Some degree of creaking in the larger joints was indeed very common, but this was not always accompanied either by pain on movement, or swelling, or any deformity of the joints. Whether this formed an essential part of the syndrome could not be determined, but it was certainly present in forty-seven patients, although it had no crippling effect, nor was it severe enough to curtail their activity. A certain number of the worst of these patients were treated by diathermy and although some degree of relief from pain was obtained, it was never observed that the diathermy did anything towards reducing the blood pressure, either temporarily or permanently.

**Thyroid Changes.** Thyroid changes were looked for without success. The nervous excitement and throbbing vessels so commonly seen were suggestive of hyperthyroidism, whereas the obesity and high malar colour in other cases strongly suggested hypothyroidism. No corroborative evidence was obtained in either group to encourage the idea that the hypertension was of the thyrotoxic variety as described by Parkinson and Hoyle.\(^{(10)}\)
Pituitary Gland. No special examinations were made with regard to pituitary activity, and no cases were found which resembled those described by Harvey Cushing\textsuperscript{11} either of basophilism or of a hyperpiesia of a malignant type which was associated with gastric ulcer. The only case of gastric ulcer associated with hypertension in this series was not of the malignant type.

Syphilis. The incidence of a positive Wassermann reaction in this series is very low, viz., nine cases, or 5.3%, and is probably no higher than the average incidence in this age group of the general population from which the cases were drawn.

None of the patients studied had undergone a course of antispecific treatment, and it seems impossible to believe that the findings of Warthin\textsuperscript{12} at Ann Arbor, are really applicable to this group of patients, or indeed that specific infection plays any material part in the production of this common disease.

Carbohydrate Tolerance. No routine test was made as to the response of these individuals to the usual 50 grammes of carbohydrate, yet in the regular examinations of the urine, sugar was found in a certain number. Such cases were put on a standard diet of 2,030 calories. It was found, however, at least while under observation in Hospital, that they were able to tolerate this amount of food without the aid of insulin in the majority of cases, and in some cases the glycosuria was only transient.

The combination of raised blood pressure, obesity and glycosuria is a commonplace of practice, occurring as frequently in men and women at the 45-55 age period, and one is tempted to believe that an increasing tendency to inactivity and the pleasures of the table are the most likely explanations. On the other hand, the fact remains that while increased exercise and a more moderate intake of food can have a profound effect upon both the obesity and the glycosuria, it has no effect whatever upon the blood pressure.

Glycosuria results from carbohydrate ingestion more readily over the age of forty than under it, and the sugar tolerance curve of patients in the 5th decade should be compared, not with the responses obtained in young people but with those of their own age group as shown in a paper written with Langley.\textsuperscript{13}

These glycosuric patients showed a vascular condition in no way differing from other patients in this series, and no degree of arteriosclerosis was found in them by the ordinary methods of examination; otherwise they would have been excluded from this study.

The condition did not appear with sufficient regularity or frequency in this series to lead to the suspicion that it was in any way related causally to the disease. In other words, it did not appear to justify any suggestion that endocrinal imbalance, whatever that may entail, could be argued to exist as a causative factor for hypertension generally.

Kylin\textsuperscript{14} states that in essential hypertension 20% suffer from glycosuria. This proportion is considerably higher than was found in these cases.
Nervous Symptoms. Apart from the headache which is well known to accompany hyperpiesia from every cause, and which although frequent was not invariably observed, the state of nervous excitement in which 34 of these patients presented themselves for examination, was sufficient to attract attention. They are commonly not good medical witnesses, but very frequently their chief complaint was that they did not feel well, that they were very quickly exhausted, and particularly easily and unnecessarily upset by small everyday worries.

Their appearance was not uncommonly that of fright, which enhanced their resemblance to mild thyrotoxic cases. The incidence of headache and vertigo amongst them was not so frequent as had been anticipated, in view of the fact that so high a level was set for the blood pressure in the series, 124 complaining of the former, and 106 of the latter symptom, but in many cases they did not "suffer from the disease" at all.

Paroxysmal Hypertension. French writers have recently recorded attacks of paroxysmal hypertension which sometimes occur in patients presenting chronic hypertension of the "essential" type, and in some cases this has been associated with local cerebral derangements such as monoplegia, aphasia, or amaurosis, and may precipitate congestive cardiac failure, angina pectoris, or pulmonary oedema.

In this study each of these symptoms has been found and in each case the patient has recovered from the attack.

Heredity. As regards inheritance of the disease, 26 patients reported a history of "strokes" in one or both parents.

Post-Mortem Evidence. Allbutt has remarked on the difficulty of obtaining post-mortem examinations in similar cases, and the same difficulty has arisen in this work; such cases as have been studied and watched have frequently terminated under conditions which have made post-mortem examinations impossible. For this reason there is only one case with post-mortem evidence to offer, and in this case, as already quoted, the kidneys were healthy, with slight granularity. The blood urea only began to rise during the last three weeks of the patient’s life, and the blood pressure only fell twenty-four hours before death.

Causes.

The striking feature of the carotid "throb" in the neck seen in many of these patients, rather led one to hope for some explanation of this phenomenon in Herring’s recent work on the "Blutdruckzügeleronus." After a careful study of this work, however, one is inclined to agree with Code and Dingle of the Mayo Clinic, who in their experiments on the sinus nerve and a review of the literature on the subject, have come to the conclusion that "dysfunction" or disease of the carotid artery probably plays no part in essential hypertension; the pressor effects so induced are, in their opinion, too transitory. They consider that in the foreign literature too much emphasis has been laid on the relation of the sinus to essential hypertension, and conclude that there are few permanent clinical conditions which can be explained by disorders of the sinus.

Again, Aitken and Wilson repeated the experiments of Bohn in their efforts to find a pressor substance in the blood as a cause of hypertension and failed.
Donnison\textsuperscript{(20)} put forth a theory of a combination of (1) repeated mental or emotional stimuli—factors of stress, (2) the induction of Cannon's\textsuperscript{(21)} emergency reaction and (3) the absence of physical struggle following the reaction—due to civilization, as a cause for hypertension; the argument being that the condition is less prevalent among the lesser civilized races. Here again, however, he puts in a separate class, a small clearly defined group of cases that fail to support this hypothesis, i.e., women, at or after the menopause, in whom adiposity is a characteristic feature. The cases reviewed here fall into this last class.

The kidneys, adrenals, thyroid, and endocrine organs, have all been accorded their share of the blame at one time or another, and so many other different causes have been cited that it is obvious that the true cause of the condition is yet to be found. Allbutt's\textsuperscript{(15)} summing up of the situation ten years ago that the "flea is still in the blanket" still seems to hold good.

**Prognosis.**

Hubener\textsuperscript{(25)} states that ten years ago the prognosis in the cases of hypertension was considered grave, but that cases are now accumulating to show that life is not necessarily shortened. Patients have been observed, who have lived for twenty years with a blood pressure of over 200 mm. Hg. He himself collected eleven cases he had watched for 10-17 years, all of whom had a pressure constantly over 200 mm. The prognosis is difficult to formulate—he considers hypertension associated with adiposity and the menopause to be favourable, and co-existent syphilis and hypertension to be unfavourable.

The patients studied here appear to conform to the first of these views, since only thirteen deaths have been recorded among the 170 cases, while as regards the association with syphilis, there has only been one death recorded out of nine cases.

Castex\textsuperscript{(26)} remarks on the grave significance attaching to bundle branch block among hypertensive patients. In this series there have been nine cases of bundle branch block of varying severity, and in spite of the fact that the outlook appeared grave, one has been impressed with the extraordinary viability that these patients possess. Two of them have been under observation for six years, though one of these wrote recently to say she was not well enough to attend the Clinic. One old lady of sixty-one who has been observed for a year, still does her own washing! One who had auricular fibrillation associated with bundle branch block died after seven months.

**Treatment.**

The treatment of these cases falls necessarily into two stages, i.e., before cardiac break-down has taken place, and afterwards.

Before the circulatory system begins to fail, a good deal can be done for these patients by symptomatic treatment, and by employing Osler's\textsuperscript{(22)} dictum of "the consolation of sensible advice." A great many of these women are of the energetic hard-working type, who prefer to do their own work rather than leave it to a substitute. What they chiefly need is a little more rest, and an hour's rest lying down after the mid-day meal, combined with a little bromide therapy, has made a great many of them considerably happier. The severe headaches generally need some analgesic; while nervous upset accompanied by a further rise in blood pressure generally reacts best to several days in bed.
Various remedies have been tried without marked success, e.g., hypotensil, anabolin, thyroid, progynon, etc. Diathermy and increased fluid intake have also failed to make an impression on the blood pressure. Grollman(23) has shown that fluid intake, up to six litres a day, does not influence the blood pressure materially, and in the cases tried in this series, the same result was found.

After the heart has begun to fail, the treatment necessarily has to be adjusted to the particular form of cardiac failure involved, e.g., digitalis for auricular fibrillation, and atropin for pulmonary œdema. Hamburger, Jame and Conder(24) stress the value of lumbar puncture in avoiding catastrophes of paroxysmal hypertension superimposed on an already existing hyperpiesia.

None of the patients has been submitted to thyroidectomy.

Summary.

1. No adequate cause has been found to account for hypertension in women.
2. The condition is very common and renal inefficiency when it occurs is secondary to the hypertension.
3. No drug treatment seems to be of any avail.
4. Regulation of the patient’s mode of life combined with bromide therapy, appears to be of value.
5. The expectation of life is apparently longer than was formerly considered possible.
6. Retinal hæmorrhages have not necessarily a grave prognostic significance.
7. Quite severe myocardial damage can be compatible with life for a considerable period of time.
8. The cataclysmic character of the end is apparently not so frequent as cardiac and renal defeat.
9. The termination of the disease appears to be due to cardiac or renal failure, or to a combination of both.

Bibliography.

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