

HYPERTENSION: BIOLOGICALLY CONSIDERED

ROBERT HESSLER, Indianapolis

Hypertension, or high blood pressure, can be looked upon medically as a disease, with special consideration in regard to cause or causes, prognosis, and treatment. Biologically, hypertension can be considered as a reaction to an abnormal environment; shall one add, in some cases, in many cases, in most cases?

High and low blood pressures, like tension in general, have always belonged to the mysterious about which little definite was known. Then, three decades ago the invention of the sphygmomanometer (to measure arterial tension) and improvements in the sphygmograph (to record heart action) began to shed light.

Hypertension is a term that only today is finding its way into the dictionary; and we should consider that it is not many years that we have had large industrial cities: the two go together.

Medically speaking, "clinical aspects" come in for main consideration; in other words, discussion revolves around disease, treatment, death. This paper is not medical: the intention is to show the development of ideas in regard to the influence of environment, as seen in some of my own academy papers since 1900. Biologically speaking, discussion concerns the where and when of reactions; place and time are very important factors. When such reactions reach a clinical stage, nature is likely to take its course. Here I am writing primarily as a biologist, as an observer, interpreter, and adviser. I might even claim to be an educationist. Vocationally I have been a physician, with all that this implies.

There are all sorts of theories trying to account for hypertension. What is truth? To what extent can statements be verified—both by laboratory investigations and by simple observation—of the facts of daily life?

Ordinarily we have only the two categories of health and disease, and, oddly enough, there are physicians who are not interested in mere ill health. Yet today we are living in the days of ill health rather than of actual or specific diseases. In verification or for evidence, look about among your friends and neighbors. Moreover, an attack of disease may be a transient event. At the other extreme are the terminal infections that kill, perhaps when a man has reached a ripe old age, perhaps after "life-long ill health."

I am aware that some ultra-scientific biologist might say that my academy papers are not biological enough, just as physicians might complain of their being not medical enough. But I have in mind the second paragraph of my presidential address of 1906: "In addressing you I am not unmindful of the fact that the people as a whole are behind you, are in a measure represented by you as leaders in scientific thought, and that a discourse should be shaped accordingly. All that I should like to say would require much time; what I can say in this brief time allotted must be suggestive rather than a full and exact statement of scientific facts and deduction." (*Evol. Med.*)

My academy paper for 1900 was on "Mosquitoes and Malaria." There was a time when malaria was absent from Indiana; it is an introduced disease; then came a period of many years when it was the most common disease in our state. The assumed cause was "miasma." About five decades ago the real cause was found to be a microbe living in the red blood cells. The reason why and how it was transmitted was learned about 35 years ago. The treatment, medically, was the free use of quinine, a specific, destructive to the active cause. Prevention, and its bearing on the eternal where, when, and why, was based on the destruction of the breeding places of mosquitoes. Malaria is today a very rare disease with us. However, in 1900 "it's malaria," was still a common explanation for many obscure cases of illness, and the term "false malaria" was often applied to cases of coniosis. In the days of real malaria, low blood pressure was the rule, an accompaniment of sallow and anemic complexions. Shall one add that formerly Uncle Sam was pictured as lean and lank, but in recent times the cartoonists are more and more filling him out; perhaps in time he will more nearly represent a John Bull, high pressure type.

My paper for 1903 was on "Colds and Cold." The active cause of common colds is as unknown today, 1934, as it was then. It is assumed to be an ultra-microscopic microbe or filtrable virus. As a rule a simple cold under good air conditions is both mild and brief, but accompanying or secondary infections by common pus-formers may prolong a cold indefinitely. The reason why colds are common is mainly because we are compelled to breathe air with pathogens, especially during the winter time. To avoid colds, change your environment—go to Florida or California. If you cannot leave, try to have your cold under good air conditions as just indicated. The Holy Grail may be near at home.

Why have I mentioned these papers on Malaria and Colds? For two reasons: The analogy in regard to causes and reason why applies to hypertension, and any advice that may be given on how to avoid, avert, or prevent, applies to high blood pressure, always keeping in mind the rule and the exceptional case. If we cannot alter our environment to make it favorable, we can or might move to a better one. Alas that so few can make a radical change, or make it when too late.

"City Dust: Cause and Effect," 1904, was a continuation of the series, incidentally showing why our triad of American diseases—catarrh (and colds), dyspepsia, and nervous prostration—are or were so widely prevalent. To this triad should be added a fourth member, rheumatic affections, or, to use a pertinent expression, "Rheumatism, neuralgia, or whatever it is." And today we must add a fifth, hypertension, making a pentad.

During 1904 and 1905 I had a series of medical papers. One was on "Atypic Cases." I tried to show that the common ailments just mentioned are manifestations of a "protean disease," one with many disguises, and that the therapeutic test, the crucial test, was pure air, that one could prove this both going and coming. In that paper there was, however, purposely omitted mention of hypertension, not simply because the term was then not in use, high blood pressure cases being referred to as being full-blooded, but because there was no instrument

to express pressure in figures, nothing analogous to a thermometer to express temperature. Moreover I was advised to "get more data"; as matters stood I was already "making large claims for a new theory."

The naturalist, the biologist, and especially the systematist will at once see that here was the old question of "Lumping versus Splitting," and the use of a new name. Here I cannot go into details; I must refer to a paper of 1911, on Coniosis. In that paper I made use of the term Smog, now in common use in industrial cities overhung by a cloud of smoke, dust, and fog. Coniosis, it may be added, is one aspect of the process of the domestication and urbanization of men. One may say it is the penalty or too much house and town life, as indicated in some of my recent papers.

From 1900 to 1905 my work was wholly concerned with first hand material, because "The proper study of mankind is man"—not books. And then, at the end of 1905, I did take up the study of books, specifically the books by biographers. My first paper before this academy was (1905) on "The Ill Health of Darwin, Huxley, Spencer and George Eliot." Little did I dream that in my future work I would associate the honored name of Darwin with the process of domestication and urbanization of man. Darwin wrote on domesticated animals and plants; he also wrote much about man, but that was in the days before bacteriology and long before the days of allergy and coniosis. In the absence of such knowledge Darwin did not understand his own reactions or his ill health; neither did his physicians. In the case of Huxley there was a similar association, man's place in the city. Huxley wrote on "Man's Place in Nature." He too did not understand his reactions, but he realized, as did Darwin, that he had better health in the country, away from cities and crowds. The final termination is always interesting to the pathologist and physician.

Huxley in the very beginning of his autobiography tells of life-long ill health, yet he reached the proverbial three score and ten. The curious may well wonder "what was really the matter," as Huxley himself did. The story is a long one, yet one can quickly plumb the bottom of a book—never of the actual life of a human being.

So important in my own life has the subject of hypertension become that I can make a division into two periods: before the days of taking blood pressure, and after. And one finds "there are others." Some, alas, learn too late that today hypertension has become a problem of first magnitude. To treat the subject properly would require a book. Here I can make only a few brief mentions that have a bearing on my theme, biologic aspects.

In 1906, when I gave my wholly impersonal presidential address on "The Evolution of Medicine in Indiana," only a few of my friends, especially fellow-students, knew that I felt very uneasy at the time. I had only recently discovered that I was a high blood pressure victim. I had suspected this to be the case in 1904, when I prepared my paper on "Atypic Cases," and then the new apparatus proved it. To what extent shall one make mention of personal experience, as I had been doing in discussions with patients?

The things that impress us most are our own experiences. I had good reasons to suspect that this hypertension process was an active one. I began to think of the outcome. That was 28 years ago.

Consider that on my father's side there is a 50-year phylogenetic life cycle, and when father reached 50 he died. I am the son of my father in traits and characteristics. One might make all sorts of observations or remarks in regard to heredity, Mendelism, immunity, and so on; likewise in regard to a final termination, but I refrain in this brief abstract. In regard to actual experience I shall be brief:

I had a high pressure and it was going up. Would I reach 50? What should I do? Go on, live in hope, and die in despair? The literature coming to the fore had a gloomy aspect. I went on with the daily work, in the heart of Logansport. Early one morning, in March, 1907, just before dawn, I suddenly awakened with sensations of "sinking feelings," to use an expression of patients. I realized at once that so-called decompensation had set in. I felt my radial pulse. Every missing beat produced that miserable feeling of passing away. I was 46. Would I reach 50? Soon the mind began to get very active. What of the influence of environment? I had advised many a patient to make a change, and with good effect. And there was Huxley, he took a new lease on life when he left London, to reside at the seashore and lead a simple life. I could not go to the seashore, nor to the mountains, nor to California or Florida; but I could move my office to my home on the edge of the city, a four acre lot; and I could lead the simple life. During that day I discussed the matter with two of my old patients; one said, "Doctor, take your own medicine." I did. I left the heart of the city and seldom went into crowds. I gardened, fished, botanized, etc. Patients knew where to find me. Soon my pressure began to drop, in a few months from 150 mm. (and even more at times) to 100 and lower (lowest record on a sphygmogram was 97). I had the best of health, and I am alive today. I have outlived that 50-year cycle by 23 years. Normal pressure for me at present is along 120/83.

What an experience I had had within less than a year! We have no control over our heredity; we must take what we get from our ancestors. But we can control our environment, and this is what I now tried to show patients. I carried on health supervision; it meant to examine both when ill and well, to get comparative data. Naturally enough I began to prepare papers on the question; an abstract of one appears in our Academy Proceedings for 1907. But in my paper of 1908, "Biography and the Influence of Environment," we are in the midst of things in regard to blood pressures. My paper when read was accompanied by several long rolls and charts, as some of the older members will recall. The same data and charts I had used earlier in the year for a paper before the State Medical Association, where I expected some worthwhile discussion, but the subject was too new; unprepared minds do not and cannot speak out. But after the meeting many do ask questions. Soon books began to appear, prepared by men in large cities.

In my paper on "Thought Stimulation" (1909) I made mention of five high pressure patients and referred to my own pressure in con-

nection with a case where the pressure ran from 200 to 250. I quote the closing sentence: "When I add that my own pressure runs from 100 to 110, the significance of 250 mm. will be better understood." The most common mental symptoms in high pressure are fullness, dullness, headache, dizziness, irritability. And today advertisements are appearing, both of proprietaries and patent medicines, that offer relief. New synthetics are constantly appearing, for relief, not cure.

While putting together these notes I thought of making a little exhibit of old and new instruments of pulse tracings and pressure records, but, time, time! And then I considered to what extent to act as a Boswell to some of my patients who in the course of years became dear and valued friends. Such a question arose in the case of a member of this Academy who died a year ago. [Dr. Coulter told of him]. He came to me first in 1900. In 1906 I found that, like myself, he was a high pressure victim, at times running over 200. By attention to his environment he outlived a prognosis of an early death by 20 years. And there is another old friend, who did not become a patient until late in life, for the simple reason that he was a member of a faith cure cult. I was called in when he was comatose from an apoplexy; his pressure was the highest I ever took, 295, thrice as high as my own. Venesection saved him. He too began to lead the simple life, but soon tired and gradually went back to his office more and more, and gradually the pressure went up; another stroke and the end. Such cases teach early health supervision. One could go on and on reciting cases, or of telling of the fate of those mentioned in my papers of 1908 and 1909. Need I add that the longer data, that is observations, are continued, the greater their value for drawing conclusions? There comes to mind another old patient with a pathetic plea: "Now please, doctor, look again through your books, see if you can't find a cure or something that will be a decided help." Alas, I knew what was in the books, as a botanist knows what is in his. His days of relief came when he was retired. And there is the remark of a physician who looked through the large book of Dr. Fishberg on Hypertension and Nephritis: "The book shows how little is known about causes, about prevention and cure. It is very discouraging to read some of the statements." I looked through the book myself a few days ago, a revised edition. I found nothing bearing on the influence of environment, neither in regard to causes, to the where and when of symptoms, nor in statements on treatment. But there are a few items that are pertinent; to understand fully their import they should, of course, be read with their context. "Systolic pressures above 150 mm. are abnormal for all ages." "Essential hypertension and its consequences are among the most common conditions confronting the practitioner." Then come a lot of statistics. "These figures afford some indication of the importance of essential hypertension to the physician, a fact which has been adequately realized only within recent years." Mention of the increase and "the strain and stress of modern life." And then we have the illuminating statement that hypertension scarcely occurs in negroes living in a primitive state in Africa, but that in negroes in New York City it occurs as in white men. And consider the following: "The

treatment of essential hypertension is one of the many unsatisfactory chapters in therapeutics. The fundamental causes of essential hypertension are largely obscure, and we can neither remove nor combat them. In many instances no method at our disposal will serve to lower the blood pressure for any significant length of time." Keep in mind that nothing is said in regard to the influence of environment.

It was interesting to go through the indexes of books and special journals, both to note the absence of "Environment," and references to causes or assumed causes, as for instance to "Overwork," a term that has been so overworked that it has lost its connotation. On the other hand, an overworking of the defensive system, in warding off infection, is scarcely mentioned at all; and in this connection we have to consider the more or less vague warnings of the primitive nervous system, symptoms that are usually not only not understood but misunderstood. And what a plain tale results when environmental influences are considered and acted upon. Such remarks also apply to "glands." Why should a gland begin to "act abnormally?" Does nature do abnormal things? "Nature makes transitions, and naturalists make divisions" applies. We should always consider the place and the time of reactions.

Did time permit I should make some mention of my paper of 1909, time of Darwin's centenary. Can life history be made into a science? In a little talk at the academy banquet I made a few remarks on how I came to take up the study of biography—Darwin's life was an early one—and how this study of domestication and urbanization became a life work. In my paper of 1911 on "Coniosis" I again took up the "Protean Disease" of 1904, with a brief mention of types. About that time the term Allergy came into use. Today it includes many reactions and conditions formerly regarded as atypic diseases or as idiosyncrasies, all the way from pollenoses to reactions to food and contacts. Perhaps this will become clear when I mention that I myself react to street dust (particularly when it is unsterilized, as in the winter time when actinic rays may be rare under the city smog); and I react to indoor dust, and to "crowd poison," and to feather dust. My brother reacts to ragweed pollen; so does one of his sons; a daughter cannot wear silk; it brings on a skin eruption. To know the cause is to avoid it, or at least indicates what we should do. Need I add that because of my own reactions I made a study of others, and then there develops that "fellow-feeling which makes us wondrous kind"; and I always want more data. In regard to recent papers, the student may find that they still revolve around the process of domestication and urbanization: there are all sorts of aspects.

There is an old saying that a man is as old as his arteries. Why do arteries harden? Why are so many men worn out at 40? On the other hand, judges of the Supreme Court at times continue to work until 80; and our ex-presidents die prematurely. Consider that half of the physicians in our country die of "heart disease," and that a third of a city population may go the same way; another third go by way of lung diseases, and the remaining third die of all other causes of death together. We need more sanitary engineering, and we need the lessons from life histories and from biography taught in the schools and colleges.