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Modern Commentaries on Hippocrates*

The Humoral Theory and Its Application

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The difficulty the modern essayist has in commenting on the writings of the ancients may not always be due to their obscurity. I realize, as I engage in it, the force of the hint Goethe threw out to his critics, that possibly the light burns dimly with me. Miss Miliona started a thrift class when she heard her father, the steel magnate, say what we needed was more labor and less bread. When we wanted peace a master of motors chartered a ship and went after it. When a foundryman and a politician entered literature, they started in to reform the English language. When a weaver found his purse fuller than his time, he began to show the farmer how to milk his cows and plant his potatoes. When a doctor devoted to mortality statistics got the chance he wrote an essay on immortality. There ought to be a field, free for all, reserved for the aberrant industry class in the world's exposition, but even this should be entered by the dry goods expert, interested in artistic architecture, or the soap boiler devoting his last years to poetry, hat in hand and with moveable joints in their spines, characters not acquired by men accustomed to the adulations extracted from a world grovelling at the feet of material success in life. Attempting to keep full in view certain lessons to be garnered from the later life of more distinguished men, when a medical man, though in no way handicapped by materialistic laurels but no longer even politely referred to as middleaged, enters the field of historical criticism, he should first look carefully around him and see who is occupying it and commune with himself as to whether he belongs there. In their new activities it has not been observed that the gilded girl or the foundryman or the politician or the weaver or many another took these precautions, deeming success a matter of course in any of their undertakings. At least he need not add unnecessarily to the gaiety of his own critics by a blindness which seems usually really to arise as much from an insufficient sense of humor as from the acquired characteristics

of persons having attained eminence in fields they have cultivated in earlier years.

All of which admonishes me I have reason to be cautious in differing a little in sentiment from that which one sometimes notices in literature old and new, to the effect that the modern student of the history of medicine, much less the casual reader, can not enter profitably into the field devoted two thousand years ago to the husbandry of philosophy and medical science. I presume from the viewpoint which some critics hold there is a modicum of truth in this. I think it very likely impossible for any one, however studious and however well equipped otherwise, ever completely to grasp or thoroughly to enter into the manner of thought of the ancients, or for that matter into the atmosphere of thought pervading epochs less remote than the term, ancient philosophy, connotes. It is certain one can never be sure that one has really penetrated the inmost recesses of the ancient mind, however assiduous one's study of it. These things may be freely granted. At least it is as impossible to deny them as to prove them. I humbly question, however, whether this is the only viewpoint from which a survey can profitably be made of the beginnings of the history of science. All history, it is said, must be written anew for each generation and the force of the remark is obvious. Each generation taking up its own angle of incident vision and seeking only the lessons it thinks important in history necessitates a continual shifting of the facts in and out of the limelight. That this usually results in the abolition or rather oblivion to the appreciation of the way they were presented to former generations also has its interest for us.

In so far as historians, skilled in the art, make a pretence of furnishing eternal, snow white truth, without fleck or blemish, to a properly obsequious and receptive world, eager for the news from the inmost Olympian circles, I suppose we must acknowledge that such sentiments are correct, but I doubt very much if all the terms of this high ideal are tenable, as sometime expressed. One naturally

*I have used the translations of Adams into English and the French translation of Littré for Hippocrates and Kühn's edition of Galen.

falls into this attitude, when one is too deeply imbued with the selfconsciousness of modern science from a wide acquaintance with its literature. I read only yesterday the approving citation of a reviewer, who yielded, coyly perhaps but with graceful readiness, to the bold assertion of an author, whoever he was, that it was false modesty not to assert that all the secrets of nature had been revealed in the processes of a certain disease, or was it some other repositories of Nature's mysteries? It is not well to be too specific about author or reviewer. I only wish to illustrate how easy it is for these gentlemen, for all of us indeed, who linger on the outskirts of things, to absorb some of this spirit in the study of modern medical literature. But is there not something, is there not some grateful thought we can derive from only a proximity to this luminosity of our times without unfortunately encountering its full glare? Is indeed after all the impression general in science, even in medicine, that we know it all? Are there not some at least who are grateful for half truths? These questions are natural in this connection and for me at least are all important.

VALUE OF ANCIENT THOUGHT.

If these are considerations to ponder as to the historians' audience, there are parallel ones not less important as to his work. Even if it is true, and I believe it is true, that it is quite impossible to fathom all the depths of ancient thought, can we not get flashes and gleams of hidden meanings, of meanings at least for us even though false interpretations, that will act as a stimulation to modern thought? Was it Browning or some other cryptic philosopher who, asked what he meant by such a line, answered complacently he was blessed if he knew what he did mean. It was of no consequence. The important thing was to know what it meant to the reader, if anything. It is not of prime importance for us to know what Shakespeare or Homer, Heracitus or Hippocrates really meant by some cryptic line. What is there in it for us? From Aristotle and Plato we can not hope to derive what it was possible for their contemporaries to learn, nor what the next generation gathered, nor the next and so on for sixty or seventy generations, but it has meant something to them all and be sure it can mean something to us. Otherwise the good they did would lie buried with their bones, but we may equally be sure it was not absolute truth even at the start, not such as modesty can be too modest in concealing. And this abnegation of absolute truth which we make in the face of history, the continual revival of interest from a new angle, this gain of a new point of view from which to behold the panorama and speculate as to its interpretation, has in fact been, with no attainment as yet of absolute truth, an ever ready source of charm and interest for thoughtful men throughout the ages. Without this eternal resurrection, without this new point of view, we should care no more for history than we do for a catalogue of the stars. New ones are discovered, of course, but they have no interest for the public. This can hardly be otherwise in the history of science for scientific men in general. Continually exhibiting new facets of absorbing interest

to the intelligence of the modern worker as he meets facts in his own work new to him, the critical survey of the past, with its incidental reminder that there were brave men before Agamemnon and wise men before Solon, can not fail to be to him a subject of interest and profit, if he will heed. Those gleams of light we get from it may not be such as they existed for former generations. They may not be such as will shine in the future, but this does not wholly destroy the value they have for the present, differing in each it may be and even always wide of absolute truth, if any one knows what that is.

So long as we make no pretence, then, of farming or of reforming the English language, no promise to bring peace to a world in arms, no threat of printing posters to enlighten the poor as to thrift, in so far as we take care not to raise hopes in our readers, which are bound to disappoint, so long as we patiently and cautiously keep hidden the conviction that we possess the well springs of eternal truth, so long as we humbly, manuscript in hand and with many reverences, bow to the editor, who is the best judge what it is practicable, even what it is best for his multitude of urgently exigent readers to read, I think we can still sleep o' nights even in proximity to our neighbor exulting in the possession of everlasting truth. I for one feel that I don't need to worry about it, it being no possession of mine. I am content to leave it to those who rejoice in it. I am content with the impression ancient literature makes on me and if I try to hand it on, such as it is, soiled as it is with my own sordid grasp of it, and the editor gives me a chance, why should I stay my hand because I know it will all be dust and ashes, while the works of genius are immortal? It was not the dream in the old temple slumbers that mattered, it was the interpretation the artful priest of Aesculapius put on it that decided the therapy the patient adopted. This is the sordid grasp to which I refer, having here particularly in mind somewhat I confess the peril of introducing too much of the personal element in formulating the general principles of the humoral theory, which was the subject of the last essay in this journal. It is desirable in the exposition of a theory which had such far reaching effects on the course of the evolution of medicine, not to be content with this personal interpretation but to illustrate it amply at its inception and in its first developments.

TEMPERATURE CHANGES.

Having referred particularly to Hippocrates' great appreciation of season, climate and weather upon man in general outline, it remains to point out the specific manifestations of his convictions in the genuine books of the Hippocratic Corpus. Naturally one first turns to the *Airs, Waters and Places*. It opens with a recognition of the influences of temperature changes in a general way on the system and then specifically we find it explaining that there are waters which are of a heating nature, some having a solvent effect on the bowels, being adapted to boiling but some are intractable and dry up the bowels. At once we grope, quite as admitted in my preceding remarks, but we see the association in the mind of Hippocrates of water both with the dry

and the moist state of the bowels and we learn that to some extent the qualities of an agent are determined not by its own physical condition but by the effects it has on the human system so far as it is classified in the humoral theory. This gives us some enlightenment on how it was possible that a theory so incongruous with all we regard as common sense could appeal to such a mind as that of Hippocrates, ever ready to rebel at any violation of it. In the *Ancient Medicine* he thus attacks its special application. Let a man, he says, of a weak constitution "eat wheat such as the threshing floor supplies, raw and unprepared, with raw meat, and let him drink water. . . . He will experience pains, his body will become weak and his bowels deranged and he will not live long. What remedy? Hot? Cold? Or moist or dry?" Not at all, he answers, change his diet. As far as he knew none of these qualities ever existed alone but always mixed with others, whether we consider them, I suppose, from the physical or the therapeutic viewpoint, but he jumps the later limitations of the theory altogether when he says that in pneumonia, there is something beside the hot mixed with it—the bitter, the salt, the acid perhaps.

TISSUE CHANGES.

He refers to waters which generate stone in the bladder, in such a way, we perceive in the *Airs, Waters and Places*, that there is a connecting thread to the thought we meet in connection with water. Our conception of inflammation has become so largely one of tissue structure and tissue change, it has become so much more associated with its varying etiology, we forget it is but a short time since it was almost exclusively a dynamic conception, one almost entirely symptomatic. For the old physicians it was so exclusively. The sensation of heat in the inflammations of the bladder had a literal connotation for the ancients to a degree foreign to us. The burning sensations in the urethra were real heat. In Hippocrates's view the cause of stone in the bladder was indubitably traceable to the water habitually drunk. Stone in the bladder was accompanied by heat. Water, he thus demonstrates, though cold and wet by nature, gives rise to heat. Thus runs the thought apparently. We see at least that water was heating, of a hot nature in connection with the symptoms.

So when "winter is dry and northerly and the spring moist and southerly, the summer will be of a febrile character," ophthalmies and dysenteries will prevail; it is the fever or the burning or the smarting of these generated by the moist spring weather, preceding the advent of summer, which makes them hot. Here we see certain agents, certain elements, the water and the air, working by contraries, but cross purposes are not the rule. Women are referred to, not only as moist and soft, but as having a cold and relaxed belly. It would seem then that some of the idea of the warm we found connected with inflammations is also inherent in the figure of speech as to sexual appetite, the men being more ardent and hence warm by temperament, the women colder. "The dysenteries are also likely to occur in women and those of a humid tem-

perament." The lack of musculature, the pliable skin, the substratum of adipose tissue we recognize as lending to the ancient mind the idea of moisture in women and children and those of flabby flesh. Soft clay, moist and cold, unbaked by heat, seems to have been the mental association. Dysenteries and violent diarrheas drain the moisture away in their copious stools and leave the plump figure of yesterday a wasted and shrunken frame. I do not know if modern statistical information or even if the impression of modern clinical experience confirms this idea that the plumpness of women and children or the flabbiness of ill nurtured males predispose to diarrheas and dysenteries. In the latter instance perhaps flabbiness and the diarrheas depend on a common cause of intestinal inefficiency, but I suspect the striking change wrought by summer diarrheas on the plumpness of women and children multiplied the cases in the mind of him recording a long clinical experience from memory without the help of statistics, at least in their modern profusion. At any rate, such things fell to the category of humoral theories. Men of a phlegmatic temperament, that is, those subject to catarrh of the upper air passages, "are like to have dysenteries too," perhaps especially when subject to stomach disorders as they sometimes are. There is trouble though for us about the brain; that like the phlegm which comes from it is cold and wet and the cold and wet of the weather increase it. Thus water or moisture we saw producing heat in stone in the bladder, working by contraries, here in the head works by similars. These two principles were as great a blessing to the ancient pedant as the ubiquity of bacteria is to his modern successor.

Why the phlegm is cold we perceive fairly well. Of the body fluids whose physical attributes, when they come under the notice of the observer, are likely to be associated with certain definite mental impressions it is the phlegm which most often leaves the impression of being cold and wet. The blood and the bile are warm when voided, while the phlegm, for long lying in the air passages before coming in contact with the skin of the examiner, is cold. Thus "some have catarrhs beginning in the head and descending to the lungs." It is the cold and wet phlegm for the ancient that caused lung trouble—and we don't form quite so coherent an etiological chain as this now, though we see the gaps in the old one.

CHANGES WITH AGE.

"Those are bilious who have dry ophthalmies from the heat and dryness of the flesh." The thought stands forth when it is at once mentioned in sequence that dryness and hardness of the flesh is connected with old age, for that is dry and hard too, if not hot; "the aged too have catarrhs from the flabbiness and melting of the veins." The cold and wet not seeming to fit in very well with the dryness of old age, there seems a faltering here, flabbiness also not being, it would seem, exactly consonant with the hardness of old age. In fact it is permissible to conclude that sometimes, at least, when we grope, there is an irreconcilable clash which no logic, ancient or modern, no diligence of

search along the mental track, entirely silences. It is a way theories have sometimes even in the best regulated eras, like our own, but it is unsafe, living in an era unsympathetic and intolerant of any logic but its own, to yield too readily to this facile interpretation.

The indications of the correlation of the humoral states of the body with the climate of different countries, of course around the Mediterranean for the most part, are too diffuse to lend themselves readily to citation, but permit the summary that the question of health and disease is inextricably involved in the interrelation of the qualities of the animal system with the characteristics of the weather and the seasons, of water and earth, in the terms of the humoral ideas prevailing in the genuine books of Hippocrates, but often as to the humors themselves this is not specifically avowed, even in this book of the *Airs, Waters and Places*. In the *Regimen in Acute Disease* we scarcely get a glimpse even of these ideas. Still less, if possible do we get any intimation of the qualities in the *I* and *III Epidemics*. In none of the foregoing is there any talk of the discrimination of the body fluids or any reference to the four humors as an exclusive class, etiologically or pathologically, but in the *Epidemics* there is frequent reference to the weather, the climate, and the location in consonance with the treatise we have had chiefly under consideration. Indeed the *III Epidemics* is divided into "constitutions" in which the chief etiological factors are these precisely and only secondarily the humors at all. The *Aphorisms*, some of which may have been independently composed by Hippocrates, some of which selected by him or by others from his genuine works, but some of them too silly and tautological to have been composed by anybody but a fool, exhibit many instances of the frank avowal of humoral doctrines. These are chiefly selections from the spurious books we have not yet paused to consider and therefore there is no reason for supposing the aphorisms, not traceable to either the genuine or the spurious books, are also from the hand of Hippocrates himself. In the *Prognostics* the best emesis is referred to as that which is formed of phlegm and bile, thoroughly mixed and much of the prognosis in pneumonia seems based on this state of expectoration, the yellow color of the sputum being thought of as derived from the yellow bile.

THEORY OF THE COCTION.

The acceptance of the importance of the coction, that is the process whereby the excretions of the air and food passages become loose and are easily voided, corresponding frequently with the crisis in pneumonia for instance, is an acceptance if not of the theory at least of a participation in the manner of thought of the humoralists. In the *Régime in Acute Disease* it is said: "Fasting itself sometimes attracts raw bilious humors to the head and the thorax and interferes with the coction by causing sleeplessness." Further along in this book we find the clue to the theory of the coction in its assimilation with digestion of food and drink, the lack of which also gives rise to insomnia.

In the *I Epidemics* in a persisting opithaimia the

humor (of the discharge, I suppose, remaining ichorous) continued without decoction. And there were bilious diarrheas, "abundant, irritating, without decoction," sometimes even watery, and again we get the assimilation with digestive processes—but in everything pertaining to the disease there was much humidity, there was vomiting of phlegm and bile and food was returned from the stomach undigested. This coction of the humors is so intimately associated with the theory of crises and critical days, it is difficult to go thoroughly into the matter without going further than my remaining space allows.

There is reason for the remark that the chief internal etiological factors in the process of disease for Hippocrates are the bile and the phlegm, but especially the bile, as that occurs more persistently in the discourse than the phlegm. Littré draws attention to the fact that both the older philosopher Anaxagoras and the younger dramatist Aristophanes allude to the bile as the origin of disease, but Plato still younger, in the *Timæus*, which is supposed to have been written in his old age, probably long after the death of Hippocrates (or in his extreme senescence if we must accept the legends of his longevity) explicitly refers to the four humors as the causes of disease, when their equilibrium is upset by the predominance of one or the other. This matter has been alluded to in the previous paper and while the evidence as to the conclusions reached do not entirely conform to those demanded by the orthodox tenets of science, they are fairly within the usual limits of historical criticism.

It is of some significance in approaching the consideration of the full blossomed humoral theory, such as appears in some of the spurious books of the Hippocratic Corpus and such as Galen handed down to posterity, to note a few special indications which point to its origin in the Sicilian School. This also has been touched upon in the previous paper. From Sicily direct rather than indirectly from the Hippocratic Corpus we may imagine Plato derived his fuller developed humoral theories. In one of the fragments of Empedocles we find the declaration, often quoted by Galen, that the vine draws its characters from the soil. The fourth book of *Maladies* Littré places in a special class (VI) as continuous with several others all coming from some able follower of Hippocrates, before the time of Aristotle; Polybus, Galen thinks, perhaps. This brings it close to the date that I have alluded to for the *Nature of Man*, but from internal evidence, from a significant difference in the treatment of the humors, we infer it certainly is not from the same hand. The author of *IV Maladies* remarks how different are the lands lying around the Mediterranean in the virtues they impart to the vine. This took place, he seems to conceive, by virtue of a power, to which Hippocrates also alludes in *Ancient Medicine*, assimilable to the famed entelechy of Aristotle, so much exploited by Galen in antiquity and also by Driesch and the modern vitalists. The immediate point for us is: "Moreover there are four other sources by means of which each humor arrives at the body—". Those sources

are for the blood—the heart; for the phlegm—the head; for the water—the spleen; for the bile, the part which is in the liver. The food and the drink contain all the biliary, the water, the sanguineous and the phlegmatic elements, some less, some more." In these origins and organs must exist powers which give them their characteristics. Of course whether it is the neovitalist or this ancient vitalist follower of Empedocles, from whom Aristotle borrowed so much, who begins to discourse on these attractive powers, so convenient for both alike, we advance not a whit, whether we call them entelechy or dynamics. This puerile logic, such as it is, we see disappearing behind Empedocles and the Sicilian school into the mists of the infancy of thought, unrefined by criticism, unfettered by reflection apparently.

In the *Nature of Man* and here also in the *IV Maladies* we find the authors, mindful of what Hippocrates had to say in the *Airs, Waters and Places*, also in difficulties with the details of reconciling all the facts of climate with those of the corporeal system of man. We notice here too the fire that burns the flesh in the humors of an eye afflicted with phlyctenæ and the advice to purge only the concocted humors. We must judge of the medication in disease by the revulsion obtained when the dry becomes warm and the moist becomes cold, for this is the true equilibrium of the qualities. The parable of the vine adopted in the *Nature of Man* runs thus: "What the earth is to trees, the stomach is to animals; it nourishes, warms, refreshes," and this author runs into absurdities, which neither the author of *IV Maladies* nor, much less, the author of *Airs, Waters and Places* could be guilty of. In *The Humors* as in *The Aliment*, the confusion of language and of ideas often naturally suggests a student with his notebook following a lecturer, steeped in the doctrines of Hippocrates, it is true, but to which, as he dilates on the points in them related to the matter, the teacher adds his own prepossessions for the theory and such interpretations of it as are set forth in *The Nature of Man* and *IV Maladies*. These the note taker in *The Humors* and *The Aliment* sets forth with the usual half lights of the unfledged medical student, foreshortened, abbreviated and confused.

NUTRITION OF THE CHILD.

In the book on *Generation*, which opens the series, with the *Nature of the Child* and the *IV Maladies* following, all of which are supposed by Littré with every appearance of probability to be one treatise by one author, it is declared at the start that the sperm of man comes from everything moist in the body, being the most active part which is thus separated, the essence of the pangeneses of Empedocles(?), of Aristotle at least and of Darwin. Much citation of proof follows, which does not immediately concern us. In the nutrition of the infant in utero nourishment is drawn both from the food which the mother consumes and from the air she breathes. These are attracted, "by the power," to the child just the same as the stomach absorbs its food, the head drawing to itself phlegm, the liver to itself bile. Here, as in *The Aliment*, air is a

food. Again in the *IV Maladies* we meet with the simile from Empedocles slightly altered. This second reference is to vegetables drawing their particular characteristics each from the soil, their flavor, I suppose. The seed or the grain swells with the air and the humors it draws from the ground. The force (the dynamics) in the humor condenses the most volatile¹ part in the seed. The confusion, I imagine, is in the thought, not in the language alone. Thus condensed by the humor and driven by the pneuma, the seed breaks forth, by virtue of the quality of its dynamics, into leaf and this finds for a while its nourishment from the burst seed itself. The comparison with the child in utero is most excellently worked out, but it is curious to see how the humors and the pneuma play their part in the animal as well as in the vegetable, true to the older pantheistic theory of primitive man, but true also to the terms of the newer humoral doctrine, the warm, the moist, the cold, the dry govern it all.

The text really here takes on an exposition which appeals to us, just as the argument must have appealed to the older Hippocrates, himself too cautious to stretch the theory to the breaking point, a catastrophe, as it appears to us, not avoided by the other authors, carried away by their enthusiasm for the neatness with which it sometimes works, perhaps. It suffices to exhibit how helpful a false theory can be, it is not necessary to show how seductive and misleading it becomes in the hands of those who deliver themselves up to it, typical fanatics in science, spellbound. The parallel reaches its climax when the author triumphantly declares: "Now I return to the purpose which has led me into these explanations. I say all vegetable productions live from the humor of the earth in a state corresponding to the qualities of that humor which the earth contains. So the child lives from its mother in the womb and in a state corresponding to the health of the mother. One may find a perfect similitude between the products of the earth and the product of men." But his comparison is so successful that his elation leads him astray. He does not heed the wise man's warning, *pas trop de zèle*. He forces the parable into applications less successful. In parturition the glairy and sanguinolent discharges come from the head, and the source of the blood in general, as today, is a rather complicated process, but evidently the heart and blood-vessels attract it from the food. It is the stomach necessarily that does most of this attracting and we infer the other organs—the head, the heart, the liver and the spleen when the water comes into play—are secondary attractions, the bile, at least in some accounts, being attracted by the liver from the blood. This to us is utter nonsense and chaos. I am not sure an unsympathetic analysis, such as I am making, would not reveal holes in modern physiology, but we will leave that for the amusement of future critics. They will have their share.

¹ The hereditary parts of it settled in the seed probably by a sort of pangeneses, since this passage seems to rest on doctrines ascribed to Empedocles, who held them before Darwin and even before Aristotle, apparently. I do not think we can entirely identify "dynamics" with the modern germ plasma, though in this particular passage, the latter modern conception fills the vacancy here, which makes the trouble.