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# METHODUS MEDENDI. ①

A SKETCH OF THE DEVELOPMENT OF  
THERAPEUTICS.

BY

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### *ERRATA.*

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- Page 25, last line. For "when" read "where."
- Page 27, 16th line. For "anomatic" read "aromatic."
- „ 6th line from bottom. For "heir" read "their."
- Page 30, 6th line. For "similara has" read "similars had."
- „ 16th line. For "was" read "were."
- Page 31, 1st line of footnote. For "Theophrotus" read "Theophrastus."
- Page 33, 32nd line. For "it was" read "they were."
- Page 43, 29th line. After "established" insert "in Europe."
- Page 44, 2nd line of footnote. For "Friend's" read "Freind's."
- Page 49, 7th line. For "1516" read "1526."
- Page 58, 24th line. For "Cuidus" read "Cnidus."
- Page 68, 14th line. For "1575" read "1555."
- „ footnote. For "Lecture" read "Lectures."
- Page 78, 32nd line. For "hair" read "eyes."



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# METHODUS MEDENDI.

## A SKETCH OF THE DEVELOPMENT OF THERAPEUTICS.\*

THERE is little doubt, I think, that the relation of the medical man to the public essentially consists in his being the agent at whose hands relief, and if possible the cure, of bodily infirmity is sought; and in a wider spirit is looked to for that highest development of his art—the prevention of disease. All the departments of a doctor's education and knowledge are directed to this as a practical end, though many students stop by the way and turn off into a siding, the results of their work being reflected on to the main line. It must be admitted, however, that the great majority of those outside the profession, notwithstanding the exceeding importance of the subject to them, are but very superficially interested in how we acquire our knowledge, and indeed in some directions display a singular opposition to our so doing by one of the only sound methods—observation and experiment.

It is to one aspect only of this relation that I propose to address myself, and even that will of necessity consist in a most summary reference to leading facts and theories, but yet sufficient I trust to give a fuller conception of the physician's duties and a more reasonable expectation of what may be demanded of him than can be said generally to prevail. Not that I would wish for a moment to suggest that a want of faith in the doctor is usually to be met with, rather is it the contrary—a too full reliance on his ability to work miracles is the more frequent attitude—and it is to furnish the grounds for a more rational understanding of the doctor's art, still to many tinged with mystery as of old, that I would direct my endeavours.

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\* The groundwork of the Inaugural Address at the opening of the Seventy-Sixth Session of the York Medical Society, delivered 10th October, 1906.



Since the essential object of a doctor's calling is treatment, let us examine:—

- (a) The principles, if any, upon which a line of treatment is based.
- (b) The means and methods by which these principles may be applied.

Together these two aspects of the subject constitute the science and art of Therapeutics. By no means, however, have they progressed *pari passu*. For, as I shall show, the principles assumed have often been fanciful and incorrect, and the methods of cure have frequently proceeded independently and empirically, with little or no relation to any principle whatsoever. In proportion as the principles have been sound so has treatment tended to become scientific, though the means at our disposal have admittedly fallen short of what we realise is required.

The story of the treatment of disease, therefore, from the earliest recorded times until to-day is one that occupies an ever-shifting point of view. As pathological knowledge has spread in one direction to find ere long that the direction was a wrong one, so has treatment hurried after on a like erroneous path, only to retrace its steps and start afresh. And all this with the result, as we shall see, of producing an almost chaotic agglomeration of ideas and so-called principles, with equally diverse methods of practice, not a little of which clings to us to-day, and has been in the past, as it is in some degree in the present, a reproach to our profession.

The fundamental principle upon which treatment should be, and indeed in great measure has been, founded is the view taken of the nature of disease. Now, however varied this view has been, however numerous have been the conceptions held, they may for present purposes be thrown into two unequal groups—the supernatural or demoniac, and what I would call the natural or rational; \* and it is in great part conformably to these groups that methods of treatment have been propounded and applied. So far as these means are based on such principles they may lay claim to being logical and consistent, however erroneous and unscientific these principles may ultimately be shown to be. What is to be regarded as scientific, *i.e.*, the verified, compared and generalised results of observation and experiment, will presently appear. But consistency with a conception of disease, however absurd, has by no means always characterised the means of treatment that have been, and are very largely now, employed. No reason beyond the mere assertion of one, or for that matter many individuals as to the beneficial effects of a certain plan, quite unsupported by

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\* I use the word rational in the sense of being based on a reason, however irrational and erroneous that reason may be proved to be.



anything like real evidence, has sufficed to ensure the adoption of the method. That this, that, or the other has been assumed to have done good to A has been too often the sole ground for trying it with B, whilst the essential nature of the morbid condition which required correction in either has been left out of the question. This of course is pure empiricism, but as a principle of therapeutics it bulks larger and is more widespread than have been those which legitimately followed from the attribution of disease to spirits on the one hand, or to the perverted working of the bodily function on the other. So then if we may group the manifold conceptions of disease that have prevailed into the supernatural and natural (including the scientific), the methods of treatment may be classed as supernatural, empirical and rational.

Although I have thus for convenience of reference and description divided therapeutic measures into these main groups, I do not wish to imply that their limits are sharply defined either in time or character, any more indeed than are the numerous theories of disease. Excepting as is probable in most primitive races among whom supernatural ideas and supernatural methods alone prevailed, there would be found at any given period coexisting modes of treatment referable to all these groups, combined and modified according to the prevailing standard of knowledge; and so it remains to-day. Nor are they so entirely distinct from one another as might appear from so artificial a separation as I have indicated. Whilst the wildest and, as may be said, most debased methods of savage people would seem to be absolutely removed from our present-day doings, treatment by suggestion and hypnotism are but highly developed and specialised procedures to be reckoned within the same category and yet come within the province of rational therapeutics. Although the greater number of the preparations of our *Materia Medica*, whatever may be their efficacy, are given solely on empirical grounds, others and it is fair to say an increasing number of our drugs are administered for reasons that are based on a knowledge of the precise effects they will produce on the organism, with some idea as to how those effects are brought about, and consequently are to be regarded as pre-eminently rational or scientific.

## CHAPTER I.

### TREATMENT BY SUPERNATURAL METHODS.

THE first—because the earliest—group of conceptions of disease which carried with them correlative modes of treatment may be denominated the supernatural—not perhaps the most correct term, but one that will suffice for the moment. In essentials they all consist in ascribing the



incidence and manifestations of disease to what we are in the habit of calling supernatural agencies. The sick man is possessed of a devil and the symptoms of illness are the work of malign influences either acting directly upon the body, which they are supposed to occupy, or indirectly through the medium of inanimate objects which for the time are the agents of the evil spirits. Once life commenced, except for the interference of such influences it should be indefinitely prolonged, and death was due to the interposition of deity or demon. One remarkable fact concerning these ideas is that whilst they seem without doubt to have been in some form or another the beliefs of all primitive people, and are held at the present day by the most savage races, and even in out of the way places by individuals among the most advanced communities, they equally prevailed among those people whom we regard as the most civilised and advanced of antiquity, such as the Egyptians, Chaldeans, Persians, Indians, Greeks and Romans. Such conceptions moreover have never remained restricted to the earliest days of races that have become celebrated for the perfection of their civilisation, but have continued to qualify and tinge or to exist alongside such notions as may in the aggregate be called natural, which have sought to ascribe to the workings of the body under abnormal conditions the phenomena which represent what we understand by disease.

If now we seek to find some explanation why beliefs that in their crude expression seem to most of us little short of absurd should have been so universally held, at all times and by all people, we come to realise that the explanation is to be sought in the inherent disposition of the human mind to seek for what it calls a "cause" for such phenomena as are presented to it, and where that cause is not immediately forthcoming and obvious to find refuge in the marvellous for satisfaction of the inquiry, rather than to rest without any answer at all. Incidentally I may say how often do we see this among our patients. Some illness has befallen them, and next to having been furnished with the name of the malady the inquiries of the sufferer and no less of his or her friends are directed to ascertain why the illness has occurred, what has brought it about, in short the cause. Failing to recognise, or ignorant maybe of the extreme difficulty of assigning a cause, which is far oftener a complicated set of conditions than some single simple antecedent event, the inquiries are pushed and for the doctor to acknowledge his inability to answer is certainly not to raise him in the lay estimation. Hence comes it that that mysterious entity denominated "chill" has been so frequently invoked and apparently with such satisfaction. Fortunately, as science has recently shown the important share taken by living organisms in determining disease, a fresh and somewhat more precise reason is forthcoming, and so much so that our



old friend "chill" is becoming largely discredited, and to say that a given malady is the effect of some germ infection—a blood-poisoning—at once satisfies, partial though such an answer is.\*

It would be impossible for me to attempt to describe in detail the multitudinous forms in which this essential principle of disease being the work of evil spirits has been manifested throughout the world. But it should be realised that such a conception is but a phase of a more general principle that ascribes to spirits, whether these be the souls of individuals, deities or demons, not only an independent free existence in space, but a capability of embodiment in living persons, in animals or plants, or indeed in inanimate objects.

The principle that attributed the manifestations of disease which we should regard as natural phenomena to supernatural agencies (theism) carried with it as a corollary that the treatment of illness should be derived from the same source. It followed, moreover, as perfectly consistent that the administrators of relief should be those who were more closely in communication with the deities than the people generally, namely, the priests. Medicine therefore became but a phase of religion whatever form the cult might take, and its practice and doctrines were subject to such modifications and open to take on such different aspects as the various forms of religion might determine. Among the primitive races the association of the two professions would be of the closest, and "the functions of priest, sorcerer and medicine-man are, as Dr. Frazer (*The Golden Bough*) says, 'not yet differentiated from each other.'"<sup>†</sup> To those individuals seemingly possessed of such superhuman powers it was not going much further to attribute the ability to cause sickness and death either by the exercise of their own will, or through the medium of the spirits they might invoke. This ascription to individuals of maleficent powers found a widespread expression in the practice of witchcraft among those who set up in opposition to the more legitimate practices of healing.

"Faith and superstition are twin brothers" says a recent learned writer.<sup>‡</sup> "Although the former leads humanity to its sublimest ideals and the latter only presents us with a caricature of human knowledge, both are children of the same family. Both originate in a sense of the

\* How readily accepted such comprehensive terms are may also be seen in what I may call a very popular cause of death, *viz.*, "heart failure," forgotten as it seems to be that death does not occur until the heart fails, and that it is the cause of this which is the real cause.

<sup>†</sup> Address to the Section of Anthropology, British Association for Advancement of Science, York, 1906, by E. Sidney Hartland, F.S.A.

<sup>‡</sup> *Superstition in Medicine*, by Dr. Hugo Magnus, translated from the German by Dr. J. L. Salinger, 1905.



inadequacy of human science in regard to natural phenomena. The fact that the most important processes of organic life cannot be traced to their ultimate origin, but that their investigation will soon lead to a point of irresistible opposition to further analysis, has always called forth a feeling of impotency and dependence in the human mind. This consciousness of being dependent upon factors which are entirely beyond human understanding has thus given rise to the metaphysical need of reflecting upon these mysterious factors and bringing them within reach of human comprehension. Humanity, in attempting to satisfy such a metaphysical requirement from an ethical standpoint, created faith, which subsequently found expression in the various forms of religion. Superstition undoubtedly entered the scene when endeavours were made to consider and to explain physical processes from the standpoint of such metaphysical requirements."

Although therefore we, from the vantage ground of superior knowledge, can afford to stigmatise as superstitious those beliefs and practices which were held by savage races in respect not only to the nature and treatment of disease, but also in regard to natural phenomena generally, it must be remembered that as a term of contempt and disparagement it is not allowable so long as those races continued in ignorance of natural explanations of the cosmos, and ascribed its manifestations to supernatural agencies; in that stage of development superstition and faith are but one. Not so, however, when science has entered the field and given reasons for natural phenomena based on the observation of Nature's ways; then to continue to account for what goes on about us by the assumed workings of gods or demons is to be superstitious in the worst sense of the term, to shut our eyes to the light and deliberately to choose the darkest way. We read but a few months ago in the daily papers that when the dead body of Bambaata, the Zulu chief, was discovered the stomach had been opened to allow the evil spirits to escape, and noted the circumstance as interesting and entirely consistent with the beliefs of those people to whom natural laws are wholly unknown, and no rightly thinking person would deery such doings as shameful, whilst to call them superstitious should be no reproach. But when in the same week's journal we are informed that the Sultan of Morocco, when suffering from typhoid fever, caused singers and dancers from his harem to execute symbolic songs and dances before his Majesty with the object of driving away the evil spirits which are held to be the cause of his illness, we are less confident about the view we should take. The closer proximity of this potentate to more highly civilised European races, with whom his dealings have savoured to say the least of considerable knowingness if not knowledge, scarcely permit us to regard his



methods of treatment as due to legitimate ignorance or to be a pardonable superstition. When, however, within the same month an educated Englishman in a court of law states as his belief that a form of faith-healing known as Christian science will cure blood-poisoning, even a snake bite, there can be no doubt as to our considering it a degradation of faith and an exaltation of the grossest superstition.

Various theories have been put forward to account for the origin of these fundamental concepts of primitive man, it being remembered that we have no knowledge of any races in the past or present who have not held some ideas that may be denominated religious in the simplest sense of that term, *viz.*, a belief in spiritual beings.\* As, however, I am not concerned with this aspect of the subject beyond such as is sufficient to give coherence to my remarks, I would follow the line adopted by Herbert Spencer† who concludes that the first ideas of spirits, ghosts or other supernatural beings arose from dreams, trance and similar states. In a vivid dream caused by preceding hunger or repletion the savage thinks he has been elsewhere, yet he finds himself on awaking where he was when he went to sleep, and those around him assure him he has not been away. Clearly the obvious explanation to such an one is to believe in a double personality that has remained and has been away. To ascribe a reality to the people of his dreams, many of whom would be familiar to him, is but a step, and an unseen world of spirits, with to him a real existence, naturally follows. Such beings, however, would not be supernatural to him in one sense of the word, they would be as natural as his relations and friends; for were not the dream personages within his own experience? A swoon or a faint or a blow that stunned would confirm these ideas, for after lying to all appearance lifeless, consciousness and power to move would return, and what easier explanation to the savage who has no conception of mind or reason as we understand them than that the other self had been away and afterwards returned; whilst death was marked by the non-return of that other self which none the less continued to exist in the spirit world, which was ever increasing as more of his friends and enemies died.

"From swoon, apoplexy, trance and ecstasy, being not infrequently preceded by feelings of weakness and ill-health in the patient, and signs of it to the spectators, there is roused in both a suspicion that the other self is about to desert. Consequently these prolonged absences of the other self become mentally associated with its impending absences at other times. Hence an interpretation of ill-health or sickness."<sup>‡</sup>

\* *Primitive Culture*, by E. B. Tylor, LL.D., F.R.S., 1873, 2 vols., vol. i., p. 424.

† *Principles of Sociology*, vol. i., chap. xviii.

‡ *Epitome of the Synthetic Philosophy*, by F. Howard Collins, 2nd edit., 1890, p. 357.



Without any explanation of the phenomena with which he was surrounded but with this vivid conception of spiritual beings it followed that he ascribed the former to the workings of the latter and "from this population, ever present, arises the potentiality of countless supernatural agencies capable of indefinite variation".\* Thus did he explain storms and clouds, the stars and the phases of the moon, and the changes of animals and plants that he saw around him, and in this way the idea of the embodiment of spirits in inanimate and other objects arose. Similarly the actions of his fellows, friends or foes, found their explanation, and whilst help and benefits were afforded him at the instigation of friendly spirits, the souls of his enemies were ever on the watch to work him evil, and this may be through those lifeless agents into which for the time being the malign spirit had entered. It is easy to see that those forms of illness characterised by perversions of the power of movement, such as paralysis or convulsions, or by severe mental disturbance such as delirium, insanity and the like would furnish strong confirmation of these primitive ideas, and that such symptoms were due to the working of spirits that had entered the sufferer's body during the absence maybe of his own soul seemed obvious, and as such performances were denied by the patient on his recovery from the attack, it was still more clear that some strange spirit had obtained entrance and given rise to the disturbance. Should the patient in his fit have injured himself it became increasingly clear that the man's own soul had been temporarily replaced by another and inimical one. Other maladies giving rise to eruptions or to changes in bodily configuration were similarly explained.

"Death often occurring after long-continued disease must be caused by that which caused the disease. Whenever the death has no visible antecedent this is the only possible supposition; and even when there is a visible antecedent, it is still probable there was some demoniacal interference. The giving way of a companion's foothold and his consequent fatal fall down a precipice, or the particular motion which carried a spear into his heart, was very likely determined by the malicious spirit of a foe."†

In the deeply interesting address of Mr. Hartland to the Anthropological Section at the recent meeting of the British Association for the Advancement of Science are given several illustrations of this primitive notion of the nature of disease as it prevails to-day among certain existing American Indians, the Melanesians and the Arunta of Central Australia.

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\* *Epitome of the Synthetic Philosophy*, by F. Howard Collins, 2nd edit., 1890, p. 365.

*Ibid.*, p. 367.



"So far," he says, "from the Arunta medicine-men being practitioners of anything analogous to modern science, they are initiated by, and their power is derived from, the spirits. . . . The initiation of the medicine-man by spirits, often the spirits of the dead, is practically the universal belief in Australia, and in this respect he is in line with his brethren all over the world."

"Each North American Indian carries with him a medicine-bag obtained under very curious circumstances. When he is approaching manhood he sets forth in search of the patent drug which is to shield him from all danger, and act as an all-powerful talisman. He lies down alone in the woods upon a litter of twigs, eats and drinks nothing for several days, and at last falls asleep from sheer exhaustion. Then he dreams—or should do so—and whatever bird or beast or reptile forms the subject of his dreams he must seek as his medicine. He goes forth upon the quest directly his strength has returned, and when he has discovered the animal of his vision he turns its skin into a pouch and wears it ever after round his neck. In peace or war he will never part with this talisman; it is the treasure of his life, a sacred possession, a charm against all maladies and a protective from foes. It is scarcely necessary to add after this that the medicine-man of the tribe is held in highest honour, and regarded as a worker of veritable miracles. All things are possible to him. By his prayers, his rites and his incantations he causes the sun to shine, the rain to descend, the rivers to deepen, the plants to thrive.

"The medicine-men of the Eskimos were called Angekoks and enjoyed the unlimited confidence of the people. They were said to have equal power over heaven and earth, this world and the next. The Eskimo, therefore, set out upon no enterprise without consulting the Angekoks, who granted blessings, exorcised demons and gave charms against disease. Their particular powers they think are derived from more than human sources. The Greenlanders believe that the Angekoks work with the help of ministering spirits called *tôrnat*, who are often none other than the souls of dead persons, especially of grandfathers; but not infrequently the *tôrnat* are supposed to be the souls of departed animals or of fairies."\*

As illustrating the views held among the older civilisations on the nature of disease and death, the following quotation may be made from *Life in Ancient Egypt and Assyria*, by G. Maspero, 1892:—

"The Egyptians are not resigned to think that illness and death are natural and inevitable; they think that life once commenced should

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\* *The Doctor*, edited by Wm. Andrews, F.R.H.S., 1896, Hull, chap. vi., *Magic and Medicine*, by Cuming Walters.



be indefinitely prolonged; if no accident intervened, what reason could there be for its ceasing? In Egypt, therefore, a man does not die, but some one or something assassinates him. The murderer often belongs to our world and can be easily pointed out; another man, an animal, an inanimate object, a stone detached from the mountain, a tree falling upon a traveller and crushing him. Often though it belongs to the invisible world and only reveals itself by the malignity of its attacks; it is a god, a spirit, the soul of a dead man, that has cunningly entered a living person or that throws itself upon him with irresistible violence. Once in possession of the body, the evil influence breaks the bones, sucks out the marrow, drinks the blood, gnaws the intestines and the heart, and devours the flesh. The invalid perishes according to the progress of this destructive work; and death speedily ensues unless the evil genius can be driven out before it has committed irreparable damage."

A conception of disease that ascribes its manifestations to demoniac agencies carried with it as a corollary that treatment should essentially consist in means directed to expel the malign invader or to avert its entrance. Granted the principle, the application of the remedy was legitimate; but inasmuch as the principle was an assumption and not a matter of knowledge the treatment however logical could not be deemed scientific. Still, the medicine-man of the tribe as he belabours the poor sufferer, hoping thus to render the invading spirit so uncomfortable in his surroundings as to induce it to quit, maybe to take up its abode in some animal, or by means of sorcery and charms to accomplish the same end, is but acting according to his lights, and whilst the recovery of the patient would be adduced as testimony of the skill of the doctor and the efficacy of his methods, failure need not always discredit either, but should rather be attributed to the weakness of the victim or the exceptional potency of the devil.\*

So long as the explanation of natural phenomena received a wholly supernatural explanation such as was the case with primitive people, and

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\* Nor can we altogether afford to laugh at the savage; for, says Mr. J. Cordy Jeaffreson, in writing about the canes of modern physicians in his *Book about Doctors*, "for many centuries fustigation was believed in as a sovereign remedy for bodily ailments as well as moral failings, and a beating was prescribed for an ague as frequently as for picking and stealing. This process Antonius Musa employed to cure Octavius Augustus of sciatica. Thomas Campanella believed it has the same effect as colocynth administered internally. Galen recommended it as a means of fattening people. Gordonius prescribed it in certain cases of nervous debility. In some rural districts mothers still flog the feet of their children to cure them of chilblains." How far these are properly to be regarded as examples of counter-irritation I know not, but the last mentioned is not far removed from a rational procedure and as a method seems to have legitimately descended from that of the savage.



as it prevails among savage races existent to-day, as well as among the more advanced nations of antiquity, Egyptians, Babylonians, Assyrians, Persians, Medes and even ancient Greece and Rome, so long did it follow that the priests as negotiators with the spirits, whether of good or ill should be regarded as possessed of supernatural powers, and as such the administrators of relief. They claimed to control nature and in the exercise of their claim surrounded themselves with a mystic ceremonial, however crude or however elaborate, whereby the more effectually to impress the wonder-loving intelligences of both worshippers and patients. From this it followed that prominent among the methods employed for the alleviation of the sick ranked invocations, prayers, incantations and exorcism, designed to cast out the evil intruder by appeals to deities more powerful than it, or by rendering its position no longer tenable, by submitting the sufferer to castigation, pounding and kneading, or literally by attempting to smoke out the spirit by the vapours of ill-smelling substances,\* or to check the progress of small-pox by strewing the path of the demon that caused it with pointed stones and thorns. Most persistent of all these efforts have been invocations and prayers, allied as these have always been to other religious exercises. Scattered throughout the earliest known medical documents (among which is to be reckoned the Ebers papyrus written, it is computed, not later than 1,500 years before Christ, and being as it is a compendium of the then medical knowledge prevalent among the Egyptians contains considerable fragments of writings that probably date from a thousand years earlier)† are forms of address to Ra, Osiris and other deities, special formulæ to be recited over and over again during the preparation of the medicaments, together with prayers for recovery or to avert the effects of illness. In a papyrus in the British Museum, dating from the time of Cheops, who built the Great Pyramids, is the following prayer in the section dealing with the treatment of wounds:—“Oh, Ra, creator of the gods, pass ye me along, renew ye me, avert from me all evil things, all evil maladies, all wounds in the flesh of these limbs.”‡ In the opening invocation in the Ebers papyrus the following occurs: “Oh, Isis, thou great enchantress, heal me, deliver me from all evil, bad, typhonic things, from demoniacal (epidemic?) and deadly diseases, and pollutions of every sort which rush upon me, as thou didst deliver and relieve thy son Horus. For I have been forced to go into the fire and to pass through the water. May I not fall into the snare

\* Cf. Tobit, chapters vi. and viii.

† *Medical History from the Earliest Times*, by E. T. Withington, M.A., M.B., 1894, p. 15; also “Ancient Egyptian Medicine,” by Dr. Finlayson, *Brit. Med. Jour.*, 1893, vol. i.

‡ *Harveian Oration*, R.C.P., by Dr. Caton, 1904, p. 18.



of the day when I shall say I am mean and deplorable. Oh, Ra, thou who hast spoken for thy body: Oh, Osiris, thou who prayest for thy manifestation; Ra speaks for his body, Osiris prays for his manifestation. Deliver me then from all possible evils, from bad, wicked, typhonic things, from demoniacal and deadly fevers of every sort." \*

In the early days of Hellenic civilisation, before the simple faiths in the supernatural had been disturbed by a rational philosophy, a customary mode of treatment consisted in the sufferer spending a night in a temple—to which later were attached sanatoria—and then during sleep to be healed by the direct ministrations of the gods, or to receive from them in dreams directions as to their cure which were subsequently carried out by the priests. Later in the Hippocratic period, when the performances imputed to the deities began to be called in question and the benefits of the temple sleep to be ascribed to more natural means, the entire performance degenerated into superstition and charlatanism, and after declining in popularity reappeared again in the early centuries of Christianity as Gregory of Tours records with many illustrations.

By incantations also, and by exorcism and adjuration consisting of special forms of words said or sung and often quite meaningless, associated with the most varied ritual, did they seek to expel the evil spirits. Exorcists it may be observed were regularly constituted church officers among Christians in the third century, and no child was admitted to baptism until it had been declared free from bondage to the Prince of Darkness by one of these officials.† Among the misdeeds of the Ten Tribes of Israel, as set forth in the second book of Kings, chap. xvii, was the charge that they "used divination and enchantments".

It is not difficult to see that such claims on the part of medicine-man and priest would be constantly requiring to find additional support as the intelligences of those to whom they addressed themselves were gradually awakened, and as the possibility of some other explanation of themselves, their doings, and their surroundings should arise in the minds of the people, leading them to question by however little the pronouncements of their spiritual guides. If further any such conceptions of a rational character should become promulgated, seeking to account for natural phenomena by natural methods, such as in connection with medicine we first have record of in the Hippocratic writings 450 years before our era, it was more than ever incumbent on the priestly exponents of the ancient faiths to avert destruction by an increasingly emphatic assertion of their powers and a more and more

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\* From Dr. Joachim's German translation of the papyrus of Ebers. See Finlayson, *loc. cit.*

† Mosheim, *Church History*, Cent. iii., pt. ii., chap. v.



extravagant method of carrying on their procedures. Hence it came about that the supernatural methods of cure became more and more outrageous and at the same time less and less consistent with their fundamental conception of the nature of disease. It has been urged \* that the extravagances in the treatment of the sick which for centuries were rampant were in great measure due to impostors and charlatans rather than to the regular priests of religion at whose hands the healing art was first practised. But be that as it may tribes of magicians (who derived their name from a sacerdotal caste of the Medes termed Magi), sorcerers, necromancers and the like flourished by the practice of magic, enchantment, sorcery and witchcraft which were varying phases of imposture based on the pretensions to control nature by supernatural means, and being practices pursued in spite of and in opposition to rational methods founded on a natural conception of the cosmos were grossly superstitious.

Among other means of treatment that might be said naturally to follow such demoniac conceptions of the origin and nature of disease as I have indicated, and designed either to avert the malign influences—preventive means that is—or to remedy the effects that the spirits had wrought, talismans, amulets and charms were among the most frequent. Talismans probably originated “from the belief that certain substances are externally impressed with the character of their properties and virtues by the influence of the planetary bodies. . . . The astrologers appropriated particular colours, metals, stones, trees, etc., to the respective planets they designed to represent, and constructed them when the planets were in their exaltation, and in a happy conjunction with other heavenly bodies; after which they attempted by incantatory rites to inspire the fabricated symbols with the power and influence of the planets themselves.”†

A talisman was a paper or other material on which is written or engraved a sacred name or other characters and used as a defence against sickness, plague or storm, and differs from an amulet in “that it may be deposited in any place, or carried about the person without losing its efficacy, whilst the latter requires to be constantly worn about the individual. . . . In its composition the amulet is of the most varied kinds; objects selected either from the animal, the vegetable or the mineral kingdom, pieces of old rags and garments, scraps of writing in legible or illegible characters, in fact, of anything to which any superstitious property has been considered to belong.”

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\* Magnus, *op. cit.*, p. 26.

† *Superstitions Connected with Medicine and Surgery*, by T. J. Pettigrew, F.R.S., 1844.



Precious stones were often employed for a similar purpose, and verses of the Psalms were looked upon as most efficacious. "Peculiar arrangements of words and letters as well as numbers all constituted amulets." Of such is the word Abracadabra. Charms, originally meaning a verse (*carmen*) in which form the spell was usually written, were also objects worn about the person and supposed to work the magical power of averting evil or curing illness when it existed. Especially as means of prevention, which at all ages seems to have been admitted to be preferable to cure, were such objects used. So strong was the belief in these magical protectors in the fourth century that the clergy were forbidden under heavy penalties to make or to sell the charms, and in the eighth century the Christian Church forbade amulets to be longer worn.\*

The wearer was among some races regarded as invulnerable, notwithstanding frequent proof to the contrary, and as counteracting the ill effects of the evil eye charms were looked upon as most efficacious. Coral had great reputation in this respect and consequently it formed a frequent ornament worn by children who have ever been considered as specially susceptible to this species of malign influence, and the little bells that formerly ornamented the baby's coral rattle were added to keep off witches.

Neither time nor space permit even the bare enumeration of the various diseases for which special charms have been assigned, or the innumerable stories of their efficacy. The long arm of coincidence has intervened sufficiently often between charm and ailment to furnish the required evidence of cure that satisfies the average mind, who hears of one success and not of the thousand failures. But there is one upon which I would linger for a moment. The wearing of metal rings has long been deemed a sovereign cure for many a complaint, or at least has warded off the malady. Brand in his *Popular Antiquities* (1813) tells us that in Berkshire a ring made from a piece of silver collected at the Communion service is a cure for convulsions and fits of every kind; if collected on Easter Sunday its efficacy is greatly increased. In Devonshire they prefer a ring made of three nails or screws that have been used to fasten a coffin, and that have been dug out of the churchyard. In the *Gentleman's Magazine* for 1794 we are told that a silver ring will cure fits, and it should be made of five sixpences, collected from five different bachelors, to be conveyed by the hand of a bachelor to a smith who is a bachelor. None of the persons who gave the sixpences are to know for what purpose, or to whom they gave them. Less than a century ago in 1815 so serious a periodical as the *London Medical and Physical Journal* notices a charm successfully employed

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\* Cuming Walters, *loc. cit.*



in the cure of epilepsy after the failure of various medical means. It consisted of a silver ring contributed by twelve young women and constantly worn on the patient's finger.\* Who shall say after this that our relations and friends who wear the iron finger-ring now so constantly seen, and that I am told is sold by thousands, as a cure for rheumatism, are not in respectable company and have full justification for their faith? †

Inasmuch as the moon and stars and other heavenly bodies were regarded as influencing men's destinies and affecting them for good or ill it was only natural that the movements and position of the planets, the phases of the moon, eclipses and such celestial phenomena should be watched with a view to furnish means of remedy for the afflictions that malign conjunctions had brought about. Different parts of the body were looked upon as being under the special domination of certain planets which influenced alike the well-being or the disorders of these several regions, and on the view propounded by Xenophanes (fl. B.C. 535) that the stars were meteors (*i.e.*, terrestrial effluvia) their malignant or beneficial effect on living things became intelligible. "As all terrestrial things have their image in the region of the stars, and as diseases also depend on the influence of the stars, we have nothing more to do in order to obtain a certain cure for these diseases than to discover, by means of the Cabbala, ‡ the harmony of the constellations." §

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\* It may be worth remembering that the reason for the fourth finger of the left hand being chosen as the one on which to place the wedding-ring as a symbol of marriage, was that it was regarded as containing a vein that communicated directly with the heart, the seat of life, to which by this channel warning of harm was conveyed. This also was why that finger was used to stir the mixtures and potions taken as medicine, and hence known as the "medicinal" finger.

† Among the thousand and one remedies of this class that have been proposed may be mentioned as examples, chips from a gallows on which several persons had been hanged worn in a bag round the neck as a cure for ague; a ring made from the hinge of a coffin to relieve cramps; a halter by which a malefactor had been hanged bound round the head for headache; nails driven into an oak tree as a preventive of toothache; for whooping-cough passing children to and fro under a donkey's belly or through a hole in a rock has been greatly commended; for the removal of warts many are the charms such as throwing thirteen bad peas over the left shoulder, meanwhile repeating a sentence provided by a witch; or rubbing them with a snail or slug through which a thorn is afterwards stuck, or rubbing them with a piece of stolen beef that is afterwards buried.

‡ This term denoted "tradition or a mysterious kind of science among Jewish Rabbis, pretended to have been delivered to the ancient Jews by revelation, and transmitted by oral tradition, serving for the interpretation of difficult passages of Scripture. This science chiefly consisted in understanding the combination of certain letters, words and numbers which are alleged to be significant" (*Imperial Dictionary*).

§ *History of Chemistry*, by T. Thomson, 1830 (referring to the doctrines and methods of Paracelsus).



Hence astrology came to be from the earliest times a study that was closely connected with that of the physician, so much so that the latter was accounted to be little better than a homicide were he not acquainted with the stars. Chaucer in his description of his doctor wrote of him as "groundit in astronomie" in addition to his acquaintance with "physik and surgerye". The Royal College of Physicians of London at the close of the sixteenth century tested men in their knowledge of astrology, deputed members of their body to inspect bewitched people, and summoning those who assumed the power of cure by touch required them to exercise their gifts in the presence of the College. Down to recent times the influences of the planets and constellations on the origin and spread of plagues and pestilences have been regarded as potent. Even so late as 1841 in one of the standard works on diseases of tropical climates, a work characterised by most careful clinical observations and full *post-mortem* records, there is a clear reference to sol-lunar influence in the production of fever, and the author admits that he conforms his practice thereto.\* That the condition of the madman if not attributable to the moon's influence was certainly made worse by these assumed emanations from our satellite is shown in the very words "lunacy" and "lunatic," and there remain to us in current use to-day such words and expressions as "moonstruck," "bewitched," "disastrous," "ascendency," "jovial," "saturnine," "born under an evil star," and the like, which all take their derivation from astrological terms.

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\* I must express my belief that the doctrine so warmly contended for by Dr. Balfour, respecting sol-lunar influence in the production of fevers and in occasional relapses, is founded in a correct observation of the phenomena connected with the causation of these diseases. My own observations have tended to confirm the doctrine, and I have always found it requisite to conform my practice to it, especially during convalescence from febrile diseases. How the lunar influence is excited, and why it should have relation to periods of full and change, I cannot pretend to form any opinion further than to suppose that it is through the medium of atmospherical vicissitudes, which are more marked at these particular periods, and to the greater rise and fall of the tides on the sea coast, influencing the states of the marshy grounds and banks of rivers in the low districts of country skirting the sea-coast and forming a large portion of the lower provinces of Bengal. Whilst, however, I admit that these circumstances may partly serve to explain the relation, so strongly and I believe justly insisted upon by Dr. Balfour, I conceive that they do not exactly explain it, inasmuch as the influence is remarkable in districts of the country not affected by the rise and fall of the tides, and during changes and seasons of the moon not characterised by any sensible or appreciable vicissitudes in the state of the atmosphere or of its temperature. (*Researches into the Causes, Nature and Treatment of the more prevalent Diseases of India and of warm Climates generally*, by James Annesley, F.R.S., F.S.A., President of the Medical Board of Madras, second edition, 1841, p. 524).



The particular form of superstition known as witchcraft was based on an assumed compact with the devil made by an individual, most commonly an old woman, in virtue of which she became possessed of the power of influencing the well-being of other persons and of cattle through the means of spells and various performances of a weird character. It was much oftener in the direction of working harm rather than benefit that the influence of witches was exerted, but whether for good or ill they were for ages the objects of popular fear and execration, and during the Puritan ascendancy in this country nearly four thousand were executed by burning from 1640 to 1660. Sir Thomas Browne, the tercentenary of whose birth (a date that corresponded with the publication of Bacon's *Advancement of Learning*) was celebrated last year, was a firm believer in the power of witchcraft and gave evidence at the trial of the Suffolk witches by Sir Matthew Hale. The Church had always recognised witchcraft and it flourished exceedingly at the Reformation, Martin Luther and Calvin being staunch believers therein. King James the first was a keen witch-finder, and among others who had faith in their existence were Meric Casaubon, Richard Baxter and in the next century John Wesley.\* In the records of York Castle it is told how Lord Chief Justice Holt (1642-1709), when a young man and unable to pay his score at an inn, passed himself off as a student of medicine and in that capacity prescribed for his host's daughter who was suffering from ague. The remedy he ordered was certain herbs which he tied up in a piece of parchment on which he had written some strange characters, and this the girl was to wear round her neck, and in return for this service his bill was remitted. Many years after, when on the bench, a woman was brought before him accused of witchcraft. She denied the charge but said she had a wonderful ball, which never failed to cure the ague. The charm was handed to the Judge, who recognised it as the very ball he had made for the young woman at the inn.† The last trial for witchcraft in England took place I believe in 1712, when Jane Denham was convicted but not executed. The delusion cannot, however, be said to have wholly died out since we read recently of a tailor in Spitalfields convicted of falsely obtaining money for pretending to cure a girl of epilepsy by witchcraft, which he had practised for some time, as well as for professing to bring back a runaway husband by means of foolish ceremonies and incantations.‡

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\* See a most interesting and instructive article on "Medicine and Witchcraft in the Days of Sir Thomas Browne," by Dr. John Knott, *British Medical Journal*, 14th October, 1905.

† *The Doctor*, edited by Wm. Andrews, F.R.H.S., chap. xix., *Medical Folklore*, by John Nicholson.

‡ See daily newspapers for 18th August, 1906.



Methods of treatment that were effected by witchcraft took the form of curious ceremonies accompanied by the utterance of mystic phrases; or of charms consisting of objects such as nails, bones of the dead dug up at midnight or of powders and potions prepared by the witch both for internal and external application. One widespread form of cure by witchcraft, examples of which occur in the remoter parts even of our country almost at the present day, is known as the method of "substitution" or the transference of the patient's malady to some animal, as by washing say a cat in the water that the invalid has used for a like purpose. Paracelsus professed to transfer diseases from mankind to the earth by means of a magnet impregnated with mercury and mixed with rich soil; in this were sown seeds having a congruity with the disease, to be daily watered with the washings of the diseased limb or body, thus conveying the malady to the seeds, and as these grew so would the illness disappear. The converse of this principle lies at the root of the witch's practice of sticking pins in the wax image of a person in order to inflict on the individual untold suffering; and the belief that a person might be injured through evil influences brought to bear on his portrait was the ground of objection of certain people, as witness the late African King Lobengula, to be photographed. The idea that a disease will subside as some particular animal gradually dies has been very prevalent. Thus in the west of England a cure for ague is to catch a spider and keep it shut up till it is dead, and a hairy caterpillar worn in a flannel bag round the neck of a child with whooping-cough will ensure the disappearance of the malady when the insect dies.

The remarkable effect of touch as a curative agent has been from remote times a popular faith, whether this is by persons, by relics, or by such means as wells and waters accounted holy. This belief finds a remarkable illustration in the method known as the royal touch for the cure of scrofula or king's evil. The practice was introduced by Edward the Confessor, and the last of our sovereigns to follow it was Queen Anne, though the latest recorded instance was in 1745 when Prince Charles Edward "touched" a child at Holyrood. During many reigns the custom was entirely in abeyance, whilst during others, notably the Stuarts, it flourished greatly. Macaulay estimated that Charles II. touched nearly one hundred thousand persons—mostly children. Evelyn in his diary gives an interesting account of the ceremony which often took place on a Sunday and was associated with a religious service that found a place in our prayer books down to 1719. The imposture—for such we should deem it—also met with the approval of the medical profession, for the persons were all passed by the royal surgeon before being presented to the monarch, who in



addition to stroking their faces presented each one—except when times were bad—with a “touch piece” in the shape of a coin, usually of gold, bearing on one side the effigy of St. Michael slaying the dragon and on the other side that of a ship. The proceedings therefore were often exceedingly costly, amounting at times to as much as £1,000 a year as stated by Macaulay, and this without counting the expenses of sending the patients to wheresoever the sovereign might be, usually London. This charge was undertaken in a large number of the cases by the corporations of towns all over the country, and I understand that in the records of the city of York are various entries, the sum granted being commonly ten shillings of the then money.\*

The practice of “touching” for the cure of various maladies, chiefly it would appear of a chronic character, was not confined to royal personages. Others assumed the power and during the latter half of the seventeenth century the Stuart sovereigns found a formidable rival in Valentine Greatrakes, who was applied to by many hundreds of persons suffering from divers complaints. The assumption that the cures were effected in virtue of some subtle emanation that passed from the healer to the healed paved the way for the doctrine of animal magnetism of which Mesmer (1734-1815) was the first and greatest exponent. He claimed to be able to magnetise whatever he touched, and attributed to this agency not only the cures he himself effected but also those which were brought about by other quacks whose methods consisted in “touching” or the “laying on of hands”. The record of his performances in Paris and elsewhere is a marvellous chapter in the history of human credulity and superstition, and so far did he succeed in imposing on the Government of the day that they appointed two commissions of inquiry by members of the Faculty of Medicine and the Academy of Sciences (among the members of which was Benjamin Franklin) to investigate his methods. Their report went to show that the results attained by Mesmer had nothing whatever to do with magnetism, but were due to the “force of the imagination”. From animal magnetism to the “magnetic trance” and so to hypnotism was but a slight step that was soon taken, and these became a popular method of treatment practised and preached by not a few of the medical faculty. Among the various offshoots of the “magnetic” practice were the so-called “metallic tractors”—magnetised discs of

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\* Mr. A. J. C. Hare, in his volume on Sussex (1894), states in reference to the preservation at Ashburnham of the shirt and drawers worn by King Charles I. at his execution and stained with his blood that these articles were formerly exhibited in the Church and “touched” by people for the King’s evil, and they were last used for this purpose in 1860.



metal invented by an American surgeon in London named Perkins. These were applied to the diseased region and alleged to bring about a cure; but it was speedily found that pieces of wood or indeed simple bandages would produce the same results.

I have said that the inherent quality of the mind to seek a cause for an occurrence lies in great measure at the root of these so to say supernatural ideas of disease and equally supernatural means of cure. But there is yet another quality almost as widespread, almost as inherent, and that is the love in most persons for the marvellous. How far that love may lead us depends on our credulity, and our faculty of self-deception. The child who makes believe in his games that a bogey or a wolf dwells in the dark cupboard under the stairs is father to the man who will not walk under a ladder or objects to thirteen at table. Most of us have a pet superstition, often designated by some higher sounding title, which is held to with a faith that is the stronger since it is unreasoning and unreasonable. Undoubtedly the degree to which such fancies prevail is most variable, for though we may find here and there one whose little weakness in this direction is hidden right away and may never be detected, and who would sooner question his own sanity than accept as fact some seeming marvel that goes against universal experience, there will be many who readily and at once give the fullest credence to the assertions of the most ignorant impostor. Even the fairly balanced mind that sees in the tricks of a clever conjurer what they really are, will allow himself to accept as real the vulgar but far less clever performances of the medium who professes the power of summoning spirits and holding converse with them. It is the mental attitude displayed by such that allows the gross impostures that disgrace our times to flourish as they do. But it must be allowed that did the claims of those who in many ways and under many designations affirm the healing power of faith rest on lies and deception only, such claims would never have continued and flourished as they have merely on such a basis; and though *populus vult decipi* is as true now as when that sentiment was first enunciated, there must have been something else to afford stability to such deceptions. This something else, apart from the occasional yet none the less real cases of coincidence when cure has taken place after some exhibition of supernatural treatment, is to be found in the undoubted influence that the mind has over the body—within certain limits.\* That this is so

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\* Plato says, "The office of the physician extends equally to the purification of mind and body; to neglect the one is to expose the other to imminent peril. It is not only the body that by its sound constitution strengthens the soul, but the well-regulated soul by its authoritative power maintains the body in perfect health."



is familiar to us all ; a sudden emotion, a great anxiety may cause our appetite to disappear, a pain to vanish or the hair to turn grey. Under the influence of great excitement and forgetfulness of self as in battle, prodigies of strength have been performed that would have entirely failed of accomplishment in cold blood ; and serious and painful wounds have been inflicted with no conscious result to the victim perhaps for many hours. Excessive grief no less than great joy have each been known to cause death.\* This is so with the healthy ; equally is it the case with the sick and ill ; and those sufferers from maladies included under the term hysterical which exhibit a wonderful mimicry of diseases based on more substantial conditions are constantly cured once and for all by the exercise of some strong impression provided by the stronger will of another with perhaps the material assistance furnished by an electrical battery, or possibly nothing more active than a metal disc. Any hospital can furnish records of cures as marvellous as those that are brought about at some shrine or holy spring, and the cases so cured are in all cases of the same category. No doubt an important element in the complex procedure that constitutes present-day treatment is the establishment of confidence in their doctor by the patient and the giving of hope to the latter. It is not very uncommon to see an individual the subject of some grave and prolonged disorder "pull through" by sheer force of will and hopefulness, though I do not for a moment mean to say that serious structural disease is overcome in such a way, but the manifestation of such power often makes all the difference between life and death, just as we meet with cases that have made up their minds to a fatal issue in spite of all our efforts to avert it.

Hence within limits there have come to be developed permissible methods of treatment based upon the mental influence of one person over another by what is known as "suggestion". In the healthy wideawake state the sensorium is constantly receiving through the channels of the senses numerous ideas, numbers of which pass by disregarded as others are accepted and acted upon. The extent to which this action takes place is mainly conditioned by the tendency to credence on the part of the individual and the degree to which this credulity is controlled by reason. Should consciousness be in abeyance as during sleep then the impressions may give rise to dreaming and somnambulism. In susceptible persons it may be sufficient for another by a mere command, possibly with authoritative gestures, by fixing the eyes, closing the eyelids or other methods, to induce a "peculiar psychical

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\* See *Illustrations of the Influences of the Mind upon the Body in Health and Disease*, by Dr. Hack Tuke, 1872.



condition" \* in which the ability "to be influenced by an idea which is accepted and realised by the brain," i.e., the suggestibility, is increased. This condition is known as hypnotism, and being itself the result of suggestion it in turn favours the action of suggestion. Among the phenomena which may be developed in this state are certain therapeutic measures "almost exclusively functional in action": thus insomnia may be relieved as well as various forms of pain, so-called "functional paralysis" may be immediately cured, and even when a definite structural lesion underlies the malady temporary improvement may follow its practice, "when the dynamic disorders surpass those of the organic lesion". Whilst in proper hands and in certain conditions of disease such methods as I now indicate are of legitimate application, it is only comparatively recently that they have taken their place in scientific therapeutics and are no longer to be designated miraculous and opposed to the working of natural causes, but it is not difficult to see that in former times when the phenomena of hypnotic suggestion were realised, but without a knowledge of their real character, they constituted a truly supernatural method of treatment akin to the incantations and sorceries of magicians, and based on the work of spirits or on some subtle emanations from man to man such as was claimed for "animal magnetism". Thus it is, and this is essentially my point, that a means of treatment which to-day is relegated to its proper position with its limitations and possibilities fairly well known and understood, takes its place in our armamentarium as the representative of those practices which among primitive people formed the sole means of fighting disease, and that have in some form or another existed at all times and among all races. But although we have thus laid down the position of treatment by the mental power of another according to the present teachings of science, there remains as a product of the uncontrolled credulity of mankind the "peculiar person" and the "Christian scientist" among whom the particle of truth has given place to a rank crop of wild assertion and has furnished excuse for criminal negligence. Among these the mode of healing is by faith alone, neither charm nor amulet nor drug, with no claim that the active agent is magnetism animal or otherwise, nothing beyond prayer, or maybe anointing with oil or laying on of hands in addition. This represents the simplest method of working through the mind, its successes are such as the other more elaborate methods effected—no more, no less. Too blind a confidence in any method of treatment offers the opportunity for the quack and the impostor.

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\* H. Bernheim in *Dictionary of Psychological Medicine*, edited by Dr. Hack Tuke, 1892.



The force of the imagination may be no less potent as a cause of what has all the semblance of illness than it is as a means of curing the same, and for a moment only I would allude to those cases of purely imaginary ailment which individuals sometimes firmly persuade themselves to be sufferers from. Such for instance as having a living lizard or other animal in their stomach, or that they have swallowed pins which have stuck in their throat or elsewhere. Although these may be wholly fanciful in conception, the patients may experience very real suffering which no argument will allay nor medicine remedy. Nothing short of producing the supposed cause will effect a cure, and the question arises then how far deception may properly be employed. That it has been successful numerous records attest; \* but each case must be decided on its merits, and as a method of treatment must ever hold a most exceptional place.

So far then the supernatural modes of treatment. A consideration of what I have said shows that the conception of disease that regards it as a spirit, an entity that takes possession of the body from outside, and whilst retaining its character inflicts damage of various kinds upon the organism, leads to strange therapeutic mysticism. Primarily and indeed consistently the principle of treatment would be to expel the intruder, and beyond this the untutored savage hardly goes.†

"The mysteries of disease, the unknown mechanism of the bodily organs and their utterly incomprehensible functions—all were entirely outside the range of primitive intellectual conception or scientific attainment; and accordingly no rational ways or means could under such conditions possibly be devised for the treatment of the physical ills of the human frame, other than perhaps those of the simplest forms of mechanical lesion. Precisely on that account the victims of suffering, of mysterious internal or of loathsome external disease, promptly turned to any and every supernatural agency which promised any hope of relief."‡

But with the gradual spread of knowledge the attempt to reconcile these primitive methods with a more rational comprehension of Nature led to all kinds of inconsistencies and extravagances. Especially too was the development of the art of medicine hampered by its association with religious doctrines and the exponents thereof. Inseparably com-

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\* *British Medical Journal*, 30th June, 1906, p. 1554.

† A large number of human skulls obtained from prehistoric burying-places have been found to have been trephined, and Broca explains this as having been for the purpose of allowing the escape of evil spirits; and since in the majority of cases the operation was performed on the young, it was supposed that they were the subjects of convulsive attacks—the manifestation of demons. (Withington, *op. cit.*).

‡ Knott, *loc. cit.*



bined at first and so remaining among primitive races, the later separation of the essentially supernatural conceptions of religion from the essentially natural processes of disease and their means of alleviation was effected with difficulty, and cannot be said to have been accomplished to-day. Even when some understanding existed of the true nature of natural phenomena there remained behind and beyond an impenetrable mystery akin to that which surrounded the notions attached to the deity or demon whatever the cult might be. To take only those nations who have accepted the Bible as their spiritual guide, so long as they could find therein no cure of disease recorded other than by supernatural agency, could point to the doings of witches recorded as natural facts and read of how the devil himself offered to make terms with Christ, ample justification existed for those who sought by prayer and charm, incantation and witchcraft to cure their mortal ills. If, added to this, account be taken of the inherent qualities of the human mind—that have been evolved no doubt from the first dawning of intelligence impotent to cope with the inexplicable and mysterious problems presented to it—that have ever led to seeking for cause and revelling in the wonderful, we can realise, however much we may disagree with the principles that have actuated our predecessors in their extraordinary therapeutic procedures. "There always have been," says Dr. Hammond,\* "and probably always will be individuals whose love for the marvellous is so great and whose logical powers are so small as to render them susceptible of entertaining any belief, no matter how preposterous it may be; and others more numerous, who, staggered by facts which they cannot understand, accept any hypothesis which may be offered as an explanation rather than confess ignorance."

But although those supernatural conceptions of disease and methods of treatment received, and not without reason, the support of the priesthood—"Physicians may say what they like; we who believe the Gospel think most diseases are due to devils," wrote Bishop Binsfield of Treves in the sixteenth century—the history of medicine shows that when the doctors' calling became differentiated from that of the priest, it was on similar lines they long continued to practise their profession. Nor is this to be wondered at so long as a demoniac hypothesis of the nature of disease prevailed, and means of treatment even on sounder lines fell so far short of the need. "When the hallucinations of the imagination were permitted to usurp the place of observation and the greatest puerilities superseded the employment of reason and experi-

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\* *Spiritualism, its Physics and Physiology*, 1871.



ment"\* it must be admitted that doctors were not free from the charge of pursuing these same lines, and the merits of witchcraft, of charms, of animal magnetism, mesmerism and faith-healing have found their exponents at the hands of physicians. Little wonder, then, that the laity followed suit. Finally, it must be remembered that such beneficial results as have admittedly followed those varied and often extravagant methods are due to the influence exerted thereby on the mental condition of the patient, or, as we to-day term it, suggestion; and that this within limits is a reasonable and legitimate means of cure for such maladies as are mainly functional and owes nothing to spiritual agencies or supernatural workings.

## CHAPTER II.

### TREATMENT BY DRUGS—THE EMPIRICAL METHOD.

THE treatment of disease by the introduction into the body of materials not ordinarily constituting articles of diet is not so far removed, at least in its inception, from those supernatural methods just considered. "The savage, as we have seen, interprets his environment in the terms of his own consciousness, and this interpretation is not scientific, but anthropomorphic. He endows the surrounding objects, whether, as we should say, they be living or dead, with a personality that itself possesses qualities that enable it to persist, to influence others, and even to overcome, subjugate, and destroy them for its own ends. Moreover, detached portions of the person, as locks of hair, parings of finger nails, and so forth, are not dead inert matter: they are still endued with the life of their original owner; nay, garments once worn, or other objects which have been in intimate contact with a human being, are penetrated by his personality."† It is this idea of the personality of inanimate objects that underlies the assumed preventive and curative virtues of charms, talismans, and such like; and if these could be efficacious by merely being worn or in the possession of the individual, how much more effective might they not become if actually incorporated into his body as would be the case were they swallowed? Hence we find that mystic words and sentences accounted of specific value were written down and then the ink washed off by water which was drunk by the patient, or the entire paper on which a charm was written might be chewed up and swallowed as is done in Thibet, the edible letters being termed *Za-yig*. Or as in Gambia when the washings of a

\* Pettigrew, *op. cit.*

† Quoted with slight re-arrangement from Mr. Hartland's address, *loc. cit.*



reflection of the writing in a mirror are duly consumed.\* There can, I think, be little doubt but that the "taking of medicine," as it may collectively be termed, originated in some such way as this, and was strengthened, as it must have been, by noticing on the one hand the absolute dependence of the individual upon the ingestion of food, and on the other the obvious ill effects of what we speak of as poisonous substances. (We may dismiss as mythical the suggestion of the older writers, who attributed the discovery of the use of certain drugs to various animals who instinctively dosed themselves therewith, whence the practice was adopted by mankind.) Thus there came to be developed a general principle so universally prevalent that it appeared to be almost characteristic of human nature—the taking of drugs to modify and correct such departures from the normal working of the body as we call disease. Although at first the method may have been quite logical, as following on the supernatural ideas of the nature of the disease, it soon lost all claim to such consistency and bore little or no relation to pathological principles, becoming for the most part purely empirical in its application, as it became enormous in its extent. It is at the same time necessary to realise that the treatment by drugs did not *follow* on supernatural methods, but, though in great measure originating from these, developed into the vast system it became alongside and co-existent with them, and so has continued to the present day.

Even when the swallowing of medicaments became fully established, and for ages afterwards, the assumption that their therapeutic value was mainly if not entirely dependent upon their relation to supernatural agencies was universally prevalent, and traces remain among us even now. Thus strict injunctions were laid down as to the collection and preparation of the various materials used as medicines, and even the administration of these at certain seasons of the moon, or when certain planets were in the ascendant. Burton, in his *Anatomy of Melancholy*, tells his readers that St. John's wort, gathered on Friday, "in the hour of Jupiter, when it comes to his effectual operation" (that is about the full moon of July), "so gathered and borne or hung about the neck will mightily help melancholy and drive away fantastical spirits." Vervain (*verbena officinalis*), which was highly esteemed by professors of both healing and magic, and especially by the Druids, who believed that it conferred the prophetic faculty, had to be gathered for this purpose "about the rising of the great dog star, but so as neither sun nor moon be at that time above the earth to see it." From *The Husbandman's Practice; or Prognostications for Ever* (London, 1664), we learn that "Good to purge with

\* See *The Buddhism of Thibet*, by Austine Waddell, 1894.



electuaries, the moon in Cancer; with pills, the moon in Pisces; with potions, the moon in Virgo; good to take vomits, the moon being in Taurus, Virgo, or Capricorni; to bathe when the moon is in Cancer, Libra, Aquarius, or Pisces; to cut the hair off the head or beard, when the moon is in Libra, Sagittarius, Aquarius, or Pisces." It should be remembered that the doctrine of favourable and unfavourable times did not apply only to the taking of medicine, but governed all the activities of life, as may be in part seen from the extract I have quoted, and as may be further learned to-day by the student of Zadkiel's Almanac. "The planets were another determining factor in the choice of remedies. Each plant was dedicated to a planet and each planet presided over a special part of the body, therefore, when any part was affected, a herb belonging to the planet that governed that special part must, as a rule, be used. Thus, Mercury presided over the brain, so for a headache one of Mercury's herbs must be chosen. Mercurial herbs were as a rule refreshing, anomatic, and of 'very subtle parts.' The planets seem usually to have caused, as well as cured, the diseases in their special province, and therefore their own herbs brought about the cure 'by sympathy.' But sometimes a planet would cause a disorder in the province ruled by another planet, to whom the first was in opposition, and in this case the cure must be made 'by antipathy.' Thus the lungs are under Jupiter, to whom Mercury is opposed, therefore in any case of the lungs being affected, the physician must first discover whether Jupiter or Mercury were the agent, and if the latter, the remedy must be 'antipathetical': it must be from one of Mercury's herbs. Sometimes when a planet had caused a disease in the part it governed, an 'antipathetical' cure, by means of an adversary's herbs, was advised; for instance, Jupiter is opposed to Saturn, so Jupiter's herbs might be given for toothache, or pains in the bones caused by Saturn, for the bones are under Saturn's dominion. An antipathetical remedy, however, Culpeper does not recommend for common use, for 'sympathetical cures strengthen nature; antipathetical cures, in one degree or another, weaken it.' Besides this, the position of the planet had to be considered, the 'house' that it was in, the aspect in which it was to the moon and other planets."\*

From the earliest times the preparation of medicines as well as their administration or application were accompanied by the recitation of special verbal formulæ, prayers or incantations; to quote again from the Ebers papyrus:—"Another (remedy) for driving away the cataract in the eyes: Come verdigris ointment! Come verdigris ointment! Come thou verdant one! Come efflux from the eyes of Horus! Come thou effusion from the eyes of the god Tum! Come ye stuffs, ye who

\* *The Book of Herbs*, by Lady Rosalind Northcote, 1903.



proceed from Osiris! Come to him (the patient) and take from him the water, the pus, the blood, the pain in the eye, the chemosis, the blindness, the flow of matter, which are worked there by the god of the inflammations, of each kind of death, of each kind of pain, and of all evil things which are found in these eyes—so many of them there are too. So it is to be recited over the verdigris ointment, dissolved in beetle honey, with which we should mix cyperus, which then should be laid upon the eyes in the prescribed fashion."

Based also upon the supernatural treatment of disease, and forming as it were a connection between such a method and a plan of therapeutics into which drugs entered, was what was known as "sympathetic medicine." According to this a subjective association was regarded as existing between the malady or injury and the means of cure, rather than a real or objective connection. A striking example of this mode of practice was exhibited by the so-called weapon salve of which Paracelsus was the reputed inventor, but others, such as Valentine and Cardan, prepared similar unguents, into which such ingredients as human fat, moss grown on a skull, oil of roses, honey, and a vast variety of spices entered. With this the weapon by which a wound was inflicted was carefully anointed and bandaged, the patient meanwhile being left alone, or at most the injury was washed and kept clean, whilst the cure which naturally followed was duly ascribed to the ointment.

One of the most famous of the remedies of this class was Sir Kenelm Digby's celebrated sympathetic powder, which was simply English vitriol (probably sulphates of copper and iron) re-crystallised and then after exposure to the sun finely powdered. But it was its mode of use rather than its nature that is of interest. "If any piece of a wounded person's apparel, having on it the stain of blood that had proceeded from the wound, was dipped in water holding in solution some of the sympathetic powder, the wound of the injured person would forthwith commence a healing process. It matters not how far distant the sufferer is from the scene of operations, or whether he is conscious of them."\* The virtues of this powder, it may be added, were the subject of frequent deliberations at the meetings of the Royal Society, on the Council of which Sir Kenelm sat, and were registered among the "Observations" of the great Chancellor Bacon. This sympathetic mode of treatment was even reduced to simpler terms than was represented by the powder, for it was alleged that it sufficed to stroke upwards the sword with which a wound had been inflicted to cause the patient to be relieved, whilst stroking it in the opposite direction caused intensification of the suffering.

\* *Doctors and Patients*, by John Timbs, F.S.A., 1876.



The plant hypericum, or St. John's wort, from the minute dots which cover the flowers and leaves and give it a supposed wounded appearance, was on this sympathetic principle used as an application for injuries. The hepatica, with its three lobed leaves and fancied resemblance to the liver, was on that account regarded as efficacious for disorders of the liver, and to-day is known as liverwort. In like manner the lungwort (*Pulmonaria officinalis*), from an assumed likeness to a lung, was employed in affections of that organ. "Though sin and Sattan have plunged mankinde into an Ocean of Infirmities . . . yet the mercy of God, which is over all His works, maketh . . . herbes for the use of man, and hath not onely stamped upon them a distinct forme but also given them particular Signatures, whereby a man may read even in legible characters, the use of them. . . . Viper's Bugloss hath its stalks all to be speckled like a snake or viper, and is a most singular remedy against poyson and the sting of scorpions. . . . Heart Trefoyle is so called not onely because the leafe is triangular, like the heart of man, but also because each leafe contains the perfection of the heart, and that in its proper colour, viz., in flesh colour. It defendeth the heart. . . ."\*

In all these cases, be it noted, the use of the herb has no basis in its properties known or unknown, but, simply on account of what was looked upon as a resemblance to the part affected, it was supposed to possess healing properties for that particular region. This treatment by likeness (*similia similibus*) was developed in mediæval times in opposition to the Galenical practice of treatment by contraries, such as using hot remedies for cold conditions, and the reverse, against which Paracelsus strongly inveighed, and was also known as the doctrine of signatures. On this principle, "to discover the virtues of plants we must study their anatomy and cheiromancy: for the leaves are their hands, and the lines observable on them enable us to appreciate the virtues which they possess. Thus the anatomy of the chelidonium shows us that it is a remedy for jaundice. There are the celebrated signatures by means of which we deduce the virtues of vegetables, and the medium of analogy which they present in relation to their form. Mediums, like women, are known by the forms which they affect. He who calls in question this principle accuses the Divinity of falsehood, the infinite wisdom of whom has contrived these external characters to bring the study of them more upon a level with the weakness of the human understanding. In the corolla of the euphrasia there is black dot; from this we may conclude that it furnishes an excellent remedy against all diseases of the eye. The lizard has the colour of malignant

\* *The Art of Simpling; or, an Introduction to the Knowledge and Gathering of Plants,* by W. Coles, London, 1656.



ulcers and of the carbuncle; this points out the efficacy which that animal possesses as a remedy. These signatures were exceedingly convenient for the fanatics; since they saved them the trouble of studying the medical virtues of plants, but enabled them to decide the subject *a priori*.\*

This doctrine of similara has an extremely wide application. Thus, the colours of substances was the indication for their medicinal employment, and red flowers were given for disorders of the blood or vascular system; yellow flowers for jaundice, for which also the mere sight of a yellow bird was deemed efficacious; white was looked upon as refrigerant, red as heating, hence hot and cold qualities were attributed to substances from their colour only. The treatment of small-pox by surrounding the patient with red curtains, etc., as practised by John of Gaddesden on the son of Edward II., and the wrapping of the Emperor Francis I. in scarlet cloth for the same malady, was based on the correspondence with the colour of the blood.

Alchemy, that bore a like relation to chemistry that astrology did to astronomy, was derived by European nations from Arabian sources, and contributed somewhat to the measures adopted in the middle ages to the treatment of disease, at the hands, among others, of Geber (who flourished in the eighth century), Albertus Magnus, Arnold de Villeneuve and Raymond Lulle (in the thirteenth), Cornelius Agrippa (1486-1535), and especially Paracelsus (1493-1541) and Jerome Cardan (1501-1576). Roger Bacon (1214-1292) who wrote the *Mirror of Alchemy* should also be included, though the actual founder of experimental science and in many respects far removed from superstition, he believed in the influence of the stars on various parts of the body. The primary object of their labours, at least of the earlier ones, was the discovery of an elixir of life by which existence might be prolonged to any age, and the philosopher's stone (not by the way necessarily a stone, but rather a fluid) by which the baser metals might be transmuted into gold. The majority of their processes were carried out by the agency of fire and distillation, by sublimation, calcination and like methods. Though they never succeeded in attaining the objects of their quest they gave the impetus to chemical inquiry, and by constantly experimenting led to the preparation of a number of substances that later became of considerable value. The spirit of enquiry that led them "to see what would happen" then as now was the parent of much important discovery. Thus alchemy may be properly credited with a share in the development of learning and advancement of knowledge which everywhere characterised the sixteenth century and that was marked among other events by the

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\* *History of Chemistry*, by T. Thompson, 1830.



Reformation and the gradual substitution of experience based on observation and experiment in place of authority as an intellectual influence. It is but fair to admit that Paracelsus in spite of much of the bombastic \* nonsense which he talked and wrote, threw over the idea of the search for any philosopher's stone and asserted that the object of alchymy was the preparation of medicines. In this way it came about that a large number of minerals came into use, among which mercury and antimony were the chief, and to that extent altered considerably the character of the *materia medica*. The efforts to get at what were regarded as the essence of things led to the preparation of extracts, essences, and tinctures, but the alchymists were not above the concoction of magic elixirs warranted to effect the most marvellous cures.

Though, as I have said, methods of supernatural treatment based on supernatural ideas of the nature of disease have prevailed at all ages and among primitive peoples have undoubtedly constituted the sole remedies employed, yet from the very earliest times, of which we have records, such means were supplemented by the administration of drugs or some form of external therapeutics, such as baths. In the Egyptian papyri it is noticeable that "prayers were much more common," as Dr. Caton (*loc. cit.*) observed, "in earlier times than during the later dynasties when the physician seems to have relied more upon treatment." Indeed, the Ebers papyrus consists in greater part of what we should at the present day call prescriptions for unctions, plasters, pills, potions, inhalations, and enemata, grouped for use according to the region of the body at fault, a large number being for diseases of the eye, which then, as now, were exceedingly prevalent in Egypt. The drugs were seldom of a poisonous though often of an exceedingly nauseous character, and as the quantities ordered were measured by bulk rather than by weight great accuracy in dispensing was scarcely possible.† Their administration and, indeed, the whole course of treatment had to be in strict accordance with the rules laid down in the sacred writings, which were attributed to the god Thoth (Hermes), from which the priest departed at peril of his own life should his patient die—a plan ill calculated to develop the healing art, which appears to have been stationary over very many centuries. Along with the various forms of medicaments, supernatural measures were also adopted, such as incantations and charms against witchcraft, and it is noticeable that these are more prominent in the later medical papyri than in the sacred books. "Whoever treats a sick person has,

\* The full name of Paracelsus was Philippus Aureolus Theophrastus Paracelsus Bombast von Hohenheim, from which the word in the text is derived.

† See article on "Egyptian Medical Papyrus: one thousand years older than Ebers papyrus," by F. L. Griffith, *British Medical Journal*, June 3rd, 1893.



therefore, two equally important duties to perform. He must first discover the nature of the spirit in possession, and, if necessary, its name, and then attack it, drive it out, or even destroy it. He can only succeed by powerful magic, so that he must be an expert in reciting incantations and skilful in making amulets. He must then use medicine to contend with the disorder which the presence of the strange being has produced in the body; this is done by a finely graduated regime and various remedies."\*

As regards the general features a very similar account might be given of medicine as it was practised by the Babylonians, as ascertained from the records set forth on tablets found in the Library at Nineveh; or from the Rig Veda composed one or two thousand years before Christ which contains the foundation of Hindu medicine, although this was considerably developed in their subsequent books of revealed wisdom or vedas. Therein we read invocations addressed to Sakman the demon of fever and others, couched much in the same language as those met with in the Egyptian papyri. The earliest mention of the healing art as practised by the Persians is contained in the Zend Avesta, which was ascribed to Zoroaster (supposed to have lived about 560 B.C.), and similarly describes how the various diseases due to demons were to be treated by prayers, incantations, and drugs. The earliest medical works of the Chinese and Japanese explain all maladies as due to spirits, and to be treated by supernatural means and the contents of an extensive Pharmacopœia. Coming nearer to our own country, like methods were employed by the ancient Cymry a thousand years before our era.

It would be a fruitless task to attempt to enumerate the hundreds, nay thousands, of substances of the most varied kind that have entered into the pharmacy of past ages, some of which have remained to us until to-day. The first to be used, and for long the only ones, were derived from the vegetable kingdom, and from their detailed description by Galen, among others, were long known as "Galenicals" in contrast to "chymicals," which were of mineral origin. From the earliest days, the herbs of the field have furnished the bulk of the apothecary's stock-in-trade and formed the greater proportion of the ingredients of the physician's prescriptions, and few indeed were the plants which were not looked upon as given for food or physic, and used accordingly. The herbalist of to-day, who boasts the freedom of his nostrums from all mineral substances, represents a numerous family in the past. To mention but a few of these simples,† one may

\* Maspero, *loc. cit.*

† This term is commonly taken to imply medicaments of vegetable origin, each possessing its special virtue, and so constituting a simple remedy; but in the older Pharmacopœias the word also includes articles derived from the animal and mineral kingdoms.



first refer to those which were by the ancients accounted as of great virtue, even when only worn as amulets, as, for instance, rue, which in the days of Aristotle was used as a protective against witches, and "in some parts of Italy a talisman against their power is made by sewing up the leaves in a little bag, and wearing it near the heart."\* Others, again, were held as of value in mental deficiencies: thus, rosemary "was supposed to strengthen the memory if regularly imbibed;"† and Ophelia tells us it is "for remembrance." Dr. Roger Hackett, in his sermon, "A Marriage Present" (1607), says: "It overtoppeth all the flowers in the garden, boasting man's rule. It helpeth the brain, strengtheneth the memorie, and is very medicineable for the head." A like reputation was imputed to hellebore for melancholy, for which complaint also "figges be good against," as Bulleyn tells us.

Of a group of plants of the buttercup family, Gerarde, in his Herbal, writes as follows:—"There be divers sorts or kinds of these pernicious herbs comprehended under the name of *Ranunculus* or Crowfoot, whereof most are very dangerous to be taken into the body. The chiefest virtue is in the root, which, being stamped with salt, is good for those that have a plague sore, if it be presently tied to the leg, by means whereof the poison and malignity of the disease is drawn off from the inward parts, for it presently raiseth a blister to what part soever of the body it be applied. Apuleius saith further, that if it be hanged in a linen cloth about the neck of him that is lunatic, in the wane of the moon, when the sign shall be in the first degree of Taurus or Scorpio, that he shall forthwith be cured." Thus did the old herbalist, whilst pointing out the harmful effects of many of this class of herbs (which includes, by the way, aconite, the root of which has been not infrequently mistaken for horseradish with fatal effect), at the same time refer to the remedy from its astrological aspect, so firm was the hold of the supernatural. It may also be noted that herbs of this group were extensively lauded for their use as applications for the bites of scorpions, in the sign of which it was most efficacious.

Another plant around which not a little superstition gathered was the mandrake, or mandragora, a member of the order *solanaceæ*. Its long fleshy and often forked root was supposed to resemble a human being, a resemblance which a little trimming and pruning increased. "To this unusual power was attributed, and in diversified forms it appears to have been used for the provocation and irresistible cure of maladies. It was eagerly sought for by sterile women, and for obstetrical labours. . . . Other virtues of a surprising character

\* *Book of Herbs*, by Lady Rosalind Northcote.

† "The Healing Art" (chapter IV, *The People's Pharmacopœia*), by W. H. Davenport Adams, 2 vols., 1887.



were awarded the omnipotent mandragora. It conciliated affection and maintained friendship, preserved conjugal fealty, and developed benevolence. The immensity of worth inherent in this mystical medicament, its vital essence, was by no means confined to sustaining health and providing certain remedies for infirmities; its power manipulated tribunals, and secured judicial favour at court; and when this resistless amulet was held under the arm by a suitor at law, however unjust his cause, the vegetable rune controlled the forum and obtained the verdict.\* In the Latin Herbarium of Apuleius Platonius (supposed to have been written about the fifth century) a chapter is devoted to an account of this plant, its description, and its uses, and a translation of this Herbarium into Old English forms a large portion of the Anglo-Saxon Leechdoms. From this it appears that the root was not to be dug up with an iron instrument, but to be dug round about with an ivory staff, and when sufficiently exposed was to be dragged out of the earth by being tied to a dog's neck, the animal being encouraged to exertion by meat placed just out of reach. Full directions are given for the administration of the expressed juice for headache, podagra, and other ailments, and also for its use as an anæsthetic. "If anyone has to have a limb amputated, or burnt, or cut, let him drink an ounce and a half in wine, and he will sleep so long that the limb may be cut off without pain or feeling."†

As illustrating the extent to which drugs of this class have been employed, it may be mentioned that in the *Materia Medica* of Dioscorides, compiled in the first century of our era, and the earliest and most complete of the works remaining to us of that class, between 600 and 700 articles are of vegetable origin. In the London Pharmacopœia of 1618 (the first year in which an official Pharmacopœia was issued in this country) are included nearly 600 drugs‡ of the same nature, whilst the present British Pharmacopœia (1898) contains about 70 less. It is not to be supposed that with this approximate correspondence in number, there is also a correspondence in the actual articles represented by these figures. Thus, of those enumerated by Dioscorides, only about 30 are to be found in our present Pharmacopœia, including such drugs as opium, hyoscyamus, rhubarb, elaterium, scammony, cardamoms, pepper, aloes, squills, colchicum, male fern, galbanum, ammoniacum, gentian, and santalin.

An interesting chapter in the subject of therapeutics is formed by

\* History of Medical Economy during the Middle Ages, by G. F. Fort. New York, 1883.

† See English Medicine in the Anglo-Saxon times. The Fitzpatrick Lectures, R.C.P., by Dr. J. F. Payne, 1904.

‡ This number is made up of 97 roots, 22 barks, 8 woods, 186 leaves, 53 flowers, 53 fruits and buds, 113 seeds, 39 gums, 19 juices, and a miscellaneous group of 7 styled *plantarum excrementa*.



the history of the introduction of the various drugs into medicine. This has been done for the medicaments obtained from the vegetable world by Professor Flückiger, of Strassburg, and Daniel Hanbury, F.R.S., and recorded in their *Pharmacographia* (second edition, 1879). There may be found the names of those drugs in present-day use which were known to the ancient Egyptians, such as myrrh, senna gum acacia, pomegranate, coriander, and olive; those that occurred in the early Hindoo medicine, such as abrus, basil, cloves, assafoetida; or in the old Jewish list of medicaments, such as almonds, quinces, galbanum, and cumin; or as used by the ancient Greeks, such as opium, elaterium, conium, tragacanth, liquorice, Chian turpentine, and many others; or as prescribed by the physicians of ancient Rome, such as have been mentioned or referred to by Dioscorides; or, to come nearer home than that, found a place in the Anglo-Saxon leechdoms,\* such as betony, pellitory, elder, dill, and cumin; or that are to be found in the collection of recipes made by the physicians of Myddvia, who attended on the Princes of South Wales in the thirteenth century, a manuscript that now reposes in the British Museum. Lastly, there are those drugs which have been used among many civilised nations that owed their introduction to native races, more particularly the native Indians of North and South America, and some Africans tribes; podophyllin, krameria, cacao, physostigma, and cinchona, are but some of these.

The curative properties assigned to these various drugs, fanciful and extravagant as they often were, the form of their administration, and sometimes the mystical conditions under which they should be employed, all find full description in the numerous works on *materia medica* which have remained to us since Dioscorides, Pliny, and Galen compiled their famous treatises. They make quaint and curious reading, and exhibit a singular faith in the supposed virtue of the enormous number of simples and their several preparations. Very many of these substances were looked upon as efficacious for the same malady, and many different affections were treated by the same remedy, although now and then a plant, *e.g.*, the misletoe, was lauded as a universal cure. No doubt a considerable number were possessed of definite and useful properties, as, for instance, opium, hyoscyamus, and other sedatives, jalap, rhubarb, scammony, and other purgatives, but the evidence of real usefulness on the part of the majority was far to seek, and no doubt accounted for so many being constantly discarded, as others were introduced in their place.

As a rule, the ingredients of the draughts and boluses under which our ancestors groaned that were derived from the animal world

\* *Leechdom, Wort-cunning, and Starcraft of Early England*, edited by Rev. O. Cockayne, 3 vols., 1864-6. From various sources the Editor has compiled a list of between 700 and 800 names of plants used in the Anglo-Saxon period.



were of the most repulsive character. The fat of man, dog, wild cat, hedgehog, stork, heron, hog, serpent, fox, or vulture, the flesh of viper, the rennet of kid, hare, or horse, bees burnt to ashes, or the head of a black cat similarly treated, and snails, are but a very few of the less disgusting, whilst human excrement and urine, or the same from many other animals, calculus from the bladder, blood of man or animals, and menstrual discharge were all administered for diverse complaints, and that freely. A mixture of human brain and honey was recommended as an application to the eyes in the Papyrus Ebers. The gratings of a human skull unburied was highly thought of in Charles II.'s reign for gout, and pulverised human bones were a favourite remedy. In 1726, there was published a work entitled *Il Medico Poeta*, by Dr. C. Brunoni, of which an account is given by Mr. T. A. Trollope in *Notes and Queries* for 1854, with special reference to "the medical uses of human skulls," and from this we learn that "all skulls are not of equal value. Indeed, those of persons who have died a natural death are good for little or nothing. The reason of this is that the disease of which they died had consumed or dissipated the essential spirit! The skulls of murderers and bandits are particularly efficacious. And this is clearly because not only is the essential spirit of the cranium concentrated therein by the nature of their violent death, but also the force of it is increased by the long exposure to the atmosphere, occasioned by the heads of such persons being ordinarily placed on spikes over the gates of cities! Such skulls are used in various manners. Preparations of volatile salt, spirit gelatine, essence, etc., are very useful in epilepsy and hæmorrhage. The notion soldiers have, that drinking out of a skull renders them invulnerable in battle, is a superstition, though respectable writers do maintain that such a practice is a proved preventive against scrofula."

Human mummy had a widespread reputation as a remedy for various ailments, and is to be found among the articles contained in the earlier pharmacopœias in this country. The following description of the preparation of "extractum mummiæ," translated from "Collectanea Clinico Curioso," by J. D. Thom a Francofurte, and published in 1693, will serve to show how this material was used:—"Take of the mummy of a healthy man, either hanged or broken on the wheel, that is of the flesh of the thighs, arms, and other parts, *q.s.* This having been once exposed to the rays of the moon and sun, cut into small pieces and sprinkle with powdered myrrh and a little aloes; afterwards macerate for some days in tincture of elder or juniper. Dry the pieces in the air, exhaust them with spirit of wine, distil off the spirit, and you have the extract remaining." There were also other preparations of mummy, such as balsam, tincture, elixir, and *aqua divina*.



Sir Thomas Browne remarks, in "Hydriotaphia" (1658): "Egyptian mummies, which Cambyses and time hath spared, avarice now consumeth. Mummy is become merchandise. Mizraim cures wounds and Pharaoh is sold for balsam."

Nor has the flesh cut from living persons been disregarded as a remedy, but it may be observed that the eating of human flesh and drinking human blood—the latter a most widely-spread practice among many nations and over many ages—for curative purposes has also to be considered from the point of view as a means whereby individuals were thus supposed to acquire such characteristics as courage, strength, ferocity, and the like possessed by those from whom the materials were derived. And, further, it is to be remembered that even among cannibal races at the present day the consumption of the flesh and particular parts of their victims is often less for the purposes of satisfying hunger than with the idea of becoming hardier and braver in consequence, or even, as suggested, in the belief that the organ eaten contains "some portion of the tribe-life or spirit of his enemy, which, when devoured, helps to build his own tribe-soul, and that cannibals eat to take in soul or life, and only secondarily to acquire specific virtues such as courage.\* Blood as a therapeutic agent was specially recommended for epilepsy so long ago as the days of Pliny, and in the fourteenth century and onwards references are also made in medical writings to the use of products distilled from blood, though what they were is not very evident. As an external application, blood was employed for leprosy and other skin affections.†

An ointment used for hypochondriacal persons, known as balsam of bats, and commended by His Majesty's physician, Dr. Thomas Sherley (1638-1678), had in its composition the flesh of adders, bats, and sucking whelps, earthworms, hogs' grease, stags' marrow, and the thigh bone of an ox, among other things, and is a fair sample of the pharmacy of the period. Dr. Bulleyn, one of the most distinguished physicians of the Elizabethan era, and author of the famous "Book of Simples" (1559), prescribed "a smal young mouse roasted" for a child suffering from some nervous malady. "For the falling sickness," it was recommended by another physician, "take the harte of a toad and drie it and beate it to powder, then drink with what drink you will." "For ye green sickness, take earthworms, open them, wash them clean, drye them in an oven, and beat them to powder: give two sponefulls in white wine in ye morning."

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\* *The Lancet*, October 20th, 1906, p. 1087.

† "Arnold de Villanova on the Therapeutic Use of Human Blood," by Dr. J. F. Payne, Janus, 1903.



Even to-day the Chinese, who "are centuries behind other nations in knowledge of medicine, and have not yet learned that the blood circulates in the body, or that a limb may be removed with beneficial effects in case of some diseases or accident, and who consider the object of the physician is 'to strengthen the breath, stimulate the gate of life, and restore harmony,' place reliance on such tonics as dog flesh, red-spotted lizard skins, tortoiseshell, fresh tops of stag horns, bones and teeth of dragons (when obtainable), shavings of rhinoceros horns, and such like. The great value which the Chinese attach to the bones, horns, tusks, and eyes of animals may be judged from various tonics and remedies which are in great request among all classes. A dose of tigers' bones inspires courage; an elephant's eye burnt to powder and mixed with human milk is a sovereign remedy for inflammation of the eye; pulverised elephant's bones cure indigestion; a preparation of elephant's ivory is the recognised cure for diabetes; and the same animal's teeth may be used for epilepsy.\*

In the *Pall Mall Gazette* for October 12th, 1866, we read that "At an inquest held on October 5th, at Bradfield (Bucks), on the body of a child of five years of age, which had died of hydrophobia, evidence was given of a practice almost incredible in civilised England. Sarah Mackness stated that at the request of the mother of the deceased she had fished out of the river the body of the dog by which the child had been bitten, and had extracted its liver, a slice of which she had frizzled before the fire, and had then given it to the child to be eaten with some bread. The dog had been drowned nine days before. The child ate the liver greedily, drank some tea afterwards, but died, in spite of this strange specific." A very respectable antiquity may be claimed for this practice since the same treatment for the bite of a mad dog was enjoined in the Talmud, that compendium of ancient Jewish oral or unwritten law that dates from 536 B.C.

Pages might be filled with the descriptions of the numerous materials of this class that have been employed as remedial agents. A brief but excellent account may be found in the annual oration delivered before the Hunterian Society in 1902 by Dr. A. T. Davies, who regarded the practice of consuming parts of the body for medicinal purposes as foreshadowing the organo-therapy of our own day, and in this respect he has been recently followed by Prof. Hugo Magnus. It can scarcely be claimed, however, that the resemblance in procedure is a very real one, or that there is any but a superficial similarity in the underlying principles. But, be that as it may, we

\* See chapter on "Magic and Medicine," by Cuming Walters, in *The Doctor*, edited by W. Andrews, Hull, 1896, quoting from "Society in China," by Professor Douglas.



cannot but observe that in marked contrast to the large number of animal substances formerly used,\* the present British Pharmacopœia only contains about a dozen articles, and most of these are employed in the preparation of external applications.

Although the *materia medica* of Dioscorides includes certain mineral substances, such as lead, silver, cinnabar, alum, gypsum, salt, sulphur, and others—between 50 and 60 in all—it was not until considerably later that these bodies entered very largely into the physician's prescriptions. That this was in great measure due to the alchemists has been previously stated, mercury and antimony among others having been introduced by them. Even then no great increase in the number of substances of this class which were used is to be found in the earlier Pharmacopœias, that of 1618 only containing 51 salts and metals, though the group of 14 articles styled "*Marina*," and consisting largely of shells, should be included among the mineral ingredients. Precious stones were accounted of great efficacy and were frequently administered.

The most striking difference between the mineral substances employed medicinally by the ancients and those in use in our day is the large number of salts contained in recent Pharmacopœias. Thus only three or four bodies of this nature were contained in the *materia medica* of Dioscorides, and about twice as many in the first London Pharmacopœia, whilst in the present work there are upwards of 120 preparations, consisting of or containing substances of this class. It is suggested by Sir William Church that many of the articles derived from the animal kingdom already referred to, and disgusting though they were, "were perhaps the readiest means our forefathers possessed for obtaining valuable remedies such as the salts of ammonia."†

So far, I have done little more than mention some of the individual drugs that were used, but it must be remembered that they were combined in numbers and quantities that sound to us with our present day tablets, containing only one or two ingredients, almost incredible. Amongst the most famous of these were *theriacum*, or Venice treacle, and *mithridaticum*, which dated from the Alexandrian School of Medicine (which flourished for nearly 800 years from 300 B.C.), and were to be found in the dispensatories of the first half of the 18th century, such a hold had they obtained on the faith alike of doctor and patient. The constituents of these *nostrums* numbered

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\* In the *materia medica* of Dioscorides about sixty articles of this nature were enumerated, and in the first London Pharmacopœia (1618) between seventy and eighty.

† See *Our Hospital Pharmacopœia and Apothecaries' Shop*, St. Bartholomew's Hospital Reports, vol. xx and xxii. Two most interesting papers, full of details concerning the working of a hospital dispensary, with much information relating to the price of drugs in former days.



from forty to sixty, and "it was supposed that each of these medicinal substances preserved its proper virtues in the midst of the common amalgam, which possessed the properties of all the drugs that entered into its compound, and thus formed a sort of panacea, good for all diseases."\* In the London Pharmacopœia for 1639 was a preparation named *Antidotus magna Matthioli adversus venena et pestem*, which contained 130 ingredients, some of them being compounds.

I am tempted to quote the following right royal remedy from Dr. Bulleyn's book; it was known as *Electuarium de gemmis*:—"Take two drachms of white perles; two little pieces of saphyre; jacinth, corneline, emerauldes, granettes of each an ounce; setwal, the sweate roote doronike, the rind of pomecitron, mace, basel seede, of each two drachms; of redde corall, amber, shaving of ivory, of each two drachms; rootes both of white and red behen, ginger, long peper, spicknard, folium indicum, saffron, cardamon, of each one drachm; of troch. diarodon, lignum aloes, of each half a small handful; cinnamon, galinga, zurubeth, which is a kind of setwal, of each one drachm and a half; thin pieces of gold and sylver, of each half a scruple; of musk, half a drachm, make your electuary with honey emblici, which is the fourth kind of mirobalans with roses, strained in equall partes, as much as will suffice. This healeth cold diseases of ye braine, harte, stomack. It is a medicine proved against the tremblynge of the harte, faynting, and sonning, the weakness of the stomacke, pensivenes, solitarines. Kings and noblemen have used this for their comfort. It causeth them to be bold-spirited, the body to smell wel, and ingendreth to the face good coloure."

As some explanation of this extraordinary polypharmacy that for many centuries characterised the treatment of disease, it may be pointed out that "it was generally supposed by our ancestors that it was necessary to correct and modify the action of all medicines, by adding others of an opposite nature, and remedies were often classified as hot and cold remedies, a certain proportion of each class being combined according to the preponderance on one side or the other which was desired."†

The vessel from which the potion was drunk frequently had as much reputation for effecting a cure as did its contents. To drink from a suicide's skull has been regarded as a cure for epilepsy; and the ague cups, in use up to at least one hundred and fifty years ago, were so called from having hideous figures painted in the interior, and

\* *History of Medicine*, by P. V. Renouard, M.D. Translated from the French by Dr. C. G. Comegys, 1856.

† *Historical Sketch of the Progress of Pharmacy in Great Britain*, by Jacob Bell, 1842. Republished with additions by Theophilus Redwood, 1880.



these, suddenly perceived, were supposed to give the patient the "shivers," which, on the principle of *similia similibus curantur*, cured or even prevented an attack of ague.

From the writings of Hippocrates and Galen, it seems that in their time the preparations of the various medicines rested in the hands of the physicians themselves, or of their students or servants, and it was not until the fourth century of our era that a special calling, analogous to that of an apothecary, was instituted. It was about that period that the practice of the healing art was first separated into the three main divisions pursued respectively by the physician, the surgeon, and the apothecary. It has been suggested\* that this specialisation was largely due to the growing custom of consulting physicians for each and every ailment, many of which had hitherto been treated by "recourse to their own family receipts and personal experiences," and that a division of labour followed as a matter of necessity. Moreover, too, since Galen declared no physician of high reputation would attend to diseases of small importance, it became necessary to provide for the treatment of minor ailments as well as for the sick poor, and so "the surgeon and apothecary, both retaining an open shop, at which they vended and disposed, without trouble, of the different drugs and materials they employed; and making at the same time an individual charge for the medicaments they had occasion to use in their private practice, maintained an easy and respectable station in life, without expecting the fees and gratuities (which were frequently very considerable) which were lavished on the physician." It is not to be supposed, however, that the distinction between the three classes of practitioners was either strictly or universally observed, but so far as their several duties were concerned we learn from Celsus that "to the physician was allotted the enquiry into the secret causes of the disease, its various symptoms, its prognosis, together with what species of diet, and other domestic arrangements, might best contribute to bring it to a happy issue, rather than the direct prescription and introduction of medicines. This last was more immediately the office of the apothecary, who was hereby supposed to investigate deeply the nature of the drugs he employed, to be scrupulous as to their quality, and sedulously attentive as to their combination. To him, likewise, almost exclusively belonged the care of tumours, wounds, ulcers, and other external or topical affections; while the office of the surgeon was

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\* *The History of Medicine so far as it relates to the Profession of the Apothecary.* By John Mason Good, 1795. An interesting work in which the development of the apothecary is traced, especially in relation to the Royal College of Physicians and "the encroachment which chemists and druggists have of late years made on the profession of apothecary."



confined to cases of mere manual operation, together with a minute attention to the study of anatomy. Though even the surgeon did not occasionally omit the use of *regimen* and medicines, while he thus exhibited himself principally to notice by the dexterity of his hand and those external effects which, amongst all the different branches of medicine, are by far the most obvious." This tripartite disposition of the healing art was thus described by Galen (A.D. 130—200 *c.*) about one hundred and fifty years later:—"That mode and manner of cure which is effected by the use of accustomed aliments is called diet, or the regulation of the food, as that which is produced by common incisions, caustics, or whatever else is performed by the hand is denominated surgery. There is a third part of medicine, however, distinct from either of these, which is termed pharmacy, and which comprises the uses of medicines."\* Among the Greeks and Romans the practitioner in pharmacy was designated almost indiscriminately as "pharmaceuta," "pharmacopola," "pharmacopœus," "pharmacotriba;" whilst the shop or place where he kept and vended his drugs was sometimes termed "apotheca." Whether any such calling as that of a druggist existed apart from the apothecary seems to be exceedingly doubtful. It may be observed that the term "medicus" was applied almost indifferently to the physician, surgeon, or apothecary, and may be best translated into our present-day phraseology as "medical men," it being clearly remembered that the apothecary or pharmaceutic practitioner was closely concerned with the administration of internal remedies as well as with their preparation. Further, it may be mentioned that Pliny, Galen, and other writers of their times complained bitterly of the ignorance and incapacity of many of those who practised physic in one or other of its branches. Among the ancients whose names are more closely associated with pharmaceutic practice, some of whom extensively investigated the action of drugs even on their own persons, may be mentioned Asclepiades (B.C. 100), Eudemus (B.C. 280), Theophrastus (B.C. 370), Pharmacion, possibly Celsus, and Oribasius (A.D. 360). Then, as now, quack medicines and nostrums were widely advertised, and sold often at fabulous prices. Aetius, a Greek physician, who practised in Constantinople in the fifth and sixth centuries of our era, and whose writings were highly esteemed, referred to the exorbitant charges made for such remedies.

During the period of decline of the Roman Empire "little else was produced but compilations of the most meagre kind, chiefly of the nature of herbals, or domestic receipt books."† One of these, by Apuleius Platicus, written in the fifth century, has been previously

\* De Vict. Rat. Comment, lib. I.

† *Art. Medicine, History of.* By Dr. J. F. Payne. *Encyc. Brit.*, 1883.



referred to as having been translated four hundred years later into Anglo-Saxon.

Among the Arabians, by whom in great measure the art of medicine was upheld during the centuries succeeding to the fall of Rome, "schools of medicine, often connected with hospitals and schools of pharmacy, arose in all the chief seats of Moslem power." Among the numerous writers of this school in particular may be mentioned Avicenna, and Mesua the younger of Damascus, who both lived in the eleventh century, and the latter's work, "*De Simplicibus*," was for centuries a standard authority on what would now be called *materia medica*, was printed in twenty-six editions in the XVth century and later, and was used in the formation of the first London Pharmacopœia issued by the College of Physicians in the reign of James I." After referring in general terms to the very slight additions to knowledge made by the Arabian physicians in the science of practice of medicines, their writings being almost entirely derived from the Greeks with little or no real improvement, Dr. Payne continues: "The only real advance was in pharmacy and the therapeutical use of drugs. By their relations with the further East, the Arabs, became acquainted with valuable new remedies, which have held their ground until modern times; and their skill in chemistry enabled them to prepare new chemical remedies from many combinations of those already in use. They produced the first pharmacopœia, and established the first apothecaries' shops. Many of the names and many of the forms of medicines now used, and, in fact, the general outline of modern pharmacy, except so far as modified by modern chemistry, started with the Arabs."

In those ages from the fifth to the tenth century, before the influence of the Arabian school became established, such medical, and indeed other, learning as there was, owed its existence to the monasteries, which later were closely connected with the origins of most of the European Universities. One of the earliest of these was that of Salerno, whence emanated the celebrated *Regimen Sanitatis Salerni*, a rhyming Latin poem of unknown authorship, and said to have been prepared for Robert, son of William the Conqueror. It was specially designed for the laity as a guide to health and to treatment of disease. At this time, also, the management of the sick, the preparation and administration of simples, together with the dressing of wounds, was to a great extent in the hands of the women of the family, who may or may not have been directed in their doings by the "leech," as the doctor of the period was designated, and who formed one of the household of the nobler or wealthy members of the community.



With the revival of learning, among other pursuits was that of botany, which led to an increased knowledge of drugs of vegetable origin, as the developing science of chemistry added to the *materia medica* fresh medicaments of chemical nature.

The first apothecaries, so styled, in this country, and understanding by the term those who took charge of patients in a manner comparable to the general practitioner of the present day, appears to have been introduced from Italy and France. "The earliest mention of an apothecary in England occurs in a grant, reprinted in Rymer's 'Fædera,' the individual, one Coursus de Gangeland, receiving a pension of 6d. per diem for life in 1345 for attending on King Edward III. while lying sick in Scotland. Gangeland is called therein 'an apothecary of London.'"<sup>\*</sup> J. Falcand de Luca publicly vended medicines in 1357, and Pierre de Montpellier filled the appointment of apothecary to Edward III. in 1360.<sup>†</sup> Their English contemporaries, Gilbertus Anglicus, John of Gaddesden, and John of Arderne, to mention only some, were described as physicians or surgeons, though the latter also engaged in pharmacy, and also united their occupations with that of barber.

Although in the middle ages the regular physicians were largely those who held University degrees, and were for the most part also in holy orders, irregular practitioners became increasingly numerous, and the first operative law in this country for legalising the several branches of the profession dates from 1511, being the third year of Henry VIII., and was thus set forth:—"Forasmuch as the science and cunning of physick and surgery (to the perfect knowledge whereof be requisite both great learning and ripe experience) is daily, within this realm, exercised by a great number of ignorant persons, of whom the greater part have no manner of insight in the same, nor in any other kinds of learning, so that common artificers as smiths, weavers and women, boldly and accustomedly take upon them great cures and things of great difficulty, in the which they partly use sorcery and witchcraft, partly apply such medicines unto the disease as be very poisons, and nothing meet therefor, to the high displeasure of God, great infamy of the faculty, and the grievous hurt, damage, and destruction of many of the King's liege people, most especially of them that cannot discern the uncunning from cunning: Be it therefore to the surety and comfort of all manner of people by the authority of this present Parliament enacted, That no person within the city of London, nor within seven miles of the same, take upon him to exercise or occupy as a physician or surgeon, except he be first

<sup>\*</sup> *The History of the Society of Apothecaries of London.* By C. R. B. Barrett, M.A., 1905.

<sup>†</sup> *Friend's History of Physick*, 1725-6, vol. II.



examined, approved, and admitted by the bishop of London, or by the dean of St. Paul's, for the time being, calling to him or them four doctors of physic and for surgery other expert persons in that faculty." It was further enacted that the foregoing should not infringe the rights of the Universities of Oxford and Cambridge. In 1518 the King granted a charter whereby the Royal College of Physicians of London was constituted, and four years later its provisions were embodied in an Act by which among other things the licensing of those to practise physic was vested in the said College without any association with bishop or dean, and was made to extend over England. In the charter the word "medicus" is employed, and clearly was intended to embrace all branches of the profession, which interpretation was definitely stated in a subsequent Act (1540), wherein it was laid down that "for as much as the science of physic doth comprehend, include, or contain the knowledge of surgery as a special member and part of the same," anyone admitted to the College might "practise and exercise the said science of physic in all and every his members and parts."

The apothecaries were first incorporated with the grocers by James I. in 1606, but received a separate charter in 1617, which constituted the Society of the Art and Mystery of the Apothecaries of the City of London. Previous to this, by an Act of 1553, the College of Physicians was charged with the duty of inspecting the goods of the apothecaries, or destroying them if found faulty and punishing the offender, and for a long period the apothecaries were very much under the control of the College, a condition of affairs that led in the early half of the eighteenth century to constant conflict, which was not restricted to the issuing of abusive pamphlets. At first it was required that the examination of the apothecaries' shops by the Censors of the College of Physicians should only take place in the presence of representatives of the Company of Grocers, from whom indeed most of the drugs of foreign source were obtained. These latter, in addition to their own particular trade, filled the position now occupied by the druggists, a term that for the first time appears to have been used in a new charter offered to the College of Physicians by James I. in 1618.\* The words of the charter—"using the art of an apothecary or the trade of a druggist"—are significant as showing the relative position of the two callings, and this would seem to be emphasised by the fact that in a previous Act passed in the reign of the same monarch the expression "trade and art of an apothecary"

\* It seems that the articles of the *materia medica* were at one time known as "materialista," and hence the druggists were termed "materialists," a definition given in *Bailey's English Dictionary*, 1773. The word druggist came to us from the French "drogue."



was used.\* Gradually it came about that a separation took place among the grocers, of those whose business was concerned with groceries proper from those who concerned themselves more especially with the vending of drugs, to whom in course of time the name of druggsters or druggists was applied, and with whom were subsequently combined those who prepared and sold the increasing number of chemical substances employed in medicine, who were designated pharmaceutical chemists, and thus arose the conjunction of chemist and druggist with which we are familiar.

The office of apothecary, its origin, duties, and relation to the other branches of the profession, here only briefly sketched, forms an interesting chapter in the history of medicine; but it is desirable to remember that, apart from the preparation of and dealing in various drugs and medicaments, the actual prescribing for and treatment of the patient appears to have always been within its scope, though the fitness for so doing was frequently insufficient, even in respect to the limited knowledge of former times, and often called forth protests from the more learned physicians; and legal enactments were formulated from time to time forbidding surgeons and apothecaries from giving internal medicines in certain specified maladies. Even since the manufacture and preparation of the articles of the *materia medica* has become a trade of its own in the hands of the chemist and druggist, the temptation to prescribe, too often at the request of the public, has not always been resisted.

Among the vast number of drugs and medicaments that were in vogue at various times the need for some sort of arrangement and classification must have been soon experienced as a guide both to physician and pharmacist. The chief of the early works on *materia medica* were by Dioscorides (first century), Pliny (first century), and Galen (second century), and of these the first named is the most complete. Reference has been previously made to the Ebers papyrus, which, of course, preceded these works by a thousand years or more, and also to the writings of various earlier physicians, but those of the three authors named may be fairly regarded as the first descriptions of plants and other substances used medicinally which are in any way to be compared to modern pharmacopœias, and that formed the source whence the Arabian and later writers compiled most of their accounts. To those already mentioned might be added Nicolas of Salerno, who wrote an *Antidotarium* in the twelfth century, Mattheus Platearius, of the same place and period, whose work *de Simplicis*

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\* *The Laws relating to the Medical Profession.* By J. W. Willcock, Barrister-at-Law, 1830. Page xviii.



*Medicina* contains a description of 273 drugs and also the definition of a "simple"—"simplex autem medicina est, quæ talis est, qualis a natura producitur." In the next century Myrepsus, a Greek, of Asia Minor, wrote a largely used dispensatory.\*

In the fifteenth and early sixteenth centuries a number of manuals were written for apothecaries, and published in Venice, Lyons, and elsewhere. "The first book of the kind to receive the impress of any authority beyond that carried by the author's name was the *Antidotarium Florentinum* (Florence, 1498), a collection of medical receipts sanctioned by the University or Medical College of that city. But the first pharmacopœia sanctioned by the civil authority, and enjoined to be used under penalties by dispensers and compounders of medicines, is that of the town of Nürnberg, published in 1545, under the title: *Pharmacorum conficiendorum ratio, vulgo vocant Dispensatorium*, etc. It was compiled by Valerius Cordus, at the early age of twenty-seven, from various sources, but is chiefly founded on the practice of Galen. Its contents comprise the collection and keeping of simples, adulterations, *succedanea* or *quid pro quo*, weights and measures, and a large number of formulæ. In this book, therefore, the style and methods of which have been closely followed down to the present day, we have exactly the modern pharmacopœia. The term 'pharmacopœia' is not met with till 1561, when we find it twice: *Compendium Pharmacopœe Johannis Placotomi*, Lyons, 1561; and *Pharmacopœa medicamentorum omnium qua hodie in officinis exstant, tractationem et usum ex antiquorum medicorum præscriptis continens*, Basel, 1561, a work by Anutius Foesius."

These works were followed by the Lyons Dispensatory in 1561, the Cologne Pharmacopœia in 1565, the Augsburg Pharmacopœia in 1573,† that of Paris in 1637, and of Brussels in 1671. Many of these

\*For information on this subject I am indebted to an address by Dr. R. Stockman, on "The Literary Sources of our Pharmacopœia," delivered before the Glasgow and West of Scotland Pharmaceutical Association, session 1898-9.

†In the introduction to the 1646 edition of the Augsburg Pharmacopœia, the duties of the Pharmacopœus are thus referred to:—"As in the province of medicine, the pharmaceutic art vindicates for itself not the least humble place, and as it exists as an integral part of medicine; moreover, as medicine among civilised peoples has always been held sacred and holy: therefore it is necessary that the pharmacist should be an honest man, trained in his art, holding exactly the reason and mode of preparing medicines, and properly skilled. It was also laid down that, without a prescription or permission from the magistrates, he was not to sell poisons, love philtres, emmenagogues, nor abortifacients, neither himself nor by his servants or apprentices. In filling prescriptions, he was to be *vigilans, circumspectus, et fidelis*; he must neither add nor subtract anything."

At the end is a decree of the most illustrious Town Council of Augsburg, concerning physicians, surgeons, and pharmacists. "When necessary they are to confer together faithfully, candidly, and diligently for the public good. Surgeons, barbers, and bath-keepers shall not overstep the limits of their own callings, but, mindful of their oath and office, shall only perform those services to the patient which appertain to their several callings, preparing no medicines, much less administering them, and very much less selling them."



volumes were handsomely got up and finely printed, being frequently embellished with a splendidly-engraved frontispiece, displaying various pharmaceutic processes, the apparatus and utensils employed, surrounded by elaborate ornamentation.

Before passing to the Pharmacopœias issued in the United Kingdom, it will be convenient to refer to what are generally known as Herbals, by which, says Dr. Payne,\* is meant "a certain class of old books on botany, dating from the fifteenth to the seventeenth century, and illustrated with wood cuts. They belong to a time when botany was still a branch of medicine and was slowly growing up to an independent position. Hence, the works were distinctly medical in their aim and use; they were written by physicians for the use of their own profession or of the public. The first printed book actually known with botanical figures is the "Treatise on the Virtues of Herbs," ascribed to one Apuleius Platonius, and first printed at Rome about the year 1480, by Philip de Liguanicus, who was a physician and scholar as well as printer." The work had for centuries existed in manuscript with the original drawings, and was supposed to have been written in the fourth century, and as previously stated, was translated into Anglo-Saxon in the tenth to the eleventh century. "It consists of 131 chapters, each giving an account of the medical properties of one plant, and appears to be compiled entirely from the works of Dioscorides and Pliny." The illustrations are remarkably rough and inaccurate both in drawing and in printing, and, as Dr. Payne points out, far inferior in execution to the current art as shewn in the illumination of missals, and even inferior to the same drawings in the earlier manuscripts, and it would seem as if "in these hardly recognisable figures of plants we have copies, degraded by passing through the hands of several generations of purely imitative draughtsmen, of original studies from nature made by Greek-Latin artists, in Roman Imperial times, for a Roman public." Hence, "the figures of plants became traditional, as did the figures of the Virgin and Saints in mediæval times." The earliest known book printed in Germany with figures of plants was styled *Herbarius*, and appeared at Maintz in the year 1484. The author is unknown. The figures were accompanied by brief descriptions of the plants, with an account of their medical uses, and "are in the earliest style of wood engraving, and much resemble in their execution the early playing-cards, which are known to have been the first production of the woodcut art. . . . *Herbarius* was soon superseded by a much more important book of the same kind, the celebrated *Hortus Sanitatis*, or Garden of Health,"

\* "Old Herbals: German and Italian." Magazine of Art, 1885. "On the *Herbarius* and *Hortus Sanitatis*," by Dr. J. F. Payne. Tr. Bibliographical Society, vol. VI., p. 63, 1903.



of which numerous editions and imitations subsequently appeared. A Latin poem attributed to Macer Floridus, and recounting the virtues of herbs, was frequently reprinted at the close of the fifteenth and beginning of sixteenth century. The following are but a selection of the very numerous works of this class, which were published within the next two hundred years, fresh editions of most of them being constantly issued:—The Greate Herball, 1516; Herbal, by Turner, 1551; Historia Stirpium, Dodonæus, 1553; The Herball, by Gerarde, 1596; Theatre of Plants, by Parkinson, 1640; Compleat Herbal, by Lovell, 1659; The Complete Herbal, by Culpeper.

The first pharmacopœia in this country—written in Latin and styled the London Pharmacopœia—was issued by the Royal College of Physicians in 1618, although so far back as 1585 a work of the kind had been contemplated. “The King’s proclamation commanding all apothecaries of the realm to follow this pharmacopœia, and this only, is dated 26th April, 1618. It was published on 7th May, 1618, surreptitiously and prematurely by the printer in the absence of the President, and, though very carelessly printed and full of errata, seems to have been rapidly exhausted. Within four months (namely, on September 5th following) arrangements were made for a new edition, which appeared on 7th December, 1618. Successive editions of this First London Pharmacopœia, each somewhat modified and an improvement on its predecessor, appeared in 1627, 1630, and 1639.”\* Nine revisions of this work were undertaken by the College from time to time, the tenth and last appearing in 1851. Of several more than one edition was issued, and all were written in Latin, an authorised English translation of many of them being published. The first Edinburgh Pharmacopœia prepared by the Royal College of Physicians of that city appeared in 1699, and the last in 1841; and the first and last editions of the Dublin Pharmacopœia, prepared by the Royal College of Physicians of Ireland, appeared respectively in 1807 and 1850. In 1864 was published the first British Pharmacopœia, by collation from those of the three divisions of the kingdom, and was issued under the authority of the General Medical Council, as one of its duties imposed by the Act of 1858, by which it had been constituted. Since then the work has been written in English.

It is interesting to compare the different issues of these Pharmacopœias and observe the alterations that were made, thus serving to indicate the drugs most in use at different periods. Whilst the earliest contained all the extraordinary and disgusting substances I have before mentioned, with many more, most of these were gradually

\* *The Roll of the Royal College of Physicians of London*, by W. Munk, M.D., Second Edition, 1875, vol. iii, p. 371 *et seq.*, to which reference is to be made for a more detailed account of this subject.



eliminated, and the composition of many of the preparations simplified in successive editions.

The first London Pharmacopœia, that of 1618, contained one thousand and twenty-eight separate articles, which entered into the composition of nine hundred and thirty-two compounds. Of these latter, collated as they for the most part were from various sources, thirteen were derived from Galen; one hundred and nine formulæ were taken from Mesua, who lived in the eleventh century; fourteen from Fernelius, who died in 1518; whilst Sir Theodore Mayerne, who had a large share in the preparation of the work, was instrumental in introducing calomel, the mineral acids, several preparations of steel and antimony, sugar of lead, and caustic potash, among other chemicals, which, as previously mentioned, were being more extensively prepared and studied about this time. The greater number of this enormous bulk of medicaments were harmless and useless, and combined in such numbers that one hundred and sixty-one of the formulæ of this pharmacopœia contained ten to nineteen ingredients; forty-four contained twenty to twenty-nine; three contained from forty to fifty-nine; and three over fifty separate items, among the last being the Mithridatium and Theriacum and the Antidotus Mathioli already referred to. In 1650 corrosive sublimate and white precipitate were added. It was the 1746, or fifth, edition which exhibited the greatest reform and "assumed many of the characteristics of the pharmacopœias of our own times." Already in the previous edition of 1721 a considerable simplification was apparent: the number of simples was reduced to seven hundred and thirty-five, and, as Dr. Munk says, "the compilers of the pharmacopœia hoped to comprise within moderate bulk such a variety of medicines as would satisfy as well the love of old as well as the love of modern prescriptions; those who preferred simplicity, equally as those who still adhered to complexity in officinal formulæ. The work really was what it thus purports to be, a compromise and a transition from the polypharmacy of a previous generation to the simpler methods of prescription which were then becoming popular." The work was notable also for including for the first time potassium sulphide, the tinctures of ammonio-chloride and the perchloride of iron, sulphate of iron, nitrate of silver, tartar emetic, and lime-water.

Although the edition of 1746 exhibited a marked improvement, for the articles of the *materia medica* numbered only two hundred and seventy-two, and human mummy was for the first time excluded, yet it still gave a place to the Mithridatium and the Venice treacle among the three hundred and seventy-eight compounds that it contained. But these were exceptions, and no other preparation



contained more than fourteen ingredients, there being only one each composed of nine, ten, thirteen, and fourteen articles—a very remarkable improvement. Liquor potassæ, acetate of potash, Glauber salts, and nitric ether were among the more important introductions.

A still further reduction took place in the next edition in 1788, which contains the minimum number of articles in any of the official pharmacopœias of this country, and for the first time the Mithridatium and Theriaca were omitted. Arnica, aconite, cascarilla, castor oil, senega, magnesia, James's and Dover's powders, oxide of zinc, ether, Hoffmann's anodyne, and Huxham's tincture of bark, most of which are still retained, were admitted. Since then the number of articles of the *materia medica*, as well as of the compounds, particularly such as liniments, ointments, mixtures, powders, and pills, has steadily increased by the addition of preparations of greater efficacy, and as a rule of greater simplicity. But it is to be remarked that the prescribing of the present day is by no means based only upon the officinal articles contained in the British Pharmacopœia, but finds inspiration in extra pharmacopœias and the lists of manufacturing chemists and druggists, as well as from the medical journals, all of which are for ever competing to furnish something new, and to proclaim the efficacy of this, that, or the other drug, whilst the rapidity with which each successive vaunted remedy sinks into oblivion is only equalled by the readiness with which others are furnished to take its place. At the same time it must be admitted that a greatly-improved pharmacy characterises present-day methods, the medicaments are purer and more reliable, whilst the form in which they are offered leaves little to be desired.

One outcome of the method of treatment by drugs is the opportunity it has always afforded for the promulgation of the panacea, of some medicament, whether for internal or external use, that claimed to be all-powerful and of the widest range of efficacy. How successfully such means have been pursued, not a few enormous fortunes, now and then devoted subsequently to worthy public purposes, bear witness. To call many of these alleged remedies quack productions, only partly disposes of them, and indeed is only true so far as their composition remained secret, for it must be confessed that the evidence of their beneficial effects is often neither better nor worse than it is for more orthodox compounds. It is their vaunted comprehensiveness that constituted their chief objection. Geber in the eighth century taught that the *aurum potable*, or liquid preparation of gold, would cure every disease of men, animals, and plants. Another of these "cure-



alls" was the celebrated tar water of Bishop Berkeley, who had learned its use from the Narragansett Indians, and finding it successful in the treatment of dysentery, went on to proclaim it a universal panacea. This claim he proceeded to substantiate by affirming that tar contains an extraordinary proportion of the vital element of the Universe, and that water is the menstruum by which this element may be drawn off and conveyed to animal and vegetable organisms. He regarded the vital element as "pure invisible fire, the most subtle and invisible of all bodies," and that of this fire, tar by its resinous properties largely partook.

Another result of an over-treatment by drugs which were, and indeed are still, asserted to be cures for this, that, and the other disease, was the establishment in the minds of the public of what I would call the antidotal view of treatment. With no sound conception as to the real nature of disease, which can only be said to have existed within the past half-century, and with a vague, half-formed notion that a malady was something that had entered into the body and was to be combated either by being driven out or its effects neutralised and made harmless by something else to be administered—a notion that I may say is held, so far as they could give expression to their ideas, by nine out of ten people at the present day—it was a natural sequence that each disease, if not each symptom, should have its own remedy, official or unofficial. It is these views that offer one of the difficulties to the physician in his attempt to make the patient or his friends realise exactly what it is he is attempting to do when he lays down a certain line of treatment in any case. And it is this which, after a lengthy consultation and investigation, followed by the usual prescription for pill, powder, and potion, leads our patient next day to write four sides of a sheet of notepaper to explain how that he had forgotten to mention a pain in his little finger, which came on under most extraordinary circumstances, and would we please send something for that; or a similar request may come from one of our patients, even without the interview or the examination.

A survey of the foregoing very brief account of the treatment of disease by drugs and medicaments clearly shows that as a therapeutic method it was not marked off by any sharp line of demarcation from those measures which may be termed supernatural, but, on the contrary, directly follows from them, subsequently developing upon lines of its own which ran *pari passu* with the more strictly anti-demoniac procedures. Primarily looked upon as adjuncts to, or as means of application of, supernatural agents, they were exhibited to



counteract the workings of evil spirits, on the same grounds that charms, amulets, or talismans were employed, and being essentially aimed at the expulsion of the intruder, were efficiently supplemented in this endeavour by the whole class of substances that acted as eliminants, which had been observed to act on the body as aperients, sudorifics, emetics, diuretics, and the like, a group of remedies that have retained their place in the *materia medica* of to-day, of which, indeed, taken collectively, they constitute the greater proportion. Such an underlying principle will readily be seen to have laid the foundation for the idea of antidotes, by which term many of the mediæval remedies were designated, and of special medicaments for special ailments, which is the popular conception of the basis of treatment at the present day, and with a different significance does, as a matter of fact, form the means of our most advanced therapeutics.

As might be expected, a practice established on such a basis, uncontrolled by positive knowledge and guided only by the wildest theories and assumptions, would sooner or later lead to gross extravagancies, such as are to be found in the hideous list of substances which were prescribed in the preposterous combinations that I have indicated. In place of the consistent, though, as we should say, absurd methods that sought to counteract the demoniac agency, it became impossible to see any relation whatever between the drug administered and any theory of the nature of disease, so irrational, *bizarre*, and monstrous were the methods adopted, though at the same time pursued side by side with a frankly-admitted supernatural procedure. It was quite the custom in the Middle Ages, and even later, for the physician to supplement his oft-to-be-repeated bolus and filthy draught with some special substance or some particular performance which he held in high esteem as a demonagogue—maybe to counteract the malicious doings of a witch in whose powers he fully believed.

As treatment by drugs extended, and faith therein increased, so grew the likelihood of the enunciation of general principles based on *a priori* assumptions rather than on observation and experiment. The doctrine of similars and signatures, which sought to provide a remedy from such superficial resemblance of its characters to those of the disease, underlay much of the old-time treatment, and from its principle of *similia similibus curantur* the homœopathy of to-day is lineally descended—a principal as mistaken as its opposite, *contraria contrariis curantur*, which for some time dominated therapeutics\*

\* "Every disease must be combated by contrary remedies—for a remedy is that which can drive out a disease. Now that which drives acts violently—that which uses violence is in opposition: therefore the remedy is always opposed to the disease, and no healing can take place except in virtue of the law of contraries.—*Therapeutices Universalis*, J. Fernelius, Geneva, 1644.



(itself an exemplification of the assumption that disease is entirely to be expelled), and as fallacious, indeed, as any other so-called "system."

It is true that a few remedial agents were more or less consistent with some of those successive theories of disease which preceded the scientific era, and that, although subsequently proved to be erroneous, had some rational basis for their use. It is also true that many of the remedies which were administered on the presumption that they were satisfactorily regulating and modifying the disturbed condition of the body had read into them, so to say, the properties desired, without the slightest proof that they were so endowed, and thus it came about that drugs had varieties of qualities assigned to them according to the particular pathological view held by the user.

"Into what errors," says Bichat,\* "are we not drawn in the employment and the denomination of medicaments? Deobstruents were created when the theory of obstruction was in vogue. Incisives sprung up when the visciditv of the humours was held; the expressions of diluants and attenuants when the ideas attached to these terms were put forward at the same epoch. When it was necessary to obtund the acids, inviscants or incrassants were created, etc. Those who saw in diseases nothing but the relaxation and tension of the fibres—the *laxum* and the *strictum* as they called it—employed astringents and relaxants. The cooling and heating remedies were employed, especially by those who had particular regard, in diseases, to the excess or want of caloric. Identical means have had often different names following the manner in which it was supposed they acted. Deobstruents with one, relaxants with another, refrigerants with a third. The same medicament has been by turns employed with different and even opposite views . . . . Except the medicaments whose effects are established by strict observation, as evacuants, diuretics, sialagogues, antispasmodic, etc., those consequently that act on a specific function, and what is our knowledge of the rest?"

But for the most part the drugs employed were used wholly on empirical grounds, and it is important to realise that there is not the slightest scientific evidence that the greater number of these drugs were possessed of anything like the properties with which they were credited, and to draw attention to the fact that at the present day, to ensure the acceptance by a judicious physician of any fresh substance, the statement that its administration has been followed by the relief or cure of certain symptoms must be attested by frequent repetition and pharmacological investigation, and not on the mere result of

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\* Anatomie Générale, Considerations generales, 1801.



some crude and imperfect observation. Whether it was as a coincidence, as an actual result, or in consequence of "suggestion,"\* the fact that benefit followed the administration of a substance was regarded as sufficient to justify the repetition of its use in a corresponding case, and this without seeking to enquire or formulating a theory as to how or why it acted. To administer in each case the remedies that have best succeeded in analogous cases is the sole doctrine of the empiric—and this course, be it observed, takes no count of any theory of disease—and, indeed, was the guiding principle of the earliest exponents of the healing art which preceded all knowledge of anatomy and physiology or chemistry, whether of health or disease; and thus therapeutics might be regarded as the foundation of medicine rather than its crowning point. Be this as it may, the stock of information acquired by the exhibition of remedies on empirical grounds, constituted the vaunted experience of the judicious physicians of the past, and as yet has been only partly supplanted by a scientific pharmacology. Until this arrived, what better reason could be given for the employment of a therapeutical agent? and in the light of such experience, what justification would there be for withholding it, because its precise *modus operandi* was unknown? All depended on the real value of the experience. Empiricism was a surer guide than the eccentricities and absurdities of a supernatural therapy, combined with a wholesale administration of drugs administered on no principle at all, not even on the observation of analogous results. For in an imperfect fashion empiricism was a method of both observation and experiment, though the observation went not below the surface and lacked the completeness which a sound pathology provides, and the experiment was uncontrolled, and was an experiment in the sense that every dose of medicine taken is one. For this reason empirical treatment may be looked upon as foreshadowing a procedure which may justly be called scientific. Thus it is that the giving of drugs, the mode of action and precise effects of which are equally unknown, though benefit has followed their use in numerous cases, has provided us with some of the most valuable articles of our pharmacopœia, and almost, or quite, independently of pathology. The empirical method was all-embracing; so long as a drug or other means, whether bleeding, bathing, exercise, a special diet or regimen could be shown to benefit, it was accepted, and so indeed is it likely long to be; but the evidence upon which the alleged value depends will be more and more carefully scrutinised, and the personal

\* Montaigne averred that "the whole art of healing was founded on the force of the imagination, and that even drugs had no curative virtue beyond such as they derive from their effect on the imagination of the patient and those around him, including the doctor."



element, so large a circumstance in judgments of this kind, more and more completely eliminated. In the pursuit of his object the scientific physician of to-day—who combines with the information and means that an ever-developing science provides for him such methods as are founded on empiricism only—has no doubt tried, with varying success and failure, materials that have been introduced or reintroduced by the followers of special schools and systems. We frequently hear how much the present medical practice owes to the followers of Hahnemann, not only in the smaller quantities of medicines that are prescribed, but also in the addition of most effective articles to our *materia medica*. The former improvement is more properly to be attributed to the use of the active ingredients of drugs which necessitate a much lessened bulk of dose, as well as to the reaction that arose from the over-drugging of the past, and had no real relation to the dilutions of the Hahnemannian doctrine; the employment of certain articles that may have first found a place in the homœopathic pharmacopœia was merely the pursuance of empirical methods, and had no reference to any principle of similars, and their acceptance or rejection depended on how far they justified the efficacy ascribed to them, how far, in fact, the evidence on which they were recommended was true. Precisely the same principle regulates the use of a remedial agent whatever its source, and until scientific pharmacology becomes perfect and complete, which presupposes a perfect and complete physiology and pathology, so long must a therapeutic empiricism endure.

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### CHAPTER III.

#### THE RATIONAL TREATMENT OF DISEASE—SCIENTIFIC THERAPEUTICS.

It is usual to refer the foundation of rational medicine to Hippocrates (B.C. 460-357), about 400 years before the Christian era, but it is certain that not a little of the knowledge ascribed to the Father of Medicine, as set forth in his writings, which probably emanated in great measure from a school rather than from an individual, was derived from his Egyptian predecessors of a remote antiquity. Prof. Macalister even goes so far as to suggest that the aphoristic style of the Hippocratic writings was acquired from the Egyptian documents.\* By him the supernatural in medicine was superseded by

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\* Address on Anatomical and Medical Knowledge of Ancient Egypt. Royal Institution, 1886.



a grand endeavour to explain natural phenomena—among which those of disease were included—by natural causes, and to remedy sickness by natural means. To this end, the careful observation of the sick was insisted on, and a body of clinical records of patients remains to us from the school of Cos that would serve as an example to present-day methods. The greatest attention was also paid to prognosis, which embraced a wider scope of meaning than it is now commonly held to possess, and comprised much that we now include in diagnosis, which, as a special stage of medical procedure, is of more modern development. Previous to Hippocrates, such principles of medicine as existed were based on the prevailing system of philosophy, chief of which was that formulated by Pythagoras, who flourished about B.C. 555, and taught that the universe was filled with intelligent spirits, by which all objects were animated, and to which their activities and qualities were due, but subordinate to a ruling spirit which harmonised all to a common end. To such views the Hippocratic doctrine of an all-powerful Nature, by which the working of the body was effected, was entirely opposed.

In the absence of any knowledge of anatomy and physiology, a completely scientific conception of disease, such as we now hold, was impossible; and although the fundamental importance of observation was insisted on, the want of this knowledge left open the door to the assumption of theories and dogmas. Nevertheless, the view that was then held formed the starting point of a doctrine which, in one form or another, dominated the study and practice of medicine for the next two thousand years, and with a different significance may almost be said to have revived to-day. Briefly, the principles of the humoral pathology, as set forth in the Hippocratic treatise on epidemics, were that health was the outcome of a proper combination or "crasis" of the four humours of the body, the blood, phlegm, yellow bile, and black bile, and that a disturbance in this combination was the cause of disease or "dyscrasia." When a disorder proceeded favourably, it was regarded as being due to certain changes in quality undergone by the humours, termed coction or pepsis, as preparing the way for the expulsion of the morbid matter or crisis; and, lastly, that the crisis tended to occur at particular days, which were called "critical," and looked upon as of great importance. In this last particular, some indication of the influence of the Pythagorean philosophy has been seen. A certain seasonal prevalence of the humours was supposed—thus, phlegm in winter, blood in spring, yellow bile in summer, and black bile in winter. But "Hippocrates is not a mere humoralist even in this modified form, for he holds that diseases may arise also from alterations in the structure of the body, and especially from external



influences, such as climate, seasons, and the like, which he sums up under the term 'constitution'; nor is he anxious to defend the above or any other hypothesis, and thinks those who spend time in doing so only show their own volubility."\*

The therapeutic system based upon these principles was in great measure consistent and rational, and aimed at restoring the due proportion of the humours; excesses were to be removed and deficiencies made up for; the doctrine of contraries was thus to be observed by evacuants and the reverse; the passages must be relaxed or contracted to allow the humours to be adequately removed or restricted in their escape; soothing measures must be adopted, and in all cases caution and hopefulness is to be observed. Among the *materia medica* by which such results were to be obtained were poppy juice, hemlock, henbane, and mandragora as sedatives; elaterium, scammony, spurge, and mercurialis perennis as purgatives; and hellebore and hyssop as emetics—all of vegetable nature. But little mention is made of these, however, in the clinical records that Hippocrates left, and it is clear from his writings that reliance was chiefly placed upon general measures, the establishment of hygienic surroundings, upon baths, waters, rest, and a suitable diet, bleedings and drugs being only adjuvants to the beneficent effects of Nature which rested over all—an expectant treatment accompanying the most careful observation of the patient, and with the *vis medicatrix nature* as the real healer. The followers of the School of Cuidus, however, appear to have made more use of drugs than did those of Cos, to which Hippocrates belonged.

The essential character of the Hippocratic teachings, viz., "the clear recognition of disease as being equally with life a process governed by what we should now call natural laws, which could be known by observation, and which indicated the spontaneous and normal direction of recovery by following which alone could the physician succeed,"† left no room for superstition or the practices and methods founded thereon. That this was so, forms, as Dr. Payne has elsewhere‡ remarked, a great and brilliant exception to what has otherwise almost universally prevailed in the history of medicine. "The Greek art of healing for several centuries, from the age of Hippocrates to that of Galen at least, or later, was almost entirely free from supernatural beliefs or superstitious practices. We know that the Hippocratic medicine was developed out of a system practised in the temples of Æsculapius, which was essentially an appeal to unseen

\* Withington, *loc. cit.*, p. 55.

† "Encyclopædia Britannica," 1883. Art, Medicine, History of, by Dr. J. F. Payne.

‡ "English Medicine in the Anglo-Saxon Times," 1904, by Dr. J. F. Payne. p. 95.



and supernatural powers, but it quickly threw off these superstitious elements, and gave to the world an example of medicine free from superstition. Thus did Greek medicine remain for many centuries. In the voluminous writings of Galen (A.D. 130-200), though he was in later times quoted as having countenanced these things, there is no recommendation of charms or magical proceedings of any kind. Galen, for instance, in the introduction to his work on 'Simples,' speaks of a certain Pamphilus, who wrote a book on herbs, that 'he was given to old wives' fables, and certain marvellous Egyptian quackeries, mixed up with incantations used in gathering medicinal herbs. He employed periapts (amulets) and juggleries which were not only useless and outside the art of medicine, but perfectly false; and to discuss these things would be a waste of time.' The meaning of this is plain enough, and all medical writers of the pure Greek tradition, with their Latin followers, either expressly or tacitly repudiate these magical arts."

Although such views as to the nature of disease, coupled with a high conception of the character of the physician's calling, such as the celebrated oath of Hippocrates bore witness to, were held by those who claimed to be learned, it was far otherwise in popular estimation. Alongside these scientific ideas there prevailed among the public such notions of the supernatural origin of their maladies, with correspondingly superstitious methods of treatment, as have been already described. Derived in great measure from the East, the methods of magic and witchcraft, the employment of charms and incantations, of amulets and talismans, gradually swamped, so to say, the better knowledge of the Greeks, and later of the Romans, finding in the so-called "dark ages"\* that followed on the decline of Rome a suitable season for their development and expansion.

Meanwhile, during the centuries immediately succeeding Hippocrates, the teaching which he inculcated was followed more or less faithfully, though the carrying out of his practical methods of observation gradually gave way to the pursuit of his more theoretical doctrines, with consequent detriment to medical science. This falling away from the Hippocratic tradition was, after all, not altogether unnatural. The observation of the manifestations of disease—the signs and symptoms presented by the patient—no less than the phenomena presented by the living world in general, demanded with ever increasing insistence some explanation, some connecting thread that should associate in a consistent whole the numberless facts that

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\* This period, corresponding to the "middle ages," is usually reckoned from the invasion of France by Clovis in 486 A.D. to the end of the fifteenth century—about a thousand years.



were ascertained. It was a further phase of the seeking for a cause that the human mind at all times has exhibited. In default of the true scientific method of procedure by observation and experiment, and the framing from the results thereof what we speak of now as natural laws, the Greeks, as have others before and since, had recourse to speculation and *à priori* assumption, and medicine, which had been largely rescued from the wordy disputations of the philosophers, fell again beneath their sway, and thus arose the Dogmatic, or as Galen called it, the Rationalist, school of medicine. Though its aims may claim to have been right—the search for guiding principles, the mere assertion of principles based on no surer foundation than crude speculation and philosophic word-splitting, could only lead to error. In one direction, however, a considerable advance was made. As learning declined in Greece after the Macedonian supremacy, and its spread to other countries followed on the campaigns of Alexander the Great, there arose in Alexandria a school of medicine, whereat the science of anatomy was much extended, especially by Herophilus (B.C. 307), who himself had studied both at Cos and Cnidus, and zealously followed the precepts of Hippocrates, therein differing from his rival Erasistratus (B.C. 304), who, equally an anatomist and physician, rejected the humoralist doctrine, and with it the practice of bleeding, which Herophilus used together with drugs, even to a greater extent than did his great exemplar. The development of anatomy, although considerable, without a corresponding knowledge of the uses of the structures disclosed—*i.e.*, physiology—had, as might be expected, but little effect on the progress of therapeutics, and, however important in itself, appeared to lead nowhere. Partly as a reaction to this apparently useless and unprofitable knowledge of bare anatomical facts, and in protest to the increasing theorising and speculations of the dogmatists, there arose the important sect denominated “Empirics,” who chiefly represented medical learning for several centuries. They discarded anatomy, “regarding it as useless to inquire into the causes of things, and thus, as they contended, being the more minute in their observation of the actual phenomena of disease. They professed that their whole practice was based upon experience, to which word they gave a special meaning. Three sources, and three only, could experience draw from—observation, history (*i.e.*, recorded observation), and judgment by analogy. It should not, however, be forgotten that the empirics read and industriously commentated on the works of Hippocrates. They were extremely successful in practical matters, especially in surgery and in the use of drugs.”\* Treatment,

\*Dr. Payne, “Encyclopædia Britannica,” *loc. cit.*



indeed, was the characteristic feature of their teaching and practice, and, as has been well said, "they reduced the whole art and science of medicine to a system of therapeutics,"\* one of their *dicta* being "it is not the cause, but the cure of diseases that concerns us." Setting aside alike the more precise results of anatomical investigation and the teaching of the humoral pathology, as well as the speculations of the dogmatists, they were opposed to the only principle of therapeutics so far enunciated, viz., the doctrine of contraries that distinguished the Hippocratic medicine, and that from its limited range of application confined treatment within somewhat narrow limits. The empirics, on the contrary, tried all manner of drugs, selecting and employing such as their experience in the sense defined, showed to be useful. Two of the most famous members of the sect, viz., Heraclides of Tarentum (B.C. 230) and Serapion (B.C. 280), may be mentioned as illustrating the different directions in which those who practised upon lines uncontrolled by anatomical and physiological knowledge, and with minds imperfectly able to estimate the real value of the effects of the drugs administered in their haphazard search for new remedies, might follow. The former, fragments of whose writings alone remain, chiefly in the works of later writers, appears to have been most cautious in his proceedings and careful in his assertions. His chief work "On the preparation and proving of drugs," sets forth only the results of his own observations, and was a source of information for many that succeeded him. In it, among other things, he first pointed out the particular value of opium, without being its actual discoverer, and laid down the indications for its use—no slight contribution to therapeutics. Serapion, on the contrary, appears to have been more violent in his writings and in his methods, and has been compared to Paracelsus of later times, though he is at least credited with the introduction of sulphur as an external application in cutaneous diseases. It is clear that experience (empiricism) as the sole basis of treatment must depend for any success it may properly claim upon the most exact curative indications deduced from the most precise clinical observation and recognition of cause, and so far, as I have previously endeavoured to show, it may be a valuable and indeed the sole ground for the employment of remedies, and failure to recognise why and how the remedy acts should then be no bar to its use. But it is easy to see that without such observation and perception (which are of the essentials of empiricism as originally defined), treatment by drugs might degenerate into the wildest extravagance. It was at this period that the hideous polypharmacy afore-mentioned flourished exceedingly. It was then that those celebrated "antidotes,"

\*"Medical History from the earliest times," by Dr. Withington, 1894, p. 68.



mithridatium and theriacum, were invented, and each practitioner vied with his fellow in the introduction of some more disgusting and nauseous substance to the materia medica, in which now and then some medicament of actual but not understood value found a place.

With the rise of the Roman empire, and its conquest of Greece and dominance of the civilised world, the art of medicine, which had hitherto been but ill developed in Italy, began to flourish in that country. It was from the Greek schools, more particularly the Empirics, and by Greek physicians, that the impetus came, and further, it was by the same persons and their descendants that the practice of medicine was mainly pursued during the days of the Roman empire. Although the Hippocratic doctrine still continued in some degree to characterise the notions held as to the nature of disease, and in some measure to direct the course of treatment, the tradition of the Father of Medicine was largely qualified by the philosophic school prevailing at the moment, from the shackles of which Hippocrates had done so much to shake medicine free. This is not the place to discuss the various rival schools, inasmuch as they made but little impression on the methods of treatment which constitute the subject in hand. For the sake of completeness, however, and as indicating the progress of therapeutics, brief mention must be made of a few of the individuals and sects that influenced the art of medicine ere the Roman domination sank beneath the barbarian invasion, and the decline of civilisation and learning set in.

About a century before Christ there arrived in Rome one Asclepiades (there was, indeed, more than one of the name, another having been celebrated as a grammarian in the time of Pompey)—a Greek who had studied at Alexandria, and who became, under the patronage of Crassus and of Cicero, one of the most successful and fashionable physicians of his day. He adapted to the explanation of morbid processes the novel atomic theory of Democritus, which found popular expression in the poem of Lucretius, and declaring "that the human body was composed of atoms, with intervals between them forming canals or pores through which still finer atoms circulated, and rejecting the humoral doctrines, he ascribed disease to changes in the relations of atoms and pores, and especially to a blocking up of the latter" (Withington, *loc. cit.*, p. 83). Although he denied the *vis medicatrix naturæ*, pointing out that Nature as often killed as cured, he nevertheless relied upon diets, exercises, baths, and general hygienics rather than on violent drugs, and appears to have been specially successful with chronic cases which had not received so much attention as acute conditions at the hands of the Hippocratic school.

By Themison (B.C. 63) the teaching and practice of his master,



Asclepiades, were developed, and certain principles formulated. Disregarding the causes of disease which so exercised the minds of the Dogmatists, and neglecting altogether the characteristic symptoms that distinguished different maladies, to the recognition of which the Empirics devoted their energies, it was now held that the object to be attained in dealing with the sick was to ascertain by investigation of the secretions and excreta whether they were increased or diminished, and to refer what was found to a relaxation or contraction of the pores, which were the common qualities of all diseases, and that alone merited attention. A third condition of partial relaxation or contraction—different regions being in these opposite conditions—was afterwards postulated, and these three principles constituted the basis of the school of the Methodists, so called from the simple method of treatment that followed from these assumptions. Clearly, if the pores were relaxed they must be constricted, and *vice versa*, and the great therapeutic principle of *contraria contrariis* was the golden rule of treatment. Remedial measures were either astringents or laxatives, to be administered in accordance with the relaxation or constriction of the pores, or the predominance of either. Chalk, alum, lead, vinegar, cold water, acidulated drinks, and certain vegetable decoctions were among the most important of the first group, as bleeding (including the application of leeches), warmth by means of poultices and fomentations, together with sudorifics and soporifics, were the most effective relaxants. Although the conception of disease held by the Methodists was so very partial, the locality of the disorder being regarded as of little moment, far less its individual features, it being sufficient alone to note whether in any case it were acute or chronic, progressing or improving, and to infer the condition of the pores as a basis of treatment, yet the doctrines and practice of this school prevailed over several centuries in opposition to the teaching of Hippocrates. Its very simplicity would seem to have furnished its vitality; and the remedial measures had the merit of facility of administration, and entailed but little swallowing of medicine, since the supposed morbid state was combated mainly by external applications, even purgatives and drugs, excepting those of the mildest and least disagreeable character, being eschewed. The methods of treatment were eminently calculated to please the patient, and as the principles were such as at least sounded intelligible to him, his curiosity was satisfied, and all was well. No wonder that such a system had an extensive vogue.

Of the various other schools of medical thought that rose and flourished during the palmy days of Rome, it will suffice to mention only the Pneumatists, who attributed the working of the body, whether



in health or disease, to the agency of a soul or pneuma, a conception based on philosophical speculation that offered the greatest contrast to the Hippocratic teaching; and the Eclectics, who selected what they deemed, best from the various systems, whether of pathology or therapeutics—a school with similar aims and pretensions flourishes to-day in the United States. It was the special merit of Galen (A.D. 130-200) that he endeavoured to bring medicine back to the lines upon which it was founded by Hippocrates, and whilst himself disclaiming adherence to any sect, it is among the Dogmatists that he is usually reckoned. But although he did much to restore the Hippocratic tradition, and developed the same in the light of the added anatomical and physiological knowledge, he nevertheless departed in certain essentials from the teaching of his great predecessor, tending rather towards an explanation of phenomena according to theoretic conceptions than advancing precise knowledge by observation. Notwithstanding that he affirmed the dependence of medicine upon anatomy and physiology, and his recognition that disease is “an abnormal affection of the body giving rise to an error of function,” he sought less to develop the art of medicine into a science than into a philosophic system (Withington). Thus it came about that, great as was the influence of Galen, for many centuries the actual progress of medicine on truly scientific lines was in a measure hindered, and it was not until observation and experiment took the place of theory and hypothesis that it came to be worthy of being reckoned a science. Inasmuch as the pathology of Galen was an elaboration and extension of the Hippocratic doctrine of the four humours, therapeutics made but little advance. Treatment was based on what was known as the “indications,” which comprised “whatever enables us to draw conclusions as to treatment apart from experience.” “The indications,” says Withington,\* “formed the touchstone of distinction between the three great medical sects. The Empirics rejected them entirely—for them, experience was the only rule of treatment; the Methodists reduced them to one only—the restoration of the normal state of the pores by the use of contraries; while to the Dogmatists, they formed the basis of all rational treatment. The first or greatest indication is to remove the cause of the disease or to prevent its action; a second class arises from the symptoms, any of which may form ground for treatment—if against nature, by contraries; if in accordance with nature, by similars. Other sources of indications are: the temperament of the patient, the season of the year and external circumstances generally, and finally, as Galen curiously adds, the patient’s dreams. His teaching as to the action of drugs was less excellent, but, un-

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\* *Loc. cit.*, p. 99.



fortunately, far more influential. He held that some, such as emetics, purgatives, poisons and their antidotes, act through their whole substance, and are, in a sense, specifics—a doctrine consonant with the older dogmatic theory of the specific action of purgatives, which still survives in the modern terms hydragogue and cholagogue. But most drugs act, according to Galen, through one of the elementary qualities—heat, cold, dryness, and moisture—which they possess, not in an actual but a potential form, each quality being further divisible into four degrees, according to its intensity. Thus, pepper and opium are (potentially) hot and cold respectively in the fourth degree.”

As further showing the therapeutic principles laid down by Galen, the following summary, extracted from his treatise, *De Simplicium Medicamentorum Facultatibus*, may be quoted.\* “He divides the actions of medicines into primitive and consecutive. The primitive action depends on one or two qualities which exist in the medicine. Thus one substance will excite heat and warmth, because the element of fire predominates in it; another is cooling, because it has the cold element in excess. There are also substances that produce heat and dryness at the same time; others which excite heat and moisture. Among therapeutic agents endowed with the same property, for example, that of heating, some have it in an eminent, others in an inferior degree. Thus bitter substances are extremely heating, the sweet are only moderately so, their heat but little surpassing our own. The saline taste proceeds from the excess of the igneous and terrestrial principle. There are substances which produce their effects immediately; for example, fire heats at once, and ice cools in like manner. The effect of others is not so prompt, such as the anthemis pyrethrum and castor, which produce a sensation of heat only after some time has elapsed, and hyoseyamus and mandragora cool also slowly. A thing may be said to possess a quality, naturally or accidentally, accordingly as it is a natural or necessary attribute. Water, for example, which is naturally cold, may become hot accidentally, but its acquired heat is not long retained, while its natural coldness persists habitually. After other distinctions still more subtle on the various ways in which we may observe the primitive effects of medicaments, Galen traces the rules to be followed in order to recognise their effects; he indicates the precautions to be observed so as not to be deceived by false appearances. Passing then from precept to example, he demonstrates by a series of experiments and arguments that water has a cold and humid temperament; vinegar a cold temperament, with a certain mixture of heat proceeding from its acridness. The consecutive action of medicines is so called

\* From The History of Medicine, by P. V. Renouard, M.D., 1856. p. 208.



because it is manifest after the primitive effect, and as a consequence of it. This action is very varied: thus there are medicines that open the pores, others which close them; some harden, others soften the tissues; some purge the humours, others alter them; some hasten their maturation and the formation of pus, others give relief to pain, etc. There are also remedies whose consecutive action is especially related to certain organs or certain functions, such as diuretics, vomits, drastics, emmenagogues, etc. Galen sought to establish the connection which exists between the primitive and secondary action of remedies; for example, he supposed that remedies which harden the tissues are of a cold and moist temperament, those which increase the flow of urine are hot and dry, and those that increase the secretion of milk and semen are moderately hot and humid. As to the principles which guide the practitioner in the choice of therapeutic means applicable to each disease, the physicians of Pergamos adopted fully the axiom proclaimed by the School of Cos, which says that diseases are cured by their contraries. Consequently all researches and pathological dissertations aimed to penetrate the essence of diseases, to make it evident and distinct from all accessory accidents; in short to apply to this essence a treatment whose action would be diametrically opposite to its mode of existence. This essence Galen considered to be sometimes the excess of one or two elementary qualities of the diseased part, at others the efficient and primary cause of all the symptoms he regarded as due to the reaction of the vital principles. In this respect his doctrine is that of the Dogmatists amplified, explained, and pushed to its last consequences. Occasionally, however, he had regard to the constriction and relaxation of the pores, which approaches the views of the Methodists. Finally he professes in many passages a great consideration for the pure concurrence of symptoms and experience—fundamental principles which the Empirics placed above everything."

It is not easy for us, with our present-day knowledge and mode of looking at these questions, to adopt the standpoint which could make the foregoing account clearly intelligible. Our information, derived from carefully repeated observation and experiment, together with the principles we have induced from ascertained facts, clash at every point with almost every statement or assumption here set forth. It will be noticed that the doctrines and practice enunciated differ considerably from the simpler teaching of the Hippocratic school, from which they departed not only in the importance attributed to drugs and the relatively diminished value attached to general hygienic and dietetic measures, but still more in the excessive definition and artificial classification in which general broad principles



were apt to be lost sight of. So firmly, however, was the authority of Galen maintained, and so widely accepted were his writings, which in their extent of subject matter and profusion of detail might well be termed encyclopædic, that it was in accordance with his doctrines and methods rather than those of Hippocrates that the art of medicine was pursued during succeeding centuries.

With the fall of the Roman empire the art of medicine shared in the general decline of learning, whilst the rise of the Mohammedan power favoured the transference of culture to the centres of Arab domination, such as Bagdad, Damascus, and the Moorish cities of Spain. Yet it was chiefly the writings of Galen that constituted the basis of the medical literature of the Arabian school, and but little scientific advance was made during the period that it flourished, that is, from the ninth to the twelfth centuries. In one direction, however, as already referred to, considerable progress took place in pharmacy and in the therapeutical use of drugs, many medicaments, both of vegetable and chemical nature, being added to the *materia medica*. Since, however, a scientific study of morbid processes and a knowledge of the causes of disease was wanting, therapeutics, however extensive the pharmacopœia might be, was still a matter of empiricism when it was not based upon bare assertion. From various quarters came additions to the increasing number of drugs inflicted on mankind. From the Byzantine physicians, who most directly continued the Greek traditions of medicine, were derived many remedies to which a saintly or priestly origin was ascribed in conformity with the overwhelmingly theological character of the period. Among the last of the Greek writers in the thirteenth century was Nicholas Myrepsus, whose *Dispensarium* contains "nearly 3,000 recipes from every source, Greek, Arabic, and Salernitan. It includes many universal medicines—panaceas or catholica—as well as prescriptions ascribed to the Apostles St. Peter and St. Paul, and the ointment with which Mary anointed the feet of Christ, which had since that time been endowed with marvellous curative properties."\* John Actuarius and Demetrius Pepagomenus lived at the same period, and their writings abound in directions for treatment both dietetic and by drugs. Their prescriptions were of the most complicated character. One of the panaceas recommended by Actuarius as of special efficacy was termed Hygia, "for if a man takes a portion of it the size of a bean daily it will not only preserve him from all disease, but also defend him against demons, ghosts, and witchcraft."

In the revival of learning that took place in Europe in the early years of the sixteenth century, medicine shared, and the developing study of

\* Withington, *loc. cit.*, p. 136.



classical literature so far influenced the medical art as to lead its votaries to consult the original writings of Hippocrates and Galen and Celsus, in place of the wordy commentaries with which the works of these masters of medicine had been for so many ages encompassed. Foremost among the results that ensued was the impetus given to anatomical investigation, which then started on a fresh course that has continued to the present day. For more than a thousand years the writings of Galen had included what was known of anatomy, and were the authority to doubt which was regarded as akin to profanity. Feeble attempts by Mundinus, who died 1326, and Berengarius, surnamed Carpi (1470-1530), to teach and record what their own observations and dissections disclosed, rather than what Galen had said, met only with the condemnation of the Church, in whose hands were the portals of learning. Sylvius (1478-1575), after whom was named the great cerebral fissure, "was an uncompromising Galenist. He trusted Galen more than he did his own eyes, and in everything taught, or rather preached, Galen."\* It was, however, his pupil Andreas Vesalius (1514-1564) who, though he suffered much from ecclesiastical opposition, by his work marked "an epoch, since by it the idol of authority in anatomical science was shattered to pieces, never to be put together again. Vesalius described the structure of the human body such as he found it to be by actual examination, by appealing to dissection, by looking at things as they are." By following anatomy on such lines the foundation was laid of the science of physiology, which resulted in the next century in the grand discovery by Harvey (1578-1667) of the true course of the circulation of the blood. As yet, however, the indications of a rational pathology and scientific conception of the nature of disease were still to seek. Nor did the extensive development of chemistry and physics during the sixteenth and seventeenth centuries help towards the attainment of this desired object. Clinical medicine, it is true, took a great start, and at the hands of Sydenham (1624-89) and Boerhaave (1668-1738) reached a high degree of development. But schools and systems continued to flourish as founded by Paracelsus, Van Helmont (1578-1644), and others of the iatro-physical school set up by Borelli (1608-79), and the iatro-chemical by Sylvius (1641-72). As regards the treatment of diseases, this continued to be frankly empirical, however much it may have been attempted to be brought into relation with prevailing theories. Fresh drugs, chemical and vegetable, were introduced, but their value was based on assumption, or on the ill-regulated experience that was uncontrolled by scientific observation and experiment.

\* Lecture on the History of Physiology, by Sir M. Foster, K.C.B., F.R.S., 1901, p. 5.



By the middle of the eighteenth century the condition of anatomical knowledge was extensive and precise, and physiology based on the scientific method of Harvey had made considerable advance, more particularly in respect to the chemical problems connected with digestion and respiration, as well as the physics of the latter function and of the circulation, whilst the activities of the secreting glands were understood at least in their essentials, and the general ideas of nervous function, though still fantastic in character, had been in great measure corrected by the work of Haller. It cannot be said, however, that pathology or the study of disease had made anything like a corresponding progress. The conceptions of morbid action had not yet entered on the path along which the phenomena of normal life were being investigated and explained. The fact that disease is the correlative of health, and that the manifestations of both are but the expressions of the functional activities of the organs and tissues according as these conform to the normal or not in their condition and environment, was not yet fully realised; and illness was still very generally looked upon as a thing apart, notwithstanding that Boerhaave had enunciated the dictum, "*Morbus est vita præter naturam.*" Just as there could be no physiology without a knowledge of structure—gross, microscopic, and chemical or atomic—so there could be no sound pathology without a basis of morbid anatomy, and it was only in 1761, when Morgagni's (1682-1771) "*De sedibus et causis Morborum per anatomen indagatis*" was published in Venice, that this was supplied, and the foundation of modern pathology laid.\* But Morgagni went further than a merely descriptive anatomy of diseased structures, for he sought to show the connection between the morbid changes he observed, and the symptoms the patient had exhibited during life, and so to indicate the proper direction of therapeutics. In fact, he did no less and no more than we attempt with greater knowledge and improved methods to-day, and so may justly be regarded as the originator of modern medicine. For the science to progress it was obvious that the knowledge of morbid structure must be developed in its several directions and in all its details, and of those who followed on these lines the names of Malpighi (1628-1694); Bichat (1771-1802), who first described the minute anatomy of the tissues, or histology; Matthew Baillie (1761-1823), whose "*Morbid Anatomy of some of the most important parts of the Human Body*," published in 1793, and "*Atlas of Morbid Anatomy*"

\* Morgagni was not actually the first to furnish accounts of *post-mortem* conditions of the body: Harvey himself had collected many such, but the records were destroyed when his house in London was ransacked during his absence at Oxford with King Charles. Bonetus (1620) also in his "*Sepulchretum sive Anatomia practica ex cadaveritis morbo denatis*," Geneva (1679), published a series of reports, but they did not approach in number or fulness those of his successor, whose work long stood unrivalled.



(1799-1802) were the first English works on the subject; Cruveilhier (1791-1874); Rokitsansky (1804-1878); and coming down to our own times, John Goodsir and Virchow deserve to be held in special remembrance.

It was also necessary that the dynamical side of the problem should be investigated more completely, that is to say the working of disease processes as manifested by the signs and symptoms of the malady presented by the patient, and extended by the experimental observation of disease in the lower animals. For the better application of the senses to the clinical examination of the sick, and the perfecting of what we know as physical diagnosis, instruments of precision as aids thereto became necessary, and it so happened that the year of publication of Morgagni's immortal work saw also the appearance in Vienna of a pamphlet by Joseph Leopold Auenbrugger (1722-1809) on a "New invention for discovering obscure thoracic diseases by percussion of the chest," and thus simultaneously arose the starting points of the two lines along which the scientific method in medicine has since travelled.\* The percussion signs of diseases of the chest received full description in Auenbrugger's work, and to this succeeded the discovery of the stethoscope by Laennec (1781-1826), and the publication in 1819 of his treatise "On mediate auscultation" which at once broadened the diagnostic methods applicable to pulmonary and cardiac disease. Among those who subsequently developed the means of investigation that these two works had opened out should be mentioned Stokes, whose Introduction to the use of the Stethoscope appeared in 1825, and the same author's Treatise on the Diagnosis and Treatment of Diseases of the Chest in 1837, and Walshe, whose book on the Physical Diagnosis of Diseases of the Lungs was published in 1843.

If now we consider what was the condition of the healing art a century and a half ago, when the foundations of modern medicine were laid, it will be seen that the methods of cure, varied as they were, nevertheless still conformed to the fundamental idea of the nature of disease as being a something added to the body which had to be got rid of. In brief, the means to effect this purpose were those drugs and methods which by elimination would expel the *materies morbi*, such as purgatives and emetics, diuretics and diaphoretics, whilst bleeding and sweatings by hot baths were directed to the same end. From another point of view the Galenical principle of contraries,

\* Isolated observations in the nature of physical examination had been made so long ago as Hippocrates, who directed that the temperature of the patient should be felt, and the ear applied to the chest to detect the friction sound of pleurisy, or the splash of air and fluid in the pleural cavity. The beats of the pulse were early noted, though not to the same extent by Hippocrates as by others both before and after him.



by which disease was to be combated by such agents as might be supposed to have an opposite effect to that of the cause of the malady, still held its ground, scarcely impaired in the conviction with which it was held by the doctrine of similars introduced by Paracelsus, a revival of the old time notion of signatures. Another and closely allied procedure was the administration of antidotes, with a view to neutralise the fermentations and chemical changes which were held to be at the root of all illness. According to yet another doctrine, it was held necessary to assist Nature in her efforts to expel the noxious material which had been introduced into the body, a principle that had much to recommend it both in theory and practice, and of which more will be said presently. If to these methods there be added the practice of the charlatan, of which Mesmer and his extravagancies may be taken as a type, associated with heroic medication, both in the magnitude of the doses of drugs as well as in their multiplicity and combinations, together with profuse bleedings, we have a summary of the methods of therapeutics which left their mark on the bills of mortality at the end of the eighteenth century.

As illustrating the prevalent views of treatment in the early years of the last century, at a period when drugging was rampant and a sound basis of pathology was still to seek, I would quote the following from the Rev. Dr. Peacock's *Life of Dr. Thomas Young*\*. It was "an age," he writes, "when what was called vigorous practice was very generally prevalent, when the use of calomel and the lancet was in the ascendant, when symptoms were rudely interfered with and combated without any proper study of the causes in which they originated, whether in fact they constituted the essence of the disease to be cured or indicated the nature of the remedy to be applied; when the 'practical man,' as he was accustomed proudly to call himself, stigmatised a just and careful induction from observation and a diligent waiting upon Nature and her operations as 'mere theory,' preferring his own preconceived notions of the nature of disease, and drawing his own inferences from false facts and blundering experiments."

It cannot be said that the introduction of morbid anatomy, or even the association of the symptoms of the patient with the organic changes found after death at once led to any more scientific treatment. The knowledge derived from these two directions of enquiry were for long made to conform with one or other of the lines of cure that I have indicated. For although the anatomical basis was laid down, it seems doubtful whether the structural abnormality was not regarded

\*Published in 1855. Although not written by a member of the medical profession, the view here set forth is based upon similar observations made by J. A. Wilson, M.D., F.R.C.P., in a work entitled *Spasm, Languor, and Palsy*, published in 1843, p. 67.



as a something imported, rather than an actual misdirection of growth of the tissues. Thus we find, even in the *Cyclopadia of Practical Medicine* (1835), emetics suggested as useful in the earlier stages of pulmonary consumption in order to expel the tubercles from the tissues of the lungs. Here again we see that pathology and therapeutics were far from advancing together, and the progress of the latter still remained in great measure empirical and based on the experience of the individual, and the same may be said for so beneficent a remedy as vaccination for small-pox which Jenner gave to the world in 1796.

But however important might have been the work of Morgagni and Auenbrugger in indicating the seats of disease and in confirming and amplifying the results of clinical observation ascertained by Sydenham and Boerhaave, it required a long time and much labour on the part of their successors before it was realised that that way lay the road to sound treatment, the more especially as the required therapeutic means were not at once forthcoming. A further difficulty arose from the fact that in the case of many fatal diseases nothing abnormal was to be found after death, and perhaps only vague and uncertain symptoms during life, from which might be inferred the seat and nature of the malady—and even we with our perfected methods of diagnosis and microscopical examination are sometimes at a loss to account for the cause of death or the actual organ primarily at fault—what, then, it might be asked, was to be the ground of treatment, and how did morbid anatomy help?

Moreover, that a really scientific method of therapeutics must be based upon a careful study of symptoms and a reference of them to their underlying structural cause, was far from obvious even to those who from their position in the profession might have been supposed to be the first to recognise such a connection, and thus delay in the progress of rational treatment was incurred from another quarter. That this was so will be best appreciated by the following extract from some observations made by Sir Henry Hallford (1766-1844), the distinguished President of the Royal College of Physicians of London for nearly a quarter of a century, upon the death of Dr. Matthew Baillie in 1823.

“Before his (*i.e.*, Baillie’s) time it was not usual for the physician to do much more than prescribe remedies for the malady, and encourage the patient by such arguments of consolation as might present themselves to humane and cultivated minds. But as the assumed gravity and outward signs of the profession were now considered obsolete customs, and were by general consent laid aside by the physicians, and as a more curious anxiety began to be observed on



the part of the patient to learn everything connected with his complaint, arising naturally from the improved state of general knowledge, a different conduct became necessary in the sick room. The innovation required by the spirit of modern times never could have been adopted by anyone more fitted by nature and inclination to carry it into effect than by Dr. Baillie. The attention which he had paid to morbid anatomy enabled him to make a nice discrimination in symptoms, and to distinguish between diseases which resemble each other. It gave him a confidence also in propounding his opinions, which our conjectural art does not readily admit; and the reputation which he enjoyed universally for openness and sincerity made his dicta be received with a ready and unresisting faith.

"He appeared to lay a great stress upon the information which he might derive from the external examination of his patient, and to be much influenced in the formation of his opinion of the nature of the complaint by this practice. He had originally adopted this habit from the peculiar turn of his early studies; and assuredly such a method, not indiscriminately but judiciously employed, as he employed it, is a valuable auxiliary to the other ordinary means used by a physician of obtaining the knowledge of a disease submitted to him. But it is equally true that, notwithstanding its air of mechanical precision, such examination is not to be depended upon beyond a certain point. Great disordered action may prevail in a part without having yet produced such disorganisation as may be sensibly felt; and to doubt of the existence of a disease because it is not discoverable to the touch, is not only unphilosophical, but must surely, in many instances, lead to unfounded and erroneous conclusions. One of the inevitable consequences of such a system is frequent disappointment in foretelling the issue of the malady, that most important of all points to the reputation of a physician; and though such a mode of investigation might prove eminently successful in the skilful hands of Dr. Baillie, it must be allowed to be an example of dangerous tendency to those who have not had his means of acquiring knowledge, nor enjoyed the advantages of his great experience, nor have learned by the previous steps of education and good discipline to reason and judge correctly. The quickness with which a physician of keen perception and great practice makes up his mind on the nature of a disease, and the plan of treatment to be adopted, differs as widely as possible from the inconsiderate haste which marks the decisions of the rash and uninformed."\*

It sounds to us at the present day somewhat strange to read so cautious and qualified an appreciation of the real importance of

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\* Quoted in vol. II of Dr. Munk's *Roll of the Royal College of Physicians*, p. 48.



morbid anatomy and precise clinical examination, and the hindrance they may be to the formation of a prognosis, but it shows how disease was still held to be something apart from the *post-mortem* appearances and the signs and symptoms exhibited by the patient, and that the treatment to be followed was essentially based on experience, and independent of the actual pathological condition. Even at a much later date physicians of repute and acknowledged eminence have been heard to declare that pathology had killed therapeutics.

Gradually, however, as the structural changes in the organs and tissues occurring in disease became more widely and better known, and the microscope was brought to play its part in the investigation, and the manifestations of disease by the patient became more accurately observed and interpreted, there grew up in men's minds a feeling that the violent and extravagant modes of treatment that had so long prevailed could not be altogether right. The idea of disease being something in the abstract that took possession of the individual was slowly being shaken, and though, as yet, a conception to take its place was hardly formulated, doubts were arising as to the propriety of methods that were admittedly based on expelling the *materies morbi*. Then for some time, it may be said up to within the past twenty years, the practice of active treatment slowly declined, to be replaced by what amounted to doing next to nothing. The wiser and more informed minds realising in a vague way that the therapeutic methods of the past had in great measure gone for ever, but being unprepared to supply any other, held their hands with remedies and adopted an expectant attitude, carefully observing the course of the malady in each case, and ready to intervene in aid of nature with such few agents and *regimen* as they felt they could rely on. Like so many other of the more modern modes of treatment, this one found its prototype in ancient times, and it was but a development of the suggestion of Hippocrates that diseases contain in themselves their own cure, and the healing power of nature was the physician's chiefest aid. The first effect, then, of the improved pathology was to lead to much milder treatment, at least, of acute ailments, to the undoubted benefit of the patients. But the reaction against the older and more violent methods and extravagant polypharmacy was carried by some too far, and this particularly by physicians who in the lines of clinical and pathological research were among the most famous of recent times. Feeling that the old methods were irrational if not barbarous, and rejecting the employment of drugs on the grounds of insufficient evidence as to their use, bleeding was altogether discarded, and mercury was denied to be of any value, even in syphilis. The most excellent descriptions of disease in its various aspects of cause,



symptomatology, morbid anatomy, diagnosis and prognosis in our text books concluded with the briefest reference to treatment which was almost contemptuously set aside—nothing, it was said in so many words, could be done, but stand by and look on. It was a time for perfection of diagnosis and therapeutic nihilism, which was looked upon by many as the highest science. Even personal experience, which in the past had done so much both in diagnosis and in treatment, was little relied on, since of active treatment of any kind many had no knowledge, and in their extreme scepticism refused to try. Asclepiades looked upon all medical science which did not lead to action as a “meditation upon death,” and it must be confessed that the practice of some at this period to which I refer might, without unfairness, have been thus described. That symptoms were relieved and the patient cured after the administration of certain drugs was of course no proof of the value of the medicaments, though in proportion to the frequency with which the sequence happened was proof approximated to. But the sceptic’s question, “How do you know he would not have recovered without the medicine?” is unanswerable, and to some minds conclusive. However true it may be that, “as compared with her (Nature’s) share in the healing process ours is insignificant in the extreme . . . and if we realise how crude and impotent are even our most delicate and successful methods compared with the refinement and efficacy of hers, we shall be the more inclined to trust to her wonderful healing power, always seeking to give it the fullest possible scope, and scrupulously abstaining from lightly employing any means of our own, lest unwittingly we interfere with her work, and only hinder when we hoped to help,”\* there still remains a very considerable amount of good that may be done even with drugs and other means which very probably, and in some cases certainly, assist and supplement the ways of Nature, but such aid would not be forthcoming did we not actively interfere. There was also a fallacy underlying the arguments of those who advocated extreme expectant measures, viz., that the efforts of Nature are invariably towards cure, which follows from the assumption “that disease is a natural variation from the normal, and tends, just as all natural variations, to revert to the normal,” that is to health. But many diseases naturally tend to death, and not to recovery, and by wise treatment the result may be averted for a time. Although, however, the expectant method sometimes went very near to culpable neglect, it undoubtedly carried with it certain great benefits, for apart from the influence it had against over-drugging and polypharmacy, it contributed to discourage the search for specific

\*Reflections on Therapeutics, by Dr. Harry Campbell, the *Lancet*, Jan. 5th, 1901.



remedies and finding for every malady its particular curative medicine, and what was even more important it induced a broader outlook on the part of the physician in respect to treatment, and diverted his attention from the disease to the patient. The conviction was growing that "the man is greater than his maladies; that his general condition is of more importance than his local ailments; that disease is a change in him, rather than in some part of him; and that no treatment can be of real service which sacrifices the greater to the lesser."\*

Although perhaps to-day we should not wholly subscribe to so sweeping a generalisation, coming at the time it did and representing as it did the views of the most scientific of our profession it contributed to amend the errors of previous conceptions, and whilst subject to some modification later most certainly tended to the attainment of those wider and more balanced principles towards which the practice of medicine has striven, not without serious diversions on its road. A very practical outcome of this greater attention to the general condition of the patient was the impetus it gave to the employment of those means which in the language of the day were directed to "keeping him up," and the consequent depreciation of "lowering" remedies, with the object of putting the sick man in the best condition to fight his malady. It began to be seen that the repeated and extensive bleedings that had been ordered as a routine treatment in each and every disease, and often as a matter of prevention, might be depressing the patient's powers and even be responsible sometimes for a fatal result, and hence they were tentatively reduced or altogether dropped, and with consequences that encouraged their cessation. Violent purgatives, heroic doses of calomel, twenty grains and more perhaps repeated, went the same way, and in their place medicaments directed to strengthen the failing powers generally, as by food, cod-liver oil, alcohol, and the whole class of remedies denominated tonics, came to take their place. But again, with that curious liability to rush to extremes, on the principle that "one can't have too much of a good thing," the benefit that manifestly attended this more enlightened treatment was frequently pushed to excess, and this more particularly in the matter of alcohol, the toxic properties of which were altogether overlooked in the over-appreciation of its value as a stimulant and food. Another demonstration, were one needed, of the wonderful resisting power of the body even to the most deleterious means pursued, as was supposed, for its benefit.

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\*System of Medicine, edited by J. Russell Reynolds, M.D., F.R.C.P. Vol. I.; p. 24. 1866.



Meanwhile knowledge progressed, and the facts of structural change, both gross and minute, were constantly accumulating, as successive editions of any of the standard works would show, and an advance was being made towards the recognition of those chemical changes in the solids and fluids of the body, which promises so much in the future. As this groundwork of assured data extended, theories of disease were less and less sought for, and the dependence of symptoms upon structural alteration, both alike being variations from the normal brought about by the influence of heredity and the environment, was slowly becoming established.

The development of the experimental method in physiology which was to prove so fruitful led to a more scientific study of disease in the living body, the subject matter of pathology proper, and as a pioneer in this work stands foremost the name of John Hunter (1728-1793), and afterwards Magendie (1783-1855) and his pupil, Claude Bernard (1813-1878). As a department, as it were, of this branch of enquiry, "the investigation of the action of drugs upon the body apart from their use in disease" naturally arose, and this constituted what is known as pharmacology. This study, says Sir Lauder Brunton,\* "appears to have had its origin in men's desire to discover poisons by which the lives of their enemies might be destroyed, or antidotes whereby their own might be saved. The general action of many drugs has long been known, and some of the most graphic descriptions ever given of them are those of Nicander of Colophon; but the analysis of their mode of action, like the study of microscopic anatomy, is of very recent origin. After localising the seats of disease more exactly than had ever been done before, Bichat began to feel how vague and unsatisfactory were the notions then prevalent regarding the action of drugs, and how necessary it was to localise this action. His early death prevented him from attempting the task, but it was taken up by his scholar, Magendie, who not only laid the foundation-stone of modern pharmacology, but left behind him works which may still serve as a model for investigators."

At the time that the study of pharmacology came to be entered on there existed for the use of a physician a large and extensive *materia medica*, some of the articles of which had been employed from the earliest ages, and the remainder represented the balance of a vast number that had been added and removed during the intervening centuries. The effect upon the body of many of the drugs, such as sedatives and anodynes, aperients, emetics, diuretics, and diaphoretics, was well known, but the value of others, and these the majority, was doubtful and wholly empirical; no explanation of their action existed

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\* *Pharmacology and Therapeutics*. 1880.



and such benefit as followed their administration was grounded on a very uncertain body of experience.

Notwithstanding the enormous advance made in our pathological conceptions by the prosecution of the study of morbid anatomy, and accurate clinical observation, and the appreciation of the connection existing between these two classes of phenomena, there was still a something wanting to give completeness to our understanding of disease, and that interfered with the direct application of the knowledge obtained to the discovery of methods of treatment beyond those which were entirely symptomatic. It may well have been that it was the unexpressed consciousness of this lacking that induced the judicious during the expectant period to hold their hands as they did, fearful in their ignorance of interfering with Nature; though it must be admitted that the negative attitude of merely refraining from interference was a poor outcome of the growing scientific knowledge of disease. This something was the *cause*, or the immediate antecedent circumstances which gave rise to disease. As the supernatural origin of illness was gradually discarded, there was nothing to supply its place by way of accounting for the occurrence of the various forms of maladies met with, and neither morbid anatomy however minute, nor clinical diagnosis however exact, could furnish the required explanation; whilst it was abundantly clear that until the cause was known, measures of prevention could be but doubtful, and efforts at treatment would be incomplete.

The first and most obvious reason that offered itself, at least in regard to a large number of maladies, was hereditary transmission or predisposition. But the recognition, or rather assumption, of heredity as a cause of disease did not help much towards treatment. Rather the contrary: if, it was argued, the morbid condition is ingrained and has come down from our ancestors, it would be as reasonable to expect to modify its workings or heal its effects as it would be to suppose that medicine would alter the colour of the hair or the cast of countenance. No relief was to be looked for by the acceptance of this doctrine, and it rather justified than otherwise the extremists of the expectant method in their inaction.

The notion of ancestral responsibility for the incidence of disease involved the idea not only of the transmission of a definite disease from parent to offspring of which the examples were but few, but of the handing down from one generation to its successor of what was spoken of as a "tendency" or "predisposition" to the development of a malady according to the suitability of surrounding circumstances. Such liability was regarded as being present in various degrees of potency, thus explaining the escape of some members of a family as



others succumbed, as well as other incidents connected with the appearance of illness among closely connected relatives. It was thus that the occurrence of malignant and tuberculous affections, gout and many nervous disorders were accounted for, and some indeed went so far as to affirm that all diseases are hereditarily transmissible. As might be supposed from the apparent simplicity of the explanation, coupled perhaps with a feeling of satisfaction at being able to cast on others no longer present such responsibility as there was, this idea of the cause of disease was readily adopted by the laity in their search for the "why" and "wherefore," and there came to be a disposition to differentiate among the various ills that afflict mankind, and to look upon some as disreputable, as others were considered rather as marks of distinction and numbered among the family heirlooms as signs of aristocracy. In course of time, however, as the principles of evolution became more thoroughly comprehended, an increasing importance was attached to the influence of surrounding circumstances, comprehensively expressed in the term "environment," and with that took place a decline in the supposed effect of heredity which does not occupy now in the minds of the profession anything like the place it did as an explanation of the origin of disease. Thus do opinions fluctuate in their progress towards the attainment of scientific truth, as it may also be said do older theories receive fresh explanations and interpretations as the knowledge of facts by observation and experiment extends.

Among the factors of the environment—the conditions of existence, so to say—are included the complex conditions comprised in the expression "climate," such as the temperature, elevation, and barometric pressure, together with the degree of humidity or dryness; the many circumstances connected with habitation, character of the soil and drainage, whether on sea-shore or inland, in river valleys or on hills or mountains; the circumstances connected with the individual's mode of living and his occupation; the quality of his ingested food, water, and air, all of which contribute to his well-being or the reverse, some of which being wholly avoidable as others are beyond control.

The idea of environment, however, soon came to denote a wider range of circumstances than were represented by such obvious and, if I may say, gross surroundings as these. The cellular pathology of Virchow, which taught that the vital phenomena of disease no less than of health were to be referred to the cell elements of the tissues, necessitated the extension of the idea of environment from the conditions surrounding the body as a whole, to those to which its living constituents are subject, such as the character of the blood



supply, the trophic governance of the nervous system, and the equally important, though as yet little known, influence exercised by the tissues one upon another, one aspect of which is represented by the so-called internal secretions.

The appreciation of the influence of the environment upon the body, whether for health or disease, and that life itself might be represented as the outcome of the interactions taking place between the body and its surroundings, had an important effect upon therapeutics. Dietetics were put upon a scientific basis; pure water, fresh air, and ventilation were recognised as necessities; in fact, the several constituents of what we know as personal hygiene became the objects of careful solicitude, sometimes, as was inevitable, amounting in their pursuit to a craze. The subtle influences of various climates, mineral waters, occupations, and pursuits all became the subject of investigation, and were adopted as means of treatment not only for the individual, but as the groundwork of the care of the public health, particularly in the direction of the prevention of disease.

Among the factors of the environment that would affect the body prejudicially is the class of agents known as poisons, but how numerous and widespread these are was far from apparent at first. It was fairly obvious how such mineral substances as arsenic, lead, copper, mercury, phosphorus, and others might obtain entrance to the body by food or water contamination, by dusts from wall paper, in the course of certain trades, or by other channels, and their effects and treatment were well understood. They were, however, but exceptional causes of illness. So, too, are to be reckoned that class of food poisons represented by the parasitic invaders of certain grains, such as the ergot of rye, mouldy maize, and the like, which have been the cause of serious and widespread outbreaks of disease. Of much narrower extent, but quite as fatal, have been the attacks of illness due to decomposed fish or meats, known as ptomaine poisoning. The ill-effects of alcohol are to be attributed rather to its abuse than to its moderate employment, and it must be admitted that its excessive administration under medical direction such as for a time prevailed was not unattended with harm. Most of these substances, however, as causes of disease are, as I have said, exceptional in occurrence and limited in range, as a rule readily detected and dealt with; not so, however, with respect to another group of toxic agents which were becoming recognised, or, to speak more correctly, the existence of which was becoming assumed, since they were not, and, indeed, have not been, isolated. I refer to those injurious compounds which are produced in the course of the chemical and metabolic changes which go on in the body, and that give rise to what is known as auto-



intoxication—a development, though on somewhat different lines, of the views put forward by the iatro-chemists of the 17th century, of which Thomas Willis (1622-1675) was the most distinguished representative. The retention of waste products or their derivatives within the body from mal-elimination; abnormal substances formed during imperfect processes of digestion, and misdirection in the changes which should take place in the ingesta; the failure to prevent certain toxic materials gaining entrance to the general circulation; and the abnormal production of active poisons by perverted cell activity are among the ways in which auto-intoxication may be set up, with the production of symptoms of all degrees of severity. When it could be shown that a given illness was to be attributed to either of these causes, the indications for its treatment were obvious, even though the means for so doing were inadequate or inefficient. On the one hand it was necessary to restore the body processes to their right route, and on the other to counteract the ill effects of the poisons by such measures as would check the abnormal fermentations that might be going on in the alimentary canal, and neutralise the results such changes had given rise to. The principle of treatment hence became in great measure antidotal, but with little more than a hypothetical knowledge of the poisons and their source, it was clear that the range of remedial application was indefinite and uncertain, and hence it is that a belief in the existence of these autogenetic poisons as causes of disease, and still more in a treatment based on their presence, has been entertained in very various degrees by different physicians. As illustrating maladies of this nature may be mentioned the morbid conditions represented by the terms gout, uræmia, cholæmia, many of the remote symptoms of indigestion, such as headache and skin eruptions, and the terminal toxæmias of many diseases, naturally very ill-defined in the absence of precise knowledge of the cause.

But there was destined to be disclosed to the world a cause of disease of far greater importance and wider reaching than any hitherto ascertained or supposed, and one in the full comprehension of which a flood of light has been thrown on the intimate nature of cell activities both in health and disease, and has indicated the direction of treatment along lines followed by nature herself—a *vera medicatrix naturæ*. The epoch-making work of Pasteur and Lister, whose discoveries led to a general recognition of the true nature of infection and infectious diseases, besides teaching the specific character of the several germs responsible for different maladies, also furnished grounds for understanding the terminable feature of many of these maladies, in fact their self-cure. The immunity from certain of these infectious diseases exhibited by various races and individuals, and the freedom from



further invasion conferred by an attack, became at once a study of the first importance, embracing as it does an investigation of the various mechanisms brought into action to preserve the individual. Thus such old-time terms as "constitution," "susceptibility," "inherited tendencies," and the like, which had hitherto vaguely indicated equally vague conceptions, came to acquire a certain degree of definiteness in meaning, whilst the appreciation of the fact that the disease brought its own remedy, was a revival of a notion as old as Hippocrates. It was soon recognised that the injurious effects of microbial infection were due to toxic substances produced by the organisms, though in very few cases have these substances been actually isolated and obtained.

Disregarding the many important problems connected with cell life and consequent growth and nutrition which the study of bacteriology offers, and limiting attention to the influence on the treatment of disease involved therein, it at once becomes apparent that from the *preventive* side of therapeutics the investigation of the channels whereby infection may take place—whether by food, water, air, by trauma or otherwise—becomes a question of prime importance, even exceeding therein the valuable results that have been obtained in the actual *treatment* of infectious diseases derived from the same line of investigation. Already the labours of the medical officer of health and sanitarian in controlling the food supply of the people and regulating the hygienic conditions of workshop and factory are bearing fruit, and diminution in the incidence of infections that are propagated or favoured through these means is already to be recorded, even tuberculosis coming within the range of actually preventible disease; and Mediterranean fever, since its communicability was traced to goat's milk, is in a fair way of being stamped out. The recognition of the part played by biting insects and other forms of life in communicating to man such diseases as malaria, plague, and sleeping sickness, due to the brilliant labours of Manson, Ross, and others, carries with it the suggestion of the mode in which prevention is to be effected, and notwithstanding the stupendous labour involved in thoroughly carrying out the extermination of the transmitting insects, there are not wanting indications that success will be attained. However promising for the future the averting of these and like maladies may be, there nevertheless remains a number of affections of this class the means of prevention of which are scarcely within sight, and for which, therefore, cure must be sought. To effect this, as already indicated, efforts are made in imitation of the methods carried out in the body in the natural course of the disease—methods of protection, that is to say, which the body itself possesses to a different degree in different races and among



different people of the same race. The injurious effects of infection by pathogenic—*i.e.*, disease-producing—organisms are attributable either to the formation of toxins and poisoning of the tissues from the seat of invasion or inoculation, or to the multiplication of these organisms and their diffusion throughout the body, the amount of soluble toxin formed being relatively less than in the former case, but amounting in the aggregate to a considerable quantity from the extensive development of the bacteria in the blood and tissues generally. Various are the ways in which the living animal offers resistance to the invasion. There is the power that the tissues offer to the poisonous action of the bacterial toxines, and the ability to neutralise their effects, and there is the capacity for destroying the invading microbes or arresting their multiplication. The investigation of the problems connected with this immunity which the body offers naturally, and the discovery of methods of artificially increasing or producing in the body this immunity, which hence may be termed “acquired,” constitutes one of the most brilliant chapters in the history of biological enquiry, and is a chapter that is still very far from being closed. Briefly, it suffices to say that the natural immunity depends upon the presence of specific protective substances in the blood, but still more upon specific resisting power possessed by the tissues, but it is the former more particularly that can be artificially increased. To effect this, doses of bacteria or their toxines much below the amount previously ascertained to be fatal are injected into the animal and repeated in gradually increasing quantities until it can safely withstand doses that would certainly have caused death had they been given at first. The animal, that is to say, is gradually accustomed by repetition to the effect of the poison, much as a person becomes accustomed to alcohol, tobacco, arsenic, opium, and other poisonous substances by constantly experiencing their effects. Clearly in the course of the proceeding the natural defensive agencies must have become intensified, and an increase of the specific protective substances has been developed. If now the blood of an animal that has been thus treated by repeated injections of a bacterial toxin of increasing strength be drawn off and allowed to clot, there will be exuded a serum that possesses antitoxic properties, which might be injected into man, when the subject of the special infection from which this antitoxin had been derived, in order to antagonise the toxin being formed in his body. The treatment of diphtheria by antitoxin is one of the most successful efforts in this direction, the severity of the symptoms and the rate of mortality being enormously reduced.

Together with the neutralising of the toxins, the blood and tissues possess also some degree of bactericidal power, that is, can actually



destroy the invading organisms. This is partly effected by chemical substances contained in the body, and partly by the property that certain of the leucocytes possess of engulfing the microbes which are hence called phagocytes. It is possible artificially to increase these defensive properties. Thus, supposing an animal had been immunised by progressive injections of dead bacteria in place of toxins, then the resulting serum of the animal's blood would be anti-bacterial rather than anti-toxic, and might be so employed. By the administration of certain drugs, such, for instance, as cinnamic acid, leucocytosis may be increased, and thus the destruction of bacteria is favoured.

Thanks to the researches especially of Wright, the phagocytic power of the leucocytes may be artificially increased, and inasmuch as this power is dependent upon some quality of the serum in which the cells are rather than upon the cells themselves, it would follow that there must be something of variable amount in the serum which increases the phagocytic capacity either by rendering the invading organisms easier—more palatable, as it were—of consumption by the leucocytes, or that these bodies are stimulated by the material to increased activity. Such material has been termed by Wright an opsonin, and its appearance in the serum appears to be the result of the bacterial invasion itself—the disease determining its own antidote.

It has long been known that an attack of many of the infections renders the individual less likely to be attacked again, though great differences exist among the maladies of this class as to the duration of the immunity conferred thereby. (It is not to be forgotten also that the reverse obtains in some cases, as, for instance, influenza, when one attack seems to increase the susceptibility of the patient to future infection). It is this fact which underlies the treatment of small-pox by vaccination, where by the inoculation of an attenuated virus, that is, the bacterial poison which has been modified by its transmission through the calf, a mild local eruption is set up rather than a generalised one, which is sufficient to protect the individual against the more serious malady. The protection afforded is, however, but of only a few years duration, when vaccination should be repeated. On similar lines vaccines for plague, typhoid fever, and other infections have been prepared and used, and with some measure of success.

The treatment of infectious disease on such lines as these, in imitation of the natural methods by which maladies of this class progress towards self-cure, is in the highest degree rational and scientific, and although the results have not been so widely nor so uniformly satisfactory as some enthusiasts foretold, a sufficient amount of solid and genuine success both in respect to prevention and cure has attended these procedures as to constitute them, next to antiseptic



surgery, the most remarkable development that has taken place in the history of therapeutics, and, what is even more important, the indications are such as to promise a fuller and wider extension. The discovery by Lister of the antiseptic treatment of wounds, which aims at the promotion of natural healing, with the exclusion of septic organisms, was probably the most beneficial and momentous event that has been recorded in the history of the healing art. Arrived at as it was as the outcome of careful and repeated observations and experiments, guided by the scientific imagination of genius, it first put the treatment of disease on a truly scientific basis.

The notion of attempting to combat disease by drugs, haphazard, empirical, and ridiculous as it often was in practice, has within the past twenty years been given in not a few directions a rational basis and justification. Pharmacology has slowly and gradually taken its place as a legitimate branch of biological enquiry. The improved and increasingly accurate methods of physiological investigation have extended to observing the effects of drugs and other reagents upon the living tissues and the functional manifestations these present under such conditions; and thus, as the clinical physician recognises the departures from the normal working of the organs which occur in abnormal circumstances, *i.e.*, in disease, he finds in the means placed at his disposal by the pharmacologists such remedies as will to a greater or less extent correct and amend the functional departures from the healthy standard. It is not for a moment contended that all the numerous items of the Pharmacopœia can claim a rational basis for their employment, many, probably the majority, enjoy such use as they possess on purely empirical grounds, but there are groups of drugs which are now prescribed because of the known effects they produce on the healthy tissues, and that may thus serve to remedy or counteract the symptoms of disease. It is more particularly in connection with the muscular, nervous, and glandular tissues that definite results have been experimentally obtained, and that have thus provided various drugs with well ascertained properties. By way of illustration may be mentioned that group of substances, the nitrites and organic nitrates, which cause a relaxation of the arterioles, and consequent flushing and lowering of blood pressure; and another group represented by digitalis, which bring about an increase in arterial tension—the cardio-vascular tonics, so-called. Therapeutically the members of the former class, notably nitrite of amyl and nitro-glycerin, have proved to be of the greatest value in the relief of and even averting attacks of angina pectoris, in which a spasm of the arterioles is generally assumed to occur; whilst the decreasing heart power, toneless vessels, and anasarca that attend a failure in compensation often find



in digitalis and its allies that stimulant which braces up the vessels, increases the force and duration of the ventricular systole, and clears away, for the time at least, the serous accumulation in the tissues by the strengthened circulation, and causing, by the raised pressure in the vessels of the kidneys, an increase of the urine, and so the removal of the effusion. Numerous other examples might be cited of drugs which, by the known effect they produce, become most valuable agents for the relief of symptoms, such as strychnine, by which the reflex excitability of the spinal cord is increased; morphia and the opium alkaloids, by which narcosis of the nervous system is produced; pilocarpine, with its stimulant effects on the cells of the sweat glands; and belladonna, with its power of diminishing the irritability of the spinal nerve cells, and causing paralysis of the nerve terminals of the sweat glands, as well as of the motor nerves of the involuntary, as curari does for the voluntary, muscles. It is by the scientific method of observation and experiment that the properties of these and many other agents have been ascertained, and that justifies the claim that drug treatment is becoming established on a scientific footing. As contributing to the investigations by the pharmacological, and satisfactory usage by the clinical, physician, is the advance that has been made in the preparation of the medicaments and the isolation of the alkaloids and active principles. Owing to this, an accuracy and precision of procedure has become attainable, which was impossible with the crude preparations that formerly obtained. At the same time reference may be made to the vastly improved form in which medicines are offered to the patient. No longer is it looked upon, either by doctor or public, that the efficacy of the dose is proportioned to the multiplicity of its ingredients and its nauseous character.

Although pharmacology has taught the specific action of various substances on the various tissues and organs, their precise mode of action on the ultimate cell elements is but most imperfectly known, and this must be the case until our knowledge of the nature of protoplasmic activity is complete, which means a full realisation of what is meant by life. But although this degree of ignorance must be admitted, what is known concerning the action of drugs is known in terms that are consistent with our knowledge and conception of other branches of biology, and is of such a character as to permit of expansion and correction as other lines of like inquiry are extended and developed. Now and then some well-tried remedy that has stood the test of many years' experience has found an explanation of its action when investigated in the light of scientific methods; such an one is quinine: long used as a remedy for malaria, it is now known to be poisonous to the causal blood parasite, itself a discovery of quite recent



years. In other cases, notably in the coal tar derivatives, which are mainly antipyretic and analgesic, and are of modern introduction, grounds are to be found for associating the chemical constitution of substances with physiological action, which, after all, represents the final stage of the enquiry. And akin to this are the remarkable discoveries of Loeb and others in the relation of such simple inorganic substances as the common alkaline salts on the vital activity, which are helping towards an understanding of the behaviour of these bodies in the economy, and their value in the treatment of disease.

As compared to what is known, or even reasonably surmised, on these subjects, what is unknown is enormous; but it is all important to realise what we do know, and still more to be able to express that knowledge in terms that is in harmony with allied branches of science. In an interesting communication lately made to the Therapeutical Society,\* Prof. W. E. Dixon, after pointing out that some drugs act in virtue of their physical properties, among which their permeability is important; others produce their effects, not as has been supposed in virtue of becoming "fixed to the proteid molecule in much the same way as Ehrlich supposes toxins and food stuffs combine," but rather it may be presumed that those agents "which excite a specific character in definite tissues do this by liberating the natural hormone which normally activates those tissues," since drugs "give no evidence that they have entered into chemical combination, and they may be removed from the tissues by means of suitable solvents."

Among the substances taken internally for the treatment of certain definite maladies, or for producing certain defined body states, are those preparations derived from some of the organs of the body, more particularly the ductless glands—thyroid, thymus, suprarenal and pituitary bodies, though extracts of testicle, kidney, and other structures have been recommended and employed. Such materials derive their usefulness from supplying substances that are lacking in the tissues from disease and impaired function of these several organs. Strictly speaking, of this nature, though not usually included in this class of remedies, are the preparations of the digestive ferments obtained from the gastric mucous membrane, or the various forms of pancreatic derivatives which are most efficacious in supplementing deficiencies of pepsin and of the pancreatic secretion. Much less useful are similar extracts of the intestinal mucosa or of the liver; even the administration of bile when this fluid is wanting has little to recommend it. Another group of medicaments properly to be comprised within the term "organo-therapy" are those consisting of

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\* MEDICAL MAGAZINE, August, 1907.



hæmoglobin and allied bodies obtained from the blood of animals, many of which are of great value in some of the anæmic states. Less pronounced has been the benefit that has followed the use of red bone marrow in similar morbid conditions. The employment of extracts of the ductless glands is based upon the assumption that these organs pour into the blood current various internal secretions which play an important part in the nutrition of the body. The ill effects that follow on disease or removal of these organs, together with in some cases the beneficial results that ensue under these circumstances upon the administration of extracts prepared from the corresponding organ taken from healthy animals, are mainly responsible for this view of their functions. As may well be supposed, the introduction of such substances as these, when, as was the case at first, portions of the fresh glands were given, into the therapeutic armoury, caused a considerable shock to previously received opinions, since it had always been maintained that in whatever form proteid and other food elements were taken they were converted by the digestive process into similar substances before being used for body construction, and that it was not necessary to consume brain to restore brain waste, or kidney to maintain the structural integrity of the kidney, and so on. But when it was found after removal of a distinctive disease of the thyroid body that the morbid conditions consequent thereon were relieved or averted by the ingestion of some of the fresh thyroid of a sheep, it became clear that certain of the constituents of the gland escaped change in the alimentary canal, and, becoming absorbed into the blood, performed such functions as were carried out by the normal organ in a healthy person. That this was so was further confirmed when it was found that glycerine or dried extracts of the fresh gland were equally efficacious with the fresh organ itself, and, as being more convenient in use, have almost entirely replaced the original method of administration. These extracts of the several organs have been made the subject of elaborate physiological investigation by some of the ablest experimenters, and their effects on the economy duly observed, and although it cannot be said that so far any very great therapeutic benefit has followed an extensive enquiry into the action of substances of this class, there nevertheless remains as a very valuable agent the various forms of adrenalin prepared from the suprarenal bodies which exercise so marked a control over the blood vessels. Incidentally it may be pointed out how the physiology of the ductless glands and of internal secretions generally has received a marked development as the result of pharmacological investigation, the two branches of enquiry being mutually helpful. As has been so often the case when new remedies, whatever their



nature, have been introduced, exaggerated ideas of their usefulness have been entertained, only to be followed by considerable disappointment to those who have expected too much on wholly inadequate grounds. So it happened with respect to preparations of the class now being considered, and the extravagant anticipations of prolonged life and rejuvenescence promised for some of them only resulted in failure and discredit. But although in our ignorance of the intimate metabolism of the tissues we are unable to say and scarcely to imagine how their substances play their part, the actual therapeutic usefulness of extracts of the thyroid and of the suprarenal bodies is undoubted and most valuable, since by the former myxœdema and cretinism, which were formerly quite incurable, are, in the majority of cases, completely relieved, and the control of hæmorrhage by adrenalin preparations is most marked. The employment of these remedies is strictly on scientific lines, and with further knowledge an extension of usefulness of substances of this nature may reasonably be looked for.

The methods of present-day treatment are not confined to serum therapy nor to the use of drugs, whether of animal, vegetable, or mineral origin. Those natural agents, heat and cold, baths and waters, exercise in its various forms, electricity and light, which from the earliest times have in some measure formed part of the armamentarium of the administrator of the healing art, have within recent years received extensive developments in their application to the ills of humanity. Based upon a more accurate knowledge of their effects upon the living economy—both vegetable and animal—though such knowledge is very far from complete, their employment for the remedying of departures from the normal processes of vitality has proportionately become more scientific, and proceeding on such lines hold out the promise of still further usefulness. The beneficial effect that many of these agents produce is probably due in most cases to an improvement in the circulation both of blood and lymph, and all that that implies. For instance, exercise, both active and passive, among other results, increases the power of the heart and the tone of the peripheral vessels, which are all important in improving and maintaining the nutrition of the tissues, removing waste products and serous effusions, and stimulating to metabolism of the living elements. Although considerable differences exist among healthy persons as to the need of exercise, some being very dependent for their well-being on a certain daily amount, as to others it is a matter of indifference whether a walk or round of golf is undertaken or not, it would not be difficult to show the actual benefit that accrues from muscular exertion, especially when this can be taken out of doors. It is desirable,



however, to recollect in connection with exercise, as with so many of the normal conditions of our life, such as sleep, food, and the like, the influence that habit has in regulating the amount and extent to which these conditions are required, and the necessity that there is for taking this factor into consideration when directions are given on these matters to those who are ill. As with exercise, so with baths and electrical applications; much of their benefit follows from the stimulant effect they exert on the superficial terminals, in awakening and inducing the repetition of those peripheral reflexes that make so much for healthy nutrition.

In the foregoing sketch of the progress of the healing art, in the strict application of that expression to the actual treatment of disease, much of necessity has been left unnoticed, such, for instance, as the methods comprised within the term surgery, a subject that requires an account to itself. The object has been, within limits that preclude anything like completeness, to indicate the main directions along which the alleviation of suffering or the cure of sickness have developed, to point out the associations that these several methods have had with the conceptions of diseases that have prevailed from time to time, and more especially to contrast the unscientific—because there was no science—and often superstitious procedures that have marked the past, with the more rational system of the present day. It is curious to notice how views that have dominated practice for a time, and have then fallen into abeyance, have, after the lapse, it may be, of centuries, reappeared with a fresh significance that increased knowledge has conferred, only again, perhaps, to drop aside, or it may be to obtain further confirmation as science has extended. What is often regarded as the new order is but the old that has so changed with time as to present a wholly different aspect; but there would seem to be the assurance, as the outcome of constant revolutions in thought and action, that the lines along which progress is now being made are full of promise of further benefit to mankind in directions that are alike scientific and encouraging.