interest to observe that the avidity of the tissues for this form of glucose is so pronounced that an overdose of insulin leaves insufficient sugar in the blood for immediate needs. Too little blood sugar is more disastrous than too much; the former immediately produces acute symptoms; the latter is compatible with fair health for years. The effect of insulin on ketosis is very marked, for even on a rigid protein and fat diet the diabetic may show no reaction for diacetic acid in the urine—another evidence of the oxidizing power of γ glucose. The rise in the respiratory quotient inevitably follows the more complete utilization of carbohydrate.

I may remark that while the discovery of insulin completely proves that the cell-islets of the pancreas form an internal secretion which promotes the assimilation of sugar, it does not prove that all diabetes is due to a pancreatic lesion. The fact that pituitary extract can antagonize insulin provides new support for the view that diabetes may be due to a more profound and subtle disturbance of metabolism than a lesion of one gland.

Swale Vincent has reminded us that organotherapy is often employed without any rational sanction. As he says, it would be difficult to mention a drug which is clearly and beyond doubt of value in the treatment of disease and yet which possesses no known pharmaco-dynamical effects. Yet many of the extracts in common use have not been shown to have any such action. Even some of those which do, cannot be satisfactorily used in substitution therapy. The early triumphs of thyroid medication tended to blind us to the difficulties surrounding the use of other glandular extracts in therapeutics. Yet the thyroid is exceptional in containing a definite reservoir of secretion and, by virtue of its duct originally opening into the alimentary canal, retaining the power of having its secretion absorbed by that route. It is perhaps fortunate that many of the preparations in use are inert, for otherwise damage might be done. Thus the injection of secretin by liberating an active pancreatic secretion may produce digestion of the intestine. It is just as well, therefore, that organotherapy lags behind endocrinology. But I feel sure that Swale Vincent, while rightly demanding more exact experimental methods in organotherapy, reaches too agnostic a position with regard to endocrinology. Here the careful study and comparison of abnormal types by clinical methods may be of considerable help. To that study I hope some of the foregoing observations may contribute.

REFERENCES.

- ¹Langdon Brown: *BRITISH MEDICAL JOURNAL*, 1920, ii, p. 687. ²Idem, *ibid.*, 1922, i, p. 85. ³Idem, *New York Med. Journ.*, April 5th, 1922. ⁴Mackenzie Wallis: *Journ. Obstet. and Gyn. of the British Empire*, Spring, 1921. ⁵Dixon: *Proc. Roy. Soc. Med.*, Therapeutic Section, vol. xvi, No. 7, p. 23. ⁶Grove and Vines: *ibid.*, p. 18.

SOME HINTS FROM THE OLD PHYSICIANS.

AN ADDRESS DELIVERED BEFORE THE BRADFORD MEDICO-CHIRURGICAL SOCIETY, OCTOBER 17TH, 1923,

BY

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HISTORY rightly occupies an important place in general education. It is not only a subject of great intrinsic interest but it is full of instruction for us. We cannot understand the present without some knowledge of the past out of which it has been evolved. History fosters judgement, chastens opinion, gives warnings, encourages research. This is true of history in general, and for us the history of medicine has special claims. We owe it to our profession to know something of the long and toilsome path which medical science has travelled before attaining its present position of influence and authority. We ought to know something of its pioneers, its seers, its heroes, and its martyrs. We can derive encouragement from their labours, sacrifices, and successes, warning from their mistakes and failures. We shall read with chastened feelings of false theories and

imaginary cures which long held the field, and we shall learn to be more careful in appraising every new medical doctrine and every new method of treatment which to-day makes its appeal to us. The past has much to teach us, positively and negatively. We shall learn that time is the great test and experience the only safe guide. The history of medicine is to-day coming into its own. There is now an International Society for the Study of the History of Medicine, which has already held three successful congresses. Chairs and lectureships in the history of medicine have been provided in various universities. The FitzPatrick Lectures at the Royal College of Physicians have produced many valuable monographs, and the time is near when some knowledge of the history of medicine will become a necessary portion of the medical curriculum.

Scientific medicine begins with the Greeks. They were the first to study medicine as a lay subject, to free it from superstition and priestly authority, to practise bedside observation on scientific lines, and to develop a sound therapeutic. Whether they owed much or little to Egypt, Babylonia, or Crete, we have no certain information. When the darkness which enshrouds early Greek history lifts, we find a cult of the God of Healing—Asclepios—and a society of physicians—the Asclepiadae. The chief centres of this cult were at Trikka in Thessaly, in the island of Cos, at Pergamos in Ionia, and at Epidauros in the Peloponnese. The temples of Asclepios were practically hospitals and sanatoriums. They were usually placed in localities favoured with climatic and hygienic advantages, and often in the neighbourhood of mineral springs. The chief means of cure were physical exercises, baths, inunctions, purgatives, emetics, dietetic regulations, rest, and various modes of suggestion. It is instructive to note that in the very earliest times the Greek physicians understood and stressed suggestion. They knew well the great influence of mind upon body. In the temples of Asclepios one of the favourite methods of treatment was the temple sleep. In the silence of the night hours the physician, personating the God of Healing, visited his patients, soothed their fears, encouraged the hope of recovery, and no doubt favourably influenced the course of disease. Whether he taught them to say "I am feeling better and better every day" I am unable to affirm; history is silent on the subject, but if the formula was different, the method and design were the same. M. Coué would have felt quite at home in a temple of Asclepios, and I am not sure that Freud, Jung, Adler, and their numerous followers might not have found some of their views and methods anticipated by the disciples of Asclepios. The wheel has come full circle, and modern psychotherapy is reverting to the practice of Cos and Epidauros.

Hippocrates is the first great figure in the history of medicine. He belonged to the great age of Greece, the age which saw such astonishing achievements in literature and in art. Born in the island of Cos in the year 460 B.C. of a family of Asclepiads, he travelled widely, acquired all the medical knowledge of his time, practised in various cities of Greece, and achieved great renown in his own time, and even greater fame in succeeding ages. Galen called him "the divine," and he is justly regarded as the Father of Medicine. His works cover the whole field of medicine, surgery, and obstetrics, and are an encyclopaedia of the best knowledge of his day. His *Aphorisms* is probably the only book of ancient medicine which is still frequently read. Much of it is obsolete, but there is hardly a page which does not contain evidence of shrewd observation and sound wisdom.

Hippocrates was the first great clinical physician and the founder of the bedside method. His anatomy was weak, his physiology weaker, and his pathology weakest, but he was an observer of the first order, and he had a sane and profound intellect. He studied disease objectively, without theory, and recorded his successes and his failures with equal impartiality. He relied upon experience. Hippocrates achieved three great objects: he freed medicine from superstition; he systematized and expanded the best medical knowledge of his day; and he gave physicians the highest ethical inspiration which medicine can possess. The famous Hippocratic oath is an ideal of medical practice which can never become obsolete. Hippocrates left descriptions of the epidemic fevers of Greece, phthisis, epilepsy, puerperal

septicaemia, epidemic parotitis, and many other diseases—descriptions to which modern medicine has little to add. His account of wounds, fractures, and dislocations is wonderfully accurate. He was the first to compile regular clinical records. His examination of the patient included the facial expression, the pulse, the temperature (estimated by laying on of hands), the respiration, the sputum, the urine, localized pains, the movements of the body. He emphasized the importance of inspection. He noted the ominous significance of picking at the bedclothes. He described that grave aspect of disease which we still call the “facies Hippocratica,” and that important sign which we know as Hippocratic succussion. He also described a sound in the chest which he compared to “a creak like that of leather”—probably pleural or pericardial friction. He recognized healing by first intention. He attached great weight to prognosis and wrote a special work on the subject.

In his therapeutic Hippocrates relied much upon the *vis medicatrix naturae*. He used few drugs and those sparingly. His favourite methods were fresh air, rest, careful diet, baths, purgation, soothing draughts, massage. Is it too much to say that to-day we are witnessing a turn of the tide towards the simple and gentle Hippocratic therapy, as contrasted with the violent practice of the Middle Ages and later? Hippocrates did not try to expel disease by force—rather to assist Nature in her efforts after elimination. “Natural powers are the healers of disease” is one of his maxims. He advised that wounds should be irrigated with water of the greatest purity, or with boiled water—a foreshadowing of the aseptic practice of to-day. He insisted that the hands and the nails of the operator should be carefully cleansed. His successors too often forgot or ignored these wise directions.

Hippocrates had sound views on public health. He wrote a book upon “airs, waters, and places,” which is the first book, so far as we know, on the subject of medical geography, climatology, and anthropology—subjects to which he attached the greatest importance. One of the “aphorisms” affirms that “the body can only be understood as a whole”—a hint against the possible dangers of excessive specialism.

Hippocrates has left a message to all of us to-day—the importance of careful bedside observation; the need to study medicine in the light of experience and not to be hidebound by theory; the wisdom of helping rather than coercing the healing powers of Nature; the necessity for a high ethical ideal for the healing art.

Plato was much interested in medicine, but he was not a practising physician, and he had more regard to the soul than to the body. Perhaps the chief lesson which we can derive from his works is the influence of mind upon body—a doctrine much inculcated upon us to-day. He puts this doctrine in a somewhat extreme form in the following passage in the *Charmides*:

“I dare say you have heard eminent physicians say to a patient who comes to them with bad eyes that they cannot cure the eyes by themselves, but if his eyes are to be cured, the head must be treated, and then again they say that to think of curing the head alone, and not the rest of the body is the height of folly . . . and, therefore, if the head and the body are to be well, you must begin by curing the soul.”

I should like to submit this passage to a jury composed of equal numbers of ophthalmic surgeons and psycho-analysts.

Aristotle was the son of an eminent physician and was much interested in medicine. His work on the subject has unfortunately been lost, but he gave medicine the foundations of zoology, comparative anatomy, and embryology. He was the first great biologist. His *Historia Animalium* is a marvellous collection of facts relating to the structure, functions, and life-history of nearly all the animals of his country and time. Recent work has shown how accurate was his observation.

Alexandrian medicine, in which the two leading names are those of Herophilus and Erasistratus, made some advances in medicine, especially in anatomy. Herophilus was on the track of the correct view of the circulation of blood, but failed to solve a problem which had to wait many centuries for Harvey. The school of Alexandria developed a tendency to polypharmacy; many remedies imported from the East came into use and stimulated a method of practice which had baneful results in the Middle Ages. Toxicology occupied

a prominent place in this school and probably owed its inspiration to the East. It had a somewhat sinister aspect. Mithridates, the famous King of Pontus, who probably derived his information from Alexandria, is said to have immunized himself against poisoning by means of the blood of ducks fed on poisonous materials, a curious anticipation of some modern doctrines.

Celsus, a Roman gentleman in the reign of Tiberius Caesar, left an elaborate work, *De Medicinā*, which had considerable influence upon medical thought and practice. Of his aphorisms the following may be quoted:

It is not to be thought that he should know the remedies of disease who does not know their original causes.

We ought not to be ignorant that the same remedies are not good for all.

Laziness slackens and dulls the body, but labour strengthens and makes it firm. The former hastens old age; the latter prolongs youth.

Idleness and luxury first corrupted men's bodies in Greece, and afterwards afflicted them in Rome.

Galen is the greatest name in ancient medicine after Hippocrates. A Greek and a native of Pergamos in Asia Minor, he practised at Rome in the second century of our era. A man of boundless energy and industry, of eagerness and curiosity in the pursuit of knowledge, a keen observer, he made large advances in osteology, myology, and the anatomy of the nervous system. His physiology was vitiated by the doctrine of vital spirits, and his pathology by the doctrine of the four humours. His therapeutic was largely governed by the theory that disease is something which must be expelled from the body—a *materia peccans* which must be got rid of. Hence his emphasis upon methods of elimination. Another of his theories was that disease must be combated by remedies exercising counteracting influences—for example, cold by warmth, plethora by deprivation—the doctrine of *contraria contrariis*. He attached much weight to housing, the influence of air and light, gymnastics, dietetics, cold and warmth, massage, baths. He advocated change of climate in certain cases. As forms of exercise he mentions rowing, digging, mowing, throwing the javelin, running, jumping, hunting, splitting wood, carrying burdens. He advised exercises for the cure of adiposity. He advised baths in fevers. He had sound views upon diet. He employed venesection, leeches, laxatives, emetics, diuretics, and diaphoretics.

Galen's influence on medicine was almost omnipotent for a thousand years. His views on anatomy and physiology paralysed research until overthrown by Vesalius. His doctrine that disease is something to be expelled from the body by blood-letting, purgation, diaphoresis, and other eliminative measures had a long career and still has weight in medical practice. It lies behind many familiar therapeutic methods. It is the foundation for some modern medical theories. “Toxaemia” is almost as blessed a word in medicine as was “Mesopotamia” in the story of the old lady who found comfort and satisfaction in that geographical expression. It is worthy of reflection how far this Galenic doctrine is, or is not, too preponderant with us. Is it really true that the colon is a human sewer which Nature has unhappily preserved as part of our anatomy? Is it the *fons et origo* of a large proportion of our woes? Should we get on more comfortably without it? I need hardly remind you that bacteriology has given this doctrine a new orientation. We have now the problem set to us: Are we likely to be more successful in our struggle with disease by attempting to destroy and evacuate our invisible foes, or by aiming at fortifying the patient's natural powers of resistance? Our therapeutic methods will be much affected by the answer which we give to this question. Galen stands for coercing Nature. Hippocrates stands for supporting Nature. A wise therapeutic will strive to find the *via media* between these two complementary conceptions.

In the early Middle Ages medicine was largely in the hands of the Arabian physicians. In the West the healing art had been overtaken by a long night. While the Arabian physicians spoke Arabic and practised the Moslem faith, many of them were Syrians, Persians, or Jews by race. Their medical lore was Greek in origin, but had travelled by devious routes to Baghdad, Jundi Shapur, Bokhara, Egypt, Cordova, and Toledo. Amongst the most

famous names are those of Rabban, Rhazes, Ali Abbas, Avicenna, Rashid, Avenzoar, Averroes, and Maimonides. Many of these physicians were prolific authors, and the *Continens* of Rhazes, the *Liber Regius* of Ali Abbas, and the *Canon* of Avicenna long enjoyed a great popularity. The last of these works is still an authority in some parts of the East. The Arabian physicians were inspired by Hippocrates and Galen. From the latter they derived most of their ideas regarding anatomy, physiology, and pathology, while in therapeutics they were guided largely by the Hippocratic tradition with its emphasis upon hygiene. They attached much weight to diet, baths, rest, climate, cleanliness, etc. They were fully alive to the influence of suggestion. Two stories have been handed down to us which illustrate this last point. Rhazes had at one time under his care the Amir Mansur, who was suffering from some obscure malady which had resisted the ordinary methods of treatment. Rhazes determined to try a little psychotherapy. He appeared suddenly in the Amir's tent with a sword in his hands, and threatened to kill him. The Amir was naturally incensed beyond measure by this extraordinary proceeding on the part of his physician, and endeavoured to seize Rhazes, who escaped with difficulty. The story goes that the Amir was cured of his malady. Avicenna once had a patient who suffered from the delusion that he was a cow and ought to be slaughtered for food. Avicenna told him that he was much too thin for the butcher, and that he must be fattened before slaughter. The patient was directed to consume large quantities of milk; he recovered his physical health and lost his delusion. Rashid, who practised at Tabriz, excelled in materia medica, a department to which the Arabian physicians made some contributions of value. He dealt largely in aromatic oils—violet, jessamine, narcissus, rose, myrtle, orange, mastic, clove, cardamoms, cassia, fumitory, betel.

The lore of the Arabian physicians reached Western Europe mainly through Spain, and there is reason to believe that the rise of the medical school of Montpellier was due in large measure to Arabian influence. The Moslem seats of learning made progress in chemistry, and this progress probably reacted upon medicine. Averroes and Maimonides represent the more philosophical side of medicine. Both were eminent philosophers as well as famous physicians.

One of the most interesting chapters in the history of medicine relates to the rise and fame of the medical school of Salerno, near Naples. Its origin is obscure, but there is reason to believe that it owed something to the traditions of Greek medicine which had lingered in Southern Italy and Sicily, something to the Arabian physicians, and something to the Jews. Its origin may be traced to the ninth or tenth century, and it became the most famous medical school in Europe during the early Middle Ages. The spirit of the school was Hippocratic. It prized clinical observation, relied upon experience, and practised a simple therapy based upon that of the Father of Medicine. The emphasis was upon diet, hygiene, baths, ventilation, and such like measures. Patients flocked from all parts to this medical shrine, which was a bright spot in a dark age, and many cures were effected. Salerno was famous for its traditions and aphorisms. Of the latter I may quote one—

Si tibi deficient medicæ, medicæ tibi fiant
Hæc tria : mens hilaris, requies, moderata diæta—

an admirable piece of advice. It reminds us of Burton's recommendation of Doctor Rest, Doctor Quiet, and Doctor Diet.

Medicine entered upon a new era with the publication in the year 1543 of the great work of Vesalius, *De Humani Corporis Fabrica*, in which he overthrew the authority of Galen and placed human anatomy upon its modern footing. His work had an immediate influence upon surgery, and was the guide of Ambroise Paré, the greatest surgeon of the Middle Ages. Paré was distinguished for his practical sagacity and robust common sense. He was influenced by the Hippocratic tradition and believed in the *vis medicatrix naturæ*. He practised amputation on scientific lines and reintroduced the ligature of arteries which had fallen into disuse in the Middle Ages.

Harvey's discovery of the circulation of the blood is the greatest landmark in the history of medicine. His *Exercitatio Anatomica de Motu Cordis et Sanguinis* was published in the year 1628. It met with early recognition in many countries, but its influence upon the practice of medicine was only gradual. Harvey himself is said not to have excelled as a practitioner, but the facts that he was physician to Charles I, and that he was chosen as Lumleian Lecturer at the Royal College of Physicians, show that he was held in high esteem. One of his aphorisms may be quoted: "I am of opinion that our first duty is to enquire whether a thing be or be not, before asking wherefore it is." If this maxim were always faithfully observed a great many controversies would be stillborn.

The seventeenth century, prior to the advent of Sydenham, was an unhappy period in the history of medicine. A vivid light is thrown upon it in the comedies of Molière. It was an age of dogmatism, of slavish adherence to rules, of neglect of clinical observation, and of drastic therapeutics, based mainly on methods of elimination. Pedantry, routine, blind subservience to authority, reigned supreme. Blood-letting was practised to a frightful extent. Purgation, scarification, clysters, and other severe methods were in vogue. There was a rage for antimony, especially in France, where the drug was held to have cured the young King Louis XIV of a fever. Medical conversation was larded with tags of Latin. The following specimen is given of the medical learning of the day. Why does opium produce sleep?

Quia est in eo
Virtus dormitiva
Cujus est natura
Sensus assoupire.

Medicine needed a reformer, and it found one in Thomas Sydenham, who earned the title of the British Hippocrates. Few men in any age have been more fully imbued with the Hippocratic temper. In his insight and sagacity, in his reliance upon clinical observation and practical experience, in his freedom from prejudice and erroneous theories, in the simplicity and thoroughness of his methods of treatment, he was a true follower of the great Greek. He achieved great fame both in his own country and abroad. Boerhaave, the famous physician of Leyden, never mentioned him without lifting his hat, and saluted him as "*Angliæ lumen, artis Phœbum, veram Hippocratici viri speciem*." Sydenham wrote on many subjects—fevers, gout, chorea, phthisis, hysteria, pneumonia, dysentery, malaria. His account of chorea was so perfect that we still speak of Sydenham's chorea. He was the first to distinguish measles and scarlatina. His account of hysteria was long held as a classic. It is interesting to recall that he thought hysteria the commonest of all diseases, and held that few women are wholly free from it. He suffered much from gout, of which he has left an excellent description. He believed that it was the only disease which included in its victims more wise men than fools. In his famous work *Methodus Curandi Febres* he says: "Fever is nature's engine which she brings into the field to remove her enemy; or her handmaid either for evacuating the impurities of the blood, or for reducing it to a new state." Are we quite sure even yet how far pyrexia is an irritative reaction or part of Nature's defensive mechanisms? We know it can run to perilous excess, but routine antipyresis may run the risk of defeating Nature's efforts at elimination and control. The subject is one to reflect over. Sydenham was a stout upholder of the doctrine of the *vis medicatrix naturæ*. He writes:

"As far as I am capable of a judgment, the dictates of reason are as follows, namely, that a disease, however much its cause may be adverse to the human body, is nothing more than an effort of nature, who strives with might and main to restore the health of the patient by the elimination of the morbid matter."

He held that some diseases "are engendered through occult and inexplicable changes in the atmosphere." We are familiar with waves of both ill health and good health spreading over large areas without assignable cause. Perhaps Sydenham's notion is worthy of reconsideration. Perhaps to-day we attach too little importance to cosmic and telluric conditions. Sydenham held that impurities

in the air were one of the main causes of phthisis—an anticipation of modern thought. He laid much stress upon diet in the treatment of disease, made a large use of diluents, recommended plenty of fluid in fevers, popularized the use of Peruvian bark in ague and iron in chlorosis, advised plenty of fresh air in sick-rooms, and thought horseback exercise valuable both in nervous affections and in phthisis. Like the Greek physicians, he urged the importance of studying the patient's constitution and avoiding routine treatment.

Sydenham's writings are full of pithy axioms and aphorisms—for example: "Experientia magistra doctorum"; "Qui mundificat bene, bene sanat"; "Lachrymae—certissima signa morbillorum." "Nevertheless, I have always thought it a greater happiness to discover a certain remedy for even the slightest disease than to accumulate the largest fortune, and whoever compasses the former I esteem not only happier but wiser and better too." Sydenham believed much in common sense. His favourite authors were Hippocrates, Cicero, Bacon, and Cervantes. Sir Richard Blackhouse, who had commenced the study of medicine, once asked Sydenham what book he would recommend. His reply was, "Read *Don Quixote*. It is a very good book. I read it still."

With Sydenham I may fairly conclude these burrowings in the medical lore of past ages. We began with Hippocrates; we conclude with his English successor. Between Hippocrates and Sydenham what a vast vista of human history—a period of just over two thousand years! During that long period the healing art has seen many vicissitudes—now advancing, conquering, again coming to a standstill, or undergoing grievous relapse. But it is significant for us that the English Hippocrates found it to his advantage to have at his elbow the works of his great forerunner. We might with profit follow his example. The past is not dead—it lives in us, in our lives, and in our work. We do not forget that in the three hundred years which separate us from the birth of Sydenham medicine has made a greater advance than in all the previous ages. But, as Rudyard Kipling says, "that is another story."

THE DIAGNOSIS OF SMALL-POX AND CHICKEN-POX: A CONTRAST.

BY

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(With Special Plate.)

THE photographs reproduced on the special plate by which this paper is illustrated exemplify the fallacy of placing much reliance upon the severity of the rash in making a differential diagnosis between chicken-pox and small-pox. Figs. 1, 2, 3, and 4 are from a case of chicken-pox; Figs. 5 and 6 from a case of mild discrete small-pox. The ratio of severity so far as the rash is concerned is the opposite to what is taught to students of medicine and is still assumed by many members of our profession—namely, that small-pox is characterized by a profuse rash, and that chicken-pox is perhaps the mildest and most negligible of all the exanthemata. Figs. 1, 2, 3, and 4 show the rash twenty-four hours old in girl aged 11; she had no prodromal symptoms; the type of rash was very superficial and the fluid in the vesicles was quite clear (glass-pox). The crenated edge of some of the vesicles can be seen in the back view. The distribution is centripetal. Figs. 3 and 4 (from the same case) show vesicles on the palms and soles, but still of the superficial type; such a condition is common in chicken-pox. Figs. 5 and 6 are of an unvaccinated boy aged 6, suffering from a mild form of discrete small-pox. The prodromal symptoms were headache, slight sickness, and pains in the limbs; the rash appeared on the fifth day. The rash, it will be noted, is centrifugal and deeper than in chicken-pox, and the pocks are circular with a central depression.

It should not be difficult to understand that doubt may exist in the mind of a medical officer when called on to make a diagnosis of small-pox in such a case as this, perhaps the first to occur in his experience, or even, with previous experi-

ence, the first case in a community hitherto free from this disease, and to report his finding to the health authority.

A correct diagnosis can and should be made, and in typical cases, even when very mild, it is simple enough. The sheet anchors of differential diagnosis are:

1. The distribution of the rash.
2. The prodromal history.
3. The characteristics of the rash.

I would like, however, to stress the possibility that these points are not always obvious and clear-cut.

Distribution.

Border-line cases occur sometimes, but fortunately rarely, and in these a count of lesions leads to no conclusion as to whether the rash is centrifugal or centripetal, and every mathematical maxim fails.

Prodromal Symptoms.

No one symptom is so consistently obvious as to constitute *per se* a specific point of diagnosis. The length of the prodromal period—that is, three to four days' illness in small-pox before the appearance of the rash—is of great importance, but very careful inquiry is often necessary, both as regards the prodromal beginnings and the first appearance of the rash, to elicit information substantiating this length of period.

The symptoms of themselves may vary in severity between one extreme and another in small-pox, and the eruption which follows does not appear to have any definite relation to the degree of their severity. Headache, a most constant feature in mild small-pox, may be described in every degree from "very severe" with delirium to a feeling of "giddiness" only. Pains in the back and limbs may vary from the excruciating type to a "feeling of tiredness" or "heaviness in the legs," enough to make the patient prefer to "lie up" rather than to "keep about." Vomiting may vary between persistent retching and "just wanting to be sick." The temperature may be high or normal. Prostration may be severe or absent.

Just before the appearance of the rash the prodromal symptoms of small-pox lessen to a very marked extent and the temperature when high may fall, so that the patient "feels better," and may return to work, or to school, as the case may be.

Chicken-pox sometimes, especially in older people, may be preceded by fairly severe symptoms of headache, etc., lasting for a few days. In chicken-pox, however, this prodromal stage is usually of shorter duration and the symptoms run on and overlap the eruption; the temperature is often highest on the second or third day of the rash.

Character of the Rash.

A typical chicken-pox rash and a typical small-pox rash are easily distinguished, but a chicken-pox rash may be severe and very pustular, and small-pox lesions may be of an abortive type; even when not abortive they may be more superficial and less markedly round than usual and may have the appearance of successive crops on successive days. The rash in chicken-pox is, however, more cuticular (glass-pox), matures more rapidly, has a more oval shape with a more crenated edge and with deeper areolae tending to run in the creases of the skin and producing an exaggeration of the ovoid appearance or giving a markedly stellate shape. On the other hand, small-pox lesions are deeper, less rapidly maturing, round, with a narrow round areola, and later on a circular central umbilication.

Confusion is sometimes caused by a resemblance of small-pox lesions to the polymorphism seen in chicken-pox, due to deeper lesions or those under denser tissue taking longer to mature, and to the fact that some small-pox lesions abort in an early stage. Then again, in chicken-pox spurious umbilication may occur, but the vesicle is more convincingly monolocular, small-pox vesicles being usually multilocular. Again, two or more small-pox lesions may run together and produce a crenated edge and an oval appearance. To complicate things a little more, post-vaccinal rashes occur more commonly than is supposed. Prodromal rashes, secondary rises of temperature, particular smells, predilection to come out more profusely at places of friction, are among other points to be considered but are inconstant.