Lectures on the eruptive fevers : delivered at St Thomas's Hospital, in January 1843 / by George Gregory.

LECTURES

ON THE

ERUPTIVE FEVERS.

By the same Author,

THE ELEMENTS

OF THE

THEORY AND PRACTICE OF MEDICINE.

THE FIFTH EDITION, CONSIDERABLY ENLARGED.

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LECTURES

ON THE

ERUPTIVE FEVERS.

DELIVERED

AT ST. THOMAS'S HOSPITAL,

IN JANUARY 1843.

BY

GEORGE GREGORY, M.D.

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PHYSICIAN OF THE SMALL POX AND VACCINATION
HOSPITAL, AT ST. PANCRAS, ETC. ETC.

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TO

SIR CHARLES MANSFIELD CLARKE, BART.

M.D. F.R.S.

My dear Sir Charles,

The days are gone by when dedications could be relied on as passports to public favour; but I hope it will never be out of fashion to make a public profession of gratitude, esteem, and respect. I am proud to acknowledge myself as your pupil, and to avow that from you I learned, not only the science of physic, but the art of lecturing.

The position which you occupy in society sufficiently attests your skill and acquirements; but the esteem and regard of your brethren, which no one ever enjoyed in a higher degree, have been earned by still higher qualities of mind, by great urbanity, and an untiring readiness to promote the professional advancement of your juniors.

I have yet another reason for prefixing your name to these pages. They treat of diseases which occur for the most part

in that early period of human life, to the management of which your thoughts have been in a great degree directed. In submitting my ideas to your judgment, I feel that I am subjecting them to their severest ordeal.

I am, my dear Sir Charles,

Ever very faithfully yours,

GEORGE GREGORY.

31, Weymouth Street,
March 16, 1843.

PREFACE.

THE following short course of Lectures on the Eruptive Fevers was delivered in the Theatre of St. Thomas's Hospital, between the 18th January and the 8th February, 1843. It was thought that the experience which twenty years of official connexion with the Small Pox and Vaccination Hospital had given to the author might contribute something towards that extended and improved system of medical education now pursued in that school.

The Lectures are published in the same form as that in which they were delivered, with the exception of certain portions necessarily omitted in the oral delivery, in order that what was calculated for thirteen lectures might be compressed into eleven.

The author is very conscious of one imperfection of the present volume. He is fully aware that the conversational tone adapted for the lecture-room does not suit the closet so well as the gravity of a didactic style; and that many, who might be inclined to look with favour on the matter, may very reasonably object to the manner.

The author would anticipate one other criticism. Those who are in possession of the "Library of Practical Medicine" will at once perceive that a chapter in the first volume of that work has here been laid heavily under contribution; but as, in so doing, the author only borrows from himself on points where later experience has suggested no improvement, he trusts to obtain the kind indulgence of the reader. Should he chance to be of the number of those who from age or position in the profession are more fitted to give than to receive instruction, the author ventures to hint that these Lectures were written for the use of pupils. His sole reason for committing them to the press is, a hope that it may prove useful to present a picture of modern as contrasted with ancient pathology, and to amalgamate with established theory and practice the searching but faithful results of statistical science.

G. G.

31, *Weymouth Street, Portland Place,*
March 17*th*, 1843.

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ON THE

ERUPTIVE FEVERS.

LECTURE I.

CHARACTER AND AFFINITIES OF THE ERUPTIVE FEVERS.

Mutual relation of diseases. Importance of the skin in the animal economy. Varieties of cutaneous disease. Exanthematic mortality throughout England, and in the metropolis. General character of the exanthemata. Of exanthematous fever, its uniformity and steadiness of course. Fever not essential to exanthema. Symmetrical disposition of exanthematous eruption. Alleged identity of the exanthematic poisons. Law of suspension. Affection of mucous surfaces accompanying exanthema. Structures secondarily implicated. Variety and occasional severity of such complications.

If there be any group or class of disorders which admits of being considered apart from and independent of others, it is undoubtedly that association of complaints called the exanthemata, or eruptive fevers. The reason is this. There are many pathological principles which are best exemplified in the phenomena of the exanthemata, and some which are nearly peculiar to them. Nevertheless, while I acknowledge this, I would at the same time impress upon you the great principle, that there are no

diseases strictly isolated from others; they are links in a chain—

"All are but parts of one stupendous whole!"

They must be viewed in conjunction, if we would hope to form just, enlarged, and legitimate views of the character and pathological affinities of each.

Let us ask ourselves, what would be the conduct of a judicious traveller, when he first sets foot in an interesting district of country? Would he not look out for some elevated point, some pinnacle or cloud-capt tower, from whence he may survey the general aspect of the country, trace the course of the rivers, and the direction of the mountains,—from whence he may note how the district is indented, on the one hand, by the countries he has already traversed, and how it loses itself, on the other, in those portions of the country which he has still to explore?

That which would be a prudent course in the traveller will be an equally prudent course with us. You have studied some portions of the great field of pathology; others remain for future investigation. Let it be our business now to take a general view of the exanthemata, in relation to other branches of pathological study. It can be but a bird's-eye view that I lay before you, but such a sketch, loose and imperfect as it must necessarily be, will prove useful to us, I had almost said essential, in the further prosecution of our design.

Let us, then, consider the relation in which the exanthemata stand, 1. to each other; 2. to other forms of fever; 3. to other diseases of the superficies; 4. to other diseases arising from morbid poison; 5. to the diseases of other structures.

On the structure of the skin, or dermoid tissue, I

have no intention to enlarge. That subject has been already brought before you in the lectures of Mr. Grainger. You will remember what was said of the epidermis, of the corion or true skin, and of the muciform tissue, called rete mucosum, interposed between them. You will bear in mind what you were taught regarding the bloodvessels and nerves of the skin.

But though I shall pass over in silence the anatomy of the skin, I must detain you for a few minutes while I direct your attention to some points in its physiology. The skin, you know, is the great organ of transpiration. By means of the skin, the body loses every twenty-four hours not less than thirty ounces of matter,—very nearly two pounds. The skin is exposed to the atmosphere, and to the moisture which the atmosphere contains, and to all its other influences. It must be, and it is, fitted to bear the extremes of temperature which the meteorologist registers. You are aware that there are at least a hundred degrees of difference between the heats of Calcutta and the snows of Caubul. The skin, too, is exposed to various injuries, for by the sweat of man's brow he is to earn his daily bread. The skin is supplied with abundant means for the repair of those physical injuries. Its numerous bloodvessels are endowed with a strong disposition to heal by the first intention (adhesive inflammation), or failing that, by the second intention, by which is understood the processes of abscess, granulation, and cicatrization.

If you wish to satisfy yourselves of the immense importance of the skin in the animal economy, observe the effects of burns and scalds. See how a severe burn affects the heart, and the brain, and the lungs; I may now say, also, the duodenum; for the inquiries of Mr.

Curling have lately added this viscus to those which severe injury of the skin disturbs and disorganizes. A man may lose one half of his lungs by slow ulceration, and he may yet live for months, nay, for years. But if one half, or one third, or even one fourth of the skin of the body be destroyed, the system rapidly gives way, and death ensues.

The skin may be considered as the fourth in the series of important organs. First come those of the encephalon, then those of the chest, then the abdominal organs, and lastly, the superficies. This portion of our frame, the superficies, is subject to various diseases originating from internal and obscure causes. They are,

1. The acute febrile affections bringing life into hazard. We call them the Exanthemata, from the Greek ἄνθος, a flower. Hence ἐξανθέω, to bud forth or effloresce. Of these greater exanthemata there are four:—SMALL POX, MEASLES, SCARLET FEVER, and ERYSIPELAS.

2. The acute febrile affections not bringing life into hazard,—the lesser Exanthemata. They are divisible into two sections. 1. Vesicular affections, of which there are four:—VACCINIA, VARICELLA, HERPES, and MILIARIA. 2. The simple efflorescences, not leading to fluid effusion; of which there are also four—namely, LICHEN, URTICARIA, ROSEOLA, and ERYTHEMA. These twelve forms of eruptive fever will constitute the subjects of the present series of lectures.

3. The chronic cutaneous affections of a mild or benignant character, formerly characterized as being *boni moris:* such as Lepra, Psoriasis, Ichthyosis, Impetigo, Elephantiasis, and Molluscum.

4. Chronic cutaneous affections, *mali moris*, bearing a malignant character, such as Cancer, Lupus, and Fungus

hæmatodes. Complaints of this latter kind are exclusively surgical. The physician is consulted in all the others.

I have said that the greater exanthemata are those which bring life into hazard. The first point, therefore, to which I have to call your attention, and which strikingly displays the relation of the exanthemata to each other, is exanthematic or epidemic mortality: what is its amount?—what proportion do deaths by the exanthemata bear to the deaths by all other diseases? Is this proportion constant or fluctuating? Is it alike in town and country? I will tell you.

Upon an average of years, 350,000 persons die annually throughout England and Wales, and 46,000 in the metropolis. The mortality by the four great epidemic maladies (small pox, measles, scarlatina, and hooping cough) is very nearly 40,000 in England and Wales, and about 5000 in the metropolis, averaging one in nine of the total mortality, or eleven per cent. This is a very large proportion. That four diseases only should absorb one ninth of the total mortality of this and probably of all other countries, may well excite our surprise.

If the exanthemata are considered independent of the hooping cough, considerable fluctuations will be perceived, the mortality by them falling sometimes as low as six per cent., at times rising to near thirteen; but a very important principle comes into play here, which serves to equalize the amount of epidemic mortality. This curious doctrine had long been surmised, but was never proved until the statistical inquiries of recent times shewed its correctness. We may, for want of a better name, call it

the law of vicarious mortality, by which is understood, that whenever one epidemic diminishes, another increases, so that the sum total of epidemic mortality remains, on an average of years, nearly the same. The following table exemplifies this:—

Table exhibiting the amount of Epidemic Mortality in England and Wales, during the years 1838, 1839, 1840.

	Year 1838.	Year 1839.	Year 1840.
Small Pox	16,268	9,131	10,434
Measles	6,514	10,937	9,326
Scarlet Fever	5,802	10,325	19,816
Total Mortality by the Exanthemata	28,584	30,393	39,576
Hooping Cough	9,107	8,165	6,132
Total of Epidemic Mortality ...	37,691	38,558	45,708
Total Mortality throughout England and Wales	342,529	338,979	359,561

We learn from this table, that every year is distinguished by some master epidemic. In 1838, small pox was the ruling epidemic throughout England. In 1839, measles and scarlet fever struggled for the mastery. In 1840, scarlet fever was so general, and so fatal, that the mortality by it exceeded by one fifth the ravages of small pox during an epidemic season, (1838,) and more than doubled the mortality by that disease in 1839.

The following table, exhibiting the amount of epidemic mortality in the metropolis during a period of five years, shews that the same general principle applies to town and country, but is less manifest in the smaller population.

Table shewing the amount of Epidemic Mortality in London during Five years—1838 *to* 1842.

	Year 1838.	Year 1839.	Year 1840.	Year 1841.	Year 1842.
Small Pox	3,817	634	1,235	1,053	360
Measles	588	2,036	1,132	973	1,292
Scarlet Fever	1,524	2,499	1,954	663	1,224
Total Mortality by the Exanthemata	5,929	5,169	4,321	2,689	2,876
Hooping Cough	2,083	1,161	1,069	2,278	1,603
Total of Epidemic Mortality	8,012	6,330	5,390	4,967	4,479
Total Mortality throughout London	52,698	45,441	46,281	45,284	45,272

From this table we learn that in 1838 small pox was the great epidemic in London as in the country. In 1839, measles and scarlet fever were both on the increase, while small pox had sunk from 3817 to 634. In 1840, scarlet fever predominated. In 1841, hooping cough doubled its numbers, and shot above all the rest; while scarlet fever sunk to the low point which small pox had reached in 1839. The year 1842 has been remarkable, first, for the extreme infrequency of small pox, one death only throughout this great metropolis being attributed to it for each day of the year; and secondly, for the uniform rate of mortality occasioned by its three great rivals. Everything teaches us that when one avenue to death is closed, another opens,—

Noctes atque dies patet atri janua Ditis.

You will perceive from all this, that vaccination, great as its merits are (and no one more fully appreciates them than I do), does not, and cannot do all that its too

sanguine admirers promised. The blessings of vaccination are met and counterbalanced by the law of vicarious mortality. How and why is this? The explanation is easy. The weak plants of a nursery must be weeded out. If weakly children do not fall victims to small-pox, they live to fall into the jaws of tyrants scarcely less inexorable. Scarlet fever and measles are both advancing in respect of mortality, and the increase of deaths by hooping cough since this century set in is quite extraordinary.

These statistical considerations are both curious and instructive, but they are not to diminish our zeal in behalf of vaccination, or our efforts to lessen the sum of human misery.

Dr. Haygarth once inquired what would be the probable effect of a complete annihilation of small pox. He entertained some extravagant idea of effecting this by a plan of universal inoculation. The result of the calculation was, that in fifty years more than one eighth would be added to the population. On a population of sixteen millions (which we now nearly reach), the increase in fifty years would therefore be two millions and a half. In this calculation, the doctrine of vicarious mortality, though not left out of consideration, was, it is plain, prodigiously underrated.

The general character of the exanthemata is derived from the following sources:—1. From the presence and course of the accompanying constitutional disturbance. 2. From the course of the local or cutaneous affection. 3. From the law of universal susceptibility. 4. From the law of non-recurrence. 5. From the law of contagious origin. 6. From the law of epidemic diffusion. Fever, eruption, universal susceptibility, non-recurrence, conta-

gion, epidemic diffusion—these are the topics which in the course of this and the succeeding lecture are to occupy our thoughts. They will be found to involve a great variety of important and some very curious considerations, all equally necessary to a due understanding of the exanthemata.

1. The exanthemata are usually described as fevers to which eruption is essentially linked. The old authors used the phrases, febris variolosa, febris rubeolosa, febris anginosa, and erysipelatosa, when speaking of these disorders. As the doctrines of fever have not yet been formally explained to you, I may premise that by fever we mean a general disturbance of the whole system, affecting principally the heart, lungs, brain, and secreting organs, but extending, more or less, to every structure and function of the body. The four leading features of fever are—1. Rigors, succeeded by or alternating with flushes. 2. Frequency of pulse. 3. Lassitude and debility. 4. Diminished and depraved secretion. When a man has a hot skin, a frequent pulse, a furred tongue, and a feeling of weariness, we say that he has an attack of fever. The lesser symptoms are, restlessness, disturbed dreams, wandering pains, especially of the back and limbs, thirst, and loss of appetite.

Fever is of several kinds, types, or characters. We distinguish four great types of fever, the inflammatory, the nervous, the gastric, and the malignant, in which respectively the heart, the brain, the intestinal canal, and the blood itself are more directly and severely implicated. The true character of exanthematous fever is inflammatory. This it exhibits in nineteen-twentieths of the cases of small pox and measles. The low or nervous form of fever occasionally characterizes scarlatina and erysipelas. The putrid, petechial, or malignant form

of fever is occasionally witnessed both in small pox and scarlatina. In these cases the blood is literally poisoned. It loses its ordinary powers of coagulation, bursts through its containing vessels, and appears in the form of petechiæ and hæmorrhages. It is a curious circumstance that the vaccine poison, mild as it is to the greater number of mankind, may yet in the same manner poison the blood. I have lately attended a case of petechial cow pox—an occurrence hitherto unrecorded.

Exanthematous fever is divided into stages. I shall have to speak to you of four stages—the incubative, eruptive, maturative, and secondary. The incubative stage, commonly called the period of breeding, is of two kinds, the *silent*, and the *overt;* that is, it is sometimes attended, sometimes unattended by symptoms. The processes of eruption and maturation have likewise their respective fevers, called the eruptive and maturative fever. The term secondary fever expresses that renewal or exacerbation of febrile symptoms which happens when the specific fever ought, normally, to subside. It is commonly applied to small-pox, but I shall have occasion to shew you that each exanthema has its stage of secondary fever, characterized by a certain group of symptoms. Here we trace another important bond of connexion among the exanthemata.

Nothing is more striking than to witness the uniformity in the character of exanthematous fever, under every possible variety of external circumstance. Neither age, season, climate, nor habit of body, affect materially the phenomena of small pox and measles. The description of the exanthemata handed down to us from the Arabians, corresponds perfectly with the appearances which we now witness: the European and the negro, the infant and the aged man, the strong and the feeble, suffer alike.

The chief modifications of exanthematous fever are the result either of idiosyncrasy or of a habit of body artificially engendered.

The peculiarly steady course of exanthematous fever enables us to predict the result, or, as we commonly say, to prognosticate, in eruptive fevers, with a certainty which it is not permitted us to do in any other tribe of diseases. Even the nurses at the Small Pox Hospital are rarely deceived.

The notion that "fever precedes the specific action of the exanthematous poisons" has prevailed in all ages, and still holds its ground. You will find this doctrine distinctly laid down in Dr. Williams's work on the morbid poisons. He calls fever the *primary* effect of the poison; affection of the skin and mucous membranes he calls the *secondary* effect of the poison; and the inflammation of internal organs its *tertiary* effect.

Having mentioned the work of Dr. Williams,* senior physician of this hospital, I should be doing injustice to my own feelings were I not to say that, in my judgment, it is the best specimen of elaborate research, of lucid and terse description, and of sound pathology, which has appeared in this country—honourable alike to the author, to this hospital, and to the age in which we live. It is a work, which better than any other that I know portrays the style of reasoning on matters of pathology prevailing in this country at this time, and as such will be quoted in after ages. It should be in the hands, not of the student, for he cannot appreciate its merit, but of every practitioner in this country, who will find in it rich stores of curious anecdote and useful instruction.

High as the authority of Dr. Williams is, I shall occa-

* Elements of Medicine. On Morbid Poisons. By Robert Williams, M.D. London, 1841. 2 vols. 8vo.

sionally venture to dissent from him, and shall do so on the present occasion. Dr. Williams, I have told you, upholds the ancient maxim that fever precedes the specific action of exanthematic poisons. The doctrine that I teach you, however, is, that exanthema may take place without fever, that the febrile state is not essential to the development of exanthem. For observe,—cow pox, varicella, inoculated small pox, and the mildest type of scarlatina, frequently display themselves without initiatory, without eruptive, nay, even without maturative fever. But further, I shall have occasion to shew you, that the less the amount of fever, the more perfectly is the eruption developed, and the more normal is the course of the disease. Any tumultuous febrile action disturbs the regular progress of an exanthem. Witness scarlatina with excessive angina. There is here literally no eruption at all. We call the complaint angina maligna. Witness the recession of the eruption in malignant measles. Witness the ill-developed eruption of petechial small pox. This consideration is strictly practical. It shews the extreme folly of the old notion, that raising a fever by means of warm baths, heated rooms, and cordial alexipharmacs, promoted eruption. It shews you the merits of Sydenham and of Sutton, who, in consecutive centuries, did so much to improve the practice in small pox. It shews you that the violence of initiatory fever must often be subdued by active purgatives, by leeches, or even by venesection, to give the disease any chance of running a safe course.

As, then, there may be eruption without fever, the question may reasonably be asked—May there not be the specific fever of an exanthematous poison without eruption? Has a man ever gone through small pox and measles without exhibiting eruption? In all ages this

doctrine has obtained some supporters. Sydenham encouraged the notion that in epidemic years a variolous fever was to be met with which shewed no eruption. Burserius, Vogel, De Haen, Frank, Hedland, and others, have, in later times, avowed their belief in this Irish mode of undergoing small pox. Some countenance is given to the doctrine by the phenomena of cynanche maligna, but it is very questionable pathology, which I cannot undertake to advocate.

2. The second character of the exanthemata is derived from the presence of eruption. Here I must advert, for a few moments, to a doctrine recently brought forward under the title of the *symmetry of diseased action;* by which is understood the fact, that in disease both sides of the body are affected alike. This doctrine always reminds me of the lines on Dutch gardening, where

> Grove nods at grove, each alley has its brother,
> And half the garden just reflects the other.

In the case of this symmetrical disposition of disease, we are all, I suspect, pretty much in the same state as the Bourgeois Gentilhomme, who found out that he had been speaking prose all his life without knowing it. We knew the facts, but we had never reasoned concerning them. The chief illustrations of the symmetry of disease are to be found in the phenomena of rheumatism, in the mode of decay of the teeth, in the growth of certain tumours; but, better than all, in the aspect of exanthematic eruption. In the corymbose form of small pox, the patches, or corymbi, will be found to correspond on the two sides of the body in the most singular manner. Once I had a patient at the Small Pox Hospital, who exhibited confluence in the highest possible degree on each hand and wrist, but in no other part of her body.

In all the exanthemata, the parts of the body nearest the centre of circulation are more affected than those at a distance. This is strikingly exemplified in the eruption of post-vaccine small pox, which is often confluent on the face, and wholly undeveloped on the extremities.

In general, the distinctive characters of exanthematous eruption are strongly marked, but difficulties in diagnosis do occur. Small pox is sometimes mistaken for chicken pox. Measles is not always readily distinguished from lichen.

When the exanthemata first invaded the world, their identity was universally believed. Rhazes and Avicenna taught that small pox and measles were the same disease. Even so late as 1640 this doctrine prevailed all over Europe. Measles and scarlatina continued to be confounded until about fifty years ago; nor has this strong bias in favour of exanthematic identity by any means subsided. Dr. Thomson, of Edinburgh, labours to prove that chicken pox is identical with small pox. Dr. Baron, Mr. Ceely, and others, who would be justly offended by the imputation of confounding scarlatina with measles, or measles with small pox, contend nevertheless strenuously for the identity of small pox and cow pox.

Nothing certain is known regarding the primary sources of the exanthematic poisons. The analogy of cow pox would lead us to conjecture that all (I mean the variolous, rubeolous, and scarlatinal) were originally derived from cattle. Such an idea was entertained long before the discovery of vaccination. Dr. Layard, in 1780, distinctly avowed his belief that the lues bovilla was of the same nature as small pox. Navier (a French author), in 1753, traced the relation subsisting between scarlatina and the distemper of horned cattle, and came

to the conclusion that scarlet-fever was originally communicated from cattle to man.

In some cases the body receives at one and the same moment the germs or miasms of two exanthemata, and though they occasionally proceed *pari passu*, the more usual law is that of suspension. Generally the lesser exanthem is suspended by the greater. Measles is suspended by small pox. Cow pox is held in abeyance by measles; but instances of the reverse proceeding are on record.

The connexion of exanthematous eruption with a like affection of those mucous expansions or tissues which are in contact with the atmospheric air, and exposed to its direct influences, claims your especial attention. It is a feature in the eruptive fevers of the highest importance both in theory and practice. A reason may be found for this connexion in the similarity of the structure and offices of skin and mucous membrane. The epithelium of the one corresponds with the epidermis of the other. The result is, that all such mucous membranes are susceptible of the changes of efflorescence, papula, vesicle, and pustule. Small pox, measles, and scarlatina, alike exhibit, in their early stages, affection of mucous surfaces,—either of the nose, mouth, fauces, larynx, or trachea. Erysipelas sometimes betrays the same tendency, and this strong disposition of the morbid poisons to affect the throat is still further exemplified in the phenomena of hydrophobia and lues venerea.

In some cases, the skin receives the whole violence of the poison; sometimes the mucous membrane to the exclusion of the skin; and in a third set of cases, both structures suffer. The blood, too, may be primarily affected by the poison, even before the development

of fever, (illustrating the principle, that the eruptive nisus is independent of fever.) But other organs occasionally suffer, when the miasm is unusually virulent, or the body in an unhealthy state. Here we trace an important bond of connexion between the eruptive and other kinds of fever.

In typhus fever, rheumatic fever, and remittent fever, we observe the implication of internal structures. These most serious aggravations of eruptive malady, whether denominated secondary or tertiary, may occur at all periods of the exanthem. They may accompany the first burst of eruption;—they may develop themselves gradually during the maturative stage, or period of *concoction*, but they prevail chiefly towards the decline of the disorder, and in the course of secondary fever.

I know of no exanthem which does not shew secondary complications, no organ or structure which may not thus be dragged, as it were, into participation with the primary malady.

In small pox we see the eye, the salivary glands, the brain, the pleura, so affected. In measles we see the lungs, the larynx, and the mucous membrane of the bowels, secondarily affected. In scarlet fever the variety is still greater. The eye, the ear, the heart, the liver, the kidney, and the peritoneal surface of the bowels, are each, in their turn, the seat of superadded disorder. In certain cases, the morbid poison acts as directly on these internal structures as it does upon the skin; but this is not a normal course of exanthematous disorder. Most of these secondary affections (especially those which occur after the climax or crisis) are satisfactorily explained on other principles, for the virulence of the poison has by this time generally expended itself. Some are attributable to season, some to plethora, some to local weakness, the

legacy of a prior ailment; some to the coincidence of a typhoid or hospital miasm. The theory of a few cases must be sought for yet deeper, and may be found in that obscure law of the animal economy which, in other diseases, probably through the medium of the veins, tends to the formation of purulent depôts.

These secondary or superadded effects of the poison vary very much in violence. The pleuritic complication in the secondary fever of small pox, the pneumonia consecutive of measles, and the dropsy supervening in the latter stages of scarlatina, absorb every other consideration, and prove, in themselves, the direct causes of death. But other affections of the surface may take place besides the specific affection belonging to the miasm. Thus we may have small pox followed by scarlatina—measles by erysipelas and gangrene—scarlatina by phlegmasia dolens. Some complications, again, are purely accidental, and this happens much more frequently in adult than in infantile life. In infancy the exanthemata occur for the most part uncomplicated; but as life advances, the probability increases of some accidental complication. Thus, for instance, small pox in the adult may be complicated with apoplexy; measles with phthisis; scarlatina with pregnancy. In infancy we sometimes meet with hooping cough complicating and thereby aggravating each of the eruptive fevers.

LECTURE II.

CHARACTER AND MANAGEMENT OF THE ERUPTIVE FEVERS.

Law of universal susceptibility. Law of non-recurrence. Exceptions to this law. Of contagion. Miasm or morbid poison. Modes of its access to the body. Inoculation. Theory of Zymosis. Absence of predisposing causes. Of Fomites. Quarantine. Epidemic diffusion. Theories of epidemic influence. Laws of epidemic visitation. Management of the Exanthemata —during the period of invasion—of maturation and decline. Inefficacy of tonics in the secondary fever of the Exanthemata. Employment of saline diaphoretics—of opiates. Influence of medicine generally on the course of the eruptive fevers.

THE eruptive fevers derive their third character from the law of universal susceptibility.

No principle is more generally recognised than that small pox and measles necessarily and unavoidably occur to every man once in the course of life. The notion can be traced back even to the Arabians. Avicenna distinctly announces the fact, and strives to account for it. Willis says, that the escape of a man living to the ordinary period of human life from small pox and measles, is as rare as the falling into them twice. Both the one and the other he describes as *rara et inusitata eventa.* Diemerbroeck is the only author I know who distrusted

the doctrine of universal susceptibility, and he was doubtless influenced by the fact that he himself reached the age of seventy without ever experiencing an attack of small pox, though so continually exposed to the contagion. In the palmy days of inoculation, it was found that very few children were permanently unsusceptible, though, of course, from temporary causes, the operation occasionally failed of success. Dr. Woodville, my predecessor at the Small Pox Hospital, estimated the proportion of unsusceptible children at one out of sixty. The proportion of unsusceptible adults was considerably higher, perhaps one in twenty.

There are still some countries in the world not yet visited by the exanthemata. Small pox, measles, and scarlet fever, are to this day unknown in Australia and Van Dieman's Land.

All the exanthemata have sprung up since the commencement of the sixth century. The dates of the first appearance of each exanthem will be duly investigated, as constituting an interesting branch of medical chronology. That a "nova febrium cohors" should thus invade the earth need not surprise us when we reflect that, within our own times, two have started into existence—Vaccinia and Asiatic Cholera,—the mildest and the most malignant of human maladies, the Alpha and the Omega in the catalogue of morbid poisons. How many more of what Gray describes as

> "The painful family of death
> More hideous than their queen,"

lie concealed in the womb of time it is not for us to conjecture.

The fourth peculiarity of the exanthemata is derived from the law of non-recurrence. It was formerly held that scarce any one had small pox or measles a second

time. This doctrine was sedulously inculcated during the greater part of the last century, when the philanthropic mind was labouring to encourage the practice of inoculation.

Dr. Mead, of London, the elder Monro, of Edinburgh, (two of the best practical physicians of the last century,) doubted the possibility of small pox recurring. De Haen, De la Condamine and Dr. Heberden, spoke of it as a possible but most unusual event. Times are changed. Vaccination has taken the place of inoculation, and now, to screen the obvious defects in the protective power of the cow pox, pathologists have wheeled round, and many, in their zeal, would fain persuade us that the recurrence both of small pox and of measles is far more frequent than our forefathers were willing to admit. The friends of vaccination, says Dr. Baron,* were *compelled* to prove that the small pox occurred a second time, and in so doing were accused of drawing upon their imagination. To determine the truth in a matter of such interest may profitably employ a few minutes of our time.

Immunity from second attacks of the same disease is a very extended and a very important principle in pathology. It does not merely apply (as the world would have us believe) to small pox, measles, and hooping cough, but to all diseases whatever which originate from a poison or miasm—which are, as we say, of *miasmatic* origin. It belongs, therefore, to scarlet fever, yellow fever, typhus fever, and Egyptian plague. It belongs, though in a less degree, to fevers of paludal, terrestrial, or, as we sometimes say, of *endemic* origin—that is, to ague and remitting fever. The law is even distinctly traceable in fevers of internal origin—such as gout and rheumatism. We congratulate a friend when we hear

* Baron's Life of Jenner, vol. i. p. 226.

that he has had a fit of the gout, because we feel sure that for a certain time he will be free from similar attacks. In all cases, therefore, the susceptibility of a disease is more or less exhausted by once undergoing it. A gradation in this respect may easily be traced from rheumatism and gout (where the law obtains least) through ague and every variety of endemic fever, whether remittent or continued, up to plague, scarlet fever, typhus, yellow fever, measles, and small pox. The law of non-recurrence is more strikingly displayed in measles and small pox than in any other known disorder. Nevertheless, exceptions occur even here, of which due mention will be made in future parts of the course.

We now approach the fifth characteristic of the exanthemata—contagious origin.

The diseases of the human body are divisible into two great classes — those of constitutional and those of accidental origin. This distinction is very obvious in surgery. Cancer, fungus hæmatodes, stone in the bladder, white swellings, psoas abscess, aneurisms,—all arise from internal causes, and are of constitutional origin. Again, fractures, dislocations, sprains, wounds, burns, scalds, and contusions, are the result of external and accidental causes. In a community where there were no railroads, no runaway horses, no high scaffoldings, no deep mines, no cotton mills, and no careless servants, a surgeon might practise for many years without ever meeting with any disorders but those of constitutional origin.

Now the same distinction holds good in physic. There are medical as well as surgical accidents. Dropsies, inflammations, hæmorrhages, apoplexy, palsy, and jaundice, are all constitutional maladies, arising from such internal causes as the following:—Advancing age,

scrofula, original weakness of constitution, the gouty or rheumatic diathesis imprinted on the individual at birth and descending to him from his parents.

The second class of medical disorders are those of accidental origin—the results of overfeeding, of intemperance, of exposure to cold, of excessive fatigue, but above all, of those deleterious agents received into the body from without, which we call miasms or poisons. The most interesting disorders belonging to this class are the exanthemata; but, besides them, we enumerate, as associated with them, the venereal disease, gonorrhœa, hydrophobia, hooping cough, plague, and some others of lesser moment. These all originate from the miasms of an animal body labouring under disease, and we therefore call them the true morbid poisons. Ague, remittent fever, dysentery, and cholera, arise from terrestrial miasm. In Dr. Williams's work, however, you will find all these diseases treated of under the general appellation of the "*morbid poisons.*"

The contagion, infective miasm, or *materies morbi*, obtains access to the human body in three modes. First, by the inhalation of air tainted by the breath or perspiration of a patient. This is called the mode of infection. Small pox, measles, plague, typhus, scarlatina, and erysipelas, are thus communicated. Experiments have been made to determine the limit of infective distance, but nothing very satisfactory is known concerning it. It probably varies from a few feet to many yards.

2. Miasms gain access to the body, secondly, by solution in the fluids, or humours, and subsequent application to the unbroken surface. It is thus that psora, tinea capitis, gonorrhœa, and the venereal disease, are communicated from man to man. We call this mode, contagion, "*a contactu corporis.*" Remember that the

materies morbi must be dissolved. "Corpora non agunt nisi soluta" was a dogma of the old chemists. It is equally true of the animal body. Fluidity is essential to all the great processes going on within the animal economy, a principle which those who vaccinate from points and glasses are very apt to forget. The germ of disease is conveyed in the fluid form into the interior of the frame, where it mixes with and taints the blood, the most complex, the most perfect, and the most essential to life of all the animal fluids.

Strongly impressed with the importance of these things, the ancient physicians professed themselves *humoral* pathologists, and the current of modern discovery is running rapidly into the same channel. Witness the importance attached to the condition of the urine in disease, and observe with what interest all microscopical observations on the blood and its secretions are now received.

3. Certain of the morbid poisons are not admitted into the frame unless (still after solution in the animal fluids) they are applied to an abraded or wounded surface. Hydrophobia, vaccinia, and farcinoma (or glanders), are received in this mode. Small pox and plague may thus be excited artificially, and the process is, as you know, called inoculation.

One of those curious points in pathology which is now attracting the attention of Continental physicians is the direct communication of disease by means of the blood, and not by the secretion derived from the blood. It is very reasonable to suppose that such may be the law of nature. All infection is probably direct from the blood. The injection of the blood of a glandered horse into the veins of a healthy horse communicates that disorder. Measles has been communicated by inocula-

tion with the blood in so many instances, and by so many experimenters, and recently in the Austrian territories on so large a scale, that no doubt can exist as to the possibility of thus exciting the disease. I have often noticed that if the vaccine vesicle be punctured so deeply as to bleed, the lymph is equally effective as when perfectly colourless and pure. All these things point to an important principle—the direct communication of disease by means of the blood. Whether the resulting disorder be thereby rendered milder, as in the ordinary process of inoculation from secreted humour, or not, is a question for our future consideration.

Each specific miasm has its respective laws—its period of latency, of development, and of decline. With reference to the period of incubation, the morbid miasms are divisible into three classes:—

1. Those of *rapid* incubation—viz., chicken pox, plague, scarlatina, and gonorrhœa. In these instances the latent period is less than a week.

2. Those of *mature* incubation, the period extending from ten to fourteen days. In this class come small pox, measles, and hooping cough.

3. Those of *tedious* incubation, (extending from four to six weeks.) In this class we place hydrophobia and secondary syphilis.

From the earliest period at which the existence of morbid poisons became known, the analogy of vegetable fermentation has been adduced to explain their *modus operandi*. The doctrine of a fermentative process going on during the incubation of small pox and measles, was distinctly announced by Sydenham, Willis, Diemerbroeck, and Morton. Liëbig has lately given increased interest to this portion of pathology, by reviving the hypothesis of fermentation, and investing it with a scientific character.

"The phenomena attending the transformation of organic vegetable compounds afford," he says, "not merely an analogy, but a correct explanation of the changes taking place in the animal economy by the agency of morbid poisons." Nothing, however, can be clearer than that in this notion, whether correct or not, Liëbig is anticipated by Diemerbroeck, who flourished two hundred years ago. "Out of an infected body," says he, "flow forth continual streams, which, being received by other bodies, presently ferment with the blood, and excite the latent and homogeneous seeds of the same distemper, disposing them into the idea or character of the same disease."

Mr. Farr, in his fourth report, recently submitted to parliament, proposes to call all those diseases which have the property of communicating their own action, and effecting analogous transformations, zymotic diseases, (from ζυμοω, to ferment,) and the action itself, zymosis. Zymotic diseases will comprehend all those now associated by the tedious periphrasis of "epidemic, endemic, and contagious maladies." The terms appear to me to be judiciously chosen, and I shall employ them in these lectures. Zymosis, you will remember, is applied to a process of the *animal* economy; fermentation to the mutual action of *vegetable* principles.

One very remarkable character of the zymotic miasms is, that they operate upon the healthy body without the aid of predisposing causes. A man in the most perfect health contracts small pox or measles, and this state of body is the best possible for ensuring the success of inoculation and vaccination. Almost all cases of vaccination which progress unfavourably, may be traced to some previously unhealthy condition of the humours or secretions. A characteristic feature, then, of the exanthemata is "*absence of predisposing causes.*"

All miasms of animal origin are capable of attaching themselves to fomites, and (provided they be excluded from the air) of retaining their communicating property for a considerable length of time. This great law of nature is the foundation of that important practical measure—quarantine. It is a law of universal application. Tinea capitis spreads by means of hats, combs, and brushes; Egyptian ophthalmia by towels and sponges; small pox and typhus by clothes and bedding; plague by personal apparel and old rags. Some would persuade us that merchandise, which, *ex necessitate rei*, could never have been near the chambers of the sick, or handled by others than by men in health, may also communicate contagion; but I believe this doctrine to be opposed to every principle in sound pathology.

Reasoning chiefly from the well-established fact that medical men very seldom communicate the seeds of disease, Dr. Haygarth discredited the doctrine of communication by fomites. That fact, though it will not bear out Haygarth in his speculations, sufficiently proves how exceedingly volatile contagious miasms are, and how short an exposure to the air deprives them of noxious quality. The term of forty days, originally judged necessary for the security of the community, is founded on utter ignorance of the laws of morbid poisons. As the incubative stage of plague never exceeds seven days, so one week of quarantine is, in strictness, sufficient, and two weeks should satisfy the most scrupulous anxiety. The period of quarantine, too, may safely commence from the departure of the ship from the suspected port. This great improvement in commercial intercourse is now sanctioned by the British Government.

You will take notice, that all fomites or harbourers of contagion, are substances of a rough surface or downy

texture. Wool, cotton, leather, every kind of apparel, the dust accumulated on walls, floors, and ceilings, are those against which it behoves you to be most on your guard. By universal consent it is admitted that money and all metallic substances are incapable of harbouring contagion.

6. The sixth and last character of the exanthemata is drawn from their occurrence as *epidemics*. This term is derived from the Greek words επι and δημος, and simply expresses the fact of the spreading of a disease among the people without reference to the precise *mode* of communication. Some diseases therefore are contagious but not epidemic, as ophthalmia, gonorrhœa, and porrigo. Some are epidemic but not contagious, as catarrh, diarrhœa, and pneumonia.

Lastly, some diseases are both epidemic and contagious, as small pox, measles, scarlet fever, typhus fever, plague, and probably also cholera. These are the diseases which, rising occasionally like a mist out of the earth, shed desolation on nations, to disappear as rapidly and as insensibly as they arose. The origin of all such disorders is necessarily obscure, but the obscurity has proved no stumbling-block in the path of medical theorists. In ancient times their appearance was attributed to the direct agency of the sun, moon, and stars; (whence the term *influenza*, applied to the least energetic among them.) Sydenham connected them with some supposed movements going on *below* the earth's surface. Some find, or pretend to find, their source in mysterious changes of the atmosphere; others in heat, or some bad quality of food. Dr. Holland looks with favour on the animalcular origin of epidemic maladies, while Diemerbroeck candidly avows his belief that this

is one of those mysteries which nature for ever intends to keep to herself.

The present most approved theory of epidemic influence attributes everything to the atmosphere, but neither the thermometer, nor the barometer, nor the hygrometer, nor the electrometer, aid us in our researches. The best prospect of attaining to truth in this recondite branch of pathology is afforded by the increasing fondness for statistical researches. Their improvement and extension to eastern countries, where all wide-spreading epidemics seem to originate, may perhaps discover order where all is now confusion and vague conjecture.

Ten diseases are placed by Mr. Farr in the category of epidemic maladies—namely, small pox, measles, scarlatina, and hooping-cough, the four great epidemics, together with croup, thrush, diarrhœa, dysentery, cholera, and influenza.

Although we make no pretensions to a knowledge of the ultimate cause of epidemic visitation, yet there are certain laws, having reference to the diffusion of epidemics which are sufficiently established.

It is seldom that two diseases are epidemic at the same time in the same district. When the yellow fever raged with such violence at Gibraltar in 1804, it was remarked, that all other diseases declined; and well they might, for in that fatal epidemic, out of a civil population of 14,000 persons, 28 only escaped an attack. We may hence learn why, during the presence of an epidemic which proves fatal at a high per centage, the sum total of annual mortality is often not sensibly augmented. The reason is obvious. Other diseases fall off, and if men die of cholera, or children of small pox, they are

not left to be the prey of pneumonia or of hydrocephalus, of asthma or of croup.

There are some exceptions to the law that only one epidemic can rage at one and the same time. In 1839, both small pox and measles were epidemic in England and Wales. On the *succession* of epidemic maladies we have as yet no details that can be relied on, but this branch of the subject invites inquiry, and promises results both curious and useful. We may safely leave it in the hands of Mr. Farr, whose laborious investigations have already done so much to elucidate the truth, conducted as they have been with great judgment, and guided by sound views of pathology. The notion once entertained of the recurrence of epidemics in cycles of five, seven, or ten years, has been disproved by modern statistics, the cultivation of which will probably serve to dispel many other long-established opinions, or rather prejudices, in physic.

It has always been observed, that epidemics are unusually severe when they first appear in any country, or are renewed after any long interval of time. When cholera first invaded India, in 1817, it raged with an intensity which may have been equalled, but never has been surpassed. When the cynanche maligna first invaded Naples, in 1618,—when small pox first appeared in America (1518),—when the putrid sore throat first invaded America in 1735, and London in 1747,—the ravages of each disorder were terrific. It seems, then, to be a law of the animal economy, that the susceptibility to any morbid poison is great in proportion as it has been little accustomed to the impression.

The principles which are to guide you in the general management of the eruptive fevers fall next to be con-

sidered. The exanthemata cannot be cut short. Common fever, accidentally arising, may be cut short by blood-letting, by an emetic, or a brisk purgative; nay, sometimes by the cold affusion; but an exanthema cannot. It has been six, eight, or twelve days breeding. It must run its course. You cannot reasonably indulge the hope of preventing or even moderating eruption either on the skin or throat by active measures in the early stages of small pox or scarlet fever. The legitimate objects of treatment at this period are to lessen inordinate constitutional tumult, to subdue plethora, to check accidental congestions and complications. These are much more likely to occur when the heart and arteries are overloaded with blood, and urged to inordinate exertion, than when the mass of blood is in a pure and healthy condition. Always remember, too, when you bleed early in an eruptive fever, that the disease has a long course to run, and be moderate in your demands on the system.

You perceive, then, that the great objects of treatment in these disorders are less directed to the specific malady than to those congestions and superadded affections by which the steady march of the exanthem is impeded. Hundreds of cases, whether of small pox, measles, or scarlatina, may be safely conducted to a close without a grain of medicine. And why? Because the febrile action or zymotic process, in such cases, goes on quietly, being neither too violent on the one hand, nor, on the other, deficient in the necessary power. To give active medicine here is hurtful. It deranges nature. But the case is different when the febrile commotion or effervescence is inordinately violent, as when small pox is ushered in with phrenitis, measles with epistaxis, scarlatina with excessive angina. Purgatives, leeches, cold lotions, bleeding from the arm, may then be required.

On the other hand, should the vis vitæ fail, should the first effect of the poison be to reduce the powers of life so low that the disorder cannot develop its regular and appointed series of phases, when the extremities are cold, the eruption tardy, when syncope occurs, or actual collapse threatened, then is the time arrived for stimulants, such as brandy, white wine negus, camphor, ether, hot bottles to the feet, mustard poultices to the epigastrium, and a warm bath.

From a very early period, a notion gained ground that nature had provided us with substances having a specific power of promoting efflorescence, and warding off poison. They were called alexipharmics, (from the Greek αλεξω, to repel, and φαρμακον, a remedy.) At the head of these was saffron; and saffron is still given to promote the eruption in measles, and to assist birds during the process of moulting. I need hardly tell you that this is an entire delusion.

You will hear people talking largely of the debility left by the exanthemata, more especially by small pox and measles. This idea is not to be adopted by you without inquiry. It is very true, that both small pox and measles do often exhaust the frame greatly, and by such debility occasion other disorders to spring up, which flourish only in a state of constitutional weakness and cachexia. All forms of scrofula are thus developed; but you are not to set this down as an universal law. The truth is, not many of the exanthemata last long enough to induce real debility. What men call debility is, in nine cases out of ten, secondary fever. If the theory of debility be adopted, and beef tea, wine, bark, and tonic medicines, be administered, you feed the fever, and make bad worse. Not long ago, I saw peritoneal inflammation occasioned by acting on this false notion of exanthematic

debility. Secondary fever must be reduced, like other fevers, by purgatives, diuretics, and low diet. You cannot safely stimulate in secondary fever.

To no disease does this principle apply more strongly than to scarlet fever. I have seen this exanthem followed by true debility; but febrile or apparent debility is far more common. The circumstances which indicate real debility in the several exanthemata will be mentioned hereafter.

Much of what applies to the treatment of common fever applies also to the exanthemata. These points will be more fully detailed to you hereafter; but I may select two general principles as illustrative of my meaning:—

1. One of the chief features of fever, both in a theoretical and practical aspect, is the general diminution of secretion observable all over the body. The secretions of the mouth, the stomach, the mucous membrane of the intestines, the kidney, the liver, and the skin, are alike checked during the presence of fever. Whatever therefore encourages secretion aids and assists in the expulsion of fever. We employ, therefore, diuretics and diaphoretics,—calomel with James's powder, or the antimonial powder, saline draughts, saline purgatives, jalap with cream of tartar, senna with the sulphate of magnesia.

2. On the very same principle, we avoid opiates as far as possible, for all opiates confine the secretions. Opium given to a man in health, *per se*, occasions a state of ephemeral feverishness, like wine. Opium locks up the bowels, diminishes the urine, causes thirst and a dry tongue. But it does more when the system is already labouring under fever of any intensity. It then disturbs the circulation very materially. It occasions, or at least aggravates, congestion in the large vessels, whether in the head, chest, or belly. We often see opium in fever

producing piles. In all exanthematous fevers, therefore, let opium be avoided, or administered with such correctives as this evil tendency of the medicine naturally suggests.

When all is done, you will not fail to remark how small a proportion the strictly therapeutical and practical parts of the course bear to the descriptive and pathological portions; it will often remind you of Falstaff's *ha'porth* of bread to his two gallons of sack. Remember, however, that in the exact proportion in which we improve the two latter, we diminish, not the importance, but the extent, of the former. In the early periods of medicine, when descriptions of disease were imperfect, and pathology was in its infancy, and statistics were unknown, physicians arrogated to themselves a power of controlling, by drugs, the course of diseases (and especially of exanthematic diseases), which we now know to be wholly unwarranted. Pages and chapters were devoted to objects quite unattainable; presenting, indeed, an imposing, but a vain parade of learning. In this respect, we have improved upon our predecessors. Trophilus, an ancient Greek physician, being asked who was the most perfect physician, replied, "He who knows best how to distinguish that which can from that which cannot be done."

LECTURE III.

EARLY HISTORY AND PHENOMENA OF SMALL POX.

Pestilence of Procopius. First appearance of small pox in England and America. Of the sweating system. Introduction and progress of inoculation. Abandonment of that process. Of the period of incubation in small pox. Diagnosis of the initiatory fever. Characters of the variolous eruption. Maturative stage. Implication of the mucous membranes. Implication of the cellular membrane. Secondary fever, and its consequences. Implication of the nervous system. Of the petechial form of small pox. Of small pox accompanied with gangrene, ophthalmia, and affection of internal organs. Of the variolous pleurisy. Of the abdominal complications. Appearances on dissection.

Small Pox is the most remarkable of all the eruptive fevers, and though I once proposed to begin with the simple efflorescences, and proceed thence to small pox, the most highly-developed form of exanthematic disease, yet I find that other and more important objects will be gained by beginning with small pox. A brief sketch of the early history of this disease will be quite essential to a due understanding of the subject.

The Greeks and Romans knew nothing of small pox. It is very true that Hahn in former times, and Dr. Willan and Dr. Baron in our own, have laboured diligently to prove the contrary. Mr. Moore, too, has been no less anxious to convince us that small pox was known in

China and Hindostan even before the time of Hippocrates; but I am very incredulous on these points, and am borne out in this scepticism by the opinions of Dr. Friend, Dr. Mead, and many other physicians of great learning, and equally indefatigable in research.

The first notice of a disease that looks like small pox is to be found in a chapter of Procopius, "De Bello Persico" (lib. ii. cap. 22), where he describes a dreadful pestilence which began at Pelusium, in Egypt, about the year 544, and spread in two directions, towards Alexandria on the one side, and Palestine on the other. This disease, he says, was accompanied by bubos and carbuncles. So far, it resembled Egyptian plague; but, on the other hand, Procopius distinctly states that it raged independent of all season; that it spread into Persia, and through the whole interior of Asia, and did not confine itself to the shores of the Mediterranean and Red Seas; that it spared neither age nor sex; that it affected the whole human race alike; that it was a new disorder, so little understood by the physicians of those days, that many recovered whom they had given over as hopeless, and many died whom they had pronounced safe. It is stated, also, that it was peculiarly severe in pregnant women. All this looks very like small pox.

Whether this epidemic was or was not small pox may be doubted; but certainly, within a short time afterwards, very unequivocal traces of small pox are to be met with in the countries bordering on the Red Sea, for we read of caliphs and caliphs' daughters being pitted. Mr. Bruce, the celebrated Abyssinian traveller, wishes to fix the first epidemic of small pox to the era 522, which corresponds sufficiently near to the date of this plague described by Procopius.

Small pox had certainly been known for several centu-

ries before it was described. Rhazes (910) is the first author who mentions it: his description is clear and full, his theory childish in the extreme, and his practice very bad. Avicenna and Hali Abbas, the Arabian physicians who succeeded Rhazes, also mention variola, adding some facts to those already described.

From the east small pox travelled to the west, whether slowly or quickly we have no means of ascertaining. It appears to have reached England towards the close of the ninth century. The word variola is to be found in several Latin manuscripts preserved in the British Museum, of date decidedly prior to 900. Exorcisms to ward off the dangers of this new plague are to be found, addressed to St. Nicase. The term variola, the diminutive of varus, a pimple, is obviously of monkish origin. The monks, you know, were the depositaries of all the little medical learning of those times. The term pock is of Saxon origin, and signifies a bag or pouch. The epithet *small* in England, and *petite* in France, were added soon after the introduction of the grand or great pox, in 1498.

If America (discovered in 1492) gave us, as people confidently say it did, the great pox, we more than returned the compliment by introducing to her acquaintance the small pox. This pestilence reached the American Continent about 1527, devastating in the first instance Mexico, and spreading afterwards, with fearful virulence, over the whole of that vast country. The ravages of small pox, great as they are in temperate climates, are far greater in tropical; severe as they are in the white skin, they are far severer in the black and coloured races.

Skipping over 120 years, the era at which I shall next pause is 1640, when the mode of treating fevers by

the hot or sweating system had attained its acme. We have a splendid picture of this practice in the writings of Diemerbroeck, a Dutch physician and professor. I must treat you to some few traits of this system, premising that it was especially applicable to small pox.

"Keep the patient," says Diemerbroeck, "in a chamber close shut. If it be winter, let the air be corrected by large fires. Take care that no cold gets to the patient's bed. Cover him over with blankets. Red blankets have always been preferred—not that the colour is material—but because, in the times of our ancestors, all the best, thickest, and warmest blankets, were dyed red. Never shift the patient's linen till after the fourteenth day, for fear of striking in the pock, to the irrecoverable ruin of the patient. Far better is it to let the patient bear with the stench, than to let him change his linen, and thus be the cause of his own death. Nevertheless, if a change be absolutely necessary, be sure that he puts on the foul linen that he put off before he fell sick, and, above all things, take care that this supply of semi-clean linen be well warmed. Sudorific expulsives are, in the meantime, to be given plentifully, such as treacle, pearls, and saffron."

This is an abbreviated sketch of the system of expelling the peccant humours in fever by perspiration; and such was the condition in which Sydenham found the practice of medicine in 1667. He had an Augean stable to cleanse when he undertook the task of reform. Unless you have well studied the writings of physicians during the first half of the seventeenth century, you can form no just estimate of Sydenham's merits. He was violently attacked by his cotemporaries for the system which he quietly substituted, but truth ultimately prevailed, and before the end of the century, the new or cooling plan

of practice was fully established. Sydenham had other merits in regard to small pox. He described the disease admirably, and was the first who separated small pox from measles.

Boerhaave, who flourished about the year 1700, was a devoted admirer of Sydenham. He deserves mention as the author who first excluded all common causes from the ætiology of small pox, and maintained that it was propagated by a specific contagion or miasm alone.

This brings us to the next great epoch—that of inoculation. It was at Constantinople, about the year 1700, when inoculation for the small pox was first practised. Dr. Emanuel Timoni, Mr. Kennedy, and Dr. Pylarini, in 1714-15, made the profession in England acquainted with the discovery, but no attention was at first paid to it. It was reserved for a lady—Lady Mary Wortley Montague—to introduce this splendid improvement into medical practice. Her son was inoculated at Constantinople in 1717, and her daughter was reserved to be the first person ever inoculated in England. This event took place in 1721. In the following year, after successful trials upon six condemned criminals in Newgate, the Princess of Wales submitted her own daughters, the Princesses Amelia and Caroline, to the new process. Both passed through the small pox favourably. The anxiety of the Princess of Wales on this occasion admits of easy explanation.

Queen Mary, wife of William the Third, died of confluent small pox, of the worst sort, at the age of 32, on the 28th December, 1694. In 1721, George the First had but recently come to the throne, and the direct succession of the Hanoverian line was of the utmost consequence to the court and the nation. Queen Mary's death had made a deep impression, which an interval of

25 years had not banished from the recollections of the people. Hence doubtless arose the extreme anxiety of the Princess of Wales to fly to the novel expedient of inoculation.

The first ten years of its career were singularly unfortunate. It fell into bad hands. It was tried on the worst possible subjects, and practised in the most injudicious manner. The consequence was, that it soon fell into disrepute. The pulpit, too, sounded the alarm, and in truth, conducted as inoculation then was, it was a very questionable improvement.

A new era arises in 1746, when, the practice being better understood and appreciated, the Small Pox Hospital was founded, to enable the poor to participate in a benefit hitherto confined to the rich. In 1754, the College of Physicians put forth a strong recommendation of inoculation. About the same period, Mead and De La Condamine wrote treatises in favour of it, the former in London, the latter in Paris. At length, in 1763, the practice was undertaken by an exceedingly clever man, Mr. Robert Sutton, who, with his two sons, inoculated with admirable skill and wonderful success. In 1775, a dispensary was opened in London for the gratuitous inoculation of the poor at their own houses; but the institution failed, chiefly through the opposition of Baron Dimsdale. The Small Pox Hospital then took up the plan of promiscuous inoculation, which was carried on to an immense extent between the years 1790 and 1800.

In 1798, Dr. Jenner announced the discovery of vaccination. On the 5th May, 1808, the inoculation of out-patients was discontinued at the Small Pox Hospital. On the 20th June, 1822, inoculation was discontinued to in-patients. On the 23rd July, 1840, the practice of inoculation, the introduction of which has conferred

immortality on the name of Lady Mary W. Montague, which had been sanctioned by the College of Physicians, which had saved the lives of many kings, queens, and princes, and of thousands of their subjects, during the greater part of the preceding century, was declared illegal by the English parliament, and all offenders were to be sent to prison, with a good chance of the tread-mill. Such are the reverses of fortune to which all sublunary things are doomed.

We define small pox to be a disease, the product of a morbid poison, or miasm, which, after a certain period of latency, develops eruption on the surface, passing through the stages of pimple, vesicle, pustule, and scab, with certain other concomitant or succeeding affections, which runs a stated course, and having exhausted itself, removes from the constitution the susceptibility of a like attack.

Small pox is divisible into varieties. The terms *confluent* and *distinct* express two of the most remarkable, but others are equally important. I shall speak to you here of confluent, semi-confluent, corymbose, distinct, and modified small pox—of superficial, cellular, and tracheal small pox—of the benignant, malignant, and petechial small pox—of simple and complicated small pox.

Every kind and variety of small pox is divisible into three stages—incubation, maturation, and decline.

1. Of the period of incubation. This is the latent or dormant period of some authors, and it includes the whole period that elapses from the reception of the variolous germ to the development of eruption. The first few days are passed, in many instances, without symptoms of any kind, but in other cases there are obvious evidences of some morbid process going forward. At

the moment of receiving the miasm, the patient experiences, perhaps, an unpleasant odour, or a feeling of sickness, or of giddiness, or of inward alarm. As the incubation advances, his nights are restless, his spirits low. He is oppressed with languor and lassitude. With respect to the period of incubation, a large accumulation of facts enables me to fix it at twelve days of apyrexia and two of fever—fourteen in all. One example may suffice.

Mrs. Joseph, wife of Mr. Joseph, surgeon, of Great Marybone-street, registrar of births and deaths for the Rectory district of Marybone, was sitting in her parlour on Monday, June 7, 1841, when a nurse called to register the death of a child who had died the preceding day of small pox. The nurse had just left the dead body. Mrs. Joseph's suspicions were sufficiently excited to induce her to have her baby vaccinated immediately, but she never thought of herself. On Saturday, June 19, (thirteenth day from exposure to the miasm,) Mrs. Joseph sickened. On Monday, June 21, (being that day fortnight on which the child's death had been registered,) small pox appeared in her.

The incubative period admits of some latitude. The extremes may perhaps be stated at ten and sixteen days.

With regard to the initiatory or eruptive fever, (constituting the two last days of the incubative period,) it may be remarked, that on the twelfth or thirteenth day from imbibing the germ, rigors occur, followed by the usual evidences of pyrexia—a quickened pulse, heat of skin, pains of the back and limbs, scanty and high-coloured urine, and restlessness. How can you prognosticate that the fever then breeding is variolous?

(1.) By the sickness at stomach. This is often very intense, continuing for two or more days, and often

accompanied by tenderness of the epigastrium on pressure. There is irritability of the stomach here, but not inflammation, for the vomiting is uninfluenced by bleeding, and it yields when the eruption shews itself.

(2.) By the pain of the back and loins. This, too, is often very intense, so that men carrying a load have dropped down in the street. The most remarkable case of the kind which I ever saw was the following:—Mrs. Delahay, (Little Marybone Street,) at her full time of her first confinement, began to complain, November 23, 1837. The pain of the back was very severe, with very little intermission. Yet the os uteri scarcely dilated at all. Mr. Jordan, who attended her, seeing some peculiarity in the case, requested my assistance. The pain of the back was agonizing, and she continued to suffer from it during the whole of the 23rd., the os uteri continuing unaltered. She was put into the warm bath, took 200 drops of laudanum, and was bled to thirty ounces. At one A.M. on the morning of the 24th, she was delivered of a dead child, but pain still continued. On the evening of the same day, confluent small pox appeared, when the pain of the back ceased. She had been well vaccinated in early life.

The peculiarity of this case consisted, you will perceive, in the incubative stage of small pox concurring with the completion of utero-gestation. The infant's life was destroyed by the intensity of the fever.

(3.) Encephalic symptoms accompany the initiatory fever of small pox in certain cases. Adults complain of severe headache. There is stupor or delirium. The face is flushed. The carotid and temporal arteries beat strongly. The patient is supposed to be on the eve of a severe cerebral affection. Somnolency or an epileptic fit are often noticed in children.

(4.) Syncope and excessive prostration of strength are the leading features in some cases. I have seen syncope occur on the seventh day after inoculation. Occasionally, even in strong habits, the effect of the miasm is so thoroughly poisonous that the countenance turns pale, the pulse is feeble, the extremities become cold. The patient is brought into a state of *collapse*.

(5.) Great anxiety of the præcordia, deep sighing, and dyspnœa, (symptoms indicating thoracic congestion), are occasionally noticed.

Sometimes the one, sometimes the other of these groups of symptoms predominate during the brief period of eruptive fever. In addition to the evidence which they afford, the suddenness of the seizure, the previous good health of the patient, the circumstance of prior exposure to the contagion, or having previously undergone small pox, will assist in the diagnosis. In adults, the fact of prior vaccination is not to throw you off your guard, for the initiatory fever is just as severe after vaccination as it is in the unprotected.

The eruptive fever of small pox acknowledges the tertian type. Forty-eight hours elapse from the rigor to the first appearance of eruption. Sydenham believed that the more time nature occupied in finishing the separation of the inflamed particles, the greater was the chance of ultimate safety to the patient; and accordingly he never interfered at this period. Before his time, the theory and practice were different. It was thought that nature was struggling to effect the separation, that she required assistance to do this effectually, which assistance was afforded to her in the shape of heating diaphoretics and alexipharmics.

The duration of the eruptive fever is never less than forty-eight hours. It may be protracted, by weakness of

habit, to seventy-two hours, and the full development of eruption over the *whole* surface may even occupy three complete days. Minute papulæ sensibly elevated above the surface of the skin shew themselves, in the first instance, on the face, forehead, and wrists. In a few instances only does the eruption commence on the lower extremities. It often happens that two or three large papulæ precede the general eruption, and advance to the state of vesicle, before the surface is extensively occupied.

In a large proportion of cases, the outbreak of eruption affords great relief to the general constitutional disturbance. The fever moderates, the sickness abates, the dorsal pains diminish, the head is relieved. From all this, you will perceive that such symptoms depend, not on inflammation, but on vascular distention.

Something may be learned by attention to the arrangement of the papulæ. They are not thrown together confusedly and without order, but are arranged in groups of three or five. Crescents and circles may be traced very distinctly when the eruption is not too copious. This constitutes an important diagnostic between variola and varicella.

The external character and internal structure of the variolous pimple and pustule have excited much attention. Cotuguo, in Italy, commenced the investigation, which John Hunter, Dr. Adams, and, in more recent times, Bousquet, Gendrin, Mr. Judd, Dr. Petzholdt, and others, have continued. The organization of the variolous pustule is very curious. Inflammation begins at a spot called the phlyctidium. Its seat is in the cutis vera. From the central point, or stigma, the inflammatory action proceeds by radiation on the surface, penetrating to a greater or less depth in different cases. Beneath the epidermis,

and constituting the greater part of the phlyctidium, is found a substance, or disc, of the consistence of pulp or thick mucus. This is not considered as any part of the skin altered by disease, but as the product of a specific action of the vessels. John Hunter and Adams called it the variolous slough. At the height of suppuration this substance is swollen, and moist like a sponge. The floor of each phlyctidium presents the papillated structure of the skin, elevated, and marked with fissures. The vesicle is divided, like the substance of an orange or poppy-head, into numerous cells, (twelve, or more.) It is, as we say, multilocular. A filament of cellular tissue binds down the central portions of cuticle to the lower surface of the phlyctidium. The fluids (lymph and pus) which at different periods distend its cells, destroy at length the filamentous attachment of the stigma to the cuticle, and that which was at first a depressed or umbilicated vesicle, becomes at last an acuminated pustule. It bursts, discharging a well-formed purulent matter, of a yellowish colour and creamy consistence.

2. The inflammation of the phlyctidium is accompanied by a kind of erythema, or specific inflammation, called the areola, extending to some distance beyond the margin of the vesicle. The colour of the areola is always to be carefully noted, for reasons which will soon be explained. On the subsidence of this inflammatory areola, the ripened pustules, having burst and discharged their contents, are succeeded by scabs, which dry up, and, in a healthy state of constitution, fall off in four or five days. In mild cases, where the full process of pustulation is not gone through, many of the vesicles shrivel, and form only tubercles, or imperfect scaly crusts. On the lower extremities, this premature desiccation of the vesicles is often very general.

In severe cases, the inflammation of the corion does not cease with the completion of the pustulating process. Portions of the cutis vera are then actually destroyed and slough away, the result being that, when cicatrization is at length completed, the skin presents the appearance of pits or foveæ, with a diffused clarety hue of the surface. This tint wears off in the course of three or four months; but the depressions are permanent. From the great vascularity of the face, there is always most risk of such disfigurement there.

Nurses will talk to you of a five, six, seven, eight, nine, and even ten days' pock. They are quite right. When the disorder is perfectly normal in its course, not interfered with by any peculiarity of habit either congenite or acquired by previous vaccination,—when the constitution is sound, with sufficient strength of system, and a good, but not over-abundant, supply of blood,—lastly, when there is not too copious a crop on the surface, the pock maturates in seven days. In severe cases of a semi-confluent or corymbose kind, the process of maturation occupies eight days. In bad confluent cases, nine or perhaps ten. On the other hand, after vaccination, or when there is some originally favourable diathesis present, the pock will maturate in six, or sometimes imperfectly in five days. This five-day pock constitutes the mild, mitigated, or modified form of variola, now so familiar to us, as occurring in those who in early life had been well vaccinated. But this variety of the disease, though formerly less frequent, was yet well known to all the old authors. Van Swieten describes it under the title of variola verrucosa and cornea, (stone pock, horn pock, and wart pock.)

A certain amount of fever accompanies the maturation of the pock even in its mildest aspects. The actual

amount depends mainly on the quantity of eruption, but something is attributable to the habit of the patient, whether irritable, or otherwise. A quiet condition of mind is always favourable to small pox. Something depends too upon season, something on diet, and the temperature of the room in which the patient lives. The corymbose, or partially confluent form of small pox, (where the vesicles are grouped into clusters, leaving intermediate spaces of unoccupied skin,) is always attended with severe and irregular fever.

The maturative process is often accompanied by an exceedingly tender state of the surface. This happens chiefly in women, and in men of delicate skin. It is a very favourable sign, though productive of much temporary inconvenience. The variolous matter, when abundant, gives off a peculiar, faint, and sickly odour. Recovery may be retarded, even in the distinct small pox, by weakness of habit, by cold, and the excitation of scrofulous disease. Ecthymatous eruption may then occupy the surface; the skin may be left dry and scaly; the scabs may be adherent. All this is owing to the setting up of a low form of secondary fever.

I must next draw your attention to the implication of certain of the mucous structures in the progress of small pox. In a large proportion of confluent, and in some semi-confluent cases, the mucous membrane of all those parts to which the atmospheric air gets access, (the nose, mouth, and trachea,) is occupied with eruption—sometimes distinct, more generally confluent. The early symptoms occasioned by this mucous complication are as follows:—Numerous white points appear on the tongue, palate, and velum pendulum. Hoarseness and alteration of voice indicate that the same condition extends to the mucous membrane of the larynx and trachea. There is

great pain in swallowing, and in bad cases, cough and dyspnœa. The cough is at first dry and tearing. As the disease progresses, there is expectoration About the eighth day, a copious viscid secretion takes place from all the affected structures.

The ulterior effects of this mucous implication are far more important than any local mischief which it occasions. The œdematous thickening of the larynx and the swollen condition of the tracheal membrane have by the eighth day materially impeded the free access of air to the lungs, and the consequences appear in every part of the circulating system. There is no crimson areola, for the blood is not well arterialized. The vesicles on the extremities never acquire any inflammatory areola, by which alone the surface can be cicatrized. On the trunk, the areola is dark or claret-coloured. The vesicles do not acuminate. They lie flat, and present much of the same appearance which is displayed after death. Sometimes the superficial inflammation partakes more of an erysipelatous than of a phlegmonous character. The results are large watery blebs, from which flows out a thin ichor. Consequences still more serious happen in the succeeding twenty-four hours. The brain becomes affected. A low muttering delirium is observed, as the waves of ill oxygenated blood begin to circulate. The tongue swells, and exhibits a purple hue. Restlessness and great anxiety succeed. The patient tries to get out of bed. The bladder loses its contractile power, and may be felt distended at the brim of the pelvis. The extremities become cold. Dyspnœa increases, and the patient dies!

The implication of the cellular membrane in the progress of small pox must next engage our attention. In the distinct small pox the skin continues moveable on

the subjacent textures, but in all bad cases, confluent, semi-confluent and corymbose, the inflammatory action dips deeper, and invades the cellular membrane. The skin now becomes swollen and tense. This cellular complication is sometimes universal, sometimes partial. The scalp is very often affected. Enormous intumescence takes place, followed by diffuse pustulation, or a succession of small and most troublesome abscesses. The cellular membrane of the throat is peculiarly liable to take on this action. The salivary glands participate in the inflammation, and salivation with great turgescence of the neck follows. Occasionally the tongue becomes involved. Glossitis is superadded to other evils, and few, if any, survive, when matters have proceeded to this extremity. Supposing, however, that neither the cellular nor laryngeal inflammation are in sufficient intensity, on the eighth or ninth day, to destroy the patient, then secondary fever sets in, to be known at all times by the occurrence of rigors, followed by a hot and dry state of the surface, and a thirst unquenchable.

3. In the progress of secondary fever you must be prepared for all sorts of troubles. The skin, already weakened and prone to inflammation, is sure to suffer first. The elbows, legs, scrotum, knee, back, and hips, take on a mixed erysipelatous and phlegmous action. The result is either boils and abscesses, or enormous imposthumes, or carbuncles and gangrenous destruction of large portions of the skin, according to the severity of each case. On the 17th July, 1829, I saw at the Small Pox Hospital an exact counterpart of the pestilential bubo and carbuncle on the groin of a small-pox patient. Sometimes the whole surface of the body is covered with a vivid scarlatinal rash. The face always suffers severely

in this aggravated form of cellular small pox, and the patient (if happily he escapes) passes through a tedious process of convalescence. In 1828 I saw a woman whose face was not simply pitted, but scored and seamed. She informed me that she was twelve years in recovering, and I could well believe it. The disposition in inflamed parts, during the secondary fever of small pox, to terminate in suppuration, appears to be universal, and almost uncontrollable. In some few cases the larger joints fill with purulent matter.

Confluent and semi-confluent cases of small pox, though very frequently, are not *necessarily* accompanied with cellular complication. There is a form of the disease called the *confluent superficial*, where the eruption passes through all its regular stages, but the inflammatory action never extends beyond the outer layer of the corion. This is sometimes confounded with the modified small pox, but the progress of eruption is very different in the two cases. The confluent superficial small pox appears in the unvaccinated. The pustules maturate equally and regularly. The confluent modified small pox, on the other hand, never appears except in the vaccinated, and the advance of the pustules is not only imperfect, but it is *unequal* on the same portion of surface. On the arm, for instance, at one and the same time, you will perceive some pustules fully maturated, others of smaller size desiccating after the escape of a minute portion of pus, while part of the eruption has become tuberculated without purulent formation, and with little or no surrounding inflammation. This inequality of aspect is the great characteristic of *modified variola.*

I must next draw your attention to the implication of

the brain and nervous system in the phenomena of small pox. Children grind their teeth, and squint. Cerebral inflammation supervenes, and the child dies, either in an epileptic fit, or with evident signs of hydrocephalus. Adults become delirious, and occasionally it is of that severe kind called *delirium ferox*, accompanied with great wildness of the eye, and such strong tendency to self-destruction that the utmost precautions do not overstep the necessities of the case. Variolous delirium depends more on some peculiarity of temperament, on some highly irritable condition of the nervous system, than it does on inflammation. Thomas Weston became a patient of the Small Pox Hospital on the 17th of July, 1829. For several years his thoughts had been absorbed in religious matters. He would often say that he was better prepared to die then than he could be if his life were lengthened. When it was announced to him that his complaint was small pox, he expressed no wish to recover. The eruption was moderate in quantity—not, *per se*, threatening danger. He had been vaccinated in early life. Delirium set in early, and he died on the eighth day of the disease. A peculiar nervous affection often supervenes on the tenth day, when the skin is extensively occupied by the confluent eruption without nervous complication. It is identical with that which is familiar to surgeons as the consequence of extensive burns and scalds. General tremors, low delirium, a quick and tremulous pulse, a dry tongue, collapse of the features, cold extremities, and subsultus tendinum, are the symptoms of this nervous complication, and the precursors of a fatal event.

The implication of the *fluids* next demands notice. It happens occasionally, though happily not often, that

the miasm of small pox poisons the blood, alters its crasis, or coagulating properties, and leads to hæmorrhages from every open surface. The evidences of this condition of the fluids are often perceptible from the first hour of initiatory fever. At other times they are not noticed until the eruption has begun to develop itself, or even later in the maturative stage. If blood be drawn from the arm, a loose layer of fibrine is thrown up, beneath which you find fluid red blood. Hæmorrhage takes place from the nose, mouth, lungs, stomach, bowels, and kidney. Petechiæ and patches of ecchymosis (called vibices) appear intermixed with the variolous papulæ. The variolous vesicles fill with blood instead of serum. The aspect of body in some cases of aggravated petechial small pox is wholly changed.

In February, 1842, I saw, in consultation with Dr. L. Stewart, a lady in small pox, whose whole body was of the colour of indigo, and whom I at first believed to be a native of Africa. She conversed with me in the most tranquil manner, and died a few hours afterwards, proving that the nervous system is not necessarily, nor is it even usually, implicated in the petechial form of small pox.

When adult females are thus attacked, menorrhagia is almost always observed, and if they be pregnant, abortion or premature delivery takes place. The fœtus, as you might naturally expect, dies in utero. This variety of small pox was known of old by the name of the black pox (variolæ nigræ,) and appears to have been more frequent in former times than it is now. Death may take place in consequence of this remarkable condition of the blood before any *unequivocal* signs of small pox are developed. More commonly, the eruption, confluent in character, displays itself, but never makes much

advance. Nature apparently gives up the struggle as hopeless. The patient is carried off very unexpectedly, perhaps on the fourth, or from that to the sixth day.

There is something not very well understood in the concurrence of gangrene with small pox. It is not necessarily connected with the petechial state, nor with affection of the nervous system, nor with debility. It often occurs where the fever is of a truly inflammatory type, and where no previous symptom gave evidence of unusual danger. It is more generally found attendant on the irregular or corymbose small pox than on the purely confluent cases. The chief seats of variolous gangrene are the scrotum, feet, and back, but I have seen it also on the breast. I cannot doubt but that in certain cases the gangrenous disposition is something *superadded* to the small pox by the condition of the air which the patient breathes.

Small pox is often accompanied with ophthalmia. It has been stated that this arises from the formation of pustules on the cornea and conjunctival membrane. This is erroneous. If these structures had been susceptible of the specific variolous eruption, every confluent case must necessarily have ended in total blindness; but, happily, Nature has arranged it otherwise. Conjunctival inflammation, iritis, inflammation still deeper seated, may indeed arise, especially when extensive crusts put a stop to all perspiration, and when secondary fever rages in the blood, and devastates internal organs. But there is no specific inflammation of the eye in small pox.

The ophthalmia by which so many eyes have been lost is a sequela of the disease, generally coincident with some great destruction of surface in a distant part. In some cases, variolous ophthalmia, setting in on the tenth

day of the disease, advances so rapidly, that in forty-eight hours the whole eyeball is irremediably injured. I have seen the whole eye converted into one large abscess. More usually, the inflammation runs into some of its less violent and more familiar consequences. An ulcer forms at the outer edge of the cornea, by which the aqueous humour escapes, or at which staphylomatous protrusion of the iris takes place; or the aqueous humour becomes clouded, or specks form on the cornea, from which blindness, more or less complete, more or less permanent, results.

It would be unreasonable to expect that such a fever as I have described should rage, expend its whole virulence on the skin, and never affect the great internal organs of the chest and abdomen. Bronchial inflammation is sometimes present during the whole course of the complaint, especially in the winter season, but it does not materially complicate the phenomena. In Lascars, and all natives of tropical climates, attacked by small pox in a cold climate, this frequently happens, and may of itself prove the cause of death. Sometimes, even among our own people, the substance of the lungs becomes involved in inflammation, and its usual consequences. But the great peculiarity deserving of your notice is the frequency of variolous *pleurisy*. It occurs between the twelfth and twentieth day. It is a peracute form of inflammation, remarkable for its sudden invasion, rapid progress, and invariable termination by empyema. The symptoms are very unequivocal. Intense pain, a hard, wiry, and incompressible pulse, *shortness* of breathing, and a dry state of the surface, betoken but too forcibly the state of the pleura. Blood-letting is almost powerless in this disease. Death usually happens on the third,

or, at farthest, fourth day, from the invasion of thoracic symptoms.

Small pox is singularly exempt from all abdominal complication. Children sometimes fall into a state of mucous enteritis, with frequent, slimy motions, and emaciation; but nothing occurs here to warrant me in detaining you.

The appearances, on dissection, peculiar to small pox, are confined to those which the larynx and trachea exhibit. The lungs, indeed, sometimes display the usual evidences of inflammation—vascular engorgement, purulent infiltration, and hepatization. The thorax of one side may be found replete with a sero-purulent fluid (resembling a mixture of cream and water), the result of acute pleurisy, and the pleura itself may be seen injected with blood, and covered with a dense layer of coagulable lymph; but all this occurs equally in other diseases. The condition of the larynx and trachea, however, in small pox, *on the eighth day*, is unique. The mucous membrane, if then inspected, appears covered with a copious, viscid, puriform secretion, of a grey or brownish colour. On detaching this, the membrane itself is seen deeply congested with blood, thickened, pulpy, and, in the worst cases, black and sloughy, exhaling a most offensive odour. These appearances may be traced to the third division of the bronchial tubes.

Much discussion has taken place regarding the occurrence of variolous pustules on the gastro-enteric mucous membrane. Cotugno, Wrisberg, Reil, and others, who have paid great attention to the subject, concur in opinion that this structure is not capable of developing them. Sir Gilbert Blane, again, reports a case where the mucous membrane of the bowels presented the appearance of

ulcerated spots, which he compared to variolous pustules. The experience of the Small Pox Hospital is in favour of the old doctrine. Inflamed, enlarged, and ulcerated follicles, with petechial patches, may indeed be noticed in a few rare cases; but such appearances are in all respects the same with those observable in typhoid fever.

In like manner, the brain presents, in small pox, no morbid phenomena different from those which other types of fever display.

LECTURE IV.

STATISTICS AND PATHOLOGY OF SMALL POX.

Diagnosis of small pox. Statistics of small pox. Mortality by small pox in the last century, and throughout England and Wales, since 1837. *Proportion of mild to severe and fatal cases. Periods of the disease at which death takes place. Direct causes of death in small pox. Pathology of small pox. Question of spontaneous origin. Of miasmatic origin exclusively. Circumstances that determine the character of the disease. Epidemic diffusion of small pox. Laws by which it is governed. Susceptibility of small pox. Of recurrent or secondary small pox. Case of Louis XV. Communication of small pox to the fœtus in utero.*

In the present lecture I propose to bring before you, in one view, the several considerations which reflection on the phenomena of small pox is calculated to elicit. Everything that relates to diagnosis, statistics, and the origin of the disorder, comes therefore now to be investigated. To distinguish one disease, however, from another, it is obviously requisite that the course of both should be known. We are therefore hardly in a situation yet to enter with advantage on this topic of inquiry. Nevertheless, that nothing may be omitted which can contribute to your practical benefit, I will say a few words on the diagnosis of small pox.

The diseases with which, after the occurrence of erup-

tive fever, small pox may be confounded, are measles, febrile lichen, varicella, and secondary syphilis.

1. The papulæ of small pox are firmer than those of measles. They feel granular under the finger. In measles, too, there is accompanying cough and watering of the eyes. Further, in small pox, forty-eight hours elapse from rigor to eruption ; in measles, seventy-two.

2. Febrile lichen is the disease from which small pox, at its onset, is with most difficulty distinguished. The aspect of eruption is in both cases nearly alike. The surest and safest grounds of diagnosis are based on the interval which has elapsed from rigor to eruption, and the mode in which the eruption has developed itself. In febrile lichen, twenty-four hours elapse from sickening to eruption; in small pox, as you know, forty-eight. Small pox almost always appears first on the face. The eruption of lichen is developed, from the first, uniformly over the head and trunk. Besides which, your judgment will be materially aided by inquiries into the prior history of the patient, and the character and course of incubation.

3. The diagnosis of small pox and chicken pox requires attention to minutiæ, and cannot be given until a later period of the course, when the phenomena of that mild disorder will be duly submitted to you.

4. There is a form of secondary syphilis, in which an eruption appears on the face and trunk very similar to the distinct small pox. This syphilitic eruption passes through the several grades of papula, vesicle, and pustule. It is preceded by a febrile attack of variable duration. The diagnosis is to be effected by careful inquiry into the whole history of the case, and close observation of the progress of the disease. To those

accustomed to the look of small pox, there is something in the general aspect of a syphilitic patient, in the absence of all febrile anxiety, which would at once indicate that the generating miasm was not variolous. The march of the disorder would convert suspicion into certainty. The pustular syphilitic eruption runs a tedious course, exceeding ten days. The pustules are developed, not simultaneously, as in small pox, but in successive crops.

From the earliest periods, much attention has been paid to the statistics of small pox. The absolute numbers carried off by it, and the relative numbers of those who die to those who are attacked, have alike been made the objects of inquiry. The old bills of mortality, which can be trusted to more in plague and small pox than in any other disorder, give 199,665 as the total amount of deaths by small pox in London during the last century, of whom 97,546 perished in the first half, and 102,119 in the second half. During the last quarter of the last century, from 1775 to 1800—that is, prior to the discovery of vaccination,—the proportion of the mortality by small pox to the total mortality, was as 8 to 100 in London, and we may reasonably conclude that the same proportion existed throughout the country. Sir Gilbert Blane and others fancied that this ratio was steadily augmenting in consequence of the spread of inoculation, but I shall shew you afterwards that this notion was unfounded.

All authors have remarked, that the greatest mortality by small pox takes place in the early periods of life. Dr. Haygarth computed, that at Chester, in 1795, one half of the deaths among children below ten years of age was due to small pox. The same law holds good at

present. From particulars to be found in Mr. Farr's first and second reports, I have drawn up the following table, which shews that out of every nine persons who now die of small pox in England, seven are below the age of five years.

Ages of 9762 *persons who died of Small Pox in England, during the years* 1837 *and* 1838.

Under the age of 5 years	7340	deaths
Between the ages of 5 and 15	1668	—
——————— 15 and 30	528	—
——————— 30 and 70	210	—
Upwards of 70 years of age	16	—
Total	9762	

When the registrar-general of England first began his labours (July 1, 1837), it was found that, notwithstanding the benefits of vaccination, there were still only four diseases which stood before small pox with reference to the actual amount of mortality. Those still more fatal complaints were—consumption, convulsions, typhus fever, and pneumonia. In the second half of 1837 there died, throughout England and Wales, by small pox, 5811; and in the metropolis, 763. The year 1838 was remarkable for the epidemic prevalence of small pox throughout this country. In that year there died by small pox in England and Wales no less than 16,268 persons, of whom 3817 died in London. In 1839, a marked diminution took place. The deaths over the whole country amounted only to 9131, and in the metropolis to 634, which, as compared to the total mortality in that year, is little more than 3 in 100.

At the Small Pox Hospital, the admissions, from 1776 to 1800 (a period of twenty-five years), were 7017—and the deaths 2277, being at the average rate of

thirty-two and a half per cent. From 1801 to 1825 (a like period), the admissions were 3743, and the deaths 1118, being at the average rate of thirty per cent. of those attacked. Since 1825, the proportion of deaths to admissions has experienced a further diminution. At the present time the deaths do not exceed twenty-five per cent. and in some years they have fallen as low as twenty per cent., or one in five. Taking the world throughout, and making allowance for the character of cases which are usually sent to an hospital, we may state the average mortality by small pox at one in six of those attacked. Now this is exactly the calculation made by Dr. Adams thirty-five years ago, when he said that small pox occasioned very nearly a double decimation.

The proportion of severe to mild cases is a subject which merits attention. The following table, which exhibits an analysis of the cases admitted into the Small Pox Hospital during four years, with the deaths in each respective class, will shew, at one view, the numbers admitted, the comparative severity of the cases in the respective years, and the amount of mortality.

Table exhibiting the proportion of Severe to Mild Cases, admitted into the Small Pox Hospital, in the Years 1837, 1838, 1839, *and* 1841.

CHARACTER OF THE DISORDER.	1837.		1838.		1839.		1841.		Total in Four Years.	
	Admitted	Died.	Admitted	Died.	Admitted	Died.	Admitted	Died.	Admitted	Died.
Confluent Cases	104	42	351	170	48	25	134	67	637	304
Semi-confluent...	45	3	120	12	31	1	71	4	267	20
Confluent & Semi-confluent Modified ...	18	1	69	5	18	1	38	1	143	8
Distinct & Varicelloid	72	0	154	1	48	0	99	2	373	3
Total	239	46	694	188	145	27	342	74	1420	335

In the foregoing table it will be perceived that the vaccinated and unvaccinated are classed together, the object of the table being to shew the proportion which the mild bear to the severe cases, without reference to the cause of such discrepancies. It will also be seen that the confluent and semi-confluent cases taken together exceed the half of the admissions;—that nearly one half of the confluent cases prove fatal, and about one in ten of the semi-confluent cases. The deaths in the remaining classes are to be looked upon only as accidental and superadded events.

The next table that I lay before you carries the analysis still further, and shews the comparative severity of the cases, as they occurred among vaccinated and unvaccinated subjects. This table I have given for one year only, 1838, the year of epidemic prevalence.

Table exhibiting the Comparative Mortality of the several varieties of Normal and Abnormal Small Pox, occurring at the Small Pox Hospital, during the Epidemic of 1838, *distinguishing the vaccinated from the unvaccinated.*

NORMAL SMALL POX.	Unprotected.		Vaccinated.	
	Admitted.	Died.	Admitted.	Died.
Confluent	295	149	56	21
Semi-confluent	78	8	42	4
Distinct	19	0	20	0
Total Normal.....	392	157	118	25
Confluent Modified ...	2	0	38	4
Semi-confluent Modified	1	0	28	1
Varicelloid	1	0	114	1
Total Abnormal...	4	0	180	6
	396	157	298	31

40 % 15 %

This table shews how remarkable is the power of vaccination in altering the proportion of severe to mild cases. It will be seen that among 396 *unprotected* cases, there were only 23 which were mild in their aspect; while out of 298 vaccinated subjects, there were no less than 134 which presented, from the onset, favourable appearances, independent of 66, which displayed modification during the maturative stage.

The next point which merits attention is the period of disease at which death takes place. Small pox may prove fatal at any period from the first invasion of fever to the fortieth day. Death may even take place prior to the development of eruption, but such cases are rare. In all countries it is observed that the second week is that which exhibits the greatest amount of mortality, and the eighth day, the day of greatest danger. The subjoined table, extracted from the records of the Small Pox Hospital for 1828-9, shews the period of eruption at which 168 patients died. The dates of their decease prove satisfactorily that no importance can be attached to the doctrine of critical days, in the fever of small pox.

Table exhibiting the Days on which 168 *Cases of Small Pox proved fatal, at the Small Pox Hospital,* 1828-29.

Days.	Fatal Cases.	Days.	Fatal Cases.	Days.	Fatal Cases.
3rd	1	13th	11	24th	3
4th	5	14th	5	25th	1
5th	10	15th	7	27th	1
6th	5	16th	5	28th	1
7th	11	17th	3	29th	1
8th	27	18th	3	31st	1
9th	15	19th	1	32nd	1
10th	14	20th	2	35th	1
11th	16	22nd	3	38th	1
12th	11	23rd	1	39th	1

We may otherwise arrange these cases by saying, that there died

During the 1st week (3rd day to the 7th),	32	Patients.
——— 2nd week (8th to 14th).....	99	—
——— 3rd week (15th to 21st).....	21	—
——— 4th week (22nd to 27th)...	9	—
——— 5th and 6th weeks.....	7	—

It may be useful, in connexion with these statistical details, to recal to your recollection the principal circumstances to which the fatal event in small pox is more immediately attributable. 1. Prior to the maturation of the pustules (that is, during the first week) small pox proves fatal by that general derangement of the whole system, and more especially of its fluids, which we usually designate by the term, *acute malignancy*. No marked lesion of any internal organ would be traced on dissection. 2. During the second week of eruption, the chief cause of death will be found in the specific affection of the trachea and larynx, and consequent asphyxia. 3. During the third week, when secondary fever has begun its work of devastation, death may happen, either by effusion on the brain (hydrocephalus), or by supervening pleurisy, pneumonia, or laryngitis, or lastly, by gangrenous destruction of portions of the skin. During the 4th and subsequent week, death may be the direct consequence of erysipelas, or of some other complaint excited by the small pox, or engendered by that debility which small pox, in any of its severer forms, so frequently entails.

The phenomena and statistics of small pox being now described, I proceed to explain to you its causes,—to unfold what is known regarding its origin and mode of propagation, and the circumstances under which it commonly displays itself. This we call the pathology of

the disease, by which is understood everything that can be learned concerning a disease by reasoning upon acknowledged phenomena.

For more than a thousand years after the first appearance of small pox in Egypt, its causes were sought for in the condition of the blood, or in those circumstances of the body, or of the atmosphere which surrounds the body, which were believed, and justly too, to give rise to common fever. Defects (or vitia) of one or more of the non-naturals were the presumed sources of small pox. The non-naturals were six in number—namely, air, aliment, the secretions, sleep, exercise, and mental emotion. Contagion was admitted as an accessory cause. To this day, a large portion of mankind believe that small pox may be bred in the blood, like gout, or rheumatism, independent of all direct external agency. Boerhaave was the first physician who abandoned these views, and professed his belief that small pox was in all cases the product of a specific poison or miasm, derived from some one already labouring under the malady. He acknowledged that the miasm must originally have sprung from some fortuitous combination of common causes, and that what had happened once might of course happen again, but he held that this contingency was improbable, and might be excluded from our reasonings.

The correctness of this view of the origin of small pox, and of the zymotic maladies associated with it, is now generally admitted. No doubt, it is difficult to explain every case that occurs on the principle of specific contagion, and many specious arguments in favour of occasional spontaneous origin might be adduced; but we should remember that anomalies would often admit of easy explanation, were the circumstances of the case thoroughly known. One illustration may suffice. In 1835 a child took

small pox in the country, under circumstances which seemed to exclude all suspicion of contagion. She had never left the house for several weeks, the few neighbours who had called were free from sickness, and no small pox existed in the neighbourhood. During her convalescence, a looking-glass being put into her hands, she immediately said, "My face is exactly like that of the child at the door from whom I bought the beads." On inquiry, it was found that some pedlers had passed through the village, and that the child, though she had never left the house, had been to the door. Had this child either died, or been an inattentive observer, the origin of this attack of small pox must, on the principle of contagion, have remained for ever mysterious. The circumstance already adverted to—that small pox has never yet been seen in Australia and Van Dieman's Land,—gives great support to this doctrine.

While we thus admit the theory of an invariable origin from contagion, we must not shut our eyes to the importance of the facts which connect small pox with other epidemic maladies, such as malignant cholera, influenza, and hooping cough, where the notion of contagious origin is either given up, or only admitted partially. To understand, therefore, the origin and propagation of small pox, you must view it, not only as a contagious, but as an epidemic disorder. And first, of the contagious origin of small pox.

Contagious emanations are given off from the human body at every stage of small pox, from the first invasion of fever to the throwing off of the latest scabs. Heberden and Haygarth believed that for the first few days, and during the initiatory fever, a patient seldom, if ever, communicated the infection; but this notion is erroneous. The dry scabs of small pox retain a contagious property

for a great length of time. Experience, too, has taught us that death does not destroy the energy of the purulent secretion. A confluent case will taint the air and spread infection for at least ten or twelve days after death. The knowledge of this fact has induced the Secretary of State to issue orders that the bodies of those dying of small pox are not to be admitted into the schools of anatomy.

The circumstances that determine the quantity of eruption and the general character of the disease are not well known, though many attempts have been made to throw light on this obscure branch of exanthematic pathology. Nothing is better ascertained than that the disorder produced bears no necessary relation to the disorder producing. A confluent case shall give origin to a varioloid, and a mild distinct case shall generate in another person malignancy and confluence. The predisposition to the reception of the variolous germ is an interesting branch of this inquiry. Persons in the best health take small pox, and, upon the whole, are more apt to take the disease than those who are out of health, just as we find it most easy to vaccinate successfully the ruddiest and finest children. The state of mind generally said to be most favourable to the reception of the virus is a dread of the disease. There is probably some truth in this statement, but you will meet with exceptions to the rule, almost as numerous as the illustrations of it. Change of air decidedly predisposes the body to receive infection. But this is a law of the animal economy of very wide application. It is this same principle, applied to endemic fevers, which leads to the phenomena of seasoning and acclimatization. You know that a regiment arriving in the West Indies, or the crew of a vessel first entering

the Bonny or Calabar, are almost sure of suffering from the remittent fever of those climates.

The quantity of eruption in any particular case is sensibly influenced by the state of the surface at the precise moment of development. Whatever tends to augment the cutaneous circulation, such as the warm bath, abundant bed-clothes, strong diaphoretic and sudorific medicines, cordials, wine, heat of the apartment, all concur in favouring confluence. The proved effect of heat in promoting, and of cold in repressing eruption, formed the keystone of the Suttonian practice of inoculation. Small pox is almost always confluent, and frequently fatal, when it occurs to a woman in child-birth. Much may in this case be attributed to heat.

All local irritants, such as blisters, mercurial inunction, and plasters, favour confluence in parts to which they have been applied. Active purgatives, taken during the incubative stage, lessen the quantity of eruption, by causing derivation of the fluids from the skin to the bowels. A plethoric state of body equally disposes to confluence, while it adds to the general severity of the disease, and is the main cause of cellular complication. Extreme weakness of frame delays the eruption, and dangerously represses that inflammatory process which is essential to the repair of the injury inflicted by the poison on the skin.

Lastly: it may be remarked that there exists in certain individuals, and not unfrequently in members of the same family, a peculiar irritability, under the influence of the variolous contagion, just as some persons suffer severely from the smallest doses and the mildest preparations of mercury. The petechial form of small pox has for its cause this idiosyncrasy, or peculiarity of habit. Such constitutions receive small pox with alarm, develop

it with difficulty, and sink under its elimination. On the other hand, other persons imbibe the morbid germ mildly, nourish it without suffering, and eliminate it safely and kindly.

The miasm of small pox belongs to every part of the body. It is given off both by the lungs and by the skin. The breath, the secretions, the matter of the pustules, the scabs, all contain it. It attaches itself to fomites, more especially the clothes of the patient, the bedding, and the bed furniture. These, if closely wrapped up, and secluded from the air, will retain the miasm, and give it out in an active state at great distances of time. But free exposure to the air greatly diminishes or altogether destroys this infecting property; for the contagion, whatever be its intimate nature, is very volatile. The medical attendant, therefore, who goes into the open air after visiting a small-pox patient, is seldom found to communicate the disorder. Very absurd stories have been gravely told regarding the time during which fomites may retain their active powers. A physician at Plymouth describes a case of small pox originating in contagion brought from London in a periwig. Another doctor assures us that he knew a maid-servant who took small pox by washing the floor of a room two years after any small-pox patient had been in it.

Experiments were made in 1832, by direction of the Royal College of Physicians of London, for the purpose of determining the power which a high temperature and chlorine gas are said to possess of destroying the activity of variolous contagion; but the results were unsatisfactory. The sphere of contagious influence has been much questioned. Dr. Haygarth's opinion was, that it was very limited, not extending more than a few feet from the patient's body. On the other hand, an American

physician, corresponding with Dr. Haygarth, affirms that the contagion, on one occasion, crossed a river 1500 feet wide, and affected ten out of twelve carpenters at work on the other side! It is undoubtedly very difficult to fix the distance at which the variolous poison ceases to be energetic; but it is almost certain that the constitution of the air, in epidemic years, permits a very wide diffusion of the germ.

Variolous matter may be diluted with water without its properties being in any degree altered. Dr. Adams first established this fact, which has since been corroborated by the analogous experiments of M. Bousquet with regard to cow pox.

We must now view small pox as an *epidemic* disorder, as one that spreads in particular seasons, and in certain districts, without our being able to ascertain why that district, or season, is subject to such a visitation. The great epidemics of the last hundred years, in London, have been those of 1757, 1781, 1796, 1825, and 1838, the respective intervals between which have been 21 years, 15 years, 29 years, and 13 years.

Epidemic visitations, whether of small pox, or of any other allied malady, acknowledge alike the law of rise, culmination, and decline. They advance gradually, attain their crisis or height, and then gradually decline. Mr. Farr has, with his usual ingenuity, traced the laws which appear to govern each of these stages of epidemic progress, and he arrives at the conclusion, that epidemic decline is always less rapid than its advance. Sydenham remarked that when a small pox epidemic is mild, it begins about the vernal equinox (March 25); but when of an extended and dangerous kind, it begins in the month of January. These observations are not confirmed by modern statistics. The last epidemic which

the metropolis experienced began in November, 1837, reached its acme in June, 1838 (being a period of eight months)—then slowly declined, and ceased entirely in January, 1839, extending thus through a period of fifteen months. The epidemic of 1796 followed a course very similar in all respects.

Some epidemics are local, some are very extended. Small pox broke out in Norwich in 1819, and destroyed 530 persons in that city between the months of May and October. It did not spread to other parts of the country. The epidemic small pox the most remarkable for its extensive diffusion which perhaps ever occurred in the world, was that which began in Sweden, in 1824,—reached England in 1825, spread to France in 1826-27, and ceased, in Italy, in 1828-29. The effects of this epidemic were very remarkable, and will be noticed hereafter, when the results of vaccination are laid before you. Mr. Farr, in his second Report, (1840,) has given a very interesting table, shewing the rise, culmination, and decline, of the variolous epidemic of 1838, in each of the great districts of England. From this table it appears that the epidemic commenced in Liverpool, in 1837, spread through the south-western counties to the metropolis, diverged to Manchester and Leeds, raged in the eastern counties during the first half-year of 1839, and then returned to its old haunts in Lancashire, after making a sweep around the island. From this fact alone we might learn, what innumerable other observations teach us, that the miasm of small pox is very indifferent to seasons, that the frosts of winter and the heats of summer are alike congenial to it.

Small pox will sometimes spread in a cold and moist state of the air, sometimes when the atmosphere is clear, bright, or frosty. Nothing, in fact, has ever been ob-

served, either with respect to the temperature, the moisture, the winds, or the general character of the atmosphere, which can throw light on the sources of epidemic visitation.

The susceptibility of small pox next claims our attention. All mankind, with few exceptions, are born with a susceptibility of small pox. The European, the negro, and the Hindoo, in this respect, at least, are on a par. This susceptibility, unless altered by vaccination, remains equally strong at all ages. Children, indeed, are the especial victims of small pox, but this is merely because the disease is usually contracted on the first occasion of exposure to the miasm. Nevertheless, to this law there are occasional exceptions. Persons have been known to go through life, exposed frequently to the contagion, yet never take it. Prior to the discovery of inoculation, and indeed after it, many thousands of mankind attained a good old age without ever experiencing an attack of small pox. Yet persons exhibiting this natural unsusceptibility have nevertheless, late in life, received the disease by inoculation. A lady residing in Salisbury was successfully inoculated for small pox in 1804, at the age of eighty-three, and lived several years afterwards. She had brought up a large family, many of whom she had attended in an attack of small pox, but had never taken it herself. A few persons pass through life apparently insensible to the variolous virus, whether casually or by inoculation; but such cases are rare. This very estimable privilege has been said to attach to particular families, but there is no foundation for the notion.

The great discovery of modern times is, that an unsusceptibility, or at least a *deferred* susceptibility of small pox may be given to man artificially. We may so

alter and modify the state of his blood that he cannot take it. I need hardly tell you, that this expedient is vaccination. The security which it affords may be permanent through life, or only temporary; but observe,—this is no more than happened to a few favoured individuals, by an inexplicable idiosyncrasy, before Jenner was born, or vaccination dreamed of.

If there are people in the world who cannot be made to take small pox, this is more than compensated by those who have the bad luck to fall into it twice. Cases of secondary or recurrent small pox have been described in all ages, from Rhazes down to our own times. They were never very common—*raræ aves* always—but they have occurred, and they may occur again. You must not, however, give credit to all that you hear said *now-a-days* on the subject of secondary small pox. One gentleman, in reply to the queries of the Provincial Medical and Surgical Association, informed us, that in his own practice he had attended between eighty and ninety cases of recurring small pox! He even goes further, and avers that he knows two families where small pox occurred a *third* time. Contrast with this the opinions of Dr. Mead, Dr. Heberden, Dr. Monro, De Haen, and other practical men of the last century, who hesitated very much about the possibility of genuine small pox recurring. Remember that De la Condamine, in 1754, estimated these cases at one in ten thousand; others, at one in five thousand. At the Small Pox Hospital, very few persons ever present themselves who affirm that they have previously undergone small pox; and of the few who do, but a very small fraction can stand the test of rigid scrutiny. In one of the last cases that occurred, a medical man who witnessed the first seizure had misgivings as to the true nature of the case. You may ask me why I am

thus incredulous on the subject of recurrent small pox? It is not that I have any theory to support, but it is because I know there are so many sources of fallacy. Sometimes the first case is incorrectly reported; sometimes the second. It is very rare that the same medical man sees and reports both the seizures. I have seen three cases of pustular syphilis so like small pox, that a careless observer,—nay, even a very careful observer, were he only to see the case once, might easily be deceived. But it is not only the pustular forms of syphilis which give rise to mistakes. Lichen, and, above all, varicella, are fruitful sources of error. I was once called in to see a case of alleged secondary small pox, which, on investigation, proved to be ecthyma. I have even seen *psora* mistaken for small pox!

With this impression strong upon my mind, I cannot go far into the history and peculiarities of recurrent small pox. I may, however, state to you, that some pathologists connect the phenomenon with a peculiar proneness in the system to suffer under the variolous virus. They argue thus, from observing that all well-authenticated cases of second small pox have been of persons who, in the first instance, took it *severely*. Another class of pathologists explain the circumstance by supposing that the first attack had not been in sufficient intensity to absorb the whole amount of susceptibility. They argue thus, from having noticed that the first attacks have been *mild*. This question I cannot undertake to decide,—tantas componere lites.

The most remarkable case of recurrent small pox on record is that of Louis XV., king of France, who died of it in the year 1774, at the age of sixty-four, after having, as it is alleged, undergone that disease casually in 1724, when he was fourteen years of age. I have been at

some pains to investigate this case, which created a great sensation at the time, has been quoted over and over again, and to which great importance has been attached. After careful inquiry into dates, the character of the incubative stage, and the course of the eruption, I convinced myself that his Majesty never had small pox in early life, and that the primary attack was varicella.

There remains only one topic connected with the pathology of small pox, on which I would wish to address you; and that is, the communicability of the disease to the fœtus in utero. Dr. Jenner, Dr. George Pearson, and others, have collected many curious facts on this subject, and I am desirous to acquaint you with some of the most interesting of them. To do full justice to the subject would lead me into a wide but unprofitable path.

It does not necessarily happen that a pregnant woman taking small pox conveys the disease to the child. Several instances to the contrary have occurred at the Small Pox Hospital. An opinion was entertained by Dr. Mead, (but erroneously,) that in cases where a woman undergoes small pox without aborting, the infant would remain through life unsusceptible, having, in fact, passed through the disease in utero. Dr. Jenner has detailed two cases which prove very satisfactorily that a fœtus in utero may contract small pox, provided the mother be exposed to the contagion, although she herself does not take it. An infant born under these circumstances sickened for the small pox five days after birth, and twelve from exposure to contagion.

In a large proportion of cases, small pox communicated by the mother to the fœtus destroys the infant's life. The child is often still-born. In the neighbouring

museum of Guy's Hospital there formerly was, and perhaps is still, a fœtus preserved, whose skin is covered with variolous pustules. Mr. Heaviside's museum contained a similar case. The earliest period of fœtal life at which I have ever seen traces of variolous eruption is four months.

LECTURE V.

MANAGEMENT OF SMALL POX.

Erroneous notions formerly entertained on this subject. Sources of danger in small pox. Treatment during the initiatory fever. Question as to the employment of blood-letting. Treatment during the maturative stage. Treatment of the mucous implication. Local treatment of the pustules. Management of the petechial form of small pox. Treatment in the secondary fever. Controversy as to the employment of purgatives in small pox. Treatment of the sequelæ of small pox. External treatment during secondary fever. Inoculation of small pox. Mode of practice. Phenomena of inoculation. Results of inoculation. Abolition of inoculation.

THE power of medicine over small pox is not so striking as it is over inflammations, over bowel complaints, over agues, or many other types of fever. Nevertheless, medicine does exert a certain amount of influence over the course of this disease. Whether it does so, however, or not; whether the amount of that influence be great or small; in either case the management of small pox must be carefully investigated by you—first, lest by your measures you may do mischief, and make bad worse; secondly, because the world expects you to do something for the benefit of your patient, and what that something is, you must be taught, remembering always

that improper treatment may do harm, though the very best may not do good.

It is a melancholy reflection, but too true, that for many hundred years the efforts of physicians were rather exerted to thwart nature, and to add to the malignancy of the disease, than to aid her in her efforts. Blisters, heating alexipharmics, large bleedings, opiates, ointments, masks, and lotions to prevent pitting, were the great measures formerly pursued, not one of which can be recommended. What think you of a prince of the blood royal of England (John, the son of Edward the Second) being treated for small pox, by being put into a bed surrounded with red hangings, covered with red blankets, and a red counterpane, gargling his throat with mulberry wine, and sucking the red juice of pomegranates? Yet this was the boasted prescription of John of Gaddesden, who took no small credit to himself for bringing his royal patient safely through the disease. We may smile at this; but if either he, or Gordonius, or Gilbertus, were to rise from their graves and inquire whether this is one whit worse than Mesmerism, or at all more absurd than homœopathy or hydropathy, we should, I fear, look a little foolish. Let us, then, avoid the errors of our ancestors, without reproaching them.

Even physicians, in more recent times, have entertained very erroneous notions regarding the powers of medicine in the treatment of small pox, and the objects which ought to be kept in view. They imagined that certain drugs possessed a power of promoting the eruption of small pox, and not only of promoting it, but of procuring a favourable sort. They arrogated to themselves a like power of controlling secondary fever, and preventing its necessary consequence—pitting. We pretend to no such power. We know that the system has

imbibed a morbid poison, which, somehow or other, must be got rid of; and consequently we study to place the system in the most favourable circumstances for the safe elimination (or concoction) of the morbid matter. We propose to ourselves, therefore,

1. To moderate the violence of febrile excitement whenever we meet with it.

2. To check and relieve local determinations of blood, at whatever period of the disease they arise.

3. To support the powers of the system when it flags, either from the malignity of the poison or the long continuance of the disorder.

4. To combat, by appropriate means, concomitant disease.

You will bear in mind what I told you in a preceding lecture of the various sources of danger in small pox. As it is very important, in undertaking the management of the disease, to keep these in view, I will recal the principal circumstances to your minds. Danger in small pox depends—1. on the quantity of eruption; 2. on the condition of the mucous membranes; 3. on the state of the fluids; 4. on the state of the brain and nervous system; 5. on the age of the patient; 6. on his habit of body; 7. on the circumstances in which he is placed.

1. Distinct small pox is a disease of little or no danger. Confluence is always unfavourable, especially on the face; nor is the danger always apparent. A confluent case shall sometimes appear to progress favourably, when, unexpectedly, a fit of convulsion occurs, and the patient sinks. The drain upon the system which excessive pustulation occasions is another source of danger; nevertheless, if the pustules on the extremities acuminate well, and exhibit a crimson areola, a good

ground of hope exists. If, on the other hand, the vesicles on the trunk and extremities be flat, with a clarety areola, while the eruption on the face is white and pasty, no reasonable hope of recovery can be entertained.

2. The condition of the mucous membrane of the trachea is equally important. Hoarseness at an early period of the disease is always to be looked upon with suspicion. A natural tone of voice is a good omen, even though the eruption be full and confluent, with a disposition to cellular complication.

3. The condition of the fluids in small pox is a feature of the utmost importance in guiding your judgment as to the probable result of the case. Every thing which indicates putrescency and a dissolved state of the blood is highly unfavourable. Petechiæ, mucous hæmorrhages, menorrhagia, and vesicles filled with blood, preclude the hope of benefit even from the most judicious treatment.

4. A tranquil state of the nervous system is peculiarly favourable, and the circumstance to which recovery in all severe confluent cases is mainly attributable. Quiet nights, composure of manner, a contented disposition, and confident hope of recovery, are among the most pleasing signs that can occur. Restlessness, a succession of sleepless nights, constant moaning, and despondency, afford little prospect of eventual recovery. Children who grind their teeth seldom recover.

5. Age is a point of great moment in estimating the degree of danger in confluent and semi-confluent cases. The extremes of life are those on which small pox always falls the heaviest. Persons above forty years of age seldom recover even from the semi-confluent small pox. Children are in danger from an amount of eruption that can scarcely be called semi-confluent. In both, the pro-

cess of cicatrization is attended with great exhaustion of nervous power, the result of which is often the setting up of acute inflammation in an internal organ essential to life—either the brain, the larynx, or the lungs. The most favourable age for taking small pox is from the seventh to the fourteenth year, when the powers of life and reproduction are in their fullest vigour.

6. The habit of body is also to be taken into account. Small pox is always aggravated by its concurrence with a state of plethora. Constitutional debility is equally to be dreaded. In the strumous habit, the sequelæ of small pox are peculiarly severe, and often threaten the loss of life when the first dangers have been passed.

7. The probability of recovery must depend, lastly, on the circumstances in which the patient is placed,—on the possibility of applying remedial measures effectively, on the treatment which may have been pursued in the early stages, and other contingencies, which scarcely admit of enumeration. In hospitals, the risk of contracting erysipelas, and falling under the influence of hospital miasm, must never be lost sight of. In private life, again, the anxieties of friends may prompt a more stimulating regimen than prudence would dictate; and thus may local congestions and inflammations be excited, from which the hospital patient is exempt.

With respect to the initiatory fever of small pox, it is either known or not known that small pox is approaching. If it be not known, then the case is necessarily treated as one of common fever, to which ordinary rules apply. On the other hand, if it be known, or strongly suspected, that the variolous poison is circulating, then the question arises, should there be any corresponding difference of treatment? Are you, on that account, to

refrain from bleeding, or to practise it?—to give a purgative, or to withhold it? It is always desirable to ascertain, if possible, the fact of variolous origin, for the same reason that it is better for a man to work in daylight than in the dark, but the differences in treatment are not material, as you will soon perceive.

In the initiatory fever of small pox, the antiphlogistic treatment is to be pursued, except in a few special cases. The surface is to be kept moderately cool. A brisk cathartic, composed of four grains of the chloride of mercury, with eight of the compound extract of colocynth, may be given with great propriety, when there is considerable tumult of the general system. Saline draughts may be taken frequently in a state of effervescence, with the addition of a pill containing three grains of James's powder. But if there be present pain of the back, or of the head, or of the epigastrium, more urgent than these measures can effectually control, blood may be taken from the arm.

It has often been said, that blood-letting, in the fever of invasion, interrupts the process of nature, repels the eruption, or so retards it, and so weakens the constitution, that the due concoction of the pustules is never effected. It is undeniable that a man may be bled unnecessarily and too largely in small pox, but a moderate bleeding does no harm, and, if the fever runs high, often does great good. If the pulse be sharp, or very full, if the headache be severe, with accompanying epistaxis, blood-letting is not only useful, but absolutely indispensable; for the eruptive process is often impeded by the quantity of blood in the body, and the violence of the arterial excitement. Huxham justly said, "that you should bleed in the onset of these fevers, for the same reason that you draw off part of a fermenting liquor,—to

prevent the splitting of the vessel. By drawing off some blood, you prevent the overdistending, inflaming, and rending the vessels of the human body."

I can give you no rules as to the quantity of blood to be drawn. Consider the circumstances of each case, and be guided by them. Your object is to unload and relieve the lungs, the liver, or the brain. Whenever, therefore, these organs are gorged, and their functions impeded by a load of stagnant or inflamed blood—when intense headache, extreme irritability of the stomach, oppressed breathing, with a full labouring pulse, give evidence of such general or local congestion, draw blood, and let the quantity drawn be such as to relieve the urgent symptom. In some cases, when headache predominates, with suffusion of the eyes, leeches applied to the temples afford all the relief which is required to take off the strain from the vessels. It is under these circumstances that active purgative pills, followed by a laxative draught, are so useful in diverting the fluids from the head and surface to a mucous membrane which is never implicated in the ordinary march of the disorder.

Some writers, in their zeal for blood-letting, have tried to persuade themselves that it is the only measure which can be relied on to lessen confluence, and to prevent the development of pustules in the mucous membrane of the throat and trachea. This opinion is altogether erroneous. Bleeding has no effect on the quantity of eruption, whether cutaneous or mucous. The most confluent eruption has succeeded to the most vigorous employment of the lancet. To bleed, therefore, merely because small pox is anticipated, with the view, thereby, of preventing confluence, is uselessly to expend that power which will be required for the repair of injury to the surface. You

will keep these general principles before you, and take care that in your efforts to diminish internal congestion you do not materially impair constitutional power.

If the stomach during the initiatory fever, remains very irritable, rejecting everything that is taken, even the saline effervescing draughts with laudanum, which you will naturally feel disposed to try, I recommend you to apply mustard poultices to the epigastrium and to the feet, and to promote eruption by the pediluvium.

Again: if the circulation at this period be languid, if the pulse be small and feeble, the skin pale, and the extremities cold; if the patient lies on his back, sunk and exhausted, let him have immediately warm brandy and water, cover him with bedclothes, apply mustard poultices to the centre and extremities of the circulating system, and give thirty drops of laudanum, to be repeated in four hours, if necessary. This cordial plan of treatment must often be continued for several days, when the eruptive nisus is accompanied with depression, and nature appears so obviously unequal to the effort.

While the pustules are in process of maturation, a variety of measures may be pursued, which, without interrupting the salutary and necessary process of pustulation, lessen the patient's sufferings, and prevent subsequent difficulties.

If the eruption proceeds favourably, you would not do more than lessen thirst by saline draughts, and occasionally relieve the bowels by a dose of castor oil. If the maturation of a large crop of pustules excites much fever, it will be prudent to employ more active purgatives, such as calomel with colocynth, the compound powder of jalap, or the infusion of senna with salts, all which cause a drain from the blood-vessels, and diminish

arterial action. Place the patient in a large and cool room, and cover him lightly with bedclothes. Remove all flannel coverings which may usually be worn next the skin. If the surface be very tender, apply to it some cooling lotion, such as the decoction of bran, with some spirit of rosemary. In all cases, even of moderate intensity, it is proper to cut the hair close, and so to maintain it during the whole course of the disease. The head is thus kept cool; delirium is relieved or prevented; the risk of cellular inflammation of the scalp diminished, cleanliness enforced, and an opportunity afforded for the employment of evaporating lotions, should more urgent symptoms arise. Opiates may be occasionally administered at bed-time, when there is much cuticular irritation, or great distress from want of sleep.

The diet of the patient should consist of tea, bread and milk, arrow-root, ricemilk, and roasted apples. Grapes, oranges, and ripe subacid fruits, are grateful to the patient, and useful adjuvants to the antiphlogistic remedies. Lemonade, apple water, tamarind water, toast water, and milk and water, must be the ordinary beverages. Sydenham permitted his patients to drink small beer—an indulgence which may still be granted. To that able physician we are indebted for this, the cooling system of treatment in small pox. How strongly does it contrast with the plan of stopping up every nook and cranny, by which a breath of fresh air could gain admission, and drenching the unhappy sufferer with treacle posset and syrup of saffron!

One of the first objects which, in cases of more urgency, will attract your attention, is the condition of the throat. Gargles of infusum rosæ compos. afford some relief. When the difficulty of swallowing is very great, and the tonsils much swollen, leeches applied to

the throat, followed by poppy-water fomentations, are serviceable. Under these circumstances some physicians counsel you to apply to the throat, by means of a camel hair pencil, a strong solution of lunar caustic, (twelve grains to the ounce,) with the view of checking the advance of the mucous vesicles. I have not adopted this practice, from a conviction that it would not affect the tracheal inflammation, from which alone danger is to be apprehended.

Three measures have been pursued, having for their object to diminish action on the *surface* of the body during the maturative stage. The first was that of opening all the pustules, as fast as they ripen, by a gold needle. This was the Arabian practice; but it is as useless as it is troublesome. The second is a modern invention, that of applying lunar caustic to the pustules, so as to destroy them at an early period of their growth. As a partial application—say, to vesicles forming near the eye,—I can recommend this measure; but I cannot advise you to employ it to any large surface covered with confluent or semi-confluent vesicles. To the distinct form of small pox such an application would be unnecessary.

The latest mode of treating the surface during the maturative stage of small pox is that of applying mercurial plasters, containing calomel or corrosive muriate of mercury, or covering the whole surface with mercurial ointment. In the French hospitals at the present time the latter mode is in fashion. The reports which have reached me of its success, however, are not very flattering. I have seen all three plans fairly tried at the Small Pox Hospital. The ointment and calomel plasters were inefficient. The plaster of corrosive sublimate converted a mass of confluent vesicles into one painful

and extensive blister, but I am still to learn what benefit the patient derived from the change.

Throughout the whole period of maturation, you will look carefully to the state of the internal organs. In a very large proportion of cases these are unaffected, but bronchial inflammation, and even pneumonia, may supervene, which you will meet by the usual remedies. In cases of delirium, carefully restrain the patient, exhibit active purgatives, and wait until the full maturation of the pustules shall have relieved the tension within the head.

The petechial form of small pox admits of no essential relief from medicine. I can scarcely say that we can palliate even the most pressing symptoms. Active purgatives are inadmissible. I have tried the influence of mercury, but it is of no value here. The loss of a little blood from the arm has appeared to me more effectual than any other measure. The infusion of roses and acid is prescribed more in conformity with general usage, than with a view to any real benefit. The citrate of ammonia in effervescence, with port wine and brandy, must be given when the powers of life appear to fail, but the hæmorrhagic diathesis is often accompanied by a hot skin and an excited circulation.

The decline of the mild form of small pox requires little else than attention to the state of the bowels, and care lest too great indulgence of the appetite should light up feverish excitement. A warm bath is always advisable before the patient mixes again in society.

The difficulties in the management of small pox begin with the setting in of secondary fever. The complications are then so numerous, the struggle between the disease and the constitution so close, excitement and

exhaustion tread so near upon each other, that it is scarcely possible to assist you with any rules admitting of precise application. I shall satisfy myself, therefore, with some remarks on the chief points which will attract your notice, first treating of internal, and then of external remedies.

One of the most remarkable disputes which ever arose in physic was that regarding the propriety of using purgatives during the secondary fever of small pox. Sydenham, with all his boldness, never wholly divested himself of the early prejudices which the Arabians had inculcated against purgatives in small pox. Morton inveighed bitterly against their use, while Dr. Friend, with the true spirit of a reformer, advocated their free employment, especially during the secondary fever.

In 1708 a young nobleman took confluent small pox. Dr. Friend was called in with two physicians of the old school. The arguments in the consulting room were long and stormy. The patient died, in spite of the purgatives, which Dr. Friend's pertinacity had at length induced his colleagues to agree to. A paper war succeeded, and from words the parties came to blows. In June, 1719, Dr. Mead and Dr. Woodward met in Cheapside, drew their swords, and, after a few passes, Mead came off victorious. This display effectually settled the dispute, and purgatives are now as freely employed in the secondary fever of small pox as in ague or in typhus. They are of the greatest service when the skin is hot and dry, when scarlatinal rash covers the body, or innumerable abscesses give evidence of the excited state of the cutaneous vessels.

Profuse pustulation demands that the strength of the system should be supported by nourishing diet, an allowance of ale, porter, or wine, and cordial medicines. In

the great depression which sometimes succeeds the destruction of large portions of the surface, when subsultus tendinum, general tremors, a feeble pulse, and a dry tongue, attract observation, wine must be liberally administered, with beef-tea, and a mixture containing nitric æther and the carbonate of ammonia in camphor julep.

In the progress of secondary fever we sometimes witness the access of very acute seizures, such as apoplexy, peripneumony, and pleurisy. Blood may be taken freely from the arm in these cases. Blisters are, from the state of the surface, very little suited to small pox.

Erysipelas, succeeding small pox, must be treated with reference to the accompanying state of the circulation. For the most part, it is best combated by purgatives and saline medicines. Sometimes, wine and the decoction of bark are indicated. Ophthalmia is one of the most serious evils which the secondary fever of small pox gives rise to. The loss of blood which the intensity of the symptoms appears to warrant, would be followed by great and perhaps irremediable exhaustion. In some cases, therefore, the eye must be sacrificed to save the patient's life. Leeches, cupping-glasses to the temples, active aperients, calomel, pushed so as to affect the mouth, with warm fomentations, are the remedies on which you must mainly rely. In a more chronic form of the complaint, blisters to the temples afford very decided benefit.

When small pox has called into activity the dormant seeds of scrofula, when irritable sores, irritable ophthalmia, enlarged joints, and ecthymatous pustulation, combine to weaken an already debilitated frame, your utmost efforts will be called into requisition, but often with doubtful success. The best remedies are occasional warm baths, a course of sarsaparilla, and moderate doses of blue pill

and rhubarb, to ensure due action of the liver. The remedy of most unquestionable efficacy is change of air. It imparts tone to the languid vessels of the surface, converts an ecthymatous surface into healthy granulations, improves the appetite, and gives tone to the retina. The influence of an altered air on the diseased actions of the body is better displayed in the sequelæ of small pox than in any other known disorder.

A few words on external treatment will conclude this division of the subject. When pustulation is profuse, benefit is obtained by covering the surface liberally with some simple dry powder. Starch powder, hair powder (well dried), and the powder of calamine, are alike available for this purpose. Cold cream, and mild unguents, such as the ung. cetacei, with a proportion of oxide of bismuth, are useful when there is much cutaneous irritation with a dry surface. Fomentations and poultices are the only local means of treating those abscesses and erythematous inflammations which so harass the patient and so fearfully peril life in the later periods of secondary fever.

All the attempts made by the use of masks to prevent pitting, end in disappointment. The only effectual means of lessening such disfigurement are those which allay cutaneous action. Purgative medicines, low diet, and free exposure of the face to a cool air, are the sole measures on which your reliance ought to be placed.

INOCULATION having been abolished by act of parliament in this country, any lengthened details concerning it would of course be superfluous, and very much out of place. Nevertheless, a measure so remarkable in its consequences, and which, for the better part of a century, was the object of general attention, to which

every individual in this kingdom above the age of forty-two now trusts as his security from a loathsome pestilence, must not be passed over without a short comment.

Inoculation is performed by introducing into the arm, at the insertion of the deltoid, by means of a lancet, a minute portion of variolous matter. The thin lymph of a fifth-day vesicle is to be preferred to the well-concocted purulent matter of the eighth day, but both are efficient. One incision only is to be made. A minute orange-coloured spot is perceptible, by aid of the microscope, on the second day; on the third or fourth day a sensation of pricking is experienced in the part. The punctured point is hard, and a minute vesicle, whose centre is depressed, may be observed, surmounting an inflamed base. On the fifth day the vesicle is well developed, and areola commences. On the sixth day, the patient feels stiffness in the axilla, with pain. The inoculated part has become a hard and inflamed phlegmon. The subjacent cellular membrane has become involved in the inflammatory action. On the evening of the seventh, or early on the eighth day, rigors, headache, a fit of syncope, vomiting, an offensive state of the breath, alternate heats and chills, languor, lassitude, or, in the child, an epileptic paroxysm, announce the setting in of fever. The constitution has taken alarm, and sympathizes with the progress of the local disorder.

On the appearance of febrile symptoms, the inflammation of the arm spreads rapidly. An areola of irregular shape is soon completed, which displays within it minute confluent vesicles. On the tenth day the arm is hard, tense, shining, and very red. The pustule discharges copiously, and ulceration has evidently penetrated the whole depth of the corion.

On the eighth day, spots of variolous eruption shew themselves in various, and often in the most distant, parts of the body. In a very large proportion of cases the eruption is distinct and moderate. Two hundred vesicles are counted a full crop. Sometimes not more than two or three papulæ can be discovered, which perhaps shrivel and dry up without going through the regular process of maturation. At other times, the eruption is full and semi-confluent, passing through all the stages of maturation, and scabbing, and cicatrization, with as much perfection as the casual disease can display. Between these extremes every possible variety may be observed. The truly confluent eruption with affection of the mucous membranes is very rare, and that implication of the fluids and of the nervous system, which together constitute the extreme of variolous malignity, is nearly, if not entirely unknown. Secondary fever, therefore, is not common, at least in any intensity.

The rules laid down for the safe conduct of inoculation were principally the following:—It should be performed exclusively in persons free from actual bodily disease, and neither plethoric nor scrofulous. It may be safely practised at all ages, beginning at the third month. It is improper to inoculate during pregnancy, on account of the danger to the child *in utero*. It may be practised in all seasons and in all climates. It proved not less successful among the negroes in Jamaica, than in the inhabitants of St. Petersburgh. Perfect health being the best condition for receiving and safely eliminating the poison, everything that tends to diminish plethora, to lessen cutaneous action, to render the bowels free, to preserve the blood in a cool, pure, and normal condition, was found useful. Laxative medicine, a

moderate diet, abstinence from all fermented and spirituous liquors, cool chambers, gentle exercise in the open air, light clothing,—all contributed, in their several degrees, to the successful result. The antimonial and mercurial medicines, which the Suttons laid much stress upon, were useful only to secure the co-operation of the patient in matters of more necessity, especially diet and exposure to the open air.

You will naturally wish to know what was the practical result of inoculation. I will tell you in a few words. Its influence in lessening the mortality of small pox was something quite extraordinary, and scarcely credible. With ordinary precautions in the choice and preparation of subjects, not more than one in five hundred cases will terminate unfavourably. The ill success which attended the early inoculations, between the years 1722 and 1730, arose entirely from bad management, from the most culpable negligence in the choice of subjects, and an utter ignorance of all the principles by which the practice of inoculation should be governed. Had not the discovery of Jenner interfered to interrupt its extension and improvement, inoculation would have continued to this day increasing yearly in popularity. It cannot be doubted that improvements in medical science generally would have shed additional lustre on this practice.

Since the introduction of vaccination, it has been the fashion to decry inoculation, and to impute to it mischief of which it was not guilty. The great objection made to inoculation, and that which recently induced Parliament to abolish it altogether, under heavy penalties, was, that it disseminated the virus, and multiplied the foci of contagion. Dr. Watkinson and Dr. Schwenke, in 1777, and more recently, Dr. Adams, broke the force of this argument, by pointing out how important a part epidemic

influence plays in the diffusion of variola. Had they lived in our times, how strongly would they have fortified their arguments! We saw, in 1838, an epidemic small pox raging in London, where inoculation had long been discontinued. The admissions into the Small Pox Hospital in that year exceeded those of 1781 and of 1796. Inoculation was abolished throughout England and Wales in 1840, and the act has been most rigidly enforced; yet, during the two last years, small pox has visited every county of England.

Sir Gilbert Blane has attempted to prove by statistics the evils of inoculation. He has shewn that the proportion which the mortality by small pox in London bore to the general mortality, increased during the last century from 78 to 94 per thousand. But various considerations serve to weaken the force of this argument. If, for instance, we divide the last ninety years of the 18th century into three periods, we shall find that the recorded deaths by small pox were as follow:—1711 to 1740 (when there was no inoculation), 65,383; 1741 to 1770 (when inoculation was coming into general use), 63,308; 1771 to 1800 (when inoculation was almost universal), the deaths were only 57,268: so that, by this shewing, inoculation diminished the mortality by 8115 lives!

Statistics are very useful, and deservedly carry great weight with them; but they may be enlisted, with a little management, on both sides of an argument.

One subject only remains for our consideration, and that is, the question, whether any circumstances would still warrant us in recommending inoculation on scientific principles? Concurring most cordially in opinion that the practice of inoculation by *unqualified* persons ought to have been put down (not in 1840, but forty years before that) by stringent legislative enactments, I still

remain of opinion, that under several circumstances it is the duty of a medical man to recommend inoculation. These circumstances do not, indeed, often occur; but the legislature would hardly wish to control and fetter, even in a single case, the deliberate judgment of a physician, acting for the benefit of his patient. I will name to you four of these cases:—1. When a person has been found, from peculiarity of habit, unsusceptible of vaccination. 2. When new sources of vaccine lymph are introduced, and it becomes of importance to ascertain that the new virus is efficient. 3. When young persons (between the ages of ten and twenty), vaccinated in early life, are proceeding as cadets to India. 4. When small pox unexpectedly breaks out in a country district, at a time when (even with the facilities of a penny post) vaccine virus is not to be obtained.

Other cases, equally strong, might be put; but what I have said will probably suffice to shew that a clause (duly guarded against abuse) permitting qualified medical practitioners to inoculate under circumstances of urgency, would have been an useful addition to the Vaccination Extension Bill. That it was not so added was no fault of mine.

LECTURE VI.

RUBEOLA, OR MEASLES.

Characters of rubeola. Its early history. Its supposed identity with small pox and scarlatina. Incubative stage. Characters of the initiatory fever. Rubeola sine catarrho. Maturation of measles. Exacerbation of the rash. Decline of measles. Rubeolous pneumonia. Other sequelæ of measles. Abdominal inflammation. Malignant measles. Appearances on dissection. Cancrum oris. Prognosis in measles. Diagnosis. Pathology of measles. Recurrence of measles. Inoculation of measles. Statistics of measles. Treatment during the early stage. Employment of blood-letting in the pneumonic complication. Treatment of malignant measles. Treatment of the several sequelæ of measles.

Rubeola, or measles, the rougeole of the French, the morbilli of Sydenham and other old authors, is an exanthematous disease, characterized by the following symptoms:—A fever, with catarrhal implication, which, at the end of seventy-two hours, throws out an abundant eruption, consisting of minute confluent papulæ, slightly elevated above the surface of the skin, and subsiding in three, or at farthest, in four days; the catarrhal symptoms, in all normal cases, declining on the appearance of eruption, but sometimes, especially in severe and irregular cases, continuing, or merging in those of pneumonia. The disorder, for the most part, occurs to all mankind once in the course of life; but having been undergone, the con-

stitution remains for ever after unsusceptible of the same disease.

No complaint possessing these very striking features is to be found recorded in the writings of any Greek or Roman author. Dr. Willan (in his Miscellaneous Works, 1821) struggles hard to prove that such a disease was known to them; but his researches have made no converts. The opinions of Friend and Mead are still adopted, and we are constrained to believe that the measles is a disease of comparatively modern origin.

All our best medical historians concur in the belief that measles began to spread through the world about the same time as small pox, and that it had its origin in the same countries whence the variolous miasm arose. The shores of the Red Sea, the coasts of Arabia and Abyssinia, first experienced the assaults of this malady, and probably about the fifth or sixth century. Constantine Africanus dates the origin of measles two or three centuries after small pox; but I know not on what grounds. The first distinct allusion to measles is found in the writings of Rhazes, the Arabian physician already mentioned as the *auctor princeps* on small pox. Rhazes is supposed to have flourished early in the tenth century, (910.) His successors, Hali Abbas and Avicenna, the two most distinguished authors of the Arabian school, described measles under its Arabic name, Hasba, or Al hasbet. The term *rubeola* was introduced subsequently by the Latin translators of Hali Abbas, and by some appears to have been appropriated to that variety of exanthema now called scarlatina.

The term morbilli was employed from a very distant period also, and seems to have included every variety of exanthema, accompanied by efflorescence. In this sense morbilli was used by Morton at the close of the seven-

teenth century. Sydenham carefully restricted the term morbilli to measles.

It is not only curious but instructive to trace the gradual expansion of men's minds in the diagnosis of the exanthemata. All the Arabian authors were impressed with the belief that small pox and measles were pathologically associated. Avicenna pronounced measles to be a bilious small pox. In 1640, Daniel Sennertus proposed as a subject of inquiry, why the disease in some constitutions assumed the form of small pox, and in others, that of measles.

Diemerbroeck, in a posthumous work, published in 1687, asserts that the two diseases are only different degrees of the same malady. "Differunt morbilli a variolis accidentaliter, vel quoad majus et minus." "The matter by which measles is generated," says he, "is not so thick as in the case of small pox. It is drier, and somewhat choleric." (Choler, or bile, was the dry humour.) This author held that such as had had small pox were generally exempt from the measles, "though 'tis true they can challenge no absolute immunity. Therefore," he adds, "measles is chiefly met with in young persons."

Sydenham, who was the contemporary of Diemerbroeck, and a much better physician, devoted much of his attention to measles. He described with great accuracy the epidemics of 1670-74, and his opinions concerning measles display singular acuteness. He permanently separated small pox from measles, which was a great step in pathology. The belief in the identity of measles and scarlatina, however, still prevailed. Twenty years after the time of Sydenham, Morton viewed measles and scarlatina as the product of the same miasm, and averred that they stood to each other in the same relation as the distinct and confluent small pox. Hence, by many

authors of that age, scarlatina was called morbilli confluentes. Even so recently as 1779, Dr. Withering speaks of measles as being *nearly allied* to scarlatina. By this time, however, physicians had become sensible that the two diseases arose from different miasms. This conviction was forced upon them by observing that patients who had gone through measles were equally with others subject to scarlatina.

Having brought down the history of measles to our own time, I proceed to describe to you its phenomena. I shall first make you acquainted with measles as it occurs in healthy habits, and in its simplest and most usual form. This constitutes the *morbilli regulares* of Sydenham.

Measles is the product of a miasm or morbid poison, which in this country is invariably received by the mode of infection. It has, of course, its breeding or incubative period. The term *latent* period is improper, because the miasm often gives evidence of its activity. Sometimes the entire incubative stage is marked by languor, lassitude, a sense of mal-aise (or dis-ease), and occasionally a characteristic symptom, such as cough. I once attended a lady, who for a fortnight had a cough which baffled us all, but terminated at length by a copious eruption of measles. At other times, the first eight or ten days of incubation are passed without any sign of ill health.

The early authors, biassed, no doubt, by their prejudices in favour of exanthematic identity, taught that the initiatory symptoms of measles were the same as those of small pox. This, as a general rule, cannot be admitted. With regard to the *duration* of such symptoms, authors are more agreed. Heberden says, that from ten to fourteen, Burns, that from twelve to fourteen days usually

elapse from exposure to contagion to the appearance of rash. Dr. Willan considers sixteen days as the extreme limit. The first week being usually passed without symptoms, the child (for the greater proportion of your measly patients will be children under seven years of age) then droops. Catarrhal symptoms supervene. Chills, flushes, disturbed nights, some degree of delirium, or drowsiness during the day, with weight on the forehead, are then observable. Pain of the back is a frequent symptom. The pulse is quick. The tongue is white.

From the occurrence of rigors to the appearance of rash seventy-two hours elapse. The initiatory fever of measles affects the quartan type. Two complete days intervene. The rash comes out on the fourth day from the setting in of fever, and the eleventh or twelfth from the imbibition of the poison. The following cases will illustrate the ordinary process of incubation, and the anomalies occasionally witnessed:—

Case 1.—Miss M. D., aged seven years, residing in a retired situation at Woodgreen, was brought to London on Tuesday, January 10, 1843, to attend a juvenile party. One of the children whom she there met sickened for the measles on the following day, and before the end of the week, two others of the party had been seized. On the morning of Tuesday, January 24, being fourteen days from exposure, Miss M. D. began to complain of languor, headache, sneezing, and cough. The eyes were suffused. On Friday, the 27th, measles appeared on the face. The full incubation extended here to eighteen days. This young lady was attended by Dr. Munk, of Finsbury-place.

Case 2.—On Tuesday, February 14, 1831, Mrs. D., aged 26, went to Camberwell in a hackney coach. The coachman appeared ill as he let down the steps. At

dinner, Mrs. D. fell sick and poorly, and so continued all the rest of the week. On Tuesday, February 21, (eighth day,) she complained of rigor and violent pain of the back. Her husband, a surgeon, imagined she was passing a calculus. This pain continued all Wednesday and Thursday. On Thursday, the 23rd, (tenth day from exposure,) I first saw her. The symptoms were backache and headache. The eyes were suffused; the pulse 130. On Friday, the 24th, at ten A.M., seventy-two hours exactly from the first rigor, measles appeared. Eleven days of incubation.

Case 3.—Eliza Finch, aged four months, residing at Pentonville, was vaccinated by me at the Small Pox Hospital, May 15, 1832. May 17, the child began to droop. Bilious vomiting, very severe, with drowsiness, succeeded. Much blood passed by stool. The head was very hot. Vomiting continued all that and the four following days. It ceased on the 22nd. On the 24th the other febrile symptoms yielded a little. On the 25th (nine days from the invasion of symptoms, and eleven from the probable reception of the germ) measles appeared, and went through its course regularly.

The leading features of the initiatory fever of measles are, I have said, catarrhal. I must describe them to you more in detail.

1. There is sneezing. I have seen both adults and children sneezing every five minutes, and really exhausted by it. In the case of Robert Woodland, whom I attended in June 1830, the sneezing ended in epistaxis. You know that sneezing indicates a gorged and irritable state of the Schneiderian membrane.

2. The eyes are red and watery. There is *epiphora*, the great diagnostic on which nurses are wont to rely. While the measles are breeding, you will be sure to find

the window-blinds down, and the curtains of the bed close drawn. The slightest ray of light is painful. There is irritability of the retina, sometimes attended by inflammation of the conjunctival membrane.

3. There is a loud, dry, hollow cough (*tussis sicca.*) The violence of this cough, on some occasions, will astonish you, as it did me many years ago, while attending a young Irishman, Mr. Webb, at Islington. It was not only loud, but incessant. The trachea and bronchia participate in the same kind of action (whatever be its nature) which takes place in the nose and eyes.

4. There is hoarseness (*raucedo.*) The larynx is also implicated. In fact, the mucous structures generally of the head and chest receive the first impetus of the poison. We are not justified in saying that the action developed in them is inflammation. The membranes are probably only in a state of congestion with increased irritability—a state which plethora, bad management, a cold season, or a bad habit of body, may *convert* into inflammation.

Ever since measles was separated from scarlatina, authors have described an exanthematic disorder, allied in aspect to rubeola, but not exhibiting any initiatory catarrhal symptoms. Such a complaint has been called rubeola sine catarrho, or incocta. By some it is called the bastard, spurious, or imperfect measles. Much attention has been paid to it in Germany. Dr. Willan's opinions on it seem to guide the pathologists of this country. He considered it as a species of measles, arising from the true rubeolous poison; but he added, "persons receiving the miasm in this form are peculiarly liable to a second attack of measles."

This last admission seems to me nearly decisive of the question. I believe that by far the larger proportion of

such cases are cases of febrile lichen. I should be inclined to lay all the stress on the duration of the initiatory fever. If this extends to 72 hours, the disorder is measles, whether catarrhal symptoms be present or not. On the other hand, if a rash of a rubeolous character succeeds a brief period of febrile commotion (24 or 48 hours), the disease is not measles, and the child will fall into true measles at some subsequent period of its life.

The appearance of measly eruption is very characteristic. It comes forth in a full crop, and rapidly reaches its climax. In regular measles, the face is always first affected. When closely examined, the eruption is found to consist of a congeries of minute papulæ, close set, or confluent, and for a short time perceptibly elevated above the level of the surrounding skin. This elevation, or roughness, is most perceptible on the forehead. On the limbs it is scarcely to be detected. The colour of the measly eruption is a dingy red, very different from the bright scarlet hue of its rival. Hence the French name Rougeole, or fievre rouge. The difference in colour may easily be traced to the tracheal and bronchial complication so generally present in measles, which, extending partially into the substance of the lungs, gives a venous character to the blood. In scarlet fever, on the other hand, the lungs are unaffected, while there is intense arterial action. The eruption, therefore, partakes strongly of the character of arterial blood.

By Willan and others, the patches of measly eruption are said to assume a crescentic arrangement. I have often been disappointed in my search for this appearance, and am inclined to think there is some little fancy called into play in this description.

On the second day of eruption (the fifth from the occurrence of rigors), the eyelids often swell, from the ex-

tension of cutaneous action to the subjacent cellular tissue. Although I have never seen such a thing, I have yet heard of children blinded by measles during the space of four days. The progress of measly eruption, in all normal cases, is steadily from above downwards. On the second day of eruption the trunk and upper extremities are occupied. On the third, it has extended to the lower extremities, by which time it has nearly disappeared from the face. On the sixth day, it has faded over the whole surface.

Some modifications occur even in the most regular measles. One of the most familiar is an abundant crop of miliary vesicles on the arms and trunk, filled with a thin transparent lymph, and of such size and distinctness as to create a suspicion of the disease being small pox. We may well believe that the frequency of this event led originally to the idea of identity. Measles of this kind has been called rubeola variolodes, or the nirles. Pathologists have reasoned themselves into the belief that this symptom is owing to a peculiarly inflammatory state of the cutaneous capillaries, but it will be observed in mild cases, unaccompanied with high fever.

Another anomaly merits notice, the re-appearance or exacerbation of the rash after having reached or passed its regular crisis. Dr. Willan first noticed this circumstance. He records two cases of the kind in his "Reports of the Diseases of London." Frank, of Vienna, has observed the same thing. Dr. Conolly recites a like case, where the renewed eruption was so copious and intense on the face as to make it impossible to recognise the features. Some years ago, a case in every respect similar occurred at Brompton to Dr. Seymour

and Mr. Chinnock. Ten days elapsed in this instance before the renewal of the exanthematic action.

By most authors, it is stated that the decline of measles is attended with desquamation of the cuticle, the scales being so minute that the body appears as if sprinkled over with fine bran. That this is perceived in some cases is unquestionable, but in many no such destruction of cuticle takes place. The cause of desquamation is the intense heat of skin which dries up and kills the minute fibrils connecting the cuticle with the corion. Desquamation does not form that striking feature of measles which it does of scarlatina and erysipelas, because the heat of surface seldom attains the requisite degree of intensity.

In the perfectly regular measles, the cough, hoarseness, and other mucous symptoms, begin to abate on the first appearance of eruption. I have seen the cough cease instantly, as if by magic. Let me pause for a moment to illustrate, by this means, the mode in which blisters relieve a teasing winter cough. The principle is exactly the same. The skin and tracheal membrane are analogous or homophysic structures, and irritation set up in the one, whether by nature or by art, relieves irritation (and even inflammation) in the other.

The sequelæ, or dregs, of measles require from you as much study as the earlier periods of the complaint. I have described the normal progress of measles in perfectly healthy subjects. I am now to trace its effects on weakened and scrofulous constitutions. Generally, in such habits something occurs early to give cause of uneasiness. The initiatory fever has been severe. The eruption has been retarded twelve or twenty-four hours. It has receded and returned. Epistaxis, or an epileptic

fit, or diarrhœa has occurred to interrupt the normal course of the disease, and warn you of impending danger. Above all, in such constitutions the catarrhal symptoms do not subside on the outbreak of eruption. The cough continues. The child becomes restless. Careful observation detects dyspnœa. The stethescope gives signs of impeded respiration. Instead of the febrile symptoms subsiding on the sixth day, and the child expressing its desire to get up and have its toys, the little sufferer continues to droop. Its hands are hot; its nights unquiet. It is thirsty, and the urine is scanty. Secondary fever has set in.

During the progress of secondary fever, inflammatory action, sometimes acute, but more commonly of a lower subacute kind, arises in one or more of the structures which were the seats of primary irritation—namely, the eyes, the glands of the neck, the larynx, the trachea, or the lungs. Scrofulous ophthalmia, scrofulous enlargements of the glands of the neck, with succeeding ulceration, laryngitis, croup, but above all, pneumonia, are the *sequelæ* of measles. Of the laryngeal and croupy affections I have nothing to offer differing from the usual phenomena of those disorders arising idiopathically. The danger is alike in both cases. Measly pneumonia, from its extreme frequency and frightful devastations, deserves a closer attention.

Pneumonic complication occurs both in the progress of the eruption and during its decline. It is a slow, creeping, insidious form of inflammation, which too often throws the practitioner off his guard. No positive complaint is made. The child droops, and appears weak and exhausted. Imagining that the disorder has weakened his patient, the practitioner directs some mild tonic. Meanwhile, pneumonic engorgement (or pneumonia in

its first stage) creeps on. The lungs become more and more congested, and at length solidified. A convulsive fit now takes place. Alarm is taken, and leeches are applied, but the mischief is irreparable. Dyspnœa increases. The child becomes drowsy, the feet cold. The pulse sinks. Fluid effusion now takes place from the bronchial membrane. Another and another fit succeeds. Rattles are heard in the throat. The child dies!

Such is the usual course of rubeolous pneumonia. Sometimes the inflammation is of a different kind, which runs on to the rapid development of tubercles, and the formation of small abscesses. The child emaciates, becomes consumptive, and dies. This series of changes may occupy a month or six weeks. The former is an affair of eight or ten days from the decline of measly eruption. I am sure I speak much within bounds, when I say that nine-tenths of the deaths by measles occur in consequence of the subacute form of pneumonia now described. I do not remember to have ever seen a case of measly pleuritis.

The ophthalmia succeeding measles is of the kind usually called scrofulous. The irritability of the retina is often so intense that it is impossible, even by force, to open the eyelids. There is redness of the conjunctiva, but not proportioned to the intolerance of light. This state of the eye may continue for weeks, nay, even for months. Eczematous runnings behind the ear are frequent after measles. So is otitis, or earache. The glands of the neck harden or advance to indolent abscess.

I have not yet spoken to you concerning the state of the bowels in measles, because in many cases the abdominal viscera remain throughout unaffected. But, at times, especially during secondary fever, a subacute form

of mucous enteritis is set up. The child cries exceedingly (which it does not do in the thoracic complication), and draws the legs up to the belly. There is diarrhœa, the stools being of unhealthy aspect, green, and very offensive, (from the foul and depraved state of the secretions,) and often ejected with force. Ulcers occupy the angles of the mouth. The tongue is red at first and afterwards aphthous. The countenance expresses great febrile anxiety. Marasmus supervenes—that is, the child emaciates, and in this state of things, death may ensue.

In India, and other hot countries thoracic complications are rare. Diarrhœa and dysentery prove the usual and often troublesome sequelæ. The mesenteric glands are not often affected. Sydenham has the merit of having first detected both the real nature and the appropriate treatment of this complication.

Measles does not always display the steady though perhaps severe course I have now described. There is a malignant or putrid variety of measles, sometimes occurring isolated in the course of epidemics of average intensity, sometimes giving a decided character to the epidemic. In 1745 measles of this kind appeared in Plymouth, and found an able historian in Dr. Huxham. In 1763 occurred the celebrated epidemic of malignant measles described by Sir William Watson with such accuracy that the disease was long known as Watson's measles. In 1816 a similar epidemic prevailed in Edinburgh. The characteristic features of malignant measles are—1. Severity of the initiatory fever. 2. Irregularity in the course of the symptoms, especially in the appearance and aspect of the eruption. 3. Severe implication of the brain. 4. Implication of the abdominal viscera. 5. Concomitant disorganization of the blood, leading to petechiæ and hæmorrhages.

The eruptive fever is severe, and attended with unusual symptoms. The fever is typhoid, not inflammatory. The eruption appears too early or too late. It perhaps recedes after having shewn itself, and partially reappears. The stomach is irritable; vomiting is both severe and protracted; there is delirium, with wildness of eye, or coma; the belly is tender; there is purging of unhealthy stools; the extremities are cold, the pulse small and wavering; on the surface appear petechiæ or ecchymosed patches of eruption; the fauces assume a livid, or dusky red colour; blood passes by stool; there is much oppression at the præcordia, and abundant muco-serous discharge from the chest, indicating the congested condition of the lungs and their mucous membrane. In these almost hopeless circumstances, children may die in forty-eight or sixty hours, asphyxiated by the condition of the air-passages; others die of coma or convulsion; some are worn out more slowly by diarrhœa and bloody stools.

The appearances presented on dissection of those who die either of the malignant measles or of the thoracic complication already described, present features which might readily be anticipated from the character of the symptoms. The bronchial membrane is spongy; abundant serous effusion escapes from the lungs on pressure; portions of their substance are consolidated; the larynx is œdematous. Abscess and purulent infiltration are rare. In the abdomen appear patches of ulceration, with or without enlarged mesenteric glands. In the ventricles of the brain, you will occasionally find effusion of serum.

I have, lastly, to speak to you of that truly frightful combination, measles with the tendency to gangrene. This is sometimes witnessed in children of the upper ranks who are of extremely weak habit, but all the worst

cases appear in the half-fed children of the lower ranks, inhabiting damp cellars, and inhaling an impure air. The measles, having superadded to it such sources of constitutional debility, proves too much for the system. The first evidence of the gangrenous disposition will probably be a sloughy state of leech-bites or blistered surfaces, soon after which cancrum oris begins to shew itself. A hard round spot, like a marble, occupies the inside of the cheek, or a small black point appears at the corner of the mouth. A tooth drops out. In twenty-four hours gangrene has spread so as to occupy a large portion of the inner and some part of the outer cheek; at length the whole cheek is eaten away, and the nose and eye are invaded. Happily, however, death puts a period, though not always an early period, to this distressing scene.

Cases of recovery from cancrum oris are seldom seen, except in adults. The affection is not peculiar to the latter stages of measles. I have seen it following small pox, and occurring in the progress of infantile remitting fever; but there is something in the rubeolous miasm peculiarly depressing to the vital power, and hence cancrum oris is much more common after measles than after any other exanthematic malady.

The prognosis in measles is easily laid down. The cause of death in the great proportion of cases is pneumonia. All symptoms indicating pulmonic congestion, and its consequences, whether affecting the chest, head, or belly, such as coma, convulsions, or vomiting, are peculiarly to be dreaded. It has generally been remarked that measles does not fall with such severity on pregnant and parturient women as the other exanthemata. Indeed, the mortality by measles among adults is very low. In hot countries measles is not viewed with alarm, evidently from the absence of thoracic complication.

The following are the observations of authors regarding the proportion of deaths to recoveries:—In one of Sir W. Watson's epidemics, the deaths were as high as ten per cent. Dr. Home estimated the proportion at eight per cent. Mr. De la Garde states that, at Exeter, in 1824, he lost eight per cent. Dr. Percival, of Manchester, lost ninety-one out of 3807, which is one in forty, or two and a half per cent. Dr. Adams states, as the generally received opinion in his time, that, *communibus annis*, measles does not prove fatal to more than three per cent. I have given (page 6) a table of the deaths by measles during three years. It will be seen that in 1839, there died, throughout England and Wales, by measles, 10,937 persons: this, at three per cent., would make the total attacked, 364,566, about the number of those born who attain the age of three years.

Mr. Farr's Fourth Report gives tables of the deaths, by measles, throughout England and Wales, for three years and a half, on a very extended scale. The following abstract presents an interesting picture of the prevalence of the disease in this country, and of its varying intensity:—

Table exhibiting the Deaths by Measles throughout England and Wales, within Ten Quarterly Periods, extending from 1*st July*, 1837, *to* 31*st December*, 1840.

QUARTERLY PERIODS.	1837.	1838.	1839.	1840.
Jan., Feb., March	...	2022	2074	2836
April, May, June.....	...	1512	3204	2641
July, August, Sept.....	2362	1037	2767	1739
Oct., Nov., Dec.....	2392	1943	2892	2110
Total Deaths.....	4754	6514	10,937	9326

The diagnosis of measles need not detain us. From scarlatina it is to be distinguished—1. By the character and duration of the eruptive fever; 2. by the character and general aspect of the eruption; 3. by the state of the throat. In a subsequent lecture, these points will be stated more in detail. From lichen febrilis, measles is distinguished by attention to the incubative stage. Measles incubates in four days; lichen, in twenty-four hours.

The real difficulties of diagnosis arise out of the concurrence of two exanthemata. Measles has been known to co-exist with small pox. Mr. De la Garde has recorded an interesting case of this kind which occurred at Exeter in the epidemic of 1824. Dr. Russell has detailed like cases occurring at Aleppo. Many years ago I attended, with the late Mr. Corbett, a case which exhibited the combined character of measles and scarlatina. There was an eruption of measles, with the sloughy throat of scarlatina. I have put on record the particulars of a family invaded at the same time by the miasms of scarlatina and measles; one child took measles first, and scarlatina afterwards; the other took scarlatina first, and measles afterwards. The character of the eruptive fever in each of the four seizures, indicated the nature of the disease which was to follow.

Willan relates the case of a young man, aged eighteen, inoculated for measles and cowpox on the same day; the cowpox took the lead, measles following at the end of sixteen days. I described (page 101) a case very analogous; but there measles had the start, and after sixteen days, cowpox had its turn. It is singular that in each case sixteen days should be the period of suspension. This, I am persuaded, was not accident.

The pathology of measles (by which I understand all speculations regarding the causes of the disease) affords much curious matter for inquiry. That measles is the product of a specific miasm, and is never generated *de novo*, is now the universally admitted doctrine. Historical facts countenance this opinion. Measles never gained footing at St. Helena until 1808. For twenty-five years it was absent from the island of Madeira; and when in 1808 it did invade the island, it found almost the whole population susceptible; in four months it destroyed 700 lives. Australia and Van Dieman's Land are to this day exempt from measles. They have, indeed, what is called *Van-Dieman's-Land measles*, which is a species of febrile lichen, affording no protection against the measles of this country.

The statistical details already given shew how universal is the susceptibility of this contagion. The recurrence of measles has been recorded, but the well authenticated cases are few. Dr. Baillie has put on record seven, of whom five were brothers and sisters. Four had recurring measles at the interval of six months; one at the interval of twenty-one years. Dr. Webster has published three similar cases, where the intervals were respectively two years, four years, and six years. Two cases are recorded by Dr. Home.

The inoculation of measles was first thought of by Dr. Home, of Edinburgh, in 1758. He inoculated with the blood, applying cotton dipped in the blood of a measly patient to a wound in the arm. We read, that febrile symptoms appeared on the sixth day, of a mild character, and that no secondary complications ensued. Early in this century, Mr. Wachsel, of the Small Pox Hospital, inoculated a lad, Richard Brookes, with fluid taken from some of the measly (or miliary) vesicles,

and the inoculation was successful. In 1822, Professor Speranza, of Mantua, inoculated himself and six boys, in the manner recommended by Home, with complete success. In other trials, it does not appear that the resulting disorder was at all mitigated.

The latest recorded experiments are those made in 1842, in Hungary, by Dr. Katona. We are informed, that he failed only in 78 cases out of 1112, (seven per cent.) that the resulting disorder was mild, contrasting favourably with the severity of the reigning epidemic. No deaths occurred among the inoculated. The infecting blood was drawn from the surface most efflo-resced; we further learn, that a red spot with surrounding areola followed. On the seventh day, rigors occurred, with the usual catarrhal symptoms. On the ninth or tenth day, eruption manifested itself, which declined on the 14th. On the 17th day from inoculation (7th or sometimes 8th from eruption), the patient was convalescent.

These experiments certainly merit more attention than they have yet received in this country. I have lately been inclined to think, that the child, whose case I detailed (page 101) as having undergone cow pox after measles, received the germ of measles and of cow pox at the same time; in other words, that, unknown to me, the child that furnished the lymph was incubating the measles. When the case occurred, I presumed that the germ of measles had been received by accidental infection.

This brings me to the infective nature and epidemic diffusion of measles, which must detain us for a short time.

It has been rendered highly probable, more especially by a case recorded by Dr. Williams of this Hospital,

that the blood throws off infective emanations during the eruptive fever, and prior to any eruption. The infective distance is unknown. It was formerly held, that measles sets in in January, reaches its crisis at the vernal equinox, and ceases in the summer solstice. Modern statistics overthrow all these long-established notions. The quarterly deaths by measles in London, in 1841, were 158—147—260—408,—total, 973. In 1842, they approximated still closer, being 308—334—311 340,—total, 1293. No such law of epidemic culmination and decline is here apparent. In fact, the recurrence and duration of epidemics is, in Europe, wholly irrespective of season. In Bengal, however, the prevalence of measles (or Hacem) is governed by different laws. There the disorder never originates except in the cold season. It begins about the middle of that division of the Indian year, and continues till the hot season is established. Season affects too, there, the character of the symptoms. In the hot months the eruption is more vivid and more elevated, and the internal organs comparatively but little affected. In the cold season, the affection of the mucous tissues is best developed.

Measles is undoubtedly increasing in severity, if not in quantity, in this country. In 1748 only ten deaths, and in 1754 only twelve, are recorded in the bills of mortality as having arisen from measles; whereas the weekly average of the last four years is thirty, and the annual average, 1560.

If I have rightly laid down the pathology of measles, the principles of treatment will flow naturally from it, and in truth there never has been any serious difference of opinion on this subject of late years. In regular measles, an antiphlogistic method of treatment has

been advised. The only doubt that can be raised is as to the extent to which such measures should be carried, and the period to which they should be protracted.

Moderate warmth is desirable during the initiatory fever, to encourage eruption, and thus relieve mucous congestion. This may, however, be carried too far. On the 15th June, 1830, I attended R. W. (ætatis 5), who was kept so hot by blankets, flannel vests, a large fire, and the closure of all doors and windows, that the child was nearly comatose. Perspiration was flowing from his skin. There was dyspnœa and epistaxis. The blood was gorging the head and chest. The loss of some blood from the arm, a total change of regimen, and lotions of vinegar and water, soon set matters to rights, and the measles ran its regular course.

On the appearance of eruption, your object is simply to avoid occasions of aggravation. Let the patient be confined to bed, take occasionally some castor oil, and a simple saline draught, with syrup of tolu and some antimonial wine, every four hours. A saline powder, such as three grains of potassæ sulphas, with five of sugar, may be given to children of very tender years, or the mistura amygdalæ with nitre. To allay the cough, a little syrup of poppies may be taken, especially at night.

If, after the completion of eruption, cough should remain, try what a mustard poultice, or the acetum cantharidis, or a blistering plaster, will do. If the cough still continues, mischief is brewing, which neglected will lead to more serious consequences. Therefore apply one, two, or more leeches, according to the age of the child; and if the symptoms indicate confirmed pneumonia, take away some blood, from the arm if you can,—if not, from the jugular vein. Do not attempt to combat measly pneumonia by

purgatives, nor by calomel and opium. Tartar emetic, pushed in the first instance to full vomiting, and then given in more moderate doses, is sometimes sufficient, but it cannot generally be relied upon.

In the malignant measles, with cold extremities, diarrhœa, and receding eruption, no plan of treatment is very successful. Diarrhœa must be restrained by one, two, or three grains of Dover's powder, given along with half a grain of calomel, every four hours. The child should be put into a warm bath, and mustard poultices applied to the feet and epigastrium. Blisters are dangerous in this state, from their tendency to degenerate into sloughing sores.

The sequelæ of measles must be treated on the same general principles. If secondary fever runs high, mild aperients (such as potassæ sulphas cum rheo, or infus. rosæ cum magnes. sulph.) are indispensable. Where pneumonia threatens, blood should be drawn, and the other means of derivation adopted to which I have just adverted.

In the abdominal complication, your sheet anchor is calomel and Dover's powder. Sydenham drew blood in these cases too, and, I dare say, by so doing saved many a child's life. The diet throughout must be perfectly simple and unirritating. Gruel, tea, arrow-root, rice-milk, roasted apples, are to be the staple articles.

In the treatment of cancrum oris I can give you but little help, and less hope. Wine and bark must be got down. Diarrhœa must be restrained by aromatic confection with laudanum. You may dress the gangrenous surface with Peruvian balsam. You will, as far as may be, support the child's strength by beef-tea, eggs, and blancmange.

LECTURE VII.

HISTORY AND PHENOMENA OF SCARLET FEVER.

First notices of scarlatina. Epidemics of the 17th and 18th centuries. Effects of the miasm. Division of scarlatina into species. Incubative stage. Phenomena of scarlatina mitis. Phenomena of the scarlatina anginosa. Character of the accompanying fever. Character of the eruption. Concomitant affection of the throat. Implication of the eye, and larynx. Cerebral complication. Affection of the heart. Phenomena of the angina maligna putrida. Scarlatina with collapse. Sequelæ of scarlet fever. Sloughing of the cellular membrane of the neck. Desquamation; debility; mucous enteritis; dropsy. Phenomena of scarlatinal dropsy.

THE extent and severity of scarlet fever at the present time are such as to demand from you the most patient attention and diligent study. It is obviously an increasing malady, and seems likely, in after times, to occupy that painful pre-eminence among the fatal diseases of early life which small pox formerly enjoyed.

By whom the term scarlatina was first used is not well known, perhaps by Sydenham, for I cannot find any traces of the word before his time. The mild variety of the disease described by him existed in the east at a very early date, but you would in vain search for it in the writings of the ancient Greeks and Romans. It probably invaded the world soon after small pox and measles

had made their debût, for the Arabian physicians describe a species of measles, which from the extent of desquamation we may be assured was scarlatina. In the ages which succeeded, scarlatina continued to be confounded with rubeola.

In the year 1610 an epidemic angina, with scarlet eruption, raged in Spain, from which country it passed over, in 1618, to Naples, then governed by a Spanish viceroy. The first authors on the anginose or malignant scarlet fever, therefore, are Spanish and Italian authors—viz., Ludovicus Mercatus (1612), and Michael Heredia, (1626.) The latter is peculiarly full and clear in his descriptions. The Italian authors are, Sgambatus "*de pestilente faucium affectu Neapoli sæviente*" (1620); and Œtius Clerus "*de morbo strangulatorio*" (1636.) Sennertus noticed the same disease in Germany about 1625. The milder type was seen by Sydenham in London between the years 1670 and 1675. He describes it as a disease more in name than in essence, and fatal only through the officiousness of the physician. He was ignorant of any connexion existing between it and the angina putrida maligna of the Continental authors of that day.

Scarlet fever, in its mild form, first reached Edinburgh in the year 1680. Sir Robert Sibbald, physician to King Charles II., for Scotland, says, "It is so recently introduced, and so little understood, that I cannot venture to offer any observations either on its theory or treatment." Morton described scarlatina as it appeared in London in 1689 and three following years. It was a severer epidemic than that witnessed by Sydenham, but Morton was so fully convinced of its intimate relation to measles, that his details cannot be trusted.

In 1747-8 London experienced a severe scarlatinal epidemic. The historian of it was Dr. Fothergill, then

a young man entering on his professional career. His work was entitled "An Account of the Sore Throat attended with Ulcers, a disease which hath of late years appeared in this city, and in several parts of the nation." It was prefaced by a very lucid explanation of the opinions of the Continental writers of the preceding century. He distinctly traces the disease to "the reception into the habit of a putrid virus, or miasm *sui generis* by contagion, and principally by means of the breath," but he professes his inability to explain the cause of its peculiarly malignant or putrid tendency. The success of this work was so great as rapidly to place its author at the head of his profession in London. In compliment to him, the complaint was long called Fothergill's sore throat.

The same epidemic spread to Plymouth, where it raged from 1751 to 1753, and was most ably described by Dr. Huxham. In 1778, an epidemic scarlatina devastated Birmingham, of which Dr. Withering has published an account. In the first edition of his work (1779), Dr. Withering drew a formal diagnosis between the scarlatina anginosa of the old authors and the angina maligna or ulcerous throat of Fothergill. In 1793, a second edition of this work appeared, wherein Dr. Withering abandoned his early prepossessions, and with great but unusual candour proclaimed his belief in the identity of the two diseases—a doctrine which has never been questioned since that period. Sauvages, in 1767, and Cullen, in 1792, had separated them in their nosologies. As this opinion of Dr. Withering, therefore, forms an epoch in the history of scarlatina, I shall give you his precise words, (dated 1793.) "From the most assiduous attention to this disease during a period of fifteen years,—from observing it in every difference of season, exposure, age, and tempera-

ment, I am now persuaded that the scarlatina anginosa and the angina gangrenosa constitute but one species of disease—that they owe their existence to the same specific contagion—that the varieties in their appearance depend upon contingent circumstances, and that their greatest differences are not greater than those of distinct and confluent small pox."

Scarlatina, taken in its widest sense, is a fever sometimes inflammatory, sometimes typhoid, the offspring of a morbid poison gaining access to the body by the mode of infection only, characterized by a short period of incubation, an eruption rapidly developed, and an inflammation of the fauces, having a strong tendency to terminate by sloughing. In its mild form, the disease does not last more than a week; but when assuming its aggravated type, it may be protracted to a month, or terminate fatally in a few hours. Such a disease does not, like measles, invade a large proportion of mankind during infancy, but having been undergone, the susceptibility to future attacks is exhausted.

The points that will demand attention from you are, 1. The phases, modifications, or types of the disease; 2. the mode of its propagation; 3. the amount of mortality which it occasions; and 4. the treatment adapted to its varied aspects.

I have explained to you that the fever now to be treated of does not originate (under common circumstances) from any *spontaneous* movements in the blood or humours of the body. A *zuma*, *ferment*, or *poison*, must have access to the body, before the blood is set in motion so as to develop the phenomenon now called *scarlet fever*. The effects produced by that poison may be exerted on the skin alone, and then the accompanying

fever is slight; or it may develop a more serious kind of ardent fever, and then the skin and throat will both exhibit appearances. It may so seriously affect the whole system as to produce intense fever, in which case the throat receives nearly the *whole* shock, the skin being only partially affected. Nay, in some extreme cases, the nervous system shall be so completely depressed and subdued by the virulence of the miasm, and the mass of blood so thoroughly poisoned and disorganized by it, that all the ordinary appearances of scarlatina are masked. Petechiæ, coma, and a sloughy state of the throat, alone appear. Life rapidly yields under such an attack.

From this rude sketch of the effects of the scarlatinal miasm, you will see that a gradation exists in nature from the mildest to the most malignant, and that the external appearances vary with the character of the fever. A division of scarlatina into species has been made, but remember that it is artificial. Nature creates genera and individual cases, but species are the imperfect arrangements of man. With this reservation, I shall avail myself of the threefold division now in general use, and shall treat of the two extreme links in the long chain of phenomena, and the intermediate variety—that is, I shall describe to you, 1. Scarlatina mitis; 2. Scarlatina anginosa; 3. Angina maligna.

The poison of scarlatina, whatever aspect it subsequently assumes, has a very short period of incubation. It invaded my own family in 1839. Rigors occurred to one member of it on the last Saturday in April. On Sunday, languor and lassitude, with dryness of skin, were the chief symptoms. At six o'clock on Monday morning eruption appeared. On the following Saturday, at two P.M., my eldest daughter sickened, so that the incubative period

could not have exceeded seven days, and was probably only six. Withering says that he has known patients begin to complain as early as the third day from exposure to the contagion, and I cannot contradict the assertion, though I never saw incubation so rapid as this. We may fairly state the incubative period as varying from four to eight days.

1. In the mildest form of scarlatina, it often happens that the first symptom is the rash. No febrile disturbance whatever has preceded. More commonly, there is a certain amount of fever, the symptoms not presenting any marked characters. Rigors, heat of surface, restlessness, thirst, languor, lassitude, muscular debility, and headache, are the chief complaints. On the succeeding day, the rash appears. Some authors would persuade us that the rash may be delayed to the third or even the fourth day from the rigor. These observations, however, were made when the diagnosis of measles and scarlatina was yet in its infancy.

The efflorescence in scarlatina mitis is first perceived on the trunk, arms, and thighs; very often nothing appears on the face, when these parts are covered with eruption. In less than twenty-four hours it spreads over the whole body. Everything is rapid about scarlatina—rapid incubation—rapid eruption—rapid course. Sometimes the redness is continuous; but much more generally it is distributed in patches of no definite shape. The colour is a bright scarlet, precisely that of the boiled lobster. When closely examined, it is found to consist of innumerable small red points, or dots. In the greater number of cases, the finger passed over the surface is not made sensible of elevation or roughness. Sometimes, especially on the breast, and parts kept very warm, the feeling of papulæ is given. This, however, can only occur when

there is fever, and sufficient force in the heart's action to distend the cutaneous capillaries. In the mild form of scarlatina I am now describing, this will not often happen. The redness of scarlatina, like that of erysipelas, disappears on pressure.

For twenty-four hours the child is restless, and refuses his food. On the third day you will find him sitting up with his toys. The rash is receding. In two days more, the little patient is convalescent. I have often examined the throats of children affected with the scarlatina mitis, and not seen the slightest trace of angina. The poison, therefore, may circulate without any throat affection. Well might Sydenham call this a disease in name only; it is nevertheless worthy of your study, in order that you may trace the steps by which it ascends into the malignant cynanche.

2. I now come to the scarlatina anginosa, the most frequent form in which the miasm develops itself, and a disease which more than any other that I know of will call into play your pathological learning, and all your therapeutical skill. It is a disease which may be materially aided by medical art. It is a disease in the management of which medical men are more apt to differ than perhaps any other. It is, lastly, a disease which, from its rapidity, leaves you little time for reflection. You must have studied it well beforehand, and determined how to act in cases of emergency.

A dry detail of the successive symptoms that will meet your observation in the course of scarlatina anginosa, varied as they are by season, habit of body, climate, and epidemic character, would profit you but little. I shall rather direct your attention to the structures and organs affected, and thus associate symptomatology and pathology. Remember, that in this complaint you have four

classes of symptoms—1. General fever, or pyrexia; 2. affection of the skin and cellular membrane; 3. affection of the mucous membranes; 4. affection of one or more of the great viscera—the brain, lungs, or heart.

(1.) The accompanying pyrexia may be, as I have already said, either inflammatory or typhoid. In the majority of cases, the inflammatory character prevails, the heat of skin being more remarkable than in any other known malady; it gives to the hand the feeling of scorching. The heat indicated by the thermometer often rises to 104, and Dr. Currie says he has seen it at 112. The body is living in a furnace of its own making. Let not this circumstance pass unnoticed by you. The human body is prepared for a heat of 96. Its functions then flourish; but it will not bear to have its internal heat much lowered, nor materially raised. A heat of 105, 108, or 110, no system can long withstand; it burns and dries up everything; it kills the cuticle and the hair, injures the delicate structure of the eye and ear, deranges the liver and the brain. I attribute a large share of the evils of scarlatina anginosa to the intensity of the animal heat. The blood is not always buffy in scarlatina, although the skin be so hot, and the pulse rapid; there is febrile tumult, but not inflammation. Inflammation may supervene, but the pulse will then be not merely frequent, but hard and incompressible.

The true character of the pulse in scarlatina is rapid, seldom less than 120; the tongue is white; and as the mucous covering of the tongue is affected, like other mucous surfaces, with eruption, so the red and elongated papillæ protrude through the fur, or diseased secretion of the mouth, presenting that peculiar appearance called the *strawberry tongue*. Sometimes it is purely red. The other febrile symptoms are the same in kind, but

exceed in severity those of scarlatina simplex. The headache is more pungent, and often accompanied with delirium. Muscular pains are severe, and the back of the neck is often very stiff. There is a feeling of tension and fulness in the fingers, evidently from the force of the blood impinging on the extreme capillaries.

(2.) But to pass to the affection of the skin and subjacent cellular membrane. The rash is vivid in colour. I once saw it elevated in circular patches, and some physicians called it urticaria rubra febrilis; but it was genuine scarlatina, with sloughy throat. The determination of blood to the skin is sometimes so great, that miliary vesicles appear interspersed among the patches of efflorescence, (especially on the breast.) This variety has been called scarlatina varioloides. With ordinary care, however, this will never happen. It is attributable to the *nimia diligentia* either of the nurse or of the doctor, of which Sydenham complains. Very often the rash recedes for a few hours, and then recurs. Sometimes it appears only partially, as on the thighs; white blisters sometimes accompany or succeed the rash.

It is very common to see the cellular membrane, especially that of the neck, taking on a kind of inflammatory action. The fingers stiffen; the neck swells; the parotid glands enlarge; the jaws are with difficulty opened.

(3.) The condition of the mucous structures of the nose, mouth, palate, and larynx, will demand a much more extended investigation.

Sometimes the very first intimation of the real nature of the disease is given by a feeling of roughness of the throat, and some pain in deglutition. On examining the fauces, the palate, uvula, and tonsils appear red and swollen; and should the fever be active, portions of coagulated lymph will be seen effused. These are often mistaken

for ulcers; but in many most severe cases of anginose scarlatina there is no actual breach of surface—only excessive engorgement, with effusion of lymph.

Deglutition is now so painful, that the patient will rather suffer thirst, than attempt to quench it with the certainty of excessive pain. Be on your guard whenever excessive pain occurs, whether it be in pleurisy, jaundice, enteritis, or scarlatina. Remember that death may be the consequence of excessive pain (as in crucifixion, or the torments of the Inquisition), or, if not death, at least serious mischief. In the case of angina, excess of pain is followed by extension of inflammation to the cellular membrane subjacent to the ear, and to the brain.

It is often difficult to examine the state of the throat from the extent of cellular inflammation, but you may always form a good judgment of what is going forward there by taking as your guides the pulse, and the degree of pain in deglutition. That actual ulceration does take place in a certain proportion of cases is undeniable, but the former is the more frequent pathological condition. I remember seeing a young lady many years ago (Miss E. H.), of exceedingly full habit, where the determination of blood to the throat was so excessive that respiration became impeded; the pulse began to give way; and timely scarifications alone saved the patient's life.

While all this is going on in the throat, the mucous membrane of the nose becomes involved. An acrid sanies, or ichor, begins to flow from the nostrils. The membrane itself appears red and swollen. The sense of smell ceases. Inflammation next extends along the Eustachian tube to the inner and outer ear. An acrid discharge, sometimes of a purulent character, distils from the ear. The ear is painful. The inflammation, if in-

tense, may destroy the interior structure of the ear. The *ossicula auditus* may slough away, the tympanum fill up with granulations, and total deafness ensue.

But this is not all, nor a tithe of the mischief which may take place while the scarlatinal poison is in process of concoction, and struggling, like a giant in prison, to work its way out. The eye may become affected, and two things may here take place, both requiring your attention. The eye itself may take on inflammation, and this, if neglected, may go on to actual destruction of one or both eyes. In 1832, at the late Sir David Barry's, I played a game of chess with Mr. Seymour, who lost both eyes by this disease. He had been seized with an intense form of scarlatina anginosa, at a village in the West of England, where the medical man wanted knowledge to guide him in the required treatment. This young man ought to have lost thirty ounces of blood from the arm. He was never bled at all. The poison, raging uncontrolled, destroyed both eyes.

But further; the inflammatory action may lay hold, not of the eye, but of the cellular substance within the orbit in which the eye lies imbedded. I have never seen this described, and never saw but one case of it, that of Mr. Hobson, Surgeon, of Great Marybone-street. The ear was here first affected, then the cellular membrane of the orbit. The eye was saved only by the most vigorous measures—bleeding, cupping, physicking, and starving, continued for many weeks, so difficult was it found to subdue an inflammatory disposition once set up in this structure. Had it been small pox instead of scarlatina, nothing could have prevented abscess. I was assisted in the management of this most difficult case by the late Dr. Warren, and Mr. Alexander of Cork-street.

The extension of inflammation to the larynx is next to engage our attention. This, too, has received but little notice from authors. In November, 1842, I was called in to witness the sudden extension of the anginose inflammation to the larynx. The croupy respiration was soon succeeded by convulsions, and the child rapidly sunk.

(4.) So much for the implication of structures situate near to the fauces, and suffering by virtue of their proximity to the primary seat of disease. I must now advert to the more serious implication of deep-seated and vital organs. Mr. Dry, of Tottenham Court-road, a man in the prime of life, of good constitution, took scarlet fever in November, 1842. When I first saw him, the rash was abundant, and the throat was evidently the seat of intense inflammation, although from cellular complication it was difficult to examine it. Above all, the brain was affected. The patient had got out of bed, and was crouching down in a corner of the room in a state of high delirium. The eye was suffused. The skin was cooled down by exposure to the cold air. The state of delirium continued many days, but was ultimately subdued.

Sometimes affection of the brain shews itself with less of violence. My eldest girl, during her illness, continually repeated the Lord's prayer. These more urgent symptoms will sometimes shew themselves very unexpectedly. Never, therefore, be thrown off your guard by the apparent mildness of the symptoms for the first two days. The third is the day of danger, when the rash begins to subside, and when the poison, still active and driven from the exterior, vents its fury on some internal organ. In a few hours irreparable mischief may then be done.

The lungs are sometimes the seat of inflammatory engorgement. I attended, many years ago, in Broad-street,

Golden-square, a young man in scarlatina, where urgent dyspnœa and distress about the præcordia indicated a gorged state of the lungs or great vessels about the heart. Timely venesection saved his life. The heart itself may become involved. *Infandum renovo dolorem.* A lady was seized with scarlatina at the period of parturition. The labour was long and severe. She perspired profusely. The heart laboured violently. The next day scarlatina appeared. The heart, exhausted by the preceding efforts, gave way, and in about fifteen hours from the appearance of eruption, became engorged. A frightful feeling of suffocation supervened, and the pulse for a few minutes was imperceptible at the wrist. This feeling subsided, but the heart never regained its natural condition. Dyspnœa increased, and in twenty-four hours more the blueness of countenance and incipient delirium shewed that the lungs were implicated, and that waves of ill-oxygenated blood were permeating the brain. Twelve hours longer of this semi-asphyxiate state closed the sad and painful scene.

3. The angina maligna putrida (the ulcerous sore throat of Fothergill, the cynanche maligna of Cullen) next claims your attention. Bear in mind, that in nature the type last described slides into this, the fever gradually losing its inflammatory, and assuming more and more the typhoid character.

The initiatory symptoms of the malignant scarlet fever are distinguished from those of the other varieties only by their intensity. An irritable state of the stomach and bowels, vomiting, and diarrhœa, are frequent occurrences. Headache, pain of the back, præcordial oppression, and stiffness of the neck, are present in considerable severity, with great dejection of spirits. The pulse is small and fluttering. The eyes appear heavy and suffused.

The poison first localizes itself in the throat, which, on inspection, appears *swollen* and livid. A disagreeable fœtor is perceived in the breath, which rapidly increases. Ash-coloured sloughs occupy the tonsils. Ulceration and often extensive gangrene destroy a large portion of the mucous membrane. The voice becomes hoarse and hollow, and respiration is performed with a noise like as of one strangling. Hence the Spanish name for the disease, *garotillo*. The throat is clogged with a viscid phlegm. The nostrils pour forth an abundant and most acrid sanies, followed by excoriation of the lips and ulceration of the angles of the mouth.

Delirium, often of a very fierce and unrestrainable kind, seizes the adult. I have seen two patients in this disease in the most raging frenzy—jumping out of bed, naked, and literally dying on the floor of the chamber. No spectacle more awful can be witnessed in Egyptian plague.

In some cases the bronchia become congested, and difficult breathing is added to the other troubles. In the most aggravated cases, hiccup, choking, bloody stools, an œdematous condition of the extremities, a bloated and cadaverous aspect of countenance, excoriation of the arms and buttocks, a hard, dry, and brown tongue, precede the fatal event. All the circumstances conspire to shew the awful derangement taking place in the nervous and circulating system through the intensity of the generating poison. The blood collects and stagnates in the mucous membranes of the whole body, (thoracic and abdominal,) as well as in the liver; and that blood is of the most depraved and vitiated quality. Such blood permeating the brain, liver, and heart, destroys their functions, and death ensues. You may examine the body, but the precise cause of death is not thereby manifested.

You will find probably great destruction of the throat by sloughy ulceration or gangrene—turgescence of all the mucous membranes—effusion of a bloody sanies into one or more of the great serous cavities, but the condition of the blood is the real cause of death. The patient dies of acute malignancy.

It is encouraging for you to know that bad as these cases are, nature does not always give way under them. Dr. Huxham relates an extraordinary instance of recovery under circumstances apparently the most hopeless. You will naturally ask, what becomes of the skin during this burst of gangrenous angina with cerebral complication and hepatic congestion? I will tell you. In some cases there is considerable efflorescence, but the colour is no longer scarlet. It is livid. It appears and recedes. It is accompanied with itching, and occasionally petechiæ appear.

There are cases, very sad ones, occurring both to adults and children, where no affection of the skin takes place at all. Some years ago, I attended, with Dr. Nevinson, Mrs. Mason, of Great Marylebone Street, and her two grown-up daughters. In each of the three cases the nervous system was utterly prostrated, or in the state of *collapse*. There was no violence, no delirium, no rash, no struggling for breath; but the pulse was small, the skin cold, and the whole system depressed by the intensity of the poison. Neither wine, nor brandy, nor capsicum, could put life into them. They sunk, one after another, without any attempt to rally. It was difficult to believe the disease scarlatina, but the eldest son took it in the usual form, and put that matter beyond doubt.

I proceed next to describe the sequelæ of scarlatina, as well of the mild as of the anginose and ulcerous kind. The very mildest form of scarlatina simplex is not free

from the risk of some unpleasant sequelæ. That which is most usually seen is a febricula, with swelled glands of the neck, and discharge from the ear. The skin is hot, the tongue white, and the alvine secretions depraved.

1. When there has been any serious anginose affection, the cellular membrane of the neck will often take on inflammation. Erysipelatous redness of the neck with great hardness and swelling are perceived. The cellular tissue sloughs, and this sloughing, if extensive, brings life into hazard. On the 15th December, 1842, I attended, with Mr. Squibb, a child who died in this state, with accompanying coma, who had struggled successfully through the first period of the disease. Suppuration of the cellular membrane of the neck is often so extensive that long and deep incisions into the neck are required to afford the necessary vent to the sloughs. I once saw abscess extend to the body of the parotid gland.

2. Desquamation of the cuticle is quite pathognomonic of scarlatina. It is hardly ever absent. In all bad cases, the hair comes off too, as indeed it does after all long fevers, accompanied (as all long fevers are) with dryness and great heat of skin. The nails are sometimes thrown off, and some cabinets contain gloves of cuticle and nail. It is a curious speculation whether this destruction of parts ends with the cuticle, whether, in fact, portions of other structures may not be killed in like manner as the cuticle, and regenerated during the convalescence.

The whole process of desquamation requires careful watching. The period is one of low fever, often tending to inflammation. The urine is scanty and high coloured during its progress. The tongue is white, the pulse quick, and the rest disturbed. Purgatives and saline draughts are often requisite throughout the whole period. The

desquamative stage begins about the fourth or fifth day, and may continue for three weeks. German physicians often confine their patients to bed during desquamation, so conscious are they of the necessity of precaution at this period.

3. The true debility that sometimes succeeds scarlatina deserves mention. The muscular power is everywhere enfeebled. The slightest exertion fatigues. The heart participates in this general debility, and frequent syncope occurs. The clean tongue distinguishes this condition of the frame from secondary *fever*.

4. In some cases, a low degree of mucous enteritis accompanies the decline of scarlatina. The patient complains of exceeding languor and lassitude, and total loss of appetite. Diarrhœa is present, and the body emaciates. The tongue is red and superficially ulcerated; the angles of the lips excoriated; the verge of the anus beset with eczematous vesicles. The mucous membrane of the bowels is tender, and is thrown into spasm and disturbance by the simplest food. Griping, therefore, is complained of, and a general soreness of the belly. All this may,and frequently does (in fever), depend simply on congestion. In bad cases, the membrane ulcerates, and much blood appears in the motions. Death may ensue, for the repair of such injury is difficult.

5. The last of the sequelæ of scarlatina is dropsy. Much has been written on this interesting subject, which might well occupy, not the tail of a lecture, but a lecture itself. I will state a few of the circumstances best ascertained regarding scarlatinal dropsy. It will occur in the apparently mild, oftener perhaps than in the severe cases. It may shew itself at any period from the tenth to the thirtieth day from the recession of eruption. I do not pretend always to anticipate when it will occur, but I

know when it will not occur. It will not occur when the pulse falls to the natural standard on the tenth day, and becomes soft with a clean state of tongue, an abundant clear urine, and a natural aspect of countenance. But it is very likely to happen to him whose pulse remains quick and sharp, and whose tongue continues obstinately white, where sleep is disturbed, and the skin is dry, and a scanty urine becomes turbid on cooling. Such persons remain languid and weak after scarlet fever, and their appetite does not return. If tonics are given to improve the appetite and recruit the strength, secretion is still further checked, and the probability of supervening dropsy increased. In a large proportion of such cases the urine is loaded with albumen, and of low specific gravity.

Scarlatinal dropsy may assume any of the usual forms —anasarca, ascites, hydrothorax. Anasarca is infinitely the most common, perhaps in the proportion of ten to one. Sometimes the three are associated. We may then rest assured that the heart has become implicated in the course of the disorder, and that some serious impediment to the free course of the blood exists within or about the heart—probably a deposition of lymph about one or more of the valves of the heart, which careful auscultation will detect. These cases may nearly be despaired of. I have seen simple ascites succeeding scarlatina, depending upon inflammation of the peritoneal covering of the liver, and yielding to leeches and saline purgatives.

The anasarca succeeding scarlatina is curable in a large proportion of cases—a circumstance which proves that the dropsy often depends on no serious disorganization about the heart, but rather on the continuance of inflammatory action in the cutaneous capillaries, and the long absence of perspiration.

It was a favourite notion of physicians in times past, that scarlatinal dropsy depended on *debility* of the capillaries, and was to be combated by tonics and wine. This doctrine must have been encouraged by the results of practice, or it never could have enjoyed such popularity; and this is true. I have seen weakly children become anasarcous after scarlatina, and recover by the aid of wine and bark. But very many cases so treated would be exasperated. The urine would become still scantier, still deeper coloured. The oppression of the breathing would augment, and they would die at length with the thorax full of water.

Hydrothorax succeeding scarlatina in the adult, still more commonly in children, may advance without attracting attention. Some years ago, a gentleman, having passed through scarlet fever, began to convalesce, but his recovery was neither rapid nor satisfactory. Symptoms were not urgent, and attracted no particular notice. He walked out one morning to his club-house. On returning, he fell, and was carried home a corpse. His chest was found full of water.

Therefore, watch carefully the secondary fever of scarlatina. Watch the period of convalescence even though no fever develops itself. Convince yourselves that the kidneys secrete urine of healthy, and not of albuminous quality. See that the pulse be soft and the tongue clean, ere you take your leave. "*Aliter male consules nomini tuo.*" Without help the disturbed system will not right itself.

LECTURE VIII.

STATISTICS, PATHOLOGY, AND MANAGEMENT OF SCARLET FEVER.

Statistical details shewing the prevalence of scarlatina in England, the proportion of severe to mild cases, and the per centage of mortality. Diagnosis of scarlatina from measles. Pathology of scarlatina. Laws of the scarlatinal miasm. Question of spontaneous origin. Recurrence of scarlatina. Cause of the diversity of its aspects. Management of scarlatina. General principles. Employment of emetics. Cold affusion. Bloodletting, general and topical, purgative medicines, stimulants and cordials. Bark. Local treatment of the angina. Management of scarlatinal dropsy.

SCARLET fever is undoubtedly an increasing malady in this country. The details of its ravages, however, in the last century, are not well known, for the deaths by scarlet fever are mixed up in the old bills of mortality with measles and quinsy. Still the united number was small, and bears no comparison with the results of recent observation. The amount of mortality occasioned by scarlet fever throughout England at the present time is really appalling. Mr. Farr, in his third and fourth Reports, has given a most instructive series of tables, shewing the deaths by scarlet fever (in each of the 324 districts into which England and Wales have been sub-

divided) for two years and a half, divided into ten quarterly periods, extending from July 1, 1837, to December 31, 1840. The general results of this gigantic investigation appear in the following brief summary:—

Table shewing the Deaths by Scarlet Fever, throughout England and Wales, within Ten Quarterly Periods, extending from 1*st July*, 1837, *to* 31*st December*, 1840.

QUARTERLY PERIODS.	1837.	1838.	1839.	1840.
Jan., Feb., March . . .	...	1380	1655	4537
April, May, June . . .	...	1104	1620	4370
July, August, Sept. . .	1033	1260	2529	4874
Oct., Nov., Dec. . . .	1487	2058	4521	6035
Total Deaths . .	2520	5802	10,325	19,816

From this table we learn that the ravages of scarlet fever have (on the whole) progressively augmented from the first to the last of these periods, and that the year 1840 exhibits an increase over 1837 of four to one. It further shews, that the greatest mortality by scarlet fever takes place in the three last months of the year, and the smallest mortality in the months of April, May, and June. This is exactly what Dr. Willan had remarked nearly fifty years ago, when watching the phenomenon of epidemic scarlet fever in London. Nevertheless, you will perceive that the influence of season on the mortality of scarlet fever is not very striking.

You are not to suppose that the above table exhibits a picture of the average mortality in England by this disease. The years 1838, '39, and '40, were years of epidemic prevalence. It is probable that no epidemic of similar length and intensity ever before visited this

country. It began in the metropolis in September, 1838, and reached its acme with us early in December, 1839. In the first week of that month eighty-two persons died of scarlet fever in London, being a daily destruction of twelve lives. Nine hundred and seventeen persons perished in London by scarlatina during the last quarter of 1839. In the whole year the deaths were 2500, being four times as many as died of small pox, and one-fifth more than the mortality by measles.

The following are the observations of authors on the proportion which severe cases bear to the mild—inflammatory, to the putrid. Dr. Willan states that in 1786 he saw 39 cases of malignant to 152 of the anginose variety, (one to four.) Dr. Clark, of Newcastle, had 33 cases of malignant to 73 of anginose (one to two); and 23 out of 131 (or one in six), had dropsy supervening He adds—" Considering the numbers that are attacked in too mild a form to seek medical advice, the proportion of malignant to mild cases should not be rated higher than one in twenty."

With reference to the per centage of mortality, we have sufficient materials for forming a good judgment. We lay aside Sir Gilbert Blane's experience, as applying only to picked cases. At Ackworth school, in 1803, the disease proved fatal at the rate of four per cent. Dr. Tweedie informs us that out of 644 cases treated at the London Fever Hospital, in the twelve years between 1822 and 1833, there died thirty-eight, (thirteen males and twenty-five females,) which is nearly six per cent. The rate of mortality at that hospital varies very greatly, far more than is observed in small pox. In 1832 it was as low as one in forty; in 1829, as high as one in six—an immense fluctuation, extending from two and a half to seventeen per cent.

I am indebted to Mr. Ward, of Bodmin, for the following:—

Table exhibiting the Number of cases of Scarlet Fever occurring at Bodmin between June 24 and December 24, 1842, with the Mortality and Character of the cases.

	Numbers.	Deaths.	Rate of Mortality.
Cases with Eruption	324	26	Eight per cent.
Cases without Eruption . . .	108	10	Nine per cent.
Total Cases	432	36	One in twelve.

Thirty-nine of the cases followed by dropsy; five, by convulsions.

The average of these observations gives six per cent. as the medium rate of mortality by scarlet fever. What a picture may be thence drawn of the actual extent of scarlet fever in years of epidemic prevalence. It shews that in London, in 1839, there were 41,650 cases of this disease; while throughout England and Wales, in 1840, when 19,816 persons died, the total number of seizures must have reached the almost incredible number of 330,266.

There are no statistical records to teach us (as in small pox) the period of greatest danger; death has been said to take place in nine hours. I never saw anything so rapid as this; but I have seen death occur on the second day, and frequently on the third. I would call sixty hours from the breaking out of the rash, the period of greatest danger. Many, of course, die at a much later period,—on the eighth or twelfth day. Dropsy and abdominal complications may protract the date of death to a month.

The proportion of fatal cases occurring at the several

periods of life (young, adult, and aged) is well illustrated in the registrar general's tables. Out of 345 cases proving fatal in London during the months of January and February 1840, 326 were children (under fifteen), and only nineteen were adults. Out of 2614 cases recorded by Mr. Farr in his fourth Report, 2419 were children, 182 adults, and 13 aged persons. The violence of the disease falls therefore on children, as compared with grown persons, in the proportion of seventeen to one in the first case—of twelve to one in the second. Dr. Withering distinctly states, and certainly a general impression prevails, that scarlatina invading adults is, *cæteris paribus*, a severer disease, and occasions a greater per centage of mortality, than when it invades infantile life. Whether this be the fact or not, I have at present no means of judging; but for a long time it has been known that scarlet fever is peculiarly dangerous when it occurs at the puerperal period. The circumstances in which the system is then placed sufficiently account for the fact: the heat of the body—the exertion—the consequent exhaustion; and possibly the peculiar condition of the blood accompanying the puerperal state.

I shall not detain you with any remarks on prognosis. After the exposition I gave of the character of the symptoms in the anginose and malignant forms of scarlatina, you cannot fail to perceive both the signs and the causes of danger.

When treating of measles, I mentioned briefly the chief points of diagnosis between it and scarlet fever. I will now recur, somewhat more in detail, to this subject, which, by the way, is very ably treated in Dr. Williams's work on the morbid poisons.

1. Measles and scarlet fever differ in their incubative

periods; scarlet fever lies latent one week—measles, two.

2. Measles and scarlet fever differ in the periods of their eruptive fever. Scarlet fever develops rash in twenty-four hours, measles in seventy-two hours, after the setting in of fever.

3. The two diseases differ in the colour and aspect of the efflorescence. In scarlatina it is bright scarlet; in measles, it is a dull raspberry red. In scarlatina, the eruption is extensive and diffused, brightest on parts covered. In measles, it is in patches, brightest on parts exposed.

4. The diseases differ in the concomitant affection of the mucous tissues. In scarlatina, there is early and often serious inflammation and sloughing of the throat. In measles, the mucous affection is chiefly in the nose, eyes, and larynx. There is no disposition to cynanche or its consequences.

5. The two diseases differ in their secondary actions. Scarlet fever is accompanied and followed by phrenitis and dropsy; measles, by pneumonia.

6. The two diseases differ, lastly, in their tolerance of remedies; measles bears blood-letting well, scarlet fever, badly.

I come next to investigate the pathology of scarlatina; to explain to you the laws which govern the phenomena of the disease—its rise—its symptoms—its varieties—its complications. The subject is one of great extent and intricacy, but it is one also of much pathological interest, and of some practical importance.

The notion that scarlet fever was the result of a morbid poison was one of very early growth. Morton expresses very clearly and pithily the opinions entertained during the 17th century on this subject:—"The

proximate cause of scarlatina," says he, "is a *poison* defiling the animal spirits, whose malignity does not only overwhelm the spirits in its first attack, but by agitating the mass of blood, breaks it down into an acrid colluvies more energetically than any other ferment."

Navier, (a French author,) who has given the history of the epidemic of 1753, goes a step further, and attempts to connect this poison with that which occasions the distemper of horned cattle—a distemper which prevailed in London in 1839, and which has lately devastated Egypt. "In this bovine epizootic," says Navier, "the convalescent beasts lose their hair, and their skin peels off. When they die, the viscera are always found more or less in a gangrenous state." He gives it as his opinion that the contagion of scarlet fever originated with cattle, and was by them communicated to man. He traces also some connexion between these complaints and small pox. I mention these circumstances, because they prove to you how early the attention of men's minds was directed to the analogy between the diseases of men and cattle, a doctrine which, investigated by the genius of Jenner, led afterwards to such brilliant results.

Scarlatina is peculiarly the disease of temperate climates. It is comparatively rare in Bengal. Dr. Jackson, formerly of Calcutta, now of Chatham, informs me, that he cannot recal to mind having seen any cases in India deserving the name of scarlatina. I have never met with any account of the disease as it occurs in the black skin; but perhaps this may be my own fault.

In Australia and Van Dieman's Land, scarlatina is still, I believe, unknown. America did not receive the contagion of scarlatina till the year 1735, as we learn

from a curious paper by Cadwallader Colden, Esq.* Its progress over that great continent was singularly slow, but attended with great loss of life. "Like most new diseases," says Mr. Kearsley, describing the epidemic that began in 1746, "it baffled every attempt to check its progress. Villages were depopulated by it, and parents left to bewail the loss of all their children."

Scarlet fever affects the sexes in equal proportions, and very remarkably. In 1838 it destroyed, in London, 747 males, 777 females. In 1839, 1241 males, 1258 females. Throughout England and Wales, in 1840, (exclusive of the metropolis,) 8927 males, 8935 females!

The infecting distance of the miasm has not been investigated; but it is found that when it invades a school, no precautions avail anything towards preventing the spread of the infection. This has often been proved at the London Foundling Hospital. At Ackworth, in 1803, the contagion lingered in the school for four months, in spite of every effort. With regard to the susceptibility of this complaint, Dr. Binns tells us, that out of 216 scholars at Ackworth school, 184 were affected. Dr. Adams remarks that this is a larger proportion than is commonly found susceptible in districts or families. Like all other miasms, that of scarlet fever is capable of attachment to fomites, especially clothes.

No doubt exists that, in a very large proportion of cases, scarlet fever is the produce of a specific miasm; but the question may well arise, whether any combination of circumstances can develop an eruption possessing the characters of scarlatina. I am bound to tell you that I believe they can. I have seen scarlet eruption, in no respect different from that of ordinary miasmatic scarlatina, arising from exposure to cold and moisture.

* Medical Observations and Inquiries, vol. i. p. 211.

A young man, residing near St. James's Street, some years since went down to the Serpentine to bathe. He walked in a hurry, plunged in when overheated, and two days afterwards I saw him covered with scarlet eruption. He had suffered in the same way once before. I often see true scarlatinal eruption occurring in the progress of the secondary fever of small pox, without any grounds for believing that contagion had operated. It seems as if secondary fever can develop this eruption in the same way as it throws out erysipelas.

Thus much I thought it right to say before approaching the *vexata questio* of secondary attacks of scarlet fever. Observe the conflicting statements of authors on this head. Dr. Willan (certainly one of the most acute and careful observers of the disease) says, that out of 2000 cases which he attended, he saw no instance of recurrence. Dr. Currie, of Liverpool, who devoted much attention to scarlatina, was compelled, by the results of long experience, to "renounce the opinion he had early imbibed, and to confess that the same individual is liable to scarlatina *once* only." Sir Gilbert Blane, on the other hand, met with one instance of scarlet fever occurring thrice, and, as he says, "without the least suspicion of ambiguity." Dr. Binns inclines to the notion of occasional recurrence.

Exceptions do occur; nevertheless, the law of exhausted susceptibility, as Dr. Williams calls it, is very strongly marked in this disease. I cannot doubt but that a large number of the alleged cases of recurrent scarlet fever are cases of lichenous or urticarial eruption, suddenly brought on by cold, or some deleterious article of food—cases which have no decided incubative stage, which run a premature course, wholly distinct from the steady march of a specific anginose fever. Medicine is filled to over-

flowing with false facts of this kind, set down without much consideration, and with a scanty knowledge of pathology.

Scarlatina is one of the very few diseases to which the fœtus in utero is liable. On the 28th April, 1839, my youngest son was born, evidently suffering under some form of fever. The throat was affected on the following day, obviously from angina maligna. Eruption was never developed. The child drooped, and died on the first of May.

Attempts have been made to produce scarlet fever artificially by inoculating with the blood, or with the serum of miliary vesicles intermixed with the specific eruption. We are informed that scarlet fever, unmitigated, was subsequently developed. No good could have been anticipated from such a measure.

You see the great diversities in the aspect of scarlet fever. Can any explanation of this phenomenon be offered which is at all satisfactory? Is it attributable to the weather, to diversities of individual habit, to diversities in the quality of the contagious miasm? Statistics teach us that season has nothing to do with it. The year 1839 was peculiarly fine, yet in that year scarlet fever raged like a pestilence. I am well aware that bad cases sometimes propagate mild cases, and *vice versa;* but I cannot shut my eyes to the fact, that, on a large scale, you will find mild cases succeeding each other, and severe cases producing severe cases. I am inclined, therefore, to attribute something to the *quality* of the infective miasm; but I candidly acknowledge the obscurity in which this branch of exanthematic pathology is involved, and hope, with Huxham, it may hereafter be cleared up.

The management of scarlet fever, in all its varied

forms, now demands your best attention. Let us first consider the objects which should be kept in view. 1. It is your duty to moderate arterial excitement when it runs dangerously high, and especially to lessen the heat of the surface. 2. You must support the tone of the system, when oppressed or subdued by the malignity of the poison. 3. You must obviate local congestions and the organic complications which arise in the progress of the fever. In these general propositions, all physicians will probably agree; but the difficulty consists in practically carrying them out. What are the best means of fulfilling these indications? How far are the remedies to be pushed? These are the pinching questions. Our chief reliance, in the management of scarlet fever, is placed in the skilful use of one or more of the following classes of remedies:—1. Emetics; 2. cold affusion; 3. blood-letting, general and topical; 4. purgatives; 5. tonics, stimulants, and antiseptics. They will require separate investigation.

We may begin, however, by getting rid of the mild form of scarlatina, which, as Sydenham said, demands very little aid from the physician. The cases should be watched, lest local congestions arise; but otherwise, a gentle laxative powder, and abstinence from meat and beer, are alone required. We may, in the same summary way, dispatch those cases which are at the other extremity of the chain—the cases of angina maligna gangrenosa, with undeveloped eruption, which, from the very onset, are characterized by depression, or collapse of the nervous system. Common sense here dictates an early recourse to stimulants—to wine, brandy, cordial draughts containing æther, camphor julep, aromatic confection, and tincture of bark, in such quantities and doses as the stomach will bear, and the age of the patient

justify. On this point there is no room for doubt or cavil.

The real difficulty centres in the management of the intermediate cases of anginose scarlatina; and the cause of such difficulty is this:—The symptoms indicate high arterial action; but the scarlatinic miasm is very depressing, and the powers of life often sink, even without artificial reduction of strength. Some physicians, therefore, let the arterial action have its full swing, for fear of subsequent exhaustion. Others check the first advances of the disease, and take their chance of succeeding debility. On this I would observe, that no one system can be pursued safely. The primary arterial excitement must sometimes be your guide. Sometimes your treatment must be regulated by a consideration of the depressing nature of the poison, the defective coagulability of the blood, and its consequent stagnation in the capillaries, especially those of the mucous surfaces. I now proceed to offer you some practical suggestions on each of the several remedies already enumerated.

1. Emetics.—Dr. Withering imagined, when recommending emetics in scarlet fever, that he had made a great improvement in medicine. He said of them that they were the remedies of nature, avoiding equally the debilitating effects of blood-letting, and the stimulating effects of bark—equalizing the circulation, and obviating local congestion. There was something more than met the eye in this extravagant laudation of emetics. Dr. Withering had a crotchet that the scarlatinal miasm operated, not upon the blood primarily, but on the mucus of the throat; that here the disease began, and from hence was propagated to the stomach and general system. Therefore, said Withering, emetics must be useful, because they dislodge the vitiated and corroding mucus, on which

everything hinges. Thus, like other physicians before and since, he made practice square with theory. That emetics cannot be so very useful as Withering represents, must be apparent, when you reflect that the cases which set in with vomiting, generally end badly. Emetics are never given now-a-days in the wholesale manner recommended by Dr. Withering—viz., "a powerful vomit, repeated, in the worst cases, three times in twenty-four hours." An emetic is sometimes beneficial at the very onset of fever, to which period the use of such a remedy should be restricted. Dr. Rush recommended calomel to be added to the emetic, the effect of which was to act subsequently on the bowels. I have no experience in this practice; which, therefore, I am not prepared to condemn.

2. Dr. Currie, of Liverpool, began, in 1802, to employ the cold affusion as the chief remedial agent in scarlet fever. It cools the surface, keeps down fever, and thus obviates some of the secondary effects of the poison. Dr. Currie was no less sanguine than Dr. Withering, as to the value of the improvement which he had introduced. Sanctioned by my uncle, the late Dr. Gregory of Edinburgh, this plan has been amply tried in all parts of the world, but it has not realized the expectations of its proposer.

The truth is, that the cold affusion is applicable only to a small number of cases. It is adapted for young people with high anginose inflammation and a burning hot skin, without plethora, without depression of nervous energy; but it is inapplicable to the scarlatina of adults, accompanied with coma, phrenitis, or marked debility. It is wholly unfit for cases of cynanche maligna. It answers its purpose very well for the first day or two, but it is often impossible to continue its use. Lastly, it

seems to increase the disposition to dropsy. Dr. Currie proposed to obviate some of these objections by substituting tepid sponging for the more formidable *affusion*, but a palliative like this is little fitted to meet the exigencies of the case. Affusion was practised by stripping the patient and pouring over his naked body four or five gallons of the coldest water, repeating this process every two or three hours, until the fever was permanently subdued.

I can recommend this practice to you, as being well adapted to the scarlet fever of young persons of sanguine temperament, and the early stages of the disorder. Cold or tepid sponging is a useful auxiliary at a later period.

3. Blood-letting, general and topical. Some physicians discourage all loss of blood in scarlatina. Others strongly advise it. Much will depend upon the character of the symptoms, the period of the disease, the condition of the patient; but I wish to impress upon you strongly, that scarlet fever not only admits of blood-letting, but often imperatively requires it, and that on general bleeding alone the safety of the patient often depends. Let me give you a few cases in illustration.

Miss Ramsay (ætatis 12), in 1832, had scarlet fever. On the second day, she became very sleepy. On the third day, this sleepiness was fast treading on the condition of coma. I had her bled in the jugular vein to twelve ounces, and all went on well.

On Thursday, 22nd June 1837, my eldest son, then six years old, was seized with rigors and vomiting. On the following day, scarlet fever appeared in great intensity. The boy is of sanguine temperament, and had required venesection the preceding year for influenza. On the night of Sunday, the 25th, the febrile symptoms

ran high; all medicine was rejected by the stomach. I bled him to six ounces with decided benefit. I feel persuaded that without the loss of blood, fever would soon have destroyed him.

In 1840, Mrs. Sabine, of Hoxton, took scarlet fever during her confinement, and narrowly escaped. Secondary fever ensued. Languor, failing appetite, and a general sense of malaise, continued long. She had been sent to Margate for change of air. On her return I saw her, and had her immediately bled to twelve ounces. Her recovery then went on progressively.

While I thus advocate the necessity of blood-letting in certain cases, I freely acknowledge that it is inapplicable to others. You would not always do harm by the attempt (for it is one thing in scarlet fever to open a vein, and another to draw blood), but any such indiscriminate use of the remedy would expose you and the profession of physic to just reproach. The successful treatment of the disease by bleeding in one epidemic, at one season, and in one district, does not authorize the same procedure in another epidemic, a different season, or a different locality. Dr. Willan tells us, that in London, in 1785, the usual results of blood-letting were, great depression and faintness, the pulse becoming weak, frequent, and often irregular. Again; in the epidemic of 1733, at Edinburgh, we find it stated that but few died who were timely blooded. It was then remarked, what I have often noticed, that vomiting in this disease is only to be checked by venesection.

The blood drawn in scarlet fever scarcely ever presents a firm coagulum. In the majority of cases the blood coagulates rapidly into a soft jelly, shewing the small power in the system, and rendering it probable that the urgent symptoms in scarlet fever (such as de-

lirium and coma) depend more upon congested veins and stagnation in the capillaries, than upon arterial action. This pathological condition of the circulating system was not unknown to the old authors, one of whom remarked, that when the superficial vessels are distended, there cannot be the same amount of blood in the interior as when the skin is cold. We may hence learn why fainting so often follows venesection in scarlatina, and why we scarcely ever bleed twice. *Post mortem* examinations confirm this doctrine. Dr. Wells records the dissection of a young soldier who died of scarlatinal coma, unattended with any considerable affection of the throat. No marks of inflammation, or even of congestion, were discovered in the brain.*

Local blood-letting is well adapted to many cases of scarlet fever—to cases accompanied with great determination of blood to the throat—to cases attended with headache, or threatening coma. I applied leeches to the temples of Mr. Dry, of Tottenham-court-road, whose case was detailed in the last lecture. They lowered the pulse till it begun alarmingly to flutter, but the progress of cerebral congestion was checked. In the management of the several inflammatory sequelæ of scarlatina (otitis, ophthalmia, and pneumonia), leeches and cupping are quite indispensable.

Leeches generally bleed profusely in scarlatina, from the excited state of the cutaneous circulation. Four leeches in scarlatina will often do as much as twelve in typhus. It becomes occasionally necessary to stop the bleeding, which lunar caustic will do effectually. This tendency of leech-bites is always to be kept in view, but

* Transactions of a Society for the Improvement of Medical and Chirurgical Knowledge, vol. ii. p. 225.

especially in the scarlet fever of young children. The child's life might otherwise be sacrificed, and the measure itself brought unfairly into disrepute.

4. *Purgative Medicines.*—Dr. Withering, who was so devoted to emetics, declared "that the action of purgatives was altogether repugnant to the curative indications in this disease." On the other hand, Dr. Hamilton, of Edinburgh, devoted one chapter of his work on Purgative Medicines to the *recommendation* of purgatives. Withering's prejudices have entirely passed away, and purgatives are now largely and most beneficially used in every stage of scarlatina anginosa, from the first onset of fever to the close of the desquamation. I know of no objection whatever to their use, and am most confident of their great utility.

The forms of purgative medicine that I would recommend to you are *calomel and jalap*—calomel and rhubarb—senna and salts—jalap with cream of tartar—senna with cream of tartar—castor oil,—and occasionally, the combination of calomel, James's powder, and extract of colocynth.

I have often pushed calomel to a great extent both in adults and children,—not that I attach importance to any specific effect from the mercury, for I never saw it do good except when it purged; but because, in the burning heat of scarlatina, no purgative will act, unless aided by the relaxing qualities of calomel. No secretion can otherwise be obtained from the vessels of the liver and intestinal mucous surface; and this, I need not tell you, is the whole secret and theory of purging. You must, of course, be cautious with your drastic purgatives, when there is a tendency to syncope.

5. Stimulants and cordials are improper (except in rare cases) in the early stage, and wholly unfit for the

inflammatory type of scarlatina. When, either by the debility succeeding venesection, or the strong action of purgative medicine, or the depressing influence of the poison, the pulse flags, the countenance turns pale, and the skin cools down, camphor, æther, the citrate of ammonia, and similar cordials, with wine, must be given. The only stimulus that can be allowed at all times is that of an acid. Direct, therefore, a drachm of the diluted hydrochloric acid, with half an ounce of syrup of orange peel and eight ounces of water; and let the patient take an ounce and a half of such a mixture frequently.

The occurrence of diarrhœa demands the employment of gentle aromatics and astringents, such as the aromatic confection, chalk mixture, and laudanum. Arrow root with port wine must be given at the same time. In the truly sloughy and grangrenous forms of anginose scarlatina, a variety of medicines supposed to possess antiseptic properties have been extolled. In the West Indies, in 1787, they found an infusion of capsicum very serviceable. Dr. Peart recommends very strongly the carbonate of ammonia, but Dr. Tweedie's large experience does not bear out the encomiums which he lavishes on the remedy. One great objection to its use is the difficulty of swallowing it—a difficulty, indeed, which meets us in every stage of scarlatina, and which authors are very little inclined to consider.

Bark was at one time highly extolled as an antiseptic and tonic in scarlatina. It was even given when the "heat of the surface was sharp." A broken texture and putrid tendency of the blood were then considered valid reasons for giving bark. The practice is now seldom pursued, except as a last resource, when the throat is sloughy, with a small pulse, cold skin, and great nervous depression. Wine and brandy, however, are much preferable under such circumstances.

You must not altogether neglect the local treatment of the angina. Gargles of rose infusion wash away the abundant and vitiated mucus of the throat, give to it a clearer aspect, but do no other good. When there is a breach of surface, acids give great pain. You may then use with advantage the decoction of bark with mel rosæ, or Sauvage's once-famous gargle, lime-water with honey. As children cannot gargle, the nurse must be instructed to clear the throat by means of a camel's hair pencil dipped in a solution of currant jelly.

The management of the sequelæ of scarlet fever next claims your attention. The cellular inflammation of the neck is to be treated by poultices in the first instance. As soon as possible, free incisions must be made through the skin, to allow of the escape of the sloughs and of that imperfect pus, which is all that the weakened state of the system permits to be formed. The strength to be supported, meantime, with beef-tea and wine.

The dropsy which succeeds scarlatina deserves all your care and consideration. Dr. Wells was, I believe, the first to throw off the pathological trammels which connected this symptom with debility of the capillaries. He saw in it an inflammatory affection; he noticed its coincidence with a white tongue and a sharp pulse, and he knew the benefit of an antiphlogistic treatment. This doctrine is that now generally admitted. We consider the dropsy succeeding scarlatina as depending on arterial excitement, either general or local, which must be subdued, by mild means if possible, but failing them, (or in the event of great urgency, even in the first instance,) by blood-letting.

Dropsy seldom occurs early in the secondary fever of scarlatina. It is almost always preceded by symptoms

which will warn you of its approach, when your eyes are opened to the pathology of exanthematic sequelæ. In the larger proportion of cases, you will succeed in relieving the dropsy effectually. Plenck, however, a celebrated physician of Vienna in the last century, who wrote on eruptive fevers (1762), held that the danger was even greater from the dropsy than the fever itself.

You will carefully watch the decline of scarlet fever. If the pulse, tongue, and secretions, be not satisfactory, exhibit daily, or on alternate days, a purgative draught, containing infusion of senna, cream of tartar, and tincture of jalap, so as to ensure two motions; direct, at the same time, a diuretic julep, containing acetate of potash, tincture of digitalis, and the spirit. ætheris nitrici, or some equivalent promoter of renal activity, in mint water. If these measures do not meet the exigencies of the case, if the character of the urine, and of the pulse and tongue, indicate increasing or unabated disorder, take ten or twelve ounces of blood from the arm. Do not wait for the appearance of dropsical swellings to adopt this proceeding, for by such delay further mischief will ensue. Coagulable lymph will be effused on some of the great serous surfaces, or in the interior of the heart. I need not say how immeasurably this would add to the severity of the dropsy and the danger of the patient.

Tonics are not to be entirely thrown aside in the management of scarlatinal dropsy. You will meet with cases that give countenance to the doctrine that the exhalant vessels want tone, that blood is detained in the cutaneous capillaries for want of sufficient energy to restore it back to the heart. Such cases will necessarily carry with them other evidences of this condition of the system, called by pathologists *leucophlegmasia*, or white inflammation. You will find the countenance sallow,

the pulse feeble, the tongue clean, (perhaps morbidly red,) and the urine, though scanty, yet pale. Under such circumstances, you would be justified in giving, and expecting benefit from, stimulants, in combination with diuretics. The infusion of cascarilla, mixed with tincture of capsicum, compound spirits of juniper, the spirit of nitric æther, a few drops of tincture of digitalis, and some syrup of ginger, will supply you with an old-fashioned, but not the less serviceable combination.

The compound squill pill, with a due proportion of pilula hydrargyri, may be given night and morning, so as to ensure the activity of the kidney.

LECTURE IX.

ERYSIPELAS.

Etymology of erysipelas and St. Anthony's fire. Ancient opinions concerning the sources of erysipelas. Gradual changes in the views entertained on the causes of erysipelas. Opinions of Dr. Wells. Contagiousness of erysipelas. Its miasmatic origin. Its relation to puerperal peritonitis and hospital gangrene. Views of Dr. Rollo. Of hospital miasm. Other sources of erysipelas. Connexion of erysipelas with breach of surface. Inoculation of erysipelas. Incubation. Phenomena of erysipelas. Of the erysipelas phlegmonodes and gangrenosum. Extension of erysipelas from the skin to the brain, and other internal organs. Statistics of erysipelas. Treatment. Efficacy of blood-letting, purgatives, and stimulants. Local treatment of erysipelas.

Erysipelas, called also the rose, ignis sacer, and St. Anthony's fire, is an exanthema, and therefore properly falls to be discussed in this division of the course; but we shall find its pathology to be in many points different from that of the three diseases already treated of. It is, in fact, the link which connects the purely zymotic exanthemata with those diseases of the human body which originate from internal causes and are unconnected with specific miasm. Erysipelas is a disease of which the pathological bearings, long as it has been known, are only now beginning to be well understood. It is a dis-

ease which, from its occasional severity, as well as on account of its frequency, merits your best attention.

Little need be said regarding the literary history of erysipelas. It was well known to the Greeks and Romans, and we retain the name which Hippocrates and the Greek physicians originally gave it. Two derivations of the word erysipelas are proposed, both supported by high classical authority; some derive it from the two Greek words ερυθρος, red; and πελλος, livid—livid redness. The German lexicographers sanction this derivation. Almost all the English authorities (including Donnegan) derive the word from ερυω, to draw forth, and πελας, near; expressive, it is said, of the tendency of the disorder to spread or extend itself to neighbouring parts, in contradistinction to those forms of inflammation, called by the Greeks apostatic (απο and ιστημι) and metastatic, from their more fixed nature. I give you your choice of the two derivations, premising that I prefer the first.

The term St. Anthony's fire was first applied to this disease in the dark ages of literature, when all the little physic that was known was monopolized by monks and ecclesiastics, who, in cases of difficulty, naturally sought aid in prayer and invocation. Diseases came thus to be consigned to one or other of the many saints in the Romish calendar. The intercession of St. Nicasius was implored in small pox. St. Vitus's shrine was sought by those who laboured under chorea. Erysipelas had for its patron St. Anthony. The circumstances which led to this selection are not unknown. In 1087, a pestilential erysipelas, or sacred fire, ravaged the interior of France, and especially the district of Dauphiné. Now it so happened, that two years previous to this epidemic the bones and relics of St. Anthony had been brought from Constantinople by the pious care of Joselin, a nobleman of

that country, and deposited in the church of a Benedictine priory, in the neighbourhood of Vienne. Numbers of pilgrims flocked thither, and many miraculous cures were there performed. This success fixed St. Anthony in the perpetual patronage of erysipelas.

We may gather something from the simple fact that erysipelas was known to and well described by Hippocrates. It shews us that physicians who could so distinguish erysipelas would not have failed to describe with equal accuracy, and to name with equal judgment, small pox, measles, and scarlet fever, had those diseases existed in their days. Their not doing so is proof positive that such diseases did not then exist. It shews, further, that there must be something very different in the great pathological features of erysipelas from those of the three greater exanthemata; else how did it happen that erysipelas should have been known to them, and not the three others?

It will conduce to a clearer understanding of erysipelas, if, in treating of it, I reverse the order in which I have hitherto investigated the eruptive fevers. I shall here first explain to you the pathology of erysipelas. I shall attempt to shew you in what respects it differs from the other exanthemata, under what circumstances it originates, and what explanation of its various sources has been offered by ancient as well as by modern authors. Having thus discussed the subject of erysipelas theoretically, we shall be better prepared for the investigation of its appearances, its progress, its terminations, its statistics, and, lastly, its method of treatment.

I must begin by informing you, that by the term erysipelas we mean an inflammation of the skin, and very commonly, also, of the subjacent cellular texture; often preceded, and almost invariably accompanied, by fever.

Such a disorder originates from various causes. Its course and duration are alike variable. So far from the constitutional susceptibility (as in the case of the three greater exanthemata) being exhausted by one attack of erysipelas, the disposition to the disease seems often, as life advances, to augment with each successive seizure.

I shall have occasion to notice great diversities of opinion among authors upon almost every topic which the pathology of erysipelas involves. Nosologists differ as to its true situation, whether among the exanthemata or the phlegmasiæ. There are strange contradictions in the statements of authors regarding the mode of its propagation, and still wider differences of opinion in respect of the best method of treating the disease.

With regard to nosology, we have outlived that idle display of learning which made it an object of importance to what class or order any particular disease was to be assigned. We consider it here as an exanthema, following in this respect the footsteps of Dr. Cullen; but I beg you clearly to understand, that very good reasons might be advanced why it should be transferred to the phlegmasiæ. The matter, however, is not worth wasting time about.

With respect to the CAUSES of erysipelas, however, and the manner in which it spreads, the diversities of opinion are of infinitely more importance; and these must now be carefully investigated.

In ancient times, by Hippocrates, and the followers of the Hippocratic or humoral pathology, erysipelas was held to be a disease originating from some intestine commotion of the humours, which threw off, or eliminated, the peccant matter by means of the skin. This doctrine continued, with very slight change of phraseology, to be generally received by pathologists until a comparatively

recent period. Dr. Cullen says, "I consider the erysipelas to depend on a *matter* generated within the body, and which, analogous to the other cases of exanthema, is, in consequence of fever, thrown out upon the surface of the body." He admits a species of erysipelas (or rather, erythema) arising from an external cause, capable of throwing off contagious emanations, but he makes no mention of any morbid poison or miasm primarily giving rise to it. His words are—"This disease is not commonly contagious, but as it may arise from an *acrid matter externally applied*, so it is possible that the disease may sometimes be communicated from one person to another."

The modern notions of the nature and sources, and pathological relations of erysipelas, have made considerable advances since the days of Cullen, (now more than half a century ago.) I know no author who has laid them down fully, but Dr. Williams, in his valuable work "On the Morbid Poisons."

The first inroad upon the old notions concerning erysipelas was made by Dr. Wells, formerly physician of this hospital, who, in 1798, published some statements shewing the contagiousness of erysipelas. These facts, and the opinion founded on them, were long neglected; but of late years they have been forced upon the attention of pathologists, by the undeniable evidence of the frequent spreading of erysipelas in hospitals, and the difficulty of explaining that circumstance on any other principle than that of the generation of erysipelas by a morbid poison, or miasm.

I propose, first, to state to you the facts which prove erysipelas to be an epidemic malady, and which, satisfactorily to my mind, shew that its most important source is miasmatic. I shall then tell you on what grounds we

further maintain that this miasm, when formed, is capable of propagating itself by contagious emanations. Lastly, it will be my duty to explain to you how erysipelas originates occasionally from causes not of a specific nature, some of which are internal, others external to the human frame.

Sauvages, in his "Nosologia Methodica," published soon after his death (which took place in 1767), admits an erysipelas contagiosum, but on what turns out to be most doubtful authority, for the epidemic referred to by him in support of that opinion (that of Toulouse, in 1715) was *scarlatina*, not erysipelas: in fact, we cannot detect any trace of the doctrine of *miasmatic* erysipelas prior to the year 1760. In the summer of that year, a person labouring under *erysipelas of the face* was brought into this very hospital, where he died. Another patient, having a different disease, was put into the same bed before it was duly purified. This patient was shortly after seized with erysipelas of the face. Several other persons in the hospital were then attacked, among whom was an upper nurse, or sister, and she died. A rumour hence arose that the plague had got into the hospital; and so widely did this opinion spread, that an advertisement was inserted in the newspapers of the day, contradicting the rumour. This, you will observe, is an instance of erysipelas brought into an hospital, and there propagating itself. I am not able to tell you who first noticed the fact that erysipelas will *commence* in an hospital, without any suspicion of importation. Dr. Baillie informs us that during the years 1795 and 1796, erysipelas of the face was much more frequent at St. George's Hospital than he had ever before known it to be. Many persons, he says, were attacked by this disease after they came

to the hospital; and as the cases in a particular ward were more numerous than in any other, Dr. Baillie was led to suspect that the disorder was contagious. He is silent, however, on the subject of origin; and we are unable to say whether this erysipelas was originally bred in the hospital, or imported, and afterwards propagated by contagion.

M. Calmiel, writing in 1828, says, "there are years when in the hospitals for the insane in Paris, erysipelas is almost indefinitely multiplied; so that it is necessary to suspend all treatment by counter-irritants, (setons, moxas, and blisters,) because they are almost certainly followed by erysipelas. Even the opening of a vein, or the application of leeches, is followed by a like result. We may be quite sure that these cases *must* have originated within the hospital, for it would be unreasonable to suppose that an insane patient actually suffering under erysipelas would be admitted.

M. Velpeau, writing in 1831, describes the epidemic prevalence of erysipelas in the Hôpital de la Pitié, where he notices, that both in the medical and surgical wards the application of leeches, a trivial operation, or even an accidental puncture, brought on this inflammation with all its consequences. Blache and Chomel also mention the epidemic prevalence of erysipelas, and instance the autumn of 1818, a year of excessive heat and long drought. Of all the Paris hospitals the Hotel Dieu is that which has suffered most frequently and most severely by this terrible scourge of hospital establishments.

There is not, I believe, a single hospital in London, which has not, at times, been afflicted in like manner. At St. George's I have several times seen erysipelas so prevalent that operations were postponed for fear of the patient being subsequently attacked by it.

A connexion of more than twenty years with the Small Pox Hospital has given me abundant opportunities, not only of confirming the truth of these positions, but of shewing that we may carry our views much further. I feel persuaded, *first*, that erysipelas may commence in an hospital without the suspicion of importation. 2. That being so generated from what, until we get a better name, I will call *hospital miasm*, it may spread by contagion. 3. That the miasm generating erysipelas is identical with that which in lying-in-hospitals generates puerperal peritonitis, which in foundling hospitals and workhouse nurseries gives rise to pudendal gangrene and umbilical ulceration — which in army hospitals generates hospital gangrene—which in hospitals differently circumstanced is found to occasion a malignant form of cellular cynanche, and sometimes the most aggravated type of typhus gravior.

I do not bring forward this as any new doctrine. It has been stated over and over again, by individual writers, but it has never, I think, been urged by systematic authors with the importance which it merits; nor has the doctrine been received as one of the avowed axioms of pathology. Dr. Rollo, in a treatise entitled "A Short Account of a Morbid Poison acting on Sores," and published very early in this century, distinctly announces the principle, and illustrates the intimate connexion between erysipelas and hospital gangrene.

The circumstances which lead to the development of hospital miasm have never been investigated with all the accuracy which is desirable, and of which the subject is certainly susceptible. The first in importance is undoubtedly overcrowding of the wards of an hospital. When the French academicians (I think it was early in the French Revolution) were labouring dili-

gently to reform the abuses in the Hotel Dieu, some of them were at the pains to calculate in how many hours, supposing the ward to have been hermetically sealed, all the patients in it must necessarily have died, presuming that each adult requires for his support a gallon of air per minute. The time was wonderfully short.

2. But it is not numbers alone which are to be considered. A ward might safely hold fifty cases of *simple* fracture, which would not with safety contain twenty cases of compound fracture. Something, therefore, depends on the nature of the disorder. All disorders which throw out diseased secretions are more apt to taint and vitiate the air, than those where no such secreting process goes forward. It is on this account that the wards of the Small Pox Hospital are so peculiarly liable to generate hospital miasm.

3. Another element of great importance in determining the sources of hospital miasm is the degree of attention bestowed on cleanliness. If the bed linen, mattrasses, palliasses, sheets, and blankets, be frequently changed, and the walls frequently whitewashed; and if the nurses be careful to carry away all foul secretions, and to purify the patient's body by abundance of soap and water; in short, if the internal regulations of the hospital be good, miasm would, I suppose, be rarely engendered, even though the ward were crowded.

4. A fourth element must enter into the calculation, and that is, a good supply of fresh air. This by some is considered all in all; but it is not so, and all the ventilation in the world, conducted on the most scientific principles, and superintended by Dr. Reid himself, would fail in preventing hospital miasm, if feather beds and bolsters, soaked in unhealthy discharges, are permitted to remain in the ward.

5. Dr. Rollo has advanced a step further in the analysis of the sources of hospital miasm, and maintains that the disposition to erysipelas and its correlative diseases (puerperal peritonitis and hospital gangrene) depends partly on a peculiar but hitherto undetected condition of the atmosphere. He is led to this, by observing that erysipelas sometimes shews itself in the airiest, least crowded, and best regulated hospitals. Without stopping to inquire how much is due to this circumstance, we are fully warranted in saying that the state of the atmosphere must not be lost sight of in such an investigation. We know, on the authority of Dr. Lind, that in Batavia and other localities notorious for malaria, hospital gangrene, and erysipelas, and every sort of associated disorder, prevail with intensity at certain seasons.

Taking it, as proved, that erysipelas is liable, from one or more of the five causes now detailed (viz., accumulation of persons, character of the discharges, want of cleanliness, want of ventilation, constitution of the atmosphere), to spread epidemically, it is still to be shewn that this disease throws off contagious emanations, which can, *per se*, independent of any such influences, propagate the like complaint.

Dr. Wells has met this question very fairly by detailing a variety of cases where erysipelas spread by contagion *in private houses*, and under circumstances calculated to exclude all agency save that of simple contagion. I will state to you a few of these cases; first, because the doctrine of contagion in erysipelas is distrusted on the continent, and by many, too, in this country; and secondly, because it is important either to establish or to negative the statement.

On the 8th of August, 1796, Dr. Wells attended, in Vine-street, Clerkenwell, an elderly man, named Skelton,

with erysipelas of the face, who died. A few days after his decease, his wife took it, and died also. Shortly after that, Skelton's nephew, a young man, who had visited his uncle during his illness, took erysipelas, and survived only a few days. On the 19th February, Dr. Wells was called to attend Mrs. Dyke, the landlady of the house in which Skelton and his wife had died, and she also was found to be labouring under erysipelas. She had attended them in their sickness; and after their death, furniture from their room had been removed to her apartment.

Dr. Pitcairn (a most acute physician) attended, in February, 1797, a lady with child-bed fever, who had erysipelatous inflammation in her skin. Her new-born babe had erysipelas of the pudendum, and both mother and child died after a few days' illness. Eight days after the death of the child, the lady's mother and a servant maid, both of whom had attended the child in its illness, were attacked with *erysipelas faciei*, from which both recovered.

Many similar cases are recorded. It is not meant to insinuate that such are common. In by far the larger proportion of cases where erysipelas invades private families, no such result follows,—no member of the family, no nurse, sickens, but the possibility of such an occurrence is to my mind satisfactorily proved.

It remains, before I bring this branch of the subject to a conclusion, that I inform you what are the circumstances, independent of contagion and miasm, which are believed by pathologists to induce erysipelas. Here another wide field of inquiry opens before us.

I told you that the miasms of small pox, measles, and scarlet fever, operate on the human body without predisposing causes. That is not the law with erysipelas. It

has long been known that certain conditions of the body favour very much the development of erysipelas.

1. Weakness of the body, whether the result of enervating employments, of prior ailment, or of bad food, contribute to bring the frame under the dominion of erysipelas. Hence it is, that erysipelas is so frequent a consequence of typhus fever, of small pox, and of all febrile diseases which seriously reduce the vis vitæ.

2. Erysipelas is a frequent complaint in military hospitals. It is met with in soldiers of full habit of body, as well as in those of intemperate habits of life. It has therefore for its predisposing causes plethora and an inflammatory diathesis. Medical men who have only seen erysipelas in the wards of a London hospital, have little idea of the phenomena which it presents, and of the treatment which is required, when it invades the plethoric soldier in the prime of life, eating abundantly of animal food, drinking to excess of bad wine, and exposed at night, without exercise, to the chilling damps of an unwholesome atmosphere. Some of the most formidable cases of erysipelas initiate in these circumstances.

3. The third source of erysipelas independent of specific miasm is original delicacy of structure and constitution. Women, formed of more delicate materials, and often endowed with less of constitutional power than men, are thereby rendered more liable to erysipelas. Some women, of weakly habit, and very delicate texture of skin, hardly pass a year without an attack. This delicacy of skin is hereditary, being transmitted, like the lineaments of the face or the colour of the hair, from mother to daughter. Hence it is that erysipelas, like gout and gravel, is hereditary in certain families. In persons thus predisposed, erysipelas may be brought out by cold, by heat, by any violent exertion, by strong emotion of mind, by a deranged state of the liver and digestive organs.

4. The last of the common causes of erysipelas is *breach of surface*. In the very worst wards of an hospital, in the most unfavourable weather, in a habit of body originally most prone to erysipelas, it often happens that the disease is not developed until the surface of the body be abraded or wounded. All sorts of wounds, whether made by leeches, lancets, the knife of the surgeon, the sword of the enemy, or the forceps of the dentist, all sores and ulcers, are at times followed by erysipelas. You may naturally inquire, why? The reason probably is, that erysipelas is the product of a morbid poison, and we know that all morbid poisons are more easily received by a wounded surface than by a whole skin. This doctrine applies to small pox, cow pox, measles, and hydrophobia. The disease is, in fact, thus introduced by a kind of inoculation. All breaches of surface, then, favour the development of erysipelas. It is *there*, where the action begins, and from which, as from a centre, it is diffused over more or less of the superficies. Let me further remind you that erysipelas may be excited artificially, by a burn, a scald, a mustard poultice, ammonia, or cantharides. The inflammation excited by a blister is *erysipelatous*.

Dr. Willan was of opinion that erysipelas could be propagated by inoculation. He tells us that the fluid secretion of the vesicles will occasion a red, painful, and diffuse inflammation of the skin, in all respects like that of true erysipelas. These experiments ought never to have been made, and do not appear to have ever been repeated. The facts, therefore, are open to doubt. I have heard of a case where vaccine matter taken from the arm of a child labouring under erysipelas communicated both diseases. But it did not fall under my own notice, and possibly may have been misrepresented.

From this sketch of the pathology of erysipelas you will see how intricate the subject is, and how widely it behoves you to extend your views, if you would fully inform yourselves of its sources.

The latent or incubative period of the erysipelatous miasm is very short, certainly not exceeding one week. It is capable, like other miasms, of attaching itself to fomites, and, so far as I have observed, is more difficultly banished from such fomites than any other known contagion.

Erysipelas sometimes begins without any very perceptible marks of fever. In general, however, when this happens, the succeeding disorder proves very mild, and some nosologists have refused to apply the term "erysipelas" to it. They would fain restrict that designation to cases of a more noble character, such as are preceded by fever, and accompanied in their progress by well marked constitutional disturbance. To the milder forms of rose-rash they appropriate the term erythema. This nosological refinement is wholly inapplicable in practice. You will find that in nature a gradation can be traced from the mildest form of local erythema without fever to the most aggravated case of constitutional, epidemic, and perhaps fatal erysipelas. No precise point can be fixed upon as the boundary of erythema and erysipelas.

Keeping this principle in view, I will tell you what are the kind of symptoms present when a person is breeding a *febris erysipelatosa*, whether within the walls of an hospital or in a private house—whether succeeding a wound, or arising from some *inward heat of the blood*—whether ultimately to develop itself on the face, or on the extremities. The patient has a *rigor*,

followed by heat of skin. His tongue becomes white; he feels languid and incapable of the exertion, mental or bodily, which previously was easy to him. Very often there is sickness at stomach, and vomiting. I know no symptom more common than this. You will remember how it accompanies the onset of small pox. I have seen the same, equally severe and long continued, during the incubative period of erysipelas. Other symptoms are also present, such as thirst, headache, disturbed dreams, or perhaps complete sleeplessness, confusion of thought—but I know nothing which can be called *characteristic* of approaching erysipelas, as contradistinguished from any other kind of eruptive ailment. The circumstances in which the patient is placed contribute materially to guide you to a right conclusion as to the nature of the malady which is breeding. Thus, when such symptoms occur, at the Small Pox Hospital, *suddenly*, to a man recovering from small pox, we know that erysipelas is going to shew itself, and we are on the watch for it. So, in like manner, at the Fever Hospital, though *there* it has happened that small pox has followed, and *not* erysipelas. The pulse is peculiarly quick and sharp during the onset of this disease.

Mr. Arnott is of opinion that an inflammatory state of the fauces accompanies in every case the initiatory fever of idiopathic erysipelas. I have noticed the same circumstance when the disorder has originated from hospital miasm. The intensity of the initiatory fever of erysipelas is sometimes excessive. Some years ago, a patient at the Small Pox Hospital died during the incubation of a fever, which I had every reason to believe was erysipelatous.

After a period, varying from twenty-four to sixty hours, a redness appears either on the face or on the leg,

or sometimes (though much more rarely) on the trunk. The redness is soon succeeded by swelling, and a sense of heat in the part. The redness and swelling extend. When the eruption attacks the head, the side of the nose is generally the part first affected, but sometimes the temple or ear. The swelling soon reaches the eyelids, which assume a peculiarly puffy or œdematous aspect, and often the eyes are for a time closed. Should the disorder prove severe, the face may swell to such an extent as to present a truly hideous spectacle, all trace of the natural features and expression of countenance being entirely gone. The extent of surface occupied by redness is extremely varied. I have seen erysipelas cease when one side only of the face had become affected. I have seen it extend from the scalp to the neck, from the neck to the breast, and there suddenly stop. At other times, it descends to the extremities, and ceases not until every portion of the skin has been successively attacked. Such cases, however, are very rare, for in general before that can take place some internal organ has become affected, the constitution has given way, and the patient been carried off, either by *coma*, *vomiting*, or *diarrhœa*.

The redness of erysipelas is easily distinguished. It fades under the finger. It is bounded by a distinct margin. The skin occupied by it is soft and inelastic. It is accompanied by a sense of *heat*, or *scalding*. There is no throbbing complained of, nor any sharp lancinating pain, as in phlegmon.

Very mild cases of erysipelas sometimes subside without any further appearances than those now described; but in all cases of even ordinary intensity, the cuticle becomes (in a period varying from twelve to thirty-six hours) elevated into small vesicles, blebs, or blisters—precisely like those which form after the application of

a plaster of cantharides, or which we see after a burn or scald. These blebs or vesicles contain a thin ichor or serum, sometimes perfectly transparent, sometimes yellowish, sometimes livid, and occasionally mixed with blood. They soon burst and discharge their contents, while the subjacent surface of the corion becomes of a reddish brown, or perhaps livid colour, according to the degree of constitutional power present. The cuticle over the whole extent of the erysipelatous surface is killed, and desquamates, as in scarlatina, in the course of the succeeding fortnight.

I have told you that the cutis vera may assume a livid aspect. I may add, that at times erysipelas exhibits still more aggravated and even appalling appearances. Pure gangrene supervenes, the constitution sympathizes, and the patient dies in the course of a week, (generally about the third or fourth day,) with symptoms of oppressed brain (coma or convulsion)—or with vomiting and diarrhœa—or with oppressed breathing and excessive restlessness. In these cases, prior to the gangrene, the skin appears hot, tense, and acutely painful. The pulse is rapid, almost beyond counting, and the expression of countenance betrays the utmost anxiety.

Nowhere is this frightful form of *erysipelas gangrenosum* more frequently witnessed than in badly-ventilated, over-crowded, and ill-regulated foundling hospitals and workhouse nurseries. The erysipelas neonatorum, and the *erysipelas pudendorum ulcerans*, have been described by Dr. Garthshore, by Dr. Underwood, by Dr. Percival of Manchester, and Mr. Kinder Wood of Oldham. Fortunately, we have not many opportunities of seeing such things in this country, but on the continent, where foundling hospitals are in fashion, the disease, in all its malignity, is still occasionally witnessed. It attacks

children from the period of birth to the second month, or even later, and chiefly affects the umbilicus, genitals, and groins.

On dissection of those who have died of this disease, Dr. Garthshore was unable to detect any lesion of the internal viscera, nor was the cellular membrane affected. The skin was the only organ diseased. Death was the result of the morbid condition of the fluids, engendered by a malignant miasm.

Isolated cases of erysipelas gangrenosum may occasionally be seen, in all our hospitals, affecting adults. In former times it raged epidemically. We read that during the middle ages the gangrenous erysipelas frequently ravaged France, where the disorder was called the plague of fire, (ignis sacer.)

Such are the phenomena of what may be called *superficial erysipelas*, or what some authors have called, erysipelas phlyctænodes. It is not often, however, that the skin alone receives the whole force of the febrile commotion. We must inquire therefore, next, what happens, during the course of erysipelatous fever, to the *neighbouring textures;* and what other organs suffer.

In almost all severe cases of erysipelas, whether affecting the face or extremities, the subjacent cellular membrane participates in the disease. Inflammation spreads to it, and, from the peculiar texture and disposition of this tissue, leads to the effusion either of serum or pus. When serum alone is effused, pathologists call the disease *erysipelas œdematodes*. When purulent matter collects, either in small abscesses, or, as more commonly happens, when it is diffused through the cells of the cellular membrane, we call the disease *erysipelas phlegmonodes*. You will understand that all these are only modifications of

the same disorder, attributable to the varying intensity of the inflammatory action, or some peculiar malignity of the exciting cause.

In the progress of erysipelas no organ is more likely to suffer than the brain. Pathologists are in the habit of saying, that a metastasis has taken place to the brain, but it is more properly extension of disease than change of locality. The external parts continue to be red, swollen, and blistered. Coma and phrenitis, with delirium of a fierce kind, are sometimes witnessed, and the patient dies apoplectic on the seventh or eighth day of the disease, sometimes even later. Dissection seldom displays anything more than turgescence of the cerebral vessels. These cases are singularly untractable. Instances of recovery have occurred, but the greater proportion of cases of erysipelas (especially of the face) complicated with phrenitis, or coma, prove fatal, and that very rapidly.

Occasionally, the stomach is the organ which suffers during the progress of erysipelas. I attended, many years ago, a gentleman of feeble frame, who, after a severe attack of initiatory fever, threw out erysipelas. The stomach, irritable at first, never recovered its tone. Vomiting continued, and so exhausted the patient that he died in one week from the seizure. In some instances, erysipelas, especially when it occupies any large portion of the surface, seems to affect the *heart* sympathetically. There is frequent syncope, with an exceedingly feeble pulse. Death takes place here by exhaustion, unless the system can be supported, in the meantime, by wine and brandy. Children attacked by erysipelas often perish by supervening mucous enteritis.

These intimations of the several sources of danger and of death in erysipelas will preclude the necessity of any

formal inquiry concerning prognosis. I will merely observe that erysipelas of the face is, *cæteris paribus*, more dangerous than erysipelas of the extremities. Nevertheless, gangrene is rarely observed as a consequence of erysipelas faciei. This termination is more frequent in the erysipelas of parts at a distance from the heart, (the scrotum and extremities.) Erysipelas faciei most commonly proves fatal by coma or phrenitis. Erysipelas is most to be dreaded in weakly habits, and constitutions exhausted by previous illness. Erysipelas from miasm and contagion is more dangerous than erysipelas from internal causes. The extremes of life suffer from it more than the middle periods.

With reference to statistics, I have not much to tell you that can be relied on. When the inquiries now in progress in the several London hospitals, under the guidance of the Statistical Society, are fairly carried out, and an average of years taken, much will be elicited on this subject that is curious and edifying. At present, all is guess work. It has been conjectured by Dr. Williams that the rate of mortality varies from one in three to one in fifteen, (thirty-three per cent. down to six or seven per cent.) With respect to the actual numbers perishing by erysipelas, we learn from the registrar general's reports, that in the metropolis, during the five years 1838, 1839, 1840, 1841, 1842, the deaths by erysipelas have been respectively as follows:—405, 301, 311, 251, 235. Throughout England and Wales, the deaths by erysipelas were, in 1838, 1203; in 1839, 1140; in 1840, 1217. The steadiness of these numbers will attract your attention, so different from the fluctuations of the true exanthemata.

Males and females appear to suffer alike. In 1838, there died (throughout the country) 605 males, 598

females. In 1839, 550 males, 590 females. In 1840, 450 males, 456 females. In the metropolis the proportion of male deaths exceeds slightly those of females.

We come now to the thorny subject of treatment. Erysipelas is obviously a highly inflammatory complaint. It displays most strikingly all the phenomena of inflammation — pain, heat, redness, swelling. Nevertheless, physicians for more than a century past have been divided as to the proper mode of treating this inflammation. Some contend for bleeding, purgatives, and the usual antiphlogistic measures. Others still more forcibly urge the adoption of bark, wine, and a system essentially tonic. The great authorities are ranged pretty equally on both sides. Cullen, Lawrence, Dupuytren, are opposed by Drs. Wells, Willan, and Fordyce. Some who recommend wine object to bark, and at all events deny to it that specific power over erysipelas which Dr. Wells and Dr. Powell claim for it.

Out of this mass of conflicting opinion it is difficult to extract any decided rule of practice. Facts are opposed to facts. Statistical inquiries, carefully conducted so as to guide our judgment, are wanting. In this emergency I must tell you what I have noticed myself, and what I believe you will find to be the safest course to pursue.

We have seen that erysipelas arises from a great variety of causes, and may display itself under circumstances the most opposite. It may happen to the plethoric soldier and the exhausted inmate of a workhouse. It may invade a young man in the prime of life, and a female of hysterical habit and feeble powers. It may arise from a depressing miasm, and it may follow a debauch of wine. Common sense dictates that any

disease so occurring must be met by corresponding difference of treatment.

As an army surgeon, you will often find it necessary to bleed largely in erysipelas. If the pulse be full, the tongue deeply loaded, and the urine of the colour of brandy, nothing but full bleeding from the arm will meet the exigencies of the case. I remember, some years ago, being called to attend a young man in erysipelas, aged about twenty-one, the apprentice of a butcher near Bond-street. He was of gross habit, and the disease (in the facial form) was very intense. I bled him largely, with great benefit. The blood was sizy. At the Small Pox Hospital, even where the disease was distinctly traceable to *miasm*, so depressing, in general, in its effects, I have often bled one patient, and given his next neighbour wine and brandy. Be guided, then, by the pulse, and never, when the pulse is *full* and *hard*, and the tongue deeply loaded, be deterred by any speculative considerations from taking blood.

But supposing the symptoms are not in sufficient intensity to warrant the detraction of blood from the arm, still the other parts of the antiphlogistic system may be beneficially pursued, more especially purging. I received a good lesson on this subject some years ago, from a boy under erysipelas. He had two mixtures given him, one, a simple saline—the other, an active aperient solution, containing salts and jalap. The boy, after experiencing the effects of both, begged me to persevere with the latter, and to spare him the former. I did so. The boy took his laxative draught twice a day, and made a rapid recovery. The best forms of aperient for erysipelas are calomel and rhubarb, senna and salts, castor oil, and the compound powder of jalap. Saline medicines are of very little service in erysipelas.

When the pulse is small, the extremities cold, and the evidences of constitutional debility great and unequivocal, wine must be given in quantities proportioned to the exigencies of the case.

Delirium is no bar to the employment of wine. This symptom is often checked in the most remarkable manner by wine. Many circumstances concur to prove that the delirium of erysipelas is not dependent on inflammatory action within the encephalon, but is akin to that which ushers in the confluent small pox. In some cases, the heart would cease to beat but for the constant stimulus of wine, or of warm brandy and water.

Under certain circumstances a mixed plan of treatment must be pursued. The liver must be stimulated and the bowels unloaded by calomel, jalap, and rhubarb, while the patient may take during the day a mixture containing the decoction of bark and the citrate of ammonia, with a proportion of æther. An opiate at night, such as the pulv. ipec. compos., with a few grains of the hydr. cum creta, to prevent any injurious effects on the secretion of the liver, may be advantageously directed.

If physicians have differed on the *constitutional* treatment of erysipelas, they have not agreed better with regard to local treatment. Some advise warm applications, some cold ones. Some recommend watery, some spirituous fomentations. Some banish all fluid applications, and place their sole reliance on dry hair powder. A few would counsel us to cover the affected surface with mercurial ointment. Others pretend to control the spread of erysipelatous inflammation by surrounding the affected part with a ring touched by the lunar caustic, and saying to the inflammation—"Hitherto shalt thou come, and no farther." Here and there a

practitioner, somewhat more energetic in his notions, applies a blister to the very centre of the inflamed surface.

I shall not occupy your time by minute criticism on these several modes of practice. All of them have, at times, proved useful—that is to say, patients have done well under them all. In truth, it would be as absurd to limit the local, as it would be to confine the constitutional treatment to any precise detail. The feelings of the patient may often be consulted advantageously, and that plan adopted which best moderates the sensation of heat and fulness which is so distressing to him. You must not expect much decided benefit from any kind of local treatment in a disease of constitutional origin.

You are not to neglect any means, however apparently trifling, which contribute to the ease and temporary comfort of the patient, but you are not to exaggerate the importance of external treatment, or to imagine you have made a great discovery, when you find a patient prospering better under a decoction of poppies than under a cold spirit lotion.

I have left to the last the great bone of contention, touching the propriety of local bleeding in erysipelas. This question admits of being viewed in a great variety of aspects. Mr. Lawrence and Mr. C. Hutchinson contended for the honour of this improvement in the treatment of erysipelas. I will state to you, in a few words, my own opinion on the subject. In erysipelas there is undoubtedly great congestion of the superficial vessels, and therefore, *a priori*, great benefit might be anticipated from the detraction of surface blood. Under careful management, and with due regard to the powers of the system, *scarifications* in erysipelas may be practised with great benefit *upon the extremities*. I have my doubts

as to the propriety of employing them on the face. I enter my protest, however, most strongly, against those deep incisions through the entire thickness of the inflamed and swollen chorion which some surgeons have recommended. If the object be to obtain a large quantity of blood, that object would be gained more safely, and as effectually, by venesection. It is difficult in *all* cases, and impossible in *some*, to control or limit the loss of blood proceeding from the gaping lips of a deeply incised erysipelatous surface. Many cases of erysipelas have undoubtedly been benefited by the detraction of surface blood, but many thousands of equally severe cases have done well without it.

LECTURE X.

HISTORY, PHENOMENA, AND PRACTICE OF VACCINATION.

Earliest notices of cow pox. Devotion of Jenner to this subject. Announcement of the discovery of vaccination. Its rapid adoption over the whole world. Insusceptibility of cow pox in certain persons. Phenomena of vaccination. Progress of the vesicle. Constitutional symptoms accompanying. Anomalies and varieties. Modified cow pox. Bryce's test. Concurrence of small pox and cow pox. Surgery of vaccination. Selection of efficient lymph. Mode of operating. Preservation of vaccine lymph.

The act of 1840, commonly called the Vaccination Extension Act,—though not nominally, yet in its practical working,—is an act for enforcing the practice of vaccination on the whole population of these kingdoms; for with the penalties of that act staring us in the face, there is no alternative but that of accepting vaccination, or exposure to the casual small pox. The latter alternative has coupled with it the passage through life in a state of constant and miserable suspense, the disorder perhaps seizing upon the individual at last under circumstances the most distressing—possibly, after having married, and become the father of a family, all of whom are dependent upon him for support. No parent in his senses could seriously hesitate when such an alternative is set before him. The whole population of England

and Wales, therefore, are virtually by this act *compelled* to submit to vaccination, whether they like it or not. Formerly the case was different. Inoculation was allowable, and if people adopted vaccination, it was their own act and deed, for which no one could be blamed. Now the government of the country interposes, and takes the responsibility on its own shoulders. The measure was a strong one, but it had been adopted in foreign countries, and found to answer. It renders more than ever necessary, that everything connected with vaccination should be carefully studied by you—its history, pathology, phenomena, and practice. These points will occupy our attention during the present lecture. I shall, on a subsequent occasion, speak to you concerning the practical results of vaccination, and the statistical details by which we have, after an experience of forty-five years, arrived at a knowledge of its real efficacy.

The earliest notice I have ever seen of cow pox is to be found in a weekly paper published at Gottingen, in 1769, where we learn that such a complaint was not uncommon in the neighbourhood of that town, and that those who caught it from the cows flattered themselves they were secure from the infection of small pox. A notion of the same kind had long prevailed in Gloucestershire—a great dairy county, as you know,—and had often been forced upon the attention of the provincial surgeons. But no one thought seriously of this rural tradition, or dreamt of applying it to the general benefit of mankind, until Jenner arose. Dr. Jenner was born at Berkeley, in Gloucestershire, on the 17th May, 1749. He displayed an early taste for natural history, and was thrown from infancy among dairies and dairy maids. There he heard of the cow pox, and appears, almost from the first, to have foreseen the uses to which it might be turned.

In the year 1770, being then twenty-one years of age, Jenner came to London, to prosecute his medical studies under the eye of John Hunter. To that enlightened man he repeatedly mentioned the popular rumours prevalent in Gloucestershire concerning cow pox; but he does not seem to have received much encouragement to prosecute the inquiry. In 1775, being then engaged in practice at Berkeley, he devoted more attention to the subject. He often talked the matter over with his professional friends and neighbours. Among them was Mr. Fewster, of Thornbury, who had, in his early days, been associated with Sutton, the great inoculator. This circumstance naturally inspired him with a warm interest in everything connected with small pox, but he never would believe in the prophylactic power of cow pock. Other professional friends, in like manner, dissuaded Jenner from wasting his time on what they thought a barren study. "We have all heard of these stories," they would say; "but the real cause of the anomaly is some peculiarity of habit in the person who escapes, not any efficacy in the disorder received from the cow."

These and such like arguments would have effectually damped the ardour of most men; but though discouraged, Jenner was not to be driven from his favourite pursuit. No opportunity was neglected by him which seemed likely to throw additional light on the subject. Cow pox appeared to be the object for which he mainly lived. He searched out all conceivable sources of failure. He learned to discriminate the various forms of eruption to which the teats of the cow are subject at different periods of the year, and was led to the belief that one only was possessed of specific or antivariolous powers. This he called true cow pox. The others he termed spurious cow pox. By degrees he convinced himself that all the

anomalies supposed by his professional brethren to be insurmountable obstacles to the success of his pursuit, were explicable on scientific principles, and that cow pox was, what the uninstructed believed it to be, a true, full, and efficient preservative against the small pox.

It would seem that about the year 1780 he first conceived the magnificent project of perpetuating and propagating this disease by inoculation, and thus extending its benefits to the whole world. In 1788, he visited London, and carried with him a drawing of the casual cow pox as it appears on the hands of the milkers. This he shewed to Sir Everard Home and other great men of that day, but the physicians of London saw in it only a curious and barren fact. Dr. Adams, physician of the Small Pox Hospital, noticed the cow pock in his "Treatise on the Morbid Poisons," published in 1795.

It is a very curious circumstance that so far back as 1782, when Dr. Archer was physician of the Small Pox Hospital, Catharine Wilkins, from Cricklade, in Wiltshire, who had had the cow pock casually during early life, was tested with variolous matter at the Small Pox Hospital, and found to be unsusceptible.

It was not until the year 1796 that Jenner began to experiment with cow pox, although he had been talking and inquiring about it for at least thirty years. The decisive experiment was made on the 17th May, 1796, on a boy, eight years of age. He was tested with small pox on the 1st of July of that year, and found to be unsusceptible.

Jenner now prepared for publication, and sent his paper, carefully and very philosophically drawn up, to the Royal Society, wishing that the discovery should come forth to the world under its high auspices; but that learned body declined to receive the paper, lest it should

injure Jenner's fame, already established by some observations on the cuckoo! Jenner, nowise disconcerted, published the paper himself in June, 1798.

It redounds to the honour of St. Thomas's Hospital, that its medical officers were the first persons in England to put Jenner's discovery to the test. Mr. Cline vaccinated a boy here, in the last week of July, 1798, with dried lymph, which had been kept three months on a quill. The boy had diseased hip, and Mr. Cline, proposing to convert the vaccine pock into a pea issue, inserted the matter on the outside of the hip. Dr. Lister, formerly physician of the Small Pox Hospital, watched the progress of the case. The boy was inoculated, almost immediately afterwards, with small pox matter, in three places, but the slight inflammation that arose subsided on the fourth day. The experiment therefore was perfectly successful.

On the 20th January, 1799, cow pock was found in Mr. Harrison's dairy, in Gray's Inn Lane, from which source, Dr. Woodville, my predecessor at the Small Pox Hospital, commenced a series of vaccinations. That same stock of lymph remained in use up to the year 1836.

To pursue the triumphant career of vaccination would be gratifying to me, but it would not conduce to your improvement. Suffice it to say, that the new practice was received with enthusiasm, not only in this country, but over the whole of Europe. It reached India in 1802, and penetrated with equal rapidity into the wilds of America; for foreign nations vied with us in efforts to extend the beneficial practice to the farthest regions of the globe.

A few detached notices will complete my sketch of the history of cow pox. In 1807, Parliament voted to Dr. Jenner a sum, amounting, in all, to 30,000*l*., as a reward

for his discovery, and the generous devotion of his time and talents to the public welfare. In 1808, the National Vaccine Establishment was formed, and the support of government given to this measure, though not in a very efficient form.

In 1823, Dr. Jenner died at Berkeley, the scene of his early labours, full of years and honours.

In 1840, a Bill passed the legislature for the extension of the practice of vaccination throughout England, Wales, and Ireland. The machinery of this act was placed under the supervision of the poor-law commissioners. Payment to medical practitioners is directed to be made, at a stipulated sum (averaging one shilling and sixpence) for each successful case; such expenses to be defrayed out of the poor rate. A still later act confirms these provisions, with a few unimportant additions. This act is working well, and the practice of vaccination is now rapidly extending over the provinces. In the metropolis, owing to the number of well-conducted vaccine institutions, it had always prospered.

Having thus brought down the history of vaccination to the latest period, my next object is to make you familiar with the several appearances which it presents, regular and irregular; but before doing so, I must inform you that occasionally we meet with persons who, from some peculiarity of habit, are wholly insensible to the vaccine poison, in whatever intensity and by whatever mode it is applied. They receive it as they would so much cold water. The proportion of mankind who exhibit this singular idiosyncrasy is very small. I may have seen thirty or forty such cases in the course of my life. It would be very interesting to determine whether this constitutional inaptitude to cow pox denotes a like inaptitude to receive and develop the variolous poison.

In the few cases which I have seen, where inoculation was subsequently tried, the insusceptibility was proved to extend to both poisons, but I have read of instances of an opposite kind. It is at all times very difficult to arrive at the truth, on a question of this nature; and now that inoculation is forbidden, we may despair of ever arriving at any certainty concerning it.

The insusceptibility to the vaccine poison is, in some cases, obviously dependent on constitutional weakness, displayed in the slowness of dentition, the imperfect ossification of the head, and the emaciated aspect of body. There exists here an atony of the absorbent system. If vaccine lymph is inserted into the arm, either no vesicles arise, or they are small, and imperfectly developed. In such cases, the indisposition to receive cow pox is only temporary. In the former cases, where idiosyncrasy is the cause of the phenomenon, the inaptitude continues through life.

I now proceed to describe to you the phenomena of vaccination.

The regular course of cow pox is as follows:—On the third day from the insertion of the virus, the wound will be perceived red and elevated. By aid of the microscope, the efflorescence surrounding the inflamed point will be distinctly perceived even on the second day. On the fifth day the cuticle is elevated into a pearl-coloured vesicle, containing a thin and perfectly transparent fluid in minute quantity. The shape of the vesicle is circular or oval, according to the mode of making the incision. On the eighth day the vesicle is in its greatest perfection, its margin is turgid and sensibly elevated above the surrounding skin. In colour the vesicle may be yellowish or pearly. The quantity of fluid which it con-

tains will be found to vary much. When closely examined, the vesicle will exhibit a cellulated structure. The cells are eight or ten in number, by the flow of which the specific matter of the disease is secreted. The vesicle possesses the umbilicated form belonging to variola.

On the evening of the eighth day (counting from the day on which the incision was made) an inflammatory circle, or areola, commences at the base of the vesicle. The skin becomes tense, red, and painful, for a considerable extent around. The figure of the areola is perfectly circular. In some cases the subjacent cellular membrane participates in the inflammatory action, and occasionally the glands of the axilla swell. The areola continues to advance during the ninth and tenth days. On the eleventh day it begins to fade, leaving, in its decline, two or three concentric circles of a bluish tinge.

The vesicle, by this time, has either burst spontaneously, or been opened by the lancet of the surgeon. Its contents now become opaque. The vesicle itself begins to dry up, and a scab forms, of a circular shape, and a brown or mahogany colour. By degrees, this hardens and blackens, and at length, between the eighteenth and twenty-first day, drops off, leaving behind it a cicatrix of a form and size proportioned to the prior inflammation. A perfect vaccine scar should be of small size, circular, and marked with radiations and indentations. These shew the character of the primary inflammation, and attest that it had not proceeded beyond the desirable degree of intensity. Many of the most perfect scars disappear entirely as life advances.

Until the eighth day the constitution seldom sympathizes. At that period, however, it is usual to find the infant somewhat restless and uneasy. The bowels are

disordered. The skin is hot, and the night's rest is disturbed. These evidences of constitutional sympathy continue for two or three days. There is, however, much variety observable here. Some children suffer slightly in their general health throughout the whole course of vaccination. Others exhibit scarce any indication of fever, although the areola be extensive, and the formation of lymph abundant. It is not uncommon to find the child's body covered, generally or partially, with a papulous eruption, of a lichenous character, from the ninth to the twelfth day, or even later. It is seldom seen in adult vaccination, but is frequent in children full of blood, in whom numerous vesicles had been raised, which discharge freely. Vaccine lichen, as this eruption is properly called, often occasions great anxiety in the mind of the parent, from a suspicion that small pox is coming out. I have seen it in such intensity as to be followed by minute vesicles; but this latter appearance is very rare. It is an accidental occurrence, chiefly attributable to the peculiar delicacy of the child's skin, and fulness of its habit. Like the constitutional irritative fever, it indicates that the disease has taken effect on the system, but it is not deemed essential to the success of the process.

The irregularities and anomalies of cow pox are various, and require to be specially described. The most common irregularity is that wherein the vesicle, at a very early period of its course, becomes prematurely red and itchy, whereby the infant is tempted to rub or scratch it. To this rubbing the subsequent appearances are usually attributed, but most unjustly, for the same consequences follow, though the child's hands are muffled. In this irregular form of vaccination, a small acuminated or conoidal *pustule*, will be perceived on the sixth or

seventh day, surrounded by a slight areola, of irregular shape. The contained fluid, instead of being a clear and transparent lymph, is opaque, and of a light straw colour. The succeeding scab is small, and drops off prematurely.

In some cases, the specific inflammation, or areola, proves very violent, extending from the shoulder to the elbow, and sometimes running into genuine erysipelas. The vesicle, instead of drying into a hard scab, is converted into an ulcer, discharging profusely, and leaving behind it a large scar, of the size of a common wafer, in which neither rays nor depressions can be traced. Much temporary inconvenience, but no permanent ill consequence results. The poison has taken full effect upon the constitution upon the eighth day. All that happens afterwards is immaterial in respect to the security of the child. Hence we may learn how small importance is to be attached to the cicatrix as an evidence of the perfection or imperfection of the vaccine process. Perfect security is compatible with a small and scarcely distinguishable cicatrix, with a large watery cicatrix, and with no cicatrix at all, at least none perceptible five years after the operation.

Another variety of cow pox exhibits, about the sixth or seventh day, the vesicle partially inflamed and scaly. A species of psoriasis has taken the place of areola. It is doubtful how far confidence can be placed in so defective a process as this.

Cow pox is occasionally retarded in its normal progress. That this should happen in consequence of the prior occupation of the system by measles or scarlatina, you can readily understand. So likewise is it easy to see why this may be the result of an accidental bowel complaint. But sometimes the cow pock vesicle, without any

such cognizable cause, is retarded for three, four, or more days. Retardation of the vesicle does not in any degree take from the ultimate security of the child.

Small pox and cow pox are sometimes seen running their course simultaneously, without mutual interference. At other times the cow pox is retarded. Occasionally they mutually restrain and modify each other's action. Much depends on the time which has elapsed from the application of each germ respectively. As a general rule, it may further be stated, that extraneous fever, however excited, restrains the growth and modifies the normal progress of the vaccine vesicle. It never reaches perfection unless the system be in a sound state. If, therefore, the *variolous* germ be received into the body quietly, and eliminate itself with little constitutional disturbance, vaccination may advance *pari passu* with the small pox, and complete its series of changes undisturbed.*

Another variety of anomalous, or what is called modified cow pox, presents itself when the vaccine virus is reinserted on the fourth, fifth, or sixth day from the

* The following striking illustration of this principle (exemplifying, also, the incubative period of small pox and the law of suspension) occurred since this lecture was delivered:—William Bavin, ætatis 27, coachman, from 15, Curzon-street, visited his brother on Friday, February 3, 1843, whom he found labouring under small pox. He took the precaution of being vaccinated on Monday, February 6; began to feel poorly, Saturday, February 11; obliged to leave off work, February 13. Eruption of small pox appeared on Wednesday, February 15, being the *thirteenth* day from exposure to contagion. Scarcely any fever was present. The small pox proved distinct and mild, and ran a perfectly normal course. The vaccine vesicles were retarded, so that both disorders maturated together. On Monday, February 20, (the sixth day of variolous eruption, and the fourteenth of cow pox,) the small-pox pustules were well acuminated, and six vaccine vesicles were to be seen, full and finely developed.

primary vaccination. The result is, that the vesicles of the second vaccination form rapidly, and are hurried forward in their course, so as to overtake the first crop, when the whole maturate and scab together. The secondary vesicles are thus necessarily much smaller than the primary. Mr. Bryce, in 1802, ingeniously proposed to avail himself of this law, with the view of ascertaining whether the system was under the full influence of vaccination. The plan, though it never received the sanction of Dr. Jenner, has nevertheless enjoyed great popularity, and is everywhere known by the name of *Bryce's test.* He recommends that the second application of the virus should take place on the evening of the fifth or morning of the sixth day, so that the new vesicles may have from thirty-six to forty-eight hours to grow, before constitutional or irritative fever is set up. Of late years this procedure has fallen comparatively into disuse. In cases where the primary vaccination proves unsatisfactory, it is now more usual to recommend a repetition of the operation at the interval of one, two, or three years, according to the extent of the apparent imperfection. I believe this to be a great improvement on the plan of Mr. Bryce.

When re-vaccination is practised at distant periods from the primary insertion of the virus, the arm very generally presents the appearances of modified cow pox—that is, the vesicles advance with abnormal rapidity. Areola forms around them on the fourth or fifth day. The resulting scabs are small, and fall off in a few days. Much itching accompanies the process.

The surgery of vaccination, simple as it may appear to you, has nevertheless been a fruitful theme of controversy. Differences of opinion have existed with respect

to the selection of lymph, the mode of making the incisions, and the number of incisions necessary to insure a full effect. Each of these points merits your attention.

1. One of the earliest and most important disputes which checquered the career of vaccination (inasmuch as it led to the secession of Jenner, in 1807, from the original Jennerian Institution) had reference to the mode of taking the lymph. Dr. Walker adopted the plan of detaching the epidermis from the vesicle, and vaccinating with the lymph (or fluid) which exuded from the abraded floor of the vesicle.* Jenner objected strongly to this, and employed only the superficial lymph. Dr. Walker persevered in his plan; and it is but fair to confess that his vaccinations have stood the test of time fully as well as those conducted according to the Jennerian method.

The proper time at which lymph may be taken so as to obtain it in the most efficient state for propagating the disease, has also been a subject of discussion. Some have objected to the employment of very early lymph, others have scruples in taking lymph after the first appearance of areola, and all parties have concurred in condemning the use of lymph taken on or after the tenth day. The facts bearing on this question are as follows. The younger the lymph is, the greater is its intensity. The lymph of a fifth-day vesicle, when it can be obtained, never fails. It is, however, equally powerful up to the eighth day, at which time it is also most abundant. After the formation of areola, the true specific matter of cow pox becomes mixed with variable propor-

* "Report from the Select Committee of the House of Commons on the Vaccine Board; 1833." Page 114.

tions of serum, the result of common inflammation, and diluted lymph is always less efficacious than the concentrated virus. After the tenth day, the lymph becomes mucilaginous, and scarcely fluid, in which state it is not at all to be depended on. Out of a dozen incisions made with such viscid lymph, not more than one will prove effective. The scabs of cow pox, ground to powder, and moistened with lukewarm water to the consistence of mucilage, will sometimes reproduce the disease in all its purity, a satisfactory proof that the alteration which the lymph undergoes in its progress to maturity is not of a specific kind, liable to influence the result of the subsequent vaccination, but simply dilution. Experiments with diluted lymph were formerly made by Dr. Adams, at the Small Pox Hospital, and have since been repeated in France by M. Bousquet, and it is ascertained that effective vaccination may be thus produced.

Cow-pox matter differs in intensity according to the source from which it has been obtained. Very pure lymph, of great intensity, will often prove efficacious when taken from the arm on the ninth, and even on the tenth days. Experience teaches, that all vesicles are not equally fitted to reproduce the disease in purity; but it requires a practised eye to detect these minutiæ. I may add, that irritable sores are often produced by draining the vesicle too much. Infantile lymph is more to be depended upon than the lymph obtained from adults. The matter of primary vaccinations is more energetic than that of secondary vaccinations. These statements may serve as a guide to you in the selection of lymph wherewith to vaccinate.

2. The second subject for our consideration is the mode of making the incisions, so as to ensure the best and most certain results. Failure in the operation is

always harassing to the friends, and is often made the pretext for delays dangerous to the child. Some surgeons use a sharp, others prefer a blunt lancet. Some consider it necessary to make the wound very superficial, others go deeper, and are careless whether much or little blood follows the incision. A few operators scarify the skin in numerous places, in preference to making incisions. I know very well that, provided the lymph be good, it matters little in what way the virus be applied, but the most uniformly successful mode is the following. Let the lancet be exceedingly sharp. It should penetrate the corion to a considerable depth. The notion that the subsequent effusion of blood will wash out the virus, and thus defeat our intention, is quite imaginary and groundless. Provided that a genuine lymph of due intensity has once come in contact with the absorbing surface of the cutis vera, the rest is immaterial. The vessels of the part have received the specific stimulus, and nothing can prevent the advance of the disorder but some constitutional cause. In making the incision, the skin should be held perfectly tense between the forefinger and thumb of the left hand. The lancet should be held in a slanting position, and the incision made from above downwards.

3. The number of incisions which it is requisite to make, in order to produce a full constitutional effect, has been always a disputed point. At an early period of vaccination, one vesicle was held to be sufficient. Then three, four, or six, were recommended. In Germany, great importance is attached to the raising of numerous vesicles, it being a received doctrine in that country, that unless some decided constitutional effect be produced, little reliance can be placed on the process as a security in after life. Common sense dictates that the greater the

number of vesicles, the greater will be the local inflammation, and on this theory the greater the probability of constitutional sympathy. Some of the German inoculators have been in the habit of raising from twenty to thirty vesicles in each subject. In forming a just judgment on this matter, the nature and quality of the lymph must always be taken into account. Lymph recently derived from the cow possesses so much intensity, and fixes itself with so much more of a poisonous character upon the skin of the arm than lymph long humanized or habituated to the human constitution, that a single incision made with it is equivalent to six or eight made with lymph of minor energy.

I would recommend that with lymph of ordinary intensity five vesicles should be raised, and that these should be at such distances from each other as not to become confluent in their advance to maturation.

Vaccine lymph should always be used in a fluid state, and direct from the arm, wherever practicable, for it is a very delicate secretion, and very slight changes in it are capable of materially altering its qualities. Lymph which has been retained fluid for four or five days, is very apt to occasion that irritable vesicle which I described to you as the most frequent of all the anomalous appearances. Dr. Gulliver has lately been occupied in attempts to discover, by means of the microscope, what is the exact change which vaccine lymph undergoes by keeping, and which gives to it this noxious quality. His observations have not hitherto yielded any decisive results, but enough has appeared to warrant further and more extended inquiries.

When lymph fresh from the arm cannot be obtained, other means must be had recourse to. Vaccine virus may be preserved fluid and effective for two or three

days in small bottles, with projecting ground stoppers, fitted to retain the matter. It may be preserved for a like time in small capillary tubes having a central bulb. This is the mode usually adopted in France for the transmission of vaccine lymph to the provinces, and which proves very effectual; but if you attempt in this manner to transmit lymph to the East or West Indies, you fail utterly.

You must all have seen what are called ivory points. These, when well armed and carefully dried, are very effective. They will retain their activity in this climate for many months, and they are found to be the most certain mode of sending lymph to our colonies. Some practitioners prefer glasses to points, but they are less certain. The employment of scabs for the propagation of cow pox was first recommended by Mr. Bryce, of Edinburgh, in 1802. It is a very excellent mode of transmitting vaccine matter to distant countries, but some nicety is required in operating with scabs, which experience alone can teach.

LECTURE XI.

PATHOLOGY AND RESULTS OF VACCINATION.

Theory of the identity of small pox and cow pox. Arguments in support of that theory. Inoculation of the cow with variolous matter. Variolo-vaccine and retro-vaccine lymph. Objections to the theory. Equine origin of cow pox. Doctrine of antagonism. Results of vaccination. Early views of Jenner concerning the permanency of vaccine influence. Notice of the variolous epidemics which have prevailed since the introduction of vaccination. Statistics of small pox as it occurs after vaccination. Number of cases. Ages of those attacked. Per centage of mortality. Actual amount of vaccine security. Suggestions for increasing it. Recurrence to the cow for lymph. Re-vaccination. Inefficacy of these measures.

AMONG the many subjects of curiosity which the theory of vaccination opens, the chief interest now attaches to the doctrine that small pox and cow pox are diseases of the same nature — not simply analogous diseases, but identical diseases. When a child is vaccinated, therefore, he has, according to the supporters of this, the *homophysic* theory, received small pox a first time. If the child happens to take the ordinary casual small pox in after life, he is, according to the same theory, undergoing a second or recurrent attack of small pox. It is a matter of considerable moment to determine on what grounds this opinion has been taken up, and to what objections it is fairly open.

Dr. Jenner through life adhered steadily to the notion which he had early imbibed, that cow pox and small pox were only modifications of each other. So strongly was this persuasion impressed upon him, that in his original essay he called cow pox *variolæ vaccinæ*. But he went even further. He entertained the idea, that cow pox was the original or parental form, which time and unfavourable circumstances had converted into the malignant variety of small pox. Jenner believed, therefore, that in giving to man cow pox, he was in reality giving to him small pox in its primitive and mildest form. Some of the followers of Jenner have adopted this fanciful notion.

Diseases that mutually produce each other are clearly referrible to a common origin. Thus swine pox and small pox are the same diseases; but cow pox and small pox are differently circumstanced. In man, no combination of circumstances, however unfavourable, has ever converted cow pox into small pox; and no care has ever succeeded in converting the small pox into the cow pox, although Dr. Adams flattered himself he had made approaches to that desirable consummation.

But Dr. Baron and others have attempted to prove the identity of the two disorders, by reference to the history of epizootic maladies, and the frequent concurrence of a lues bovilla, or distemper in cattle, with variolous epidemics. Epizootics have often attracted public attention. In 1746 an act was passed to suppress, by strong preventive measures, the distemper among horned cattle. The fine for non-compliance was ten pounds. In 1757, another more stringent act for the same purpose was passed, the penalty being raised to fifty pounds. In 1769, a severe and fatal distemper of this kind ravaged England, and was considered of

sufficient importance to form part of the speech with which King George the Third opened the parliament, January 9th, 1770. He recommends "this very important subject to the immediate consideration of parliament." Dr. Baron, in his "Life of Jenner," (chapter 7,) labours diligently to prove that this bovine disorder is allied in many of its features to small pox. "A beast," it is said, "having once had this sickness, naturally or by inoculation, never has it a second time."

A second argument brought forward to prove the common origin of small pox and cow pox, is deduced from the alleged fact, that matter taken from the cow labouring under the malignant epizootic has produced in man, by inoculation, small pox. The experiments performed in India, in 1833, by Messrs. Furnel and Brown, which appear to bear out this assertion, are open to many sources of fallacy.

It has further been argued, in support of the same theory, that we can, by making cows breathe an atmosphere impregnated with the matter of human small pox, infect them with a pustular disorder attended with fever, the pustules so developed in the cow assuming the characteristic appearances of cow pox, and being filled with a lymph exactly resembling that of the vaccine vesicle. These facts would be very decisive if they could be relied on, but no one in this country or in India has yet been able to verify them.

The pathologists who support the doctrine of identity have lately abandoned these views, and maintain that the principle is fully made out by the experiment of inoculating the cow with variolous matter. Such an attempt was first made by Gassner in 1807, and it was announced that the resulting vesicle yielded a lymph, which, transplanted into the human body, produced cow

pox. The subsequent experiments of Coleman, Sacco, Dr. Naylor, and of others made under my own eye at the Small Pox Hospital in 1828, threw a doubt over these statements, and they were generally discredited.

In 1839, Mr. Ceely, of Aylesbury, decided the question, by shewing, in a perfectly satisfactory manner, that by operating upon the mucous surfaces instead of the more insensible corion, the cow can be made with facility to receive the variolous poison, which the constitution of that animal converts into vaccine. These important experiments were instituted under the supervision of the Provincial Medical and Surgical Association, in whose Transactions (vols. viii. and ix.) they are detailed at great length. Into the details of these experiments it is unnecessary to enter. No doubt can be entertained concerning their correctness, which indeed the labours of some continental physicians, engaged nearly at the same time in the same pursuit, have abundantly corroborated. The lymph thus obtained has been called the variolo-vaccine, to distinguish it from that which is obtained from the idiopathic affection of the animal.

In 1836 M. Bousquet made a valuable addition to these facts, by proving that the cow will also receive the long humanized vaccine virus, and re-transmit it to man in a state of improved intensity. To this kind of lymph the name of *retro-vaccine* has been applied. These trials have been repeated at Aylesbury by Mr. Ceely, and the results of the French observers fully confirmed.

One effect of these experiments has been to refute Jenner's favourite notion, that the cow pox is the parent of small pox. So far as they go, they tend to shew that small pox is the primary, and cow pox the secondary disorder. But it may reasonably be asked, do these experiments warrant the conclusion, that cow pox and

small pox are identical? To me it appears that they do not. The disorders are allied (so are measles and scarlatina), but they are not therefore identical. The characters of the two are very different. Cow pox produces no eruption, no constitutional disturbance; it throws off no contagious emanations; it can be perpetuated from man to man in an uniform state of intensity; whereas the inoculation of small pox produces the disorder in varying shades of severity. The local characters of each malady are no less strikingly contrasted. The variolous action goes on to pustulation, to the *acumination* of the pustule, to sloughing of the corion, and implication of subjacent cellular membrane. The vesicle of cow pox never loses its umbilicated character; no purulent matter forms; the areola is circular, not irregular, like that of the inoculated small pox.

The facts regarding the origin of vaccinia, so far as they are yet known to us, are these. The morbid secretions from the cow, which possess the singular properties of transplantation to the human frame, and of producing there a like disease, which subsequently protects the human body from the assaults of small pox, may be produced in that animal in four modes:—

1. They are generated spontaneously in the cow, under certain circumstances of soil, season, and locality. Such diseased secretions are often met with on the teats of the cow soon after parturition, in the spring season of the year, and when the animal is feeding upon young grass. It was this form of the malady, arising idiopathically, which Jenner chiefly studied, and from which all his conclusions were derived.

2. The very same malady, developing the very same morbid secretion, is often observed to arise from contagion—that is, to originate in the application of the

diseased secretion, thus idiopathically developed, to the teats of healthy cows, differently circumstanced, by the hands of the milker. I have already told you, that vaccine lymph from the arm of a child will, in like manner, excite vaccine vesicles when applied to the teats, or the mucous surfaces of the cow, even though twenty years have elapsed since that lymph had been humanized, or assimilated to the human constitution.

3. A like morbid product, possessed of like properties, may be developed in the teats of the cow, by the application to them of matter taken from the diseased heels of the horse. Dr. Jenner was so deeply impressed with the importance of this principle in vaccine pathology, that he put it prominently forward in his very first paper, and even contended at that time, that the cow pox never appeared in cows, except when they had, directly or indirectly, access to horses. Dr. Jenner believed that this affection of the heel of the horse was that commonly called by farriers *the grease*. Attempts have been made of late years to throw discredit on this supposed origin of vaccinia. Some have doubted the facts altogether. Others, as Dr. Baron and Mr. Ceely, aver, that the affection is not the pure *grease*, but a disorder allied to it. The name of the disease is a point of little importance. The experiments of Dr. Loy, Dr. Sacco, and many others, have satisfactorily shewn that vaccine vesicles may be produced in the cow by *matter* originally supplied by the horse.

4. To these three modes, so long known, of exciting vaccinia in the cow, the labours of Mr. Ceely have now added a fourth. He has proved that the matter of human small pox will excite the vessels of the cow's teat or vaginal membrane to the production of a fluid or humour, identical in all its properties with that which

arises from febrile disturbance in the cow's system, from contagion, and from the matter of grease, or some allied disorder of the horse.

To conclude, however, from these experiments, that cow pox is small pox in a modified form, it should be shewn, 1st, that the febrile disturbance of the cow is of the nature of variola; and 2nd, that the affection of the horse's heel is also variolous. Dr. Baron and Mr. Ceely, sensible of this, have attempted to prove both these points, but, in my opinion, have signally failed in each instance. The variolous character of the equine affection appears to be entirely gratuitous, and I have elsewhere given my reasons for thinking that the lues bovilla is more nearly allied to scarlatina than to variola. In truth, it is neither the one nor the other, but an affection *sui generis*.

I would rather deduce from these experiments and observations, the conclusion at which Mr. Creaser, of Bath, arrived, in January, 1801*—viz., "that a morbid poison applied to different animals produces, not a similar and specific disease, but the disease to which the animal, from constitution and structure, is predisposed." Equine matter, long humanized vaccine lymph, variolous matter—each, when applied to the vessels of the cow, develops vaccinia. The constitution of the cow converts the variolous and the equine miasm into the vaccine miasm, in the same way as the vaccine fluid is secreted under several forms of feverish excitement.

Other facts might be mentioned which militate against the theory of identity. If, for instance, a child is inoculated for small pox some days after exposure to casual infection, the diseases, locally and constitutionally excited, coalesce, and unite in producing one effect on the body.

* "Creaser's Evidences of the Utility of Vaccine Inoculation. Bath, 1801." Page 10.

But if a child be *vaccinated* some days after exposure to variolous infection, the two diseases do not coalesce or hybridize. Each preserves its separate and specific character. In October, 1800, this actually happened at the Small Pox Hospital. A child, who had been exposed to the infection of small pox, was vaccinated. Both diseases advanced. A lancet charged with lymph from the vaccine vesicle produced cow pox. Another lancet charged with matter from a variolous pustule, *formed within the vaccine areola*, communicated small pox.*

On all these grounds I demur to the theory of identity, and hold that small pox and cow pox are antagonist affections—that cow pox, instead of being, as Dr. Baron maintains, of a variolous, is, in fact, of an *anti-variolous* nature—that it alters and modifies the human constitution so as to render some individuals wholly, others partially, and for a time, unsusceptible of small pox.

I have gone into this detail, because the doctrine of identity is now very generally received throughout this country, and I cannot but think it has been hastily adopted. The difficulties into which such a doctrine leads us will be made very manifest when we have investigated the facts regarding post-vaccine small pox.

When we were engaged in tracing the early history of vaccination, you must have been struck with the extraordinary contrast between the absolute scepticism concerning the prophylactic virtue of cow pox which prevailed before the publication of Jenner's first essay, and the unlimited confidence reposed in it, within two years afterwards, in all parts of the world. A calm and dispassionate examination of Jenner's first essay is cal-

* See case of the co-existence of variola and vaccinia, recorded by Dr. Woodville, in Med. and Phys. Journal, 1801; vol. v. p. 8.

culated to awaken some surprise at this sudden conversion of men's minds. The equine origin of cow pox which the work begins by promulgating, was mere theory, which time has since greatly modified. The identity of small pox and cow pox, also put prominently forward, was at that time a doctrine unsupported by any direct experiments. The cases of successful result which the work recorded were few in number, (twenty-three in all—viz., sixteen of the casual, and seven of the inoculated disease,) and the doctrine of permanent security was deduced from *casual* cases alone. It is singular that in this first essay no mention is made of any instances in which the cow pox failed to afford protection in after life, though, as I stated to you, such occurrences had frequently been pressed upon Jenner's attention. It was not until the year 1800, and in his third publication, that any allusion to them is to be found. It ran in these words—"Some there are who suppose that the security from the small pox obtained through the cow pox will be of a temporary nature only. This supposition is refuted, not only by analogy with the habits of diseases of a similar nature, but by incontrovertible facts, which appear in great numbers against it."* In his original essay, Dr. Jenner does not propose the abandonment of inoculation, nor does he allude to the possible extermination of small pox by the general adoption of vaccination, but he suggests the probability of its usefulness to four classes of persons:—1. to those who from family predisposition may be presumed liable to take small pox severely; 2. to those constitutionally predisposed to scrofula; 3. to those who from peculiarity of habit resist small pox inoculation in after life; 4. to those

* "Continuation of Facts and Observations, by Dr. Jenner. 1800."

who may labour under some chronic ailment in which counter-irritation is desirable. I have shewn you that it was an individual belonging to this fourth class, who was selected by Mr. Cline at this hospital, as the subject of the first experiment in London.

It was not long before Jenner threw off that reserve with respect to the powers of cow pox manifested in his first publication. He confidently stated that the security afforded by cow pox was as complete and as permanent as that afforded by once undergoing the disease; and in May, 1801, within three years from the first announcement of his discovery, he writes thus:—"It is now too manifest to admit of controversy, that the annihilation of small pox, the most dreadful scourge of the human species, must be the final result of this practice." The popular voice went fully with Dr. Jenner in these pleasing, but illusory anticipations. After ten years of almost uninterrupted prosperity, however, the course of vaccination began to be slightly clouded. In the year 1809, Mr. Brown, of Musselburgh, published an inquiry into the anti-variolous power of vaccination, in which he broached the opinion, that its virtue diminished as the distance from the period of vaccination increased. His statements, however, were vague, and made no impression upon the public mind.

In the year 1818-19, an epidemic small pox pervaded Scotland, the first that had occurred in these countries since the great epidemic of 1796. During this epidemic, many vaccinated persons passed through a mild form of small pox. About this period the term *modified* small pox was introduced, and generally adopted. Dr. Monro, of Edinburgh, and Dr. Thomson, detailed the chief events of these epidemics, and though much discus-

sion arose, the general confidence in vaccination was in no degree shaken. In 1824, small pox prevailed epidemically in Sweden, and attacked a considerable number of vaccinated persons. In 1825, this epidemic visited London, a great increase in the deaths by small pox appeared in the bills of mortality, and many persons vaccinated in early life took the disease. In 1826-27, France suffered from an extension of the same epidemic, which fell with great severity on the population of Marseilles. Many vaccinated persons went through the modified disease. In 1829, the same epidemy invaded the north of Italy, and was particularly severe at Turin. In the same year, the governments of Germany, who had always encouraged and even enforced vaccination, seeing the steady advance of the disease towards them, took alarm; and then began that practice of RE-VACCINATION which has formed so striking a feature in the medical history of the German states for the last twelve years. It commenced in the royal armies of Wirtemberg. Then succeeded the re-vaccination of the Prussian, Danish, and Baden armies.

In 1835 the government of Wirtemberg, satisfied with the results of the military trials, extended the plan, and ordered the re-vaccination of the entire civil population of the kingdom.

Ceylon was the British colony where the government earliest interfered and most rigorously encouraged the practice of vaccination. Salaried vaccinators were scattered over the whole island. So successful were their labours, that up to the beginning of 1819 it had often been said that the experiment of exterminating small pox had been made and successfully carried out in Ceylon. In July, 1819, however, a severe epidemic small

pox broke out there. In 1830 a second epidemic overspread the island—in 1833 a third, and in 1836 a fourth. In these four epidemics, 12,557 persons were attacked, of whom 4090 died, being at the rate of thirty-three per cent., or one out of every three.

In each of these epidemics a certain number of vaccinated persons took small pox. The proportion of the vaccinated to the unprotected varied. In the third epidemic, out of a total of 460 attacked, 341 represented themselves as vaccinated.

Denmark has undergone several visitations of epidemic small pox; yet in no country in Europe has more attention been paid to the practice of vaccination, both as respects the numbers submitted to the process, and the purity of the lymph employed.

The first was in 1824, the second in 1826, the third in 1829. Copenhagen suffered also in the years 1833 and 1835.

England experienced the second epidemic visitation of this century in the year 1838, and again many vaccinated persons (or persons believing themselves to have been vaccinated, and trusting to it as their security) suffered attacks of the prevailing malady.

This epidemic commenced in the summer of 1837, and did not finally terminate till December, 1839. The total deaths throughout England and Wales during that period (two years and a half) by small pox, amounted to 30,819, or an average of 12,200 deaths per annum. Calculating that the rate of mortality ruled about twenty or twenty-five per cent., it follows that in those thirty months there occurred in England and Wales not fewer than one hundred and fifty-four thousand cases of small pox.

After this imperfect sketch of the reappearance of small pox both in Europe and Asia, since the lull which succeeded the first introduction of vaccination, I shall proceed to state to you the results which statistical researches have given, as to the relative numbers and ages of the vaccinated who have been attacked by small pox, and the ratio at which small pox succeeding to vaccination has proved fatal in this and other countries.

I shall begin by stating the results of the experience at the Small Pox Hospital, and shall then contrast them with the recorded experience of other countries, and other establishments.

The following table was presented by me to a committee of the House of Commons which sat, in 1832, to consider the expediency of continuing the Vaccine Board.

Table exhibiting the Admissions and Deaths at the Small Pox Hospital in the Seven Years from 1826 *to* 1832 *inclusive.*

YEARS.	Total Number treated at the Hospital.		Numbers having the Small Pox at variable periods after Vaccination.	
	Admissions.	Deaths.	Admissions.	Deaths.
1826	168	52	63	4
1827	305	85	105	1
1828	202	67	71	3
1829	328	103	109	7
1830	259	76	84	7
1831	193	53	66	6
1832	330	98	121	12
Total . .	1785	534	619	40

With this we may compare the results of the succeed-

ing seven years at the Small Pox Hospital, which will be seen in the following table:—

Table exhibiting the Admissions and Deaths at the Small Pox Hospital in the Seven Years from 1833 *to* 1839 *inclusive.*

YEARS.	Total Number treated at the Hospital.		Numbers having the Small Pox at variable periods after Vaccination.	
	Admissions.	Deaths.	Admissions.	Deaths.
1833	242	50	89	4
1834	165	23	63	3
1835	401	89	144	7
1836	329	84	128	10
1837	251	46	95	1
1838	712	188	298	31
1839	155	27	83	4
Total . .	2255	507	900	60

One of the most interesting documents which I have obtained, bearing upon the subjects now under consideration, is the following, which exhibits the amount and character of the cases of variola succeeding vaccination which occurred in the British army, on home service, during the five years, from 1834 to 1838 inclusive. I must premise that the strength of the army during that period was very uniform, averaging about 43,500 men. The regulations of the army require, and the careful superintendence of the medical officers ensures, that every individual of that force (not having previously undergone small pox) had been *effectively* vaccinated. There is here, therefore, no room for dispute as to the reality of the alleged prior vaccination—a difficulty which meets us in almost every other case.

Abstract of the Cases of Small Pox succeeding Vaccination, which occurred in the British Army on Home Service, from 1834 *to* 1838, (*inclusive.*)

YEAR.	Variola Discreta.		Variola Confluens.		Variola Modificata.		TOTAL.	
	Admitted	Died.	Admitted	Died.	Admitted	Died.	Admitted	Died.
1834	12	1	9	4	17	0	38	5
1835	4	0	17	1	34	1	55	2
1836	33	0	62	7	29	0	98	7
1837	31	1	36	24	67	0	160	25
1838	49	3	84	26	104	0	237	29
Total	129	5	208	62	251	1	588	68

The next table shews the modifying effects of vaccination whenever the variolous miasm spreads epidemically in a population extensively vaccinated. Such is the population of Copenhagen.

Table exhibiting the Amount and Mortality by Small Pox, in the well-vaccinated population of Copenhagen, from 1824 *to* 1835.

	Period occupied by each Epidemic.	Total attacked	Total Deaths	After Vaccination.	
				Total attacked	Total died.
1st Epidemic	Jan. 22, 1824 to Feb. 28, 1825	412	40	257	3
2nd ditto	Sept. 1825 to Augt. 1826	623	39	438	2
3rd ditto	March 1828 to July 1830	562	28	457	4
4th ditto	Augt. 1832 to Dec. 1834	1045	45	898	10
5th ditto	May 15 to Dec. 31, 1835 ...	1197	106	1043	47
	Total.....	3839	258	3093	66

These statements and tables are amply sufficient to shew how large a proportion of those who, in Europe at the present time, contract small pox, have undergone vaccination in early life. They cannot be perused without the

conviction, that some material error had crept into the views originally entertained regarding the power and capabilities of the vaccine inoculation. If small pox can invade so large a proportion of a well-vaccinated population, as the last table exhibits, it is obvious, that all idea of banishing that disease from the earth is vain and illusory. It is equally manifest, that any attempt to institute a parallel between cases of small pox after vaccination, and cases of secondary or recurrent small pox, must fail. The most credulous on this point may search far and wide before he finds any counterpart to the facts which the five Danish epidemics display.

The interval between the primary vaccination and the attack of small pox fluctuated in most of the preceding instances between seven and thirty years. By far the larger proportion of the cases consisted of adults in the vigour of life. The following table exhibits the ages of those who were admitted into the Small Pox Hospital, having small pox after vaccination, during the epidemic of 1838.

Ages of those admitted into the Small Pox Hospital in 1838, *having Small Pox after Vaccination.*

AGES.	Admissions	Deaths.
Under 5 years of age	0	0
From 5 to 9 inclusive	5	0
— 10 to 14	25	0
— 15 to 19	90	6
— 20 to 24	106	16
— 25 to 30	55	8
— 31 to 35	13	1
Above 35 years of age	4	0
Total	298	31

From this it will be seen that between the ages of

twenty and twenty-five, the disposition in the vaccinated to take small pox is at its maximum.

We may compare these results with those derived from the experience of Continental physicians. The writings of Dr. Heim, of Ludwigsburg, and Dr. Möhl, of Copenhagen, furnish us with the required details.

Table exhibiting the relative Ages of Persons attacked by Small Pox after Vaccination in Wirtemberg and Denmark.

AGES.	Wirtemberg. Dr. Heim.	Denmark. Dr. Mohl.
Between 1 and 5 years, inclusive,	40	14
— 6 and 10.....	68	102
— 11 and 15.....	186	173
— 16 and 20.....	275	187
— 21 and 25.....	239	156
— 26 and 30.....	172	19
— 31 and 35.....	75	2
Total.....	1055	653

These tables correspond so closely with each other, and with the experience of the Small Pox Hospital already given, that you may rest assured they indicate some law of the animal economy. In each instance, you perceive, the maximum of cases occurs at the period which immediately follows puberty. It is therefore rendered more than probable that some modification of the system takes place at that eventful epoch of human life which lessens the protective power that vaccination had previously exerted. I have already made you acquainted with the fact, that in very early times an impression prevailed that the protective power of cow pox did deteriorate in the course of time, and that Jenner was very unwilling to give credit to it. It is a matter of general notoriety that small pox is very seldom taken by vac-

cinated children who are under the age of eight years. In the course of a long experience at the Small Pox Hospital, I have never seen more than three or four instances of such an occurrence. The protective power of cow pox may therefore, for all practical purposes, be considered as *complete* for that period; but we are compelled to confess that later in life it diminishes in a certain proportion of cases. What the *exact* proportion is, never has been ascertained, and, for very obvious reasons, never can be known or even guessed at.

But though this be impossible, there seems no reason why we should not attempt to ascertain the laws which affect and limit the resistance to the variolous virus which cow pox displays in so many instances, and so remarkably in infantile life. I have mentioned puberty as a disturbing cause. I have no doubt that others exist, of equal, perhaps of superior efficacy. Among them may be mentioned change of climate, which appears to have a very marked influence, sufficient to induce us to recommend the re-vaccination of all young people going to or returning from India. A severe fever, in like manner, may so alter and modify the general mass of fluids as to open a door to the variolous effluvium. Importance should be attached also to the epidemic constitution of the season. It is certain that persons who under common circumstances have, through the agency of the cow pox, resisted the variolous miasm, succumb to it under epidemic visitation. To pursue these speculations would lead us out of our course. I recommend them, however, to your future study, from a firm conviction that a knowledge of the laws which *limit* the powers of cow pox will improve pathology far more than a blind adherence to the doctrine of its unvarying prophylactic virtue.

The preceding tables, while they certainly countenance

the notion of diminished vaccine energy through the medium of those changes which time effects in the frame, prove at the same time, most incontestably, that a portion of virtue still clings, sufficient to preserve life, though not to exhaust susceptibility. To determine with accuracy the average ratio of mortality which obtains when small pox invades those who have been well vaccinated, is a point which the statistical records of the last twenty years teach us with considerable precision. You will remember that small pox in former times, (and among the unprotected in recent times) proved fatal at the rate of twenty-five, or from that to thirty-three per cent. (one out of four, or one out of three.) The following table, compiled from various sources, will shew how great is the diminution in the ordinary rate of mortality by small pox when vaccination has preceded. It will be seen that the average rate is then five and a half per cent., the maximum being thirteen and the minimum two.

Table shewing the Rate of Mortality by Small Pox after Vaccination at different periods and in different parts of the world.

LOCALITY.		Number of Cases.	Deaths.	Rate of Mortality per cent.
Small Pox Hospital, London,	1826 to 1832	619	40	7
Ditto	1833 to 1839	900	60	7
Ditto	1840 to 1842	333	22	7
Total at ditto	1826 to 1842	1852	122	7
British Army	1834 to 1838	588	68	12
Copenhagen.....	1824 to 1835	3093	66	2
Wirtemberg	1831 to 1836	1055	75	7
Vienna.....	1834	200	16	8
Ceylon, Epidemic of	1830	260	34	13
Ditto	1833 to 1834	341	23	7
	Total.....	7389	404	$5\frac{1}{2}$

The result of these statistical investigations may be stated to you in a few words. Small pox in the unvaccinated is five times more fatal than it is to those who have previously undergone vaccination. The following table, carefully drawn up from the records of the Small Pox Hospital for the year 1841, shews you how this is effected. It is an analysis of the several cases admitted in that year, having small pox after vaccination. It will be seen that nearly two-thirds of the cases (or 60 per cent.) receive the disease in a modified form. The remainder (40 per cent.) receive it in a normal form, but in variable degrees of intensity, the mortality among *them* following the ordinary law.

Analysis of 151 *cases of Small Pox succeeding Vaccination, which occurred at the Small Pox Hospital in* 1841.

			Admissions.	Deaths.
Normal..... ..	56	Confluent.....	25	8
		Semi-confluent	19	0
		Distinct, regular	12	1
Abnormal, or modified	95	Confluent modified	18	0
		Semi-confluent modified	19	1
		Varicelloid, or distinct modified.....	58	0
		Total.....	151	10

I am myself firmly persuaded that we must rest satisfied with the amount of protection that vaccination actually affords; that, though shorn of some of its splendour, it is still an inestimable blessing; and that no additional precautions on the part of vaccinators, and no alteration in the kind of lymph employed, will have the slightest effect on the general results. But the world are not so easily persuaded to rest upon their oars. A rest-

lessness in regard to the amount of vaccine protection has been perceptible throughout Europe for many years, and two expedients have been largely practised, with the view of increasing the security of the vaccinated. One of these is the employment of lymph recently derived from the cow; the other is re-vaccination. A few observations on each of these topics will conclude my account of cow pox.

An impression that vaccine virus decays in power, in proportion to the number of times that it makes the circuit of the human body, has long prevailed. In all parts of the Continent, and recently in England also, it has led to the frequent trials of lymph *fresh from the cow*. Jenner did not object to occasional renewals of the stock of lymph, but it does not appear that he ever acknowledged deterioration of the virus by use as a common occurrence, or as a source of failure. In 1829, the invasion of epidemic small pox induced the Sardinian government to try a variety of new stocks of lymph. We are informed by Dr. Griva, chief of the vaccine establishment at Turin, that no perceptible difference was to be traced between the aspect and progress of the old and of the new lymph. In Wirtemberg, between 1831 and 1836, forty new varieties of lymph were tried, but without any obvious advantages. In other parts of Germany, the same trials were made. In France, a new variety of lymph, obtained from the dairies of Passy, near Paris, was brought into use by M. Bousquet in 1836, and it certainly proved much more energetic in its *primary* effects than that which had previously been employed. About the same period, we changed our stock of lymph at the Small Pox Hospital, and with decided advantage. There are occasions, therefore, when I should be disposed to recommend the measure, but it is not lightly to be

resorted to. Heim calculates that three-fourths of the inoculations made with lymph direct from the cow fail altogether of effect. When they do take effect, it often happens that severe local inflammation is excited, producing irritable sores and glandular swellings. Nor are we at all sure that the ultimate effect, the security of the patient in after life, will be sensibly augmented.

And now as touching re-vaccination. It is believed by many that vaccine protection may be renewed, as we renew the lease of a house, every seven, fourteen, and twenty-one years. By the physicians of Germany, re-vaccination has been held up as a measure scarcely less important in its effects, nor less widely applicable, than primary vaccination. In France, on the other hand, the repetition of the vaccine process has been disparaged. A commission, expressly nominated to investigate the matter, comprising some of the most talented men in Paris, reported against re-vaccination.

The question is not easily decided for want of data, which, in the very nature of things, can never be supplied so as to ensure a satisfactory result. Happily, there is no occasion to press the cause to judgment. The operation, except in a few rare instances, is productive only of slight and temporary inconvenience. It may be safely recommended, even though we may reasonably question how far it adds anything material to the security of the vaccinated.

LECTURE XII.

VARICELLOID, HERPETIC, AND MILIARY ERUPTION.

Early history of varicella, or chicken pox. Detail of its symptoms, and progress of the eruption. Question of its identity with variola considered. Diagnostic characters of varicella vera and of variola varicelloides. Question of the inoculation of chicken pox considered. Of herpes. Characters of herpetic eruption. Varieties of herpetic eruption. Herpes zoster, circinatus, labialis, iris. Sources of herpes. Treatment. Miliaria. Early history of miliary fever and eruption. Appearances of miliary eruption. Causes of miliary eruption. Theory of miliary eruption. Treatment.

VARICELLA.

THE very mildest form in which disease ever shews itself, involving neither risk to life nor any consequences of serious import, is the complaint known familiarly by the name of chicken pox, and to systematic writers by that of varicella. Some might consider it unworthy of occupying attention in a course of lectures where there is hardly time for investigating fully the more serious disorders of the body. But something may be learned from the study of nature under all her aspects, the mildest as well as the gravest, and we shall find varicella to afford some lessons of practical utility.

From the earliest periods at which small pox was noticed, physicians have remarked a mild form of eruption, resembling it in some respects. Rhazes describes a mild or spurious eruption which gave no protection against small pox when it occurred epidemically; doubtless, this was varicella.

The first acknowledged author on varicella is Ingrassias, a Sicilian physician, who, in 1553, published at Naples a work entitled, "De Tumoribus contra Naturam,"—"On Preternatural Swellings,"—in which he gives a very distinct sketch of varicelloid eruption. He was followed, about forty years afterwards, by Vidus Vidius, an anatomist and physician, who wrote an "Ars Medicinalis," in which he gives an improved version of Ingrassias. He describes varicella under the title of a third species of small pox, the two first being variola vera, and rubeola. To this he gives the name of chrystalli, or variolæ chrystallinæ, by which name it was long known. By the Italians it was early called ravaglione. Sydenham passes it over without notice. Riverius, in 1646, describes it accurately.* Morton, still later in the century, mentions this disorder under the title of variolæ admodum benignæ, and states that it was vulgarly known in this country by the name of CHICKEN POX. This is the first mention I can find of the term chicken pox, (1694.) In the ex-

* The description of Riverius is so terse and accurate, that I am tempted to give it in his own words:—"Est et tertium pustularum genus, pueris familiare et variolis simile quoad magnitudinem et figuram; sed in eo ab iis distinguitur quod variolæ cum rubore et inflammatione appareant. Hæ vero albæ sunt et veluti vesiculæ seroso humore repletæ, quæ intra triduum disrumpuntur et exsiccantur, nullumque solent afferre periculum, et plerumque sine febri erumpunt. Id pustularum genus a nostratibus fœminis *la verolette* nominari solet."

pressions, chicken pox, swine pox, and cow pox, popularly applied to three varieties of mild eruptive ailment in man, it is curious to trace the latent doctrine of animal miasm. Morton and all the authors of that period concurred in considering chicken pox as the mildest possible form of small pox.

Nothing worthy of observation concerning varicella occurs in medical history until the year 1767, when Dr. Heberden, in the first volume of the Transactions published by the Royal College of Physicians of London, entered fully into the theory and diagnosis of varicella. He adopted the notion, hitherto unavowed by any medical author, that variola and varicella are different diseases. He brings forward very strong arguments in favour of this doctrine. His paper is long, and apparently drawn up with great care and attention. But Heberden falls into many errors, and was obviously ignorant of some essential facts bearing upon the pathology of varicella. He merits our applause, however, for having first distinguished varicella as the offspring of a specific poison. The strange thing is that, with this impression so strong on his mind, he should still have called the disease *variolæ pusillæ*. It had been named varicella three years before, by Vogel, in Germany. The term varicella does not occur in Sauvage's "Nosology," published in 1768. His synomyms are "water pock, petite verole volante, verolette, variolæ lymphaticæ, variolæ volaticæ." We may be sure from this that the term varicella did not come into general use until after 1770.

Heberden's memoir on chicken pox was long considered as the standard work on the disease. The principal authors on varicella in the present century are, Frank, of Vienna, who wrote on it in 1805, under the title of Pemphigus Variolodes Vesiculosus; Willan, in

1806, who has a chapter devoted to varicella in his work on "Vaccine Inoculation;" Dr. Heim, of Berlin, 1809, a notice of whose work is to be found in Cross's "Account of the Variolous Epidemic of Norwich;" Dr. Mohl, of Copenhagen, (1817,) whose treatise is entitled "De Varioloidibus et Varicellis;" and lastly, Dr. Thomson, of Edinburgh, who wrote on it in 1820, and revived the exploded doctrine of its identity with small pox.

And now I must give you a brief description of this disease, the true, vesicular, lymphatic varicella—the bastard, flying, lymphatic, crystaline, or imperfect variola of some authors. The definition of varicella is as follows:—"A slight disorder, the offspring of a specific miasm, which, without initiatory fever, throws out an eruption of confluent vesicles, which maturate in three days, and desiccate into granular scabs, which speedily fall off. Little or no fever accompanies the maturative stage, and no secondary fever follows. The disorder chiefly prevails among children, and occurs but once in life."

Varicella has a very short incubation, not exceeding, as I believe, four days, certainly less than a week. Dr. Heberden, in his Commentaries, mentions the case of a lady whose two boys had varicella. On the eighth or ninth day from the maturity of the vesicles, the mother sickened for the same malady. He then inquires whether this is the usual period of incubation? This incubative period is always, so far as I have seen, *silent*, and so say Heberden, Plenck, and Bryce; but Dr. Willan, who is entitled to attention, says there are often present, for one, two, or three days prior to the eruption of varicella, languor, somnolency, a furred tongue, a hot skin, a quick pulse, with some sore throat and rheumatic pains.

I cannot reconcile these statements of Willan with the results of my own experience.

The first thing I ever observe in varicella is the eruption of vesicles, of the size of a split pea, being simple elevations of the cuticle, or minute blisters, presenting the appearance of the skin having been exposed to a shower of boiling water. The parts chiefly occupied by eruption are the back and scalp. The vesicles vary in shape. Dr. Willan, who loved minuteness, wishes to distinguish three kinds—the lenticular, conoidal, and globate. I cannot see these distinctions myself, and therefore I will not attempt to teach them to you. The vesicles are surrounded by a superficial and narrow areola. They appear in successive crops for two or three days. While the new vesicles are forming, the old ones shrivel and dry up.

On puncturing the vesicles, a clear lymph, scarcely at all mucilaginous, escapes, and the cuticle falls to the level of the surrounding skin. There is no tumour, no varus. If the vesicles remain unbroken for twenty-four hours, the contained fluid becomes slightly opaque. They are very itchy, and when rubbed, a degree of superficial inflammation may succeed, sufficient to convert the lymph into an imperfect pus. The scabs of varicella are very small, and as the lymph wants a mucilaginous quality, they are granular. The desiccation is very rapid, and in six days the complaint completes the whole circle of its phases.

No constitutional symptoms of any importance are present. Generally, the tongue is clean, and the pulse unaffected. The aspect of countenance betrays neither languor nor feverishness. The appetite is good and the sleep undisturbed. The complaint often shews itself in

schools, and runs through all the young members of a family. It is manifestly both contagious and epidemic.

Now, can this be a form of variola? Observe the marked differences between the two disorders. Varicella has not the incubative period of variola. It has not the character of variolous eruption. Children take it almost exclusively. I do not say that adults never take it. I have seen a few adult females attacked by it, but it is a rare occurrence. This is not like variola. But far and above all, it is taken indiscriminately by those who have and those who have not been vaccinated. Its course is not in the slightest degree altered by previously undergoing vaccination. It is now nearly always taken *after* vaccination. Whether it was taken equally after inoculation of small pox I cannot tell you from my own experience, but I have the authority of Sir Henry Halford for saying that it was; and there are few physicians now besides himself who can be appealed to on such a point. These general considerations are of themselves sufficient to decide the question of non-identity.

But if we examine the subject still more closely, we find that the organization of the varicelloid vesicle bears no relation to that of variola. Here there is no umbilication, no central depression, no division into cells, no slough. There is simply partial elevations of cuticle, of irregular and undetermined arrangement. Here we see no groupings into threes and fives, no crescentic or circular figures formed. Everything in varicella is hurried forward—the incubation, the eruption, the desiccation.

These things seem so clear, that you may naturally be tempted to ask—how did the notion of identity ever originate? A reply to this question will lead us still

further into the consideration of diagnosis and general pathology. There is a disease which resembles varicella in its mildness, which really does arise from the variolous poison; and physicians, in former times, looking only to the general, and neglecting the minute anatomical characters of the eruption, have thought proper to confound the two diseases. By way of distinction, we will call the one varicella vera; the other, variola varicelloides. I do not say that mistakes can always be avoided. During the past year (1842), a child was admitted into the Small Pox Hospital, having the incubative symptoms of variola, and the local symptoms of varicella. I remain doubtful about this case. Nothing but inoculation with small pox could clear up the difficulty. In most cases, however, the diagnosis is clear enough. Let me enumerate the chief features of each complaint.

In the true lymphatic varicella there is no premonitory fever. In the variola varicelloides there are at least forty-eight hours of preceding febrile disturbance. In the varicella vera there are no hard vari or tubercles. In the varicelloid form of variola, tuberculous elevations of the skin are distinctly perceptible. In the vesicles of the one there are no central depressions; in the other, central depressions can always be traced, either by the naked eye or by the microscope. In the true varicella the crusts are granular, and quickly fall off. In the variola varicelloides, the lymph being mucilaginous, the crusts are firm, adherent, and drop off, *en masse*, at the end of six or eight days. Authors have described pits as having succeeded true varicellous eruption, but the occurrence is very rare. I have never seen any case where the inflammation ran so high as to admit of such a result.

Hitherto I have not touched upon a question which you might naturally suppose would at once settle the

dispute—I mean, the question of inoculation. Can varicella be communicated in this manner? The question is more easily put than answered. Dr. Heberden blinks it. He does not say he ever saw inoculation performed with the lymph of varicella, or rather serum (for it is nothing else), but he says that mistakes have been made in such inoculations, implying that the disease is propagable in that mode.

Dr. Willan entertained the belief that varicella was so communicable; but his experiments are few, and, to my mind, very unsatisfactory. I need not state them to you, because, since his time, Mr. Bryce of Edinburgh has set the question at rest. He states* that he has inoculated with the fluid of varicella vera, at all periods of the disease, and at all seasons of the year, children who had never undergone either small pox or cow pox, and yet that he had never been successful in producing from it either variola or varicella. Since the date of Bryce's experiments (1816) I know of none on the inoculation of varicella.

What, then, are the arguments which can be brought forward in support of the doctrine of identity. There must be some, seeing that up to the date 1767, certainly for 1000 years since the disorder was known, physicians adopted that notion, which has even been revived in our own times.

Dr. Thomson's great arguments are these:—1. Varicella prevails when variola prevails, and never without. Hence, says he, we may deduce the probability that one contagion is operating, not two. The answer to this argument is, that the facts are incorrectly stated. Varicella frequently prevails without variola. Dr. Mohl has

* See "Thomson on Varioloid Diseases," page 74.

shewn this most satisfactorily from the experience of the Copenhagen epidemics. From 1809 to 1823, chicken pox was annually observed at Copenhagen without accompanying variola. Since 1823 both diseases have prevailed epidemically, but the physicians could always trace their sources, and this convinced them that the generating miasms were distinct.

Besides, the doctrine goes for nothing if it can be shewn, as has been shewn over and over again, that some children take varicella after cow pock, and others cow pock after varicella, while some have cow pock and varicella going through their phases at the same time. I have published the details of a case of this kind which occurred to me in 1827.*

Dr. Thomson's next argument is, that he had never witnessed chicken pox in those who had undergone small pox. I cannot undertake to meet this objection, because I see so few children who have undergone variola; and chicken pox is a disease of infantile life. I strongly suspect, however, that here also the facts are imperfectly known. All I can assure you is, that at the Small Pox Hospital no difficulties in diagnosis are acknowledged, save in a few rare cases.

It cannot be doubted for one moment, after reading the details of this controversy in the works of Dr. Thomson and elsewhere, that a very large proportion of the cases of alleged secondary or recurrent small pox are really cases of genuine lymphatic varicella mistaken for small pox.

The treatment of varicella demands no comment. A little manna and magnesia, with abstinence from animal food for a few days, comprise all that is essential.

* See "London Medical Gazette," vol. ii. page 633.

HERPES.

This disorder may be thus defined:—

"An exanthema originating from obscure internal causes, and not propagating itself by contagion; characterized by partial clusters of phlyctenæ or vesicles, which are surrounded by areola; preceded and accompanied by fever, passing through a regular course of increase, maturation, and decline, and terminating within a fortnight by small scabs."

Such a disorder was well known to the ancient Greek and Roman physicians. The term herpes is derived from the Greek ἕρπω, to creep. The phlyctenæ which characterize it derive their name from the Greek φλυκταινα, a blister; or φλυω, to bubble up. The best modern authors on herpes are, Dr. Willan, Dr. Bateman, and Dr. A. T. Thomson, whose essay you will find in the "Cyclopædia of Practical Medicine."

Nosologists have delighted to form species of herpes. Five or six have been so enumerated. I shall be compelled to instruct you in their names, but you will bear in mind that there is nothing pathologically important in these subdivisions. They display merely the ingenuity of the nosologist. The leading variety of herpes is that called zoster, (from the Greek ζωστηρ, a belt, or ζωννυμι, to girdle.) By the vulgar in this country the disease is familiarly called the shingles—a corruption from the Latin *cingulum*, a girdle. These denominations it receives from the peculiar seat of the herpetic disorder, the waist, or rather, a circular line around the belly, commencing at the navel. I know of no other disorder which specially affects this portion of the human body. All other cutaneous affections appear on the face, the arms, the lower extremities, the scalp, the

back, the chest. Herpes zoster alone fixes on the belly.

1. The eruption of herpes is preceded for several days, sometimes for a week, by symptoms of general constitutional disturbance, occasionally aggravated into fever. Languor, low spirits, a succession of bad nights, a failing appetite, and weakness of the limbs, betoken some lurking disorder. Rigors and flushes, with a white tongue, are sometimes superadded, but the febrile symptoms, so far as my observations extend, never attain any considerable height.

At length the eruption shews itself, and very frequently the precise spot will be indicated by a previous sensation of heat and itching, sometimes amounting to actual pain. I have seen some cases with so little preceding constitutional disturbance, that the patient has been startled by finding the abdomen occupied by eruption. Inflammation first shews itself by the side of the navel, followed by the rapid formation of vesicles in clusters. These spread round the belly, generally (but not invariably) from right to left; and a vulgar prejudice teaches, that if they extend entirely round the body the patient dies. This may be said very safely, for such an event is scarcely ever witnessed. The eruption seldom extends more than half round the body. A perpendicular position of the clusters is very rare. Rayer tells us, he once saw this arrangement on the thigh, but on the trunk of the body it is unknown.

Herpetic vesicles are about the size of a pea. The areola surrounding them, which forms very early, is often considerable. They attain their maximum of development in three, or at furthest, in four days. The contained fluid is at first perfectly limpid, but before desiccation, becomes opaque or semipurulent. Dark-coloured

scabs succeed, which harden and fall off in the course of a week or ten days, during which time the skin cicatrizes. A certain amount of feverishness accompanies the maturation of the herpetic vesicles. Some relief to the constitutional depression is afforded by the development of eruption.

2. Having thus made you acquainted with the features of the chief form of herpes, I will briefly allude to the other varieties of this affection. Clusters of herpetic vesicles running the same course with that now described sometimes appear on the chest, and extend across the shoulder, in the usual direction of a sword belt. Herpetic vesicles sometimes appear on the arms, shoulders, neck, temples, and groin, assuming an oval, or sometimes a decidedly circular shape. These are called herpetic ringworms. Sometimes there shall be one such, sometimes many. To this variety of herpes the term *circinatus* is applied. This form of herpes is seldom accompanied by any cognizable constitutional disturbance. The vesicles are very small, and they include a portion of unaffected skin. The complaint, if so it may be called, runs its course in eight or ten days, but successive crops of vesicular rings may procrastinate recovery. Though called a ringworm, you will remember that this affection is not contagious, like the true ringworm of the scalp (porrigo scutulata.)

3. The term herpes iris has been appropriated to those forms of herpetic vesicles which form on the back of the hand, and are characterized by the phenomenon of concentric circles of vesicles of different colours, corresponding to the period of inflammation in each successive crop. Their form is generally oval. The iritic form of herpes may display itself on other parts, but always where the skin is near the bone.

4. The fourth variety of herpes is the herpes labialis. Here the seat of eruption is the upper lip. I have seen it extend round the whole mouth, accompanied by such tumefaction that speaking and swallowing were exceedingly painful. The variety of herpes termed præputialis belongs to surgery.

The sources of herpetic fever and eruption are now to be considered. This complaint invariably has its origin in irregularity of one or more of the non-naturals, which you will recollect to be, air, aliment, the secretions—sleep and watching, exercise, and mental anxiety. Any irregularities in these will, in certain constitutions, give rise to an attack of herpes. Let me give you a few illustrative examples.

A gentleman, accustomed, in his native county (Yorkshire), to great regularity of life, came up to London to engage in parliamentary matters. He sat till late at night in the heated gallery of the House of Commons. He had his meals most irregularly, sometimes dining in the forenoon, sometimes not till nine o'clock at night. His sleep was broken, and his mind harassed. After about a fortnight of this system, he became languid and oppressed. Herpes zoster, fully developed, came to his relief, and in little more than a week he was restored to his ordinary condition of health.

A young lady (Mademoiselle Missonier) came over from France to England some years ago. She had a very bad passage. The hatches were closed. The air in the cabin was stifling. Heat, anxiety, change of air, change of diet, change in her habits of life, conspired to disarrange the young lady's whole system. Herpes labialis in great severity succeeded, on the disappearance of which her health speedily returned.

In January, 1824, Mr. Simpson, one of my earliest

pupils, passed through a severe form of low fever. At the end of the third week, herpes labialis appeared, and continued so long, and proceeded to such an extent, that for many days he could not speak nor protrude his tongue, and hardly could he swallow enough to support life. His aspect was hideous. The saliva was so offensive that it could not be swallowed for more than a fortnight. It yielded at length, and subsided much quicker than could have been expected—in about six days. No medicine appeared to exert the smallest influence over it.

We may enumerate the following, as some of the most usual sources of herpetic affections:—1. Confinement to a hot and crowded room (defect of air); 2. sudden changes in the mode of life (irregularities of aliment); 3. in infantile life, dentition; 4. at all ages, prior disease of a catarrhal, bilious, or typhoid kind.

With reference to causes, I would add that in its most perfect development herpes occurs chiefly among adults. Children often display clusters of herpetic vesicles on the hand, arm, or below the ear, but seldom in any notable intensity. Herpes occurs more frequently in warm than in cold seasons. It attacks chiefly those of fine and delicate organization of skin. It is therefore more common in women than men. A disposition to herpes is hereditary in some families. In the "London Medical Gazette" (vol. ii. p. 632) will be found a brief notice by me of a family named Swinburne. The grandfather, uncle, and nephew, had each experienced an attack of herpes zoster. The boy had it at the early age of nine. It was strongly marked, affecting the thorax, and extending from left to right.

The treatment of herpes is very simple. In children, during the process of dentition, an eruption of herpetic vesicles is critical and salutary. So is the herpes labialis

which succeeds catarrh. Hence we may estimate the value of blisters in several forms of infantile feverishness, of catarrhal and gastric fever. It is often impossible to repress herpes, and if it were possible, it would be highly injudicious.

Herpes zoster is to be treated by gentle laxative draughts containing senna, magnesia and its sulphate. Whenever herpes or any other febrile eruption is attended with much itching of the surface, magnesia is a useful remedy, for this itching indicates acidity acting on the denuded coats of an irritable stomach. A mixture of magnesia, mucilage, and the liq. opii sedativi, allays the uneasy feeling. You may direct, at the same time, a camphorated Saturnine lotion, which cools the part. Cold cream is a convenient means of allaying irritation. The black wash may be employed to the herpetic vesicles so often observed in infantile life.

MILIARIA.

The history of medicine presents few chapters so discreditable to physicians as that which is devoted to miliaria. It would certainly be to our credit to pass it over *sub silentio*, but it is right that you should know something about it, and about the controversies to which it has given rise.

Some obscure allusions to miliary eruptions may be traced in the writings of Hippocrates, but the term does not occur there, nor, in fact, is it anywhere to be met with until the middle of the seventeenth century, the period which I have already mentioned to you as famous for the perfection to which medical art had brought the heating, or alexipharmic mode of treating fever. About that period, some German writers described certain epi-

demic fevers having miliary eruption for their distinguishing character. These epidemics happened in 1648, at Lubec; in 1652, at Leipsic. In 1710, Sir David Hamilton, physician to Queen Anne, published a regular treatise on miliary fever, the English translation of which extends to 256 pages, and makes a goodly octavo volume. Later in the eighteenth century, it attracted the attention of Dr. Fordyce, in London, and of physicians in various parts of the continent, among whom may be mentioned, Allioni, Fantoni, Walthier, and Gastellier. Sauvages, in his "Methodical Nosology," (1768,) devotes eleven quarto pages to miliaria, and only eight to variola! In 1760, De Haen, then practising physic with great success at Vienna, attacked the miliary doctors, and being himself rather fond of controversy, continued his attacks upon them with increasing severity for many years.

De Haen labours to prove, and certainly to my mind succeeded in proving most satisfactorily, that there is no form of fever which has miliary eruption for its specific or distinguishing feature. "Miliary eruptions," he says, "are, like petechiæ, accidental occurrences in the progress of fevers, which may be encouraged by certain modes of treatment, and diminished or entirely prevented by others." He shews up the inaccurate observations and the loose reasoning of physicians during the preceding hundred years, without the smallest mercy.

Notwithstanding these cutting criticisms of De Haen, authors continued to write about specific miliary fevers for many years afterwards. Pujol described with great minuteness an epidemic miliary fever which prevailed in Languedoc in 1782. Since the present century set in, however, miliary fever has been at a discount. I know of nothing written on it in this country, but Rayer has

detailed the particulars of an epidemic miliary fever which pervaded the department of the Oise (Normandy and Picardy) in 1821. The disease is duly noticed in all our systematic works. You will see it ably described in Dr. Craigie's work "On the Practice of Physic," and in the "Cyclopædia of Practical Medicine," by Dr. Tweedie.

It is greatly to the honour of Sydenham, that he never fell into the fashionable theory of miliary fever. He was aware of the occasional appearance of miliary vesicles, and of their causes, and he alludes to them especially in his sketch of the fevers of 1685 and following years; but it requires a careful study of his works to detect even this incidental mention of them.

I now proceed to describe briefly (for I need not do more) the phenomena of miliary eruption.

The first appearance of miliaria is preceded by fever, with redness and roughness of the skin, especially on parts covered by the bed-clothes—the chest, belly, and thighs. After a time, the skin thus affected exhibits innumerable minute confluent vesicles of the size of millet seeds (whence the name, *milium*), of a pearly-white colour. Now and then small blebs, of a size superior to the common miliary vesicles, are seen intermingled with them. The duration of the eruption is uncertain, being, in point of fact, determined by the treatment pursued. Authors generally allowed a week for the continuance of the eruption, and state that it then terminated by thin crusts, with general desquamation of the cuticle.

The symptoms which by the authors of the seventeenth century were considered as the initiatory signs of miliaria were, sighing, oppression of the præcordia, restlessness, panting of the breath, jactitation, cramps, subsultus tendinum, and a sense of fulness and faintness. "I knew," says Sir David Hamilton, (describing the

case of Mr. Bullock, August 8, 1700)—"I knew, by the oppression of the breathing, and the languor and faintness of the spirits, that this would end in a miliary fever." It is scarcely needful to apprize you, that these symptoms indicated congestion of blood about the lungs and great vessels. The miliary eruption is accompanied by a pulse always rapid, and generally small. Sometimes, however, we read of a hard, irregular, and intermitting pulse, co-existing with a crop of miliary vesicles. The tongue is often clean and moist. Much thirst is usually present.

Miliary eruptions are always associated with a moist state of the surface, and the odour of the sweat is singularly rank, offensive, and acid. This is the clue to the theory of miliary eruption. It never appears under a cool treatment, or with a cool condition of surface; but it may appear in any fever where the surface is either naturally very hot, with a strong and full action of the heart and arteries; or where such a condition of surface is brought on artificially, either by sweating drinks, or by stimulating medicines, or by superabundant bedclothes, or the excessive heat of the weather, or the great exertions of the patient. To give you some examples:—

1. Miliary eruptions have always been observed in the lying-in room. To this three things contribute: the exertions of the woman, the closeness of the chamber, and the caudle with which the officious nurse supplies the object of her care. The febris puerperarum miliaris is described by Hoffman, and all the writers of that day, (1700.) It is still occasionally seen under the same circumstances.

2. Miliary eruptions occur occasionally in the early stages of all fevers developing eruption. They are ob-

served, therefore, and have been already noticed, as accompanying the outbreak of small pox, measles, and scarlatina, and that without the additional aid of heating or forcing medicines.

3. Miliary vesicles appear in the progress of all fevers treated by sweating remedies. You will remember that it was in 1640, when this method of managing fevers had attained its acme of absurdity, that miliaria first attracted the special attention of physicians. The most complete and universal eruption of miliaria which I ever saw was in the case of a young man, aged eighteen, labouring under acute rheumatism. His first medical attendant had enveloped his body in folds of flannel from head to foot, giving him very much the appearance of a mummy. When I took charge of the patient and unrolled the mummy, the most superb crop of miliary vesicles was displayed which I had ever seen, or ever expect to see again. The effect of such local treatment, and of the guiacum, camphor, and Dover's powder, which formed so prominent a part in the old treatment of rheumatic fever, is not only to drive the blood to the surface, but to gorge the large vessels of the lungs. Hence the dyspnœa. Now, if the blood is detained in the lungs and the cutaneous capillaries, it cannot be in the heart. The supply of blood to the heart, therefore, is imperfect, and hence the fainting which made Sir David Hamilton know that his patient was going to have miliary fever. Cool the skin, and the tendency to faintness goes off, because the blood is driven towards the heart. Upon this principle you treat a young woman who has fainted at church, when the congregation and the gas-lights are alike numerous.

When miliary eruptions occurred in the progress of typhus fever, it was generally remarked that they ap-

peared about the tenth day of the fever, and declined about the eighteenth. All authors agreed that no critical days were perceptible. Sometimes fresh crops of vesicles would appear and protract recovery.

Attempts have been made to propagate miliaria by inoculation, but, as you might anticipate, without effect.

Miliaria, then, is chiefly an artificial exanthema. I do not go so far as to say there may not be fevers which have a greater tendency than others to develop miliary vesicles, but the idea of a purely miliary fever is now abandoned.

The cure of the complaint need not detain us long. The cause is, superabundant warmth and too violent action of the heart and arteries. The remedies are, cold or tepid sponging, cool air, cooling subacid drinks, and mild laxatives.

LECTURE XIII.

THE NON-CONTAGIOUS EFFLORESCENCES.

Lichen. Its characters and chief varieties. Lichen febrilis of adults. Diagnosis of lichenous and variolous eruption. Lichen febrilis of children. Varieties of strophulus. Syphilitic lichen of adults. Lichen tropicus, or prickly heat. Urticaria febrilis. Its characters and causes. Roseola. Its several varieties. Roseola exanthematica. Erythema. Its relation to roseola and erysipelas. Notice of the several varieties of erythema. Character, course, and treatment of the erythema nodosum. Pathological connexion of fever, efflorescence, and specific exanthem. Conclusion.

We come now to the consideration of those forms of febrile eruption which are not associated with actual inflammation of the corion, and consequently exhibit no traces of fluid effusion. We call them the simple efflorescences, and they have for their common pathological feature a more than average supply of blood to the cutaneous vessels. They are four in number:—lichen, urticaria, roseola, erythema.

LICHEN.

The term λειχην was introduced into medical literature by Hippocrates, who applied it to designate a species of chronic tetter, the precise nature of which is unknown.

Since the adoption of Dr. Willan's system of cutaneous nosology, lichen is appropriated to an eruption (sometimes attended, sometimes unattended, by fever) consisting of small elevated papulæ, which do not run into vesicle or pustule, but terminate by scurfy desquamation. Such a disorder acknowledges various causes, and occurs under very opposite conditions of the body. It is not contagious, is dependent on no miasm, and it may recur frequently to the same individual.

Such is the definition of lichenous eruption. Dr. Willan has introduced into his work a great variety of species of the genus lichen—viz., the lichen simplex, agrius, circumscriptus, pilaris, lividus, urticatus, and tropicus. Every trifling alteration in the appearance of the eruption has been magnified into importance, and been made the foundation of a species. I cannot see the utility of these learned minutiæ. When the differences are such as indicate important distinctions in pathology, or affect materially the treatment, they may, and indeed ought to be adopted, but not otherwise.

1. The first kind of lichen that I shall describe to you is the lichen febrilis of adults.

This complaint is one of the most frequent sources of difficulty and error in exanthematic diagnosis. A modification of febrile lichen, perhaps the disorder itself, is called by some, "rubeola sine catarrho." Lichen is frequently mistaken for true measles, and almost as often for small pox. Not a year passes over without our receiving, at the Small Pox Hospital, three or four patients having this form of febrile eruption; and, to confess the truth, I have myself, in former times, mistaken the complaint for small pox.

Lichen febrilis affects chiefly adults. Its familiar designation is, *a surfeit*. Its most usual cause is, sudden

exposure to cold when the body is perspiring profusely. Hence, by far the most frequent subjects of it are cooks, who, in their useful callings, are suddenly taken from before a huge Christmas fire to a cold scullery or a damp coal-cellar. But I have occasionally seen the disease where the same cause does not appear to have operated. We may conclude, therefore, that other "vices of the non-naturals" (to use the language of our professional forefathers) may occasion lichenous fever,—such as irregularities of exercise, of sleep, of diet. Modern pathologists are apt to attribute such affections to disturbances in the hepatic and gastric functions, but these are probably coexistent with the lichenous disorder, not its sources. The old authors, too, wrote on the "*vitia secretorum et excretorum* as leading to febrile lichen, but I question the correctness of the doctrine. The eruption of lichen is sometimes associated with typhoid fever.

Febrile lichen has an incubative stage of twenty-four hours only. This is the great secret by which to effect the diagnosis of lichen from the greater exanthemata, (small pox and measles.) There is here the same languor and lassitude, the same sickness, restlessness, debility, and loss of appetite, the same confusion of intellect, and general diminution of secretion, which characterize eruptive fever under other circumstances. Lichenous eruption usually appears over the whole surface of the body at once. I have seen it in the course of twelve hours as vivid on the lower as on the upper extremities. This happened to me, to witness on one occasion, in consultation with Mr. Money on the case of a young woman who had travelled up by railway from Birmingham. The confusion prior to her journey, and the heat during and succeeding it, had, in common parlance,

heated her blood. The result was, a sudden and severe burst of febrile lichen. A few days of rest restored the system to its normal condition, but in the meantime great alarm had been taken in the fashionable hotel at the west end of the town in which she was lodged, under the persuasion that confluent small pox had broken out there.

The eruption of febrile lichen is sometimes nearly as vivid as that of scarlatina, but generally it is of the darker or venous colour, characteristic of rubeola. Sometimes its colour is so deep as to induce nosologists to dignify the occurrence by the name of lichen lividus. The eruption of lichen is decidedly *papuliform*. Elevations of the skin in the form of pimples, close set, or confluent, and very extensively diffused, can be perceived. The eruption is accompanied by considerable itching. Its usual course is as follows. On the second, or at furthest the third day, it fades. The associated fever diminishes. The patient expresses a desire to get up, and in less than a week is again at her ordinary employments ; I say, *her* employments, because the disorder is so much more common in females than in males.

The diagnosis is to be effected—1. by inquiry into the prior history of the patient; 2. by the shortness of the incubation; 3. by the character of the eruption; 4. by a comparison of the quantity of eruption with the intensity of the accompanying fever. The eruption, from its amount, would perhaps suggest the idea of small pox, but the fever necessary to develop so much variolous eruption would not correspond with that which would be present in a case of lichenous eruption, however full and confluent.

Lichen febrilis is a disease of no danger. It arises

from causes not affecting any of the great organs essential to life. It therefore never appears in the tables of mortality. A few doses of opening medicine, low diet, and some saline draughts, include all that is essential with regard to treatment.

2. Lichen febrilis of children. During the process of teething, and again when under process of vaccination, still more frequently when these two processes are going on simultaneously, children are very liable to be attacked with lichen. The complaint, as it occurs in infantile life, is called strophulus by most authors, but the character of the eruption is simply lichenous, sometimes with, sometimes without, sympathetic fever. Strophulus—the red gum or infantile lichen—has been split and subdivided by the cutaneous nosologists into a variety of species, the specific differences being some accidental and unimportant shade of colour, or unusual mode of grouping of the papulæ. It will be sufficient to have merely enumerated them. They are—strophulus intertinctus, albidus, confertus, volaticus, and candidus. Many cases of strophulus are compatible with a good state of health, and really require no medical treatment whatever.

When lichenous eruption arises in the infant from the vaccine poison, it usually shews itself on or after the eighth day. It is most common in the warm months of the year, and in children nourished on a good breast of milk, and full of blood. But peculiarity of habit will suffice to develop it in some children without such contingent circumstances. It frequently occasions great uneasiness to the parent, who is impressed with the belief that her infant has taken small pox, or been vaccinated from an unhealthy child, or cut with a foul lancet. None of these notions are founded in reason. Vaccine lichen may continue to shew itself for ten days. It then

gradually subsides, especially with the aid of a little aperient medicine. A powder containing one grain of calomel with five of jalap and five of rhubarb, may be divided into four parts, of which one should be taken daily.

3. Lichen chronicus syphiliticus. The third variety of lichen is that which attacks adults, in a chronic form, as the secondary offspring of the venereal poison. To describe the appearances of venereal lichen is the duty of the lecturer on surgery. I have no wish to poach upon his manor, but as the diagnosis of exanthematic affections may be materially aided by your knowledge of lichen syphiliticus, I may tell you briefly the principal points in its history. This variety of lichen has its chief seat between the shoulders, and it sometimes extends over the whole back. It is often accompanied by, or alternates with, syphilitic iritis, or syphilitic affection of the throat. It is rarely, if ever, associated with fever. It is very chronic in its nature, often persisting for three weeks or a month. I have known it to continue for upwards of a month, especially where no remedial measures are adopted for aiding the elimination of the poison. This kind of lichen is much benefited by gentle doses of blue pill.

These are the three varieties of lichenous eruption chiefly observed in this country. It remains that I notice one other, exceedingly common in hot climates, where it is known by the name of the *prickly heat.* From nosologists it has received the appropriate name of lichen tropicus.

All Europeans, on their first arrival in a tropical climate, suffer more or less from this affection. It is the direct effect of the burning rays of a vertical sun upon the skin. Many continue to suffer from it in spite

of *acclimatization*. We can sometimes trace, even in this climate, during the months of July and August, an approach to the lichen tropicus. The character of the eruption is purely lichenous—that is, papulæ elevated, but not advancing to fluid effusion. The great peculiarity of lichen tropicus is the intolerable pruritus or itching which accompanies it. All that we see of the itchiness of lichen in this country gives but a faint picture of the miseries endured by the unhappy European suffering under lichen tropicus in the East Indies, especially when the cutaneous circulation is excited by such exercise as brings out perspiration, by drinking wine, or even taking hot soup at dinner. The sensation is a horrid compound of heat, tingling, itching, and pricking. The cold bath rather aggravates than appeases the sufferings of the patient, especially during the glow that succeeds the immersion.

We have the high authority of Dr. James Johnson for saying, that until the constitution becomes assimilated to the climate, the only thing that can be done is, to use light clothing; to be temperate both in eating and drinking; to avoid all exercise in the heat of the day; to keep the bowels gently open; and to resist, with stoical firmness, the disposition to scratch.

URTICARIA.

The febrile urticaria, or nettlerash, is an exanthema of a very mild or benignant kind, possessing the following characters:—

It displays elevations of the outer surface of the corion, of considerable extent, and usually of a circular form, of a white colour, to which the term *wheals* is popularly applied. These eminences, or wheals, are sometimes persistent, but more commonly they fade during the day

and return with the return of night. They are always attended with troublesome itching, and the affected parts are hot. The accompanying fever is sometimes severe. Sometimes little or no constitutional affection is perceptible. It occurs to persons of all ages, and acknowledges several sources, but has no origin from miasm.

Urticaria, like lichen, has been a favourite complaint with nosologists. Every minute deviation from the ordinary character of the eruption has been the signal for the creation of a fresh species. I know but of two kinds of urticaria, the acute and the chronic; but Dr. Willan gives us no less than six—the urticaria febrilis, evanida, perstans, conferta, subcutanea, and tuberosa.

1. The simplest form of urticaria is that which arises from the local application of nettles. Hence the name—*urtica*, a nettle. Some animals of the molluscous kind have a like effect upon the skin.

2. The acute or febrile urticaria is a well marked variety of exanthema, of which, in the course of my life, I have seen several striking examples. The incubative stage is short, and presents no peculiar characters. This eruptive ailment is attended with constitutional excitement, or fever, much more intense than the nature of the exanthem would lead you to expect. The heat of skin is often as great as in scarlatina. The pulse is active. Delirium and other evidences of constitutional disturbance are sometimes met with. Dr. Elliotson first taught me the necessity of taking blood from the arm in severe cases of febrile urticaria. I have followed the practice with great advantage, and strongly counsel you to pursue the same line of treatment. On several occasions I have tried to do without it, and have failed. The itching and heat accompanying febrile urticaria are great sources of discomfort. They admit of partial

relief from the use of the decoction of bran, with a little spirit of rosemary. Purgative medicines are useful, but it is better to draw blood moderately from the arm, than to attempt to subdue any considerable amount of inflammatory fever by purgatives alone.

I know nothing of the causes of the febrile urticaria different from what I said with reference to the acute forms of herpes and lichen. Any notable deviation from the ordinary course of life may end in an attack of acute urticaria. Severe exercise, exposure to cold, a draught of cold water taken when the body is overheated, may prove the exciting cause. The vaccine poison, when developed in great abundance in a plethoric child, has brought out urticaria, with some fever. Certain articles of food will produce, in particular habits, where the skin is irritable, an ephemeral feverishness, during which an urticarial exanthem shall display itself. Almonds, or prussic acid in any shape, has this effect on some; lobsters, shrimps, and certain other kinds of shell-fish, on others. Cucumbers, vinegar, cayenne pepper, honey, mushrooms, and other vegetable substances not possessing any particular noxious principle, will have a like effect on a third class of persons.

This kind of urticaria is very evanescent. A gentle emetic, followed by a mild laxative, suffices for its cure.

3. A chronic form of urticaria has been observed, in which the eruption appears and recedes alternately for a great length of time, without fever or any perceptible derangement of the general health. It probably arises from some irregularity of diet, such as over-indulgence in wine, or food of too stimulating a quality. Restrictions on diet, with the use of magnesia, or other simple laxative, are generally found adequate to effect a cure.

ROSEOLA.

The term roseola is appropriated to a mild rash of a rose colour, appearing in patches of irregular shape, without any pimples or perceptible elevation of the corion. This disorder is accompanied by a light evanescent febricula, and is not contagious.

Little need be said concerning a disorder which, except as it may lead to mistakes in diagnosis, would hardly be reckoned worthy of notice. On that account, however, the circumstances under which it appears deserve some attention.

1. A roseolous eruption occurs in the hot months of the year, and occupies (as roseola generally does) the face and upper parts of the body. It is called the roseola æstiva, and if accompanied by any affection of the throat is probably a variety of scarlatina rather than roseola.

2. I have occasionally seen roseola in females of plethoric habit and irritable temperament. In them, a little extra exercise, an additional glass of wine, nay, sometimes emotion of mind, will throw out a roseolous rash over the neck and bosom. Such women may be said to blush, not only with the cheeks, but with the whole upper part of the body.

3. A roseolous rash occurs often in children in connexion with dentition, (roseola infantilis.)

4. The most important of all the varieties of roseola is the roseola exanthematica, or variolosa. It often happens that after one, two, or three days of fever, a roseolous rash is suddenly thrown out over the face, neck, arms, and back, in irregular patches. On the second or third day from their appearance, pimples display themselves in the very midst of these patches. These gradually advance, and in three days more shew the

depressed centres of variola. The occurrence is very annoying in practice. The physician first pronounces that his patient has fever. Two days afterwards he changes his note and informs the friends that the patient, besides fever, has the roseola, or rose-rash, an affair of no consequence. Two days after that, he announces to the astonished listeners that the patient has small pox! This once occurred to myself in consultation with Mr. Hammond, at Windsor. Three diseases in as many days! The unprofessional man considers this impossible; but he is wrong. He is not aware of that great law of nature which binds together fever, simple efflorescence, and specific exanthem.

Roseola exanthematica frequently accompanies the incubative stage of post-vaccine small pox. It indicates invariably the advent of a mild form of variola. It was a frequent attendant on the inoculated small pox, and always hailed as a good omen by the professed inoculators. The most perfect specimens of roseola which can now be seen are those which attend the development of cow pox in some children of irritable habit and delicate skin.

The treatment of roseola offers no topic of sufficient importance to arrest our attention.

ERYTHEMA.

The last in the series of eruptive fevers is erythema, which is so closely allied to roseola that it is only a stretch of nosological refinement which has separated them into distinct disorders. The term ερυθημα, as used everywhere by Hippocrates, simply denotes redness; and it is therefore correctly applied to any disorder having for its character simple efflorescence, not accompanied by swelling, and not advancing, under com-

mon circumstances, to vesication. But this is the nosological definition of roseola. Having so many terms, therefore, to express the same thing, we cannot wonder that modern authors should have differed in their acceptation of the term erythema. Some hold it to be merely the mildest form and earliest stage of erysipelas; others restrict the term to such cases as exhibit redness of the skin, in patches, with some concomitant constitutional disorder, but neither originating in a contagious miasm, nor terminating in fluid effusion. It matters little in which sense we employ the term, for all that is important in regard to pathology is comprised under the head of erysipelas. Erythematous eruption, indeed, offers little to interest us, though, as usual, nosologists have done their best to turn that little to good account. Dr. Willan describes six species, varieties, or rather, as we ought to say, shades of erythema, to which he gives the names of erythema fugax, læve, marginatum, papulatum, tuberculatum, and nodosum. Without attempting any formal description of these several kinds of efflorescence, I may state briefly all that it concerns you to know concerning erythema, its aspects, sources, and most characteristic variety.

The best illustration I can give you of erythematous redness is the areola of cow pox. It does not commonly advance to vesicle. We are therefore hardly justified in calling it erysipelatous redness. Yet to shew you how nearly allied are the two disorders (erythema and erysipelas), I may state, that occasionally the vaccine areola does merge in erysipelas, and by so doing creates no small alarm in the mind of the patient or parent. It is not uncommon to see the re-vaccination of adults followed by irregular erysipelatous areola.

Patches of erythematous redness appear at uncertain

times in the progress of various kinds of febrile disease, and in many chronic affections, especially those of gastric or hepatic origin. Erythema is an almost constant attendant on the aggravated cases of anasarca, where the skin is put upon the stretch. Under such circumstances, it appears in streaks of a dark red or purple hue. All these varieties of erythema are obviously symptomatic. The only important question for our consideration is, whether there exists any disease having erythematous redness for its chief character, sufficiently distinguished from erysipelas and from roseola to be entitled to separate examination? There is such a disease, and it is called erythema nodosum. It is a mild exanthem, being often preceded and accompanied by fever. It is distinguished from erysipelas in that it does not run into vesications. It is distinguished from roseola by the circumstance of its occupying the lower parts of the body, to the exclusion of the upper.

Erythema nodosum is characterized by patches of efflorescence occupying the skin lying over the tibia. The patches are oval in shape, the long diameter being parallel to the tibia. They slowly rise into hard and painful protuberances, and present very much of the appearance of nodes. I have seen this disorder ushered in by a kind of irregular or low fever. Languor and lassitude have been the predominant symptoms, and the patient has often been surprised by accidentally discovering the eruption. This complaint is chiefly met with in young women between the ages of fifteen and twenty-five. I once saw it in a delicate lad, the apprentice of Mr. Courtney, formerly chemist and druggist in the Regent-circus.

Erythema nodosum is a tedious disorder, often extending to three or four weeks, during the whole of which period the only urgent symptoms are languor and de-

bility. The eruption subsides as the constitution improves. Gentle laxatives, followed by the decoction of bark with acid, promote recovery.

The same observations which I have made with reference to the origin of herpes zoster, urticaria febrilis, and lichen febrilis, apply equally to erythema nodosum. These febrile efflorescences are all closely associated in their pathological features; they constitute the extreme links of that chain which connects the specific exanthemata with the febrile diseases of the human body where the skin is simply *dry*. In those fevers you find increased action of the cutaneous vessels, but it is neither of that kind, nor is it in that intensity which ends in ERUPTION. Here, therefore, my labours terminate.

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THE END.

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