1850

Varicola
by
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On Varicola.
Smallpox may be referred to three different epochs: first, from the time of Mæger's to the beginning of the eighteenth century, a period of eight hundred years; second, the introduction into practice in Europe of inoculation to the discovery of vaccination, a period of nearly eighty years; and third, from the discovery of vaccination to the present time.

The first notice we have of the varieties of small-pox is contained in the few fragments of the doctrines of the four Arabian physicians which have been preserved by Mæger. They reported all the varieties of this disease to the different temperaments.

Mæger described very accurately the different varieties of smallpox, both the distinct, the evolvent, and the confluent kinds, also the regular and unusual, the benign and malignant. Indeed, all the principal distinctions which have been noticed in succeeding ages.

But a disease having the characters of small-pox is supposed to have been known in China about 1722 years before
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the birth of Christ, and to have passed from thence to the contiguous territories of Japan and India.

It has been the subject of keen controversy whether small pox was known to the Greek and Roman physicians. Hellen, Tilla, Varenier, and more recently William, have tried to prove that the disease was known to them.

The first appearance of the disease in Arabia is generally referred to the 55th or 57th year of the Christian Era. shines who gave his account at the end of the ninth century acknowledged that he followed Aburen and some of the ancient Arabian physicians. From Arabia, and the interior of Egypt it seems to have been imported into Africa, about the close of the eleventh century, and thence to have spread over Europe.

There are several well marked forms of this disease, which are distinguished by the characters of the eruptions into variola minima, variola complicata, and variola coherens.
according to the course of the disease, into
various regular or irregular motions, and
according to the prominent symptoms, into
various inflammatory or phlegmatic, and
various hypobiotic and nervous. In the latter
instance, the pustules are distinct, and of a
regular circular circumscribed form,
with portions of convex skin between
them; in this variety there is seldom
any danger. In variola, complicated the
pustules coalesce, and their common
outline becomes irregular; in this form
there is always danger. In the coherent form
the pustules are collected into clusters, but
do not cohere so much as to prevent them
from being distinguished and counted.

The pustules in distinct and confluent
small fur have further been observed to present
several peculiar modifications. Thus they
are sometimes filled with a thin transparent
serous fluid, supposed to be air, and even
bubbling, and which is not readily
converted into purulent matter. They are
then denominated by Mead variola
crystallinae. A peculiar form of this,
consisting of round, soft, concave bacillary-like vesicles, pustules, and voids of fluid, was named by Treitsch variola siliqueosa. A third variety of eruption sometimes occurs in distinct small pustules, but generally, attended with a train of unfavourable symptoms indicative of nervous complications, is that in which the pustules are small, hard, and void of fluid, like warts, named variola minima. These are slow in assuming suppuration, and the concomitant fever, when indurated, is generally severe and attended with symptoms of nervous disorder. These three varieties, though seen in distinct small pustules, are common in confluent.

Variola minima may be divided into four stages: 1st stage; vesicles from the first to the fourth day; 2nd stage; eruptions from the fourth to the seventh day; 3rd stage; pustules, suppurative, matured, and suppurative; from the seventh to the eleventh day; 4th stage; eruptions and suppuration from the eleventh to the fourteenth or fifteenth day.
It sets in, with febrile symptoms, rigors, prostration and asthenia, pain of head, panting rapid and laboured breathing, sickness and often vomiting. Children frequently have grinding of the teeth, stomach cramps, or even convulsions. Adults complain of pain in the back, bones, head, neck, and limbs generally, often likewise of tenderness over the stomach. After a time these symptoms are followed by so hot stage, the pulse frequent, strong and free, the face flushed, the patient thirsty. There is no general some moisture of the skin, often as time in adults, without however relief to the breathing or other symptoms. The urine is scanty, deep coloured, and Deposits in bourny sediment.

It is of importance to recognize smallpox at its commencement, for the force of the impending disaster may sometimes be lessened by judicious measures adopted at that early stage. But the symptoms that mark the onset of febrile diseases are necessarily very much the same.
occurs during the prevalence of small-pox, if the person be not vaccinated, and if he has been lately in the way of contagious variola may be suspected, vomiting, pain or backache being common at the commencement of variola, but not at the beginning of the other symptoms, may likewise help us to form an early diagnosis.

Early delirium, convulsions, and stupor are indicative of severity during the progress of the disease. The continuance of nausea and vomiting after the eruption has appeared also indicate the same thing. Helenium noticed that acute pain in the loins was almost always followed by a severe disorder, pain higher up between the shoulders was of better augury, and that it was to be reckoned a good sign in all cases if there was no pain in the back at all.

The peculiar eruption of small-pox is indistinct at first, and generally appears at the end of the third, or the beginning of the fourth day of the fever, in the form of minute red spots, or patches,
generally making their appearance first on the forehead, upper lip, side of the nose, and chin. The disorder generally proves severe if the eruption comes out much sooner than usual. The eruption nearly always takes a uniform course, appearing first on the face and gradually extending downwards to the lower extremities; so that it does not cease to come out till the fifth day; and the disease declines in the same order. Sometimes however the eruption first appears on the lower extremities, and gradually extends upwards to the face. In some cases pustules come out here and there after the general eruption is fully formed.

The slightly hard and elevated papules increase in size both at their base and upwards and gradually ripen into successively vesicles and pustules. When they first appear, the symptoms undergo slight but perceptible alleviation; the sickness and pain disappear, the breathing becomes less anxious and laboured; there is an abatement of the swelling and, roughly, the
force of the pulse comes down. The pustules are usually ripe and break on the eighth day, and after that scale or crust over. But this is not the constant order for the crusts are sometimes visible on the seventh day and sometimes not till the ninth.

The more numerous the pustules the greater the severity of the disease. This differs very much; sometimes the disease is very mild, and there is not more than half a dozen pustules, at other times the body is nearly covered with pustules and the disease is very severe. The amount of pustules affect the constitutional symptoms in two ways: in the first place they show the quantity of noxious poison that has entered the blood; secondly the inflammation of the skin caused by the pustules would affect the constitution independently of the specific disease.

In the discrete form of the disease, whilst the pustules gradually increase there is a slight reddening of a distinctly blemish of the neighbouring skin, on the third day they begin to contain a little white, semi-transparent
serves fluid, which elevates the cuticle to form their summits. After that they only increase in breadth, surrounded by the ring or hoop of redness successively the vessel, and become flat, level, cross even; a slight depression is observable on the summits of most of them. Whilst these changes are going on, the contents of the pustules likewise change; at first it is semi-transparent, but it gradually becomes more opaque, and whitish yellow or straw-coloured. Somewhat later they begin to lose their marginal redness, the depression on their summits likewise disappear, and they assume a hemispherical shape. When the pustules are numerous this process is attended with considerable general fever. In their enlargement the individual pustules follow the same course as the general eruption, these on the face attaining their proper size first, and the increase in magnitude extending gradually to the inferior extremities. On the eighth day of the disease or the fifth of the eruption, they become
perfectly transparent with yellow opaque matter, and as dark a spot makes its appearance on the top of each of them, at that spot the entire breaks, a portion of the matter oozes out, and the pusissue dries into a scab. While the pusissues are filling up the face successions, often so much that the eyes lose their luster, and the appearance of the countenance completely changed. When the crusts fall off they either leave a purplish red stain, or a depressed scar. The variety of the disease is named from the appearance it presents on the face; when it is confluent there the disease is said to be confluent, whether it is so or not on the extremities. In like manner when the pusissues are separate on the face, it is called variola discretia, whether they are so on the rest of the body or not.

The skin and commencement of the mucous membranes are the parts where the pusissues generally occur. I will speak of them as they affect the mucous membranes afterwards, but the external surface is by far the
most general seat of them. They are not
however distributed with equal profusion
over the skin, but the face has proportion-
ally much more than the rest of the body.
Next to the face stands the superior extremi-
ties. Over the extremities there are gener-
ally more than on the trunk, where
they are usually very thinly scattered.

The fact and hence since at the
same time that the face does, even they
begin to resume their natural size as
the features begin to subside, although
the pustules disappear as well as com-
mence two or three days later. Some of
the pustules especially on the extremities
do not burst at all, but shrivel up, which
has been generally ascribed to the absorp-
tion of the pus, but it seems more proba-
ble that pus has never really been formed, the
serous fluid produced at the commence-
ment of the inflammation not
having passed to the suppurative
stage, but is condensed in the serous
form, the entire shrinking over
it.
In the formation of a various pustule the first step that can be discovered is a minute red central point or stigmata, situated at the cuticular surface of the true sinus which spreads both in circumference and depth by radiating processes, but with the epidermis entire. Around this there forms in the course of two or three days a rather hard red circle, variable in breadth and degree of colour. From the vesicles of this central red point is secreted all the fluids the pustule subsequently contains; at first serous, afterwards it may be bloody, fluids or pus. In distinct blemishes not small pust this point is of a bright red colour, but when the strength is impaired it is pale, in malignant small pus it assumes a brown hue, and in gangrenous small pus it becomes quite black. These red points may be easily seen by making an incision into a various pustule at an early stage, but if the pustule be opened
Later we see it filled with yellow opaque matter, surrounded by a whitish mass. When this matter is removed by a sponge we can see the surface of the true skin hollow or cup-shaped, red, rough, villous, and vascular, but not generally in the discrete form described, with no strongly acuminate point in the middle the true central point. If so puncture be examined carefully, it will be found to contain a central vesicle of a whitish colour, surrounded by the puriform matter. The central vesicle consists of lymph, and is most probably the purer part of the various poisons by a puncture the lymph may be allowed to escape from the vesicle, whilst the surrounding pus still retains its place. The vesicle has been distended and by some, and is said to consist of small cells. The pus may also be evacuated by a puncture without affecting the central vesicle. This appearance is seen best about the fifth or sixth day of the eruption.
In the discrete form of the disease, the fever generally ceases on the coming out of the eruptions, the headache, pain of limbs, vomiting, restlessness to disappear, the pulse resumes its natural force and frequency, the skin its natural temperature. About the seventh or eighth day of the eruptions there is commonly for 1 or 2 days recurrence of fever. This is called the fever of manifestation or secondary fever.

The constitutional fever is of much greater severity and indicates more or less affection of some internal organ in the confluent disease. The disturbance of the cerebral functions is more complete which is indicated by violent delirium or coma or a hypomanical state, convulsions in adults or epileptic fits in infants. All the other symptoms of the disease are also more severe. There is greater panting and anxiety of respiration, often attended with a frequent dry cough, small frequent and profound pulse, difficult.
deglutition, pain at the epigastric region, vomiting being much more severe, joint pain, diarrhea, and hemorrhage are also present. The hemorrhage may be either from the mucous membranes of the respiratory or alimentary systems, or in females from the womb.

The diagnosis of the disease from the appearance of the skin is more uncertain than in its discrete form, on account of the papules being more minute and crowded together in patches, and often accompanied by a rash like that of scarlet fever. The papules themselves are at first not unlike those of measles, but they may soon be distinguished by a collection of fluid at their summits, but they do not fill up so completely as in the milder forms of the disease, they likewise differ in being flatter, less plump, and more irregularly depressed, also somewhat in colour, being at first whitish and then of a brownish tinge, seldom of the yellow purulent hue.
seen in the variola dissecta, sometimes even bluish or purple. The eruption also generally comes out sooner than in the discrete form, but in some cases in which the confluence and stupor or languor precedes it, it may be delayed to the fifth or sixth day, even later according to some. The febrile disturbance sometimes abates somewhat in the convalescent as well as in the discrete form after the appearance of the eruptions if it comes out freely, but not in so marked a degree, and in most cases there is no relapses. Nigths are apt to usher in the fever of maturation.

But the most important difference between the two forms is what is called the secondary fever, which sets in about the eleventh day of the disease, or the eighth of the eruptions, just when the maturation of the pustules is complete, and they begin to decrease. It cannot cease entirely on the suppurations of the pustules as some have supposed, for in many cases the febrile symptoms
will be violent and aggravated, when no
purulences have appeared. The intensity of
its symptoms is in cases of this kind,
associated with ana proportionate to the
inflammation of the mucus membrane
of the nose, throat, windpipe, and
bronchial tubes, due to the irritations
and disorders thereby caused to the
functions of respiration and circula-
tion. The secondary fever is slightly
marked in the distinct small-pox and
very intense and paroxysmal in most in-
stances of confluent. It is at this period
of the disorder, that death in the fatal
cases of the pox occurs. The early occurrence
of death denotes a peculiar malignancy
in the disease. The nervous system
appears to be completely overwhelmed
by the force of the poison. During
the second week the disorder proves
fatal chiefly in the way of a process from
some affection of the respiratory organs.
The pulse is quickly, but small, feeble and
pressed; the skin hot with occasional
coldness of the extremities, the thirsts
intense, the patient delirious, or muttering without sleep, the respiration quick and laborious, or frequent hacks, rushing loudly, the urine retained, or discharged mixed with blood, and the patient sits from laryngitis, edemae glutaei, pneumoniae etc. After that period the characters of asthma commonly predominate, the patient sits under some casual complication, or the powers of life are gradually worn out by so much irritation of the surfaces, and so large an amount of suppuration.

Pustules are formed at the entrance of all the mucous membranes, and may be seen in the gums, lips, tongue, roof of the mouth, the inside of the cheek, the naris and nasal part, and the soreness of the pustules in some cases may depend on them; they are also found in the nostrils, the eyes, the margins of the eyelids, the external ear, as far as the meatus, but not within that canalic; some authors have given cases where they have attached the cornea, producing...
ulceration, and perforation of that membrane, causing the escape of the aqueous humour and prolapsus of the iris, then irritate inflammation and adhesion with complete loss of vision, and collapse of the eyeball. Dr. Gregory however states that true variculous pustules do not form on the conjunctival membrane; and that blindness of one or both eyes which is so common as a result of smallpox, especially in children, is produced by an intense kind of opthalmia, which sets in about the period of the secondary fever, and rapidly invades or spoils the transparent tissues of the organ. The pustules generally occur on the skin, and the mucous membranes, freely exposed to the air, but some hold that variculous pustules may be found in many of the internal organs, as the esophagus, stomach, intestinal tube, the membranes of the brain, pleurae, pericardium, peritoneum, liver, spleen, pancreas, and even the wounds. That these parts may be affected during the disease no one doubts, but that they are
the seat of pustules has been derived with
good reasons by many. The mucus mem-
brane of the alimentary canal may pre-
sent the appearance of pustules by the
inflammation of its solitary pustules and
ciliated glands; since they resemble
them so much that they were mistaken
for them by so accurate an observer as
Sauville. These appearances Wishberg
found in most of the bodies he opened,
and along with them, there were numer-
ous petechial spots, varying in size and
colour, but often brown, and containing
blood extravasated into coagulated tissue.
With regard to the various pustules
said to be found on the pleura, peritonae-
um, etc., they are in all probability mi-
nerial tubercles of these membranes and
organs. Besides occurring on the
mucus membranes in the situations
mentioned above, they are found on
the mucus membrane of learmarked
nasal tumours, when they project
below the margins of the veins, like
on the glass pipes to the extent that is
left uncovered by the prepuce, in the female on the labia, mons pubis, clitoris, hymen, and prenauma, but Wrisberg states that in many objections he did not find one case in which they were to be seen within the canals of the urethra, vagina, or rectum.

Salivation occurs in connection with, and caused by, inflammation of the mucous membrane of the throat, with or without prenacula—such lasts for several days. The tonsils and base of the tongue are also involved. The inflammatory action in the throat may cause the increased flow of salivary, partly by the glands being influenced; they secrete it in greater quantity than usual, partly by its being prevented from passing into the stomacula by the enlarged tonsils, and the inability of the velum and tongue to move. At first the discharge, which usually commences on the appearance of the eruption, but is sometimes as very or two later, is thin and abundant, but
towards the periods of maturation it often becomes viscid andropy by being mixed with thicken tough mucous secreted by the inflamed membrane, and is with difficulty got rid of by the patient; at the same time the throat is so much inflamed that the voice is nasal and liquid similar is forcibly ejected by the nostrils. If the salivation cease abruptly and especially if the swelling of the face at the same time suddenly accede prematurely subside, this peril is great, and the patient usually dies by suffocation. In children the salinations does not so often occur; but diarrhœa appears sometimes to take its place. The diarrhœa is sometimes beneficial, sometimes not, it is often the cause of the patients death about the periods of the secondary fever; whilst in some epidemics it seems to be a favourable symptom. It has been asserted that it was a symptom as certain in the confluent small-pox of children during an epidemic he witnessed as salinations in adults, and so
favourable that it might not to be checked. 

Much has made the same observation on an epidemic that occurred at Ferm in 1720. Similar facts have been noticed by several others. The eczema occurs in all forms of the disease, but is much more severe in the complaint, and may cause a great deal of additional suffering to the patient, as well as endanger life by causing suffocation.

During the periods of maturation, patients often complain of great itching of the surface, which tempts them to scratch off the heads of the pustules and they thus often ensure pits. At this period of the disease, the patient likewise exhibits a peculiar greasy disagreeable odour.

There is a difference of opinion as to whether smallpox may affect the fetus in utero, but the preponderance of opinion goes to prove that the fetus may be affected; and it may live afterwards. There is an instance given by Dr Jenner in the first volume of.
the Medical Chirurgical Transactions of an infant who upon the fifth day of its age became indisposed, since on the seventh exhibited the eruption of small-pox, so that the contagion must of been communicated to it whilst it was in the womb. A few days before her confinement the mother of this child had been in the street, a person conversed with small-pox patients, the same week sight of whose body had sensibly affected her. Sir William Watson likewise relates an instance in which there was sear on a newly born infant, the infant was afterwards inoculated with variolous matter, but it took no effect. Dr. Pearson describes a case in which he inoculated the mother during the sixth month of intra gestation; since she had the disease severely, her child was twice inoculated without success. The poet seems able to be affected with small-pox even when the mother entirely
escaped it. Dr. Mead has noticed a case of this kind, a woman near her full time who had the smallpox previously, attended her husband whilst he was affected, with that necessity; although she was not affected herself with it, she was delivered at the full time of a healthy child covered with variolous pustules. Hoadleys and Cotanius say they never saw a foetus affected with variola, although they have great advantages. The mother may have smallpox without the foetus being affected. The cases that have been recorded of this kind may be divided into three classes. 1. Smallpox has taken place in the foetus, or the infant has been born with the disease, with previous or simultaneous affection of the mother. 2. The foetus, or infant immediately after birth, has been attacked with smallpox, without the previous or simultaneous appearance of the disease in the mother. 3. A pregnant
woman has been attached with the disease, yet the fetus has not presented any symptoms of it. In the first of these cases there can be no doubt but that the poison is transmitted from the mother to the child, and this takes place most probably through the vascular system. Although the blood of the mother and fetus do not directly mix, it is as easy to conceive that the fetal vessels of the placenta will absorb the poison from the maternal blood as that it is absorbed by the lungs in an adult. In the second class the poison is most probably transmitted from the mother to the child, likewise the poison having entered her frame, but has not produced any specific influence on account of the susceptibility to some not having been ameliorated either by previous attacks of the disease or by vaccination, or that she is originally susceptible to it. The third class
accidents of different explanations. The eruptive fever may have been so violent as to cause the death of the child before any external marks of disease were produced. The mother becomes affected at an early period of pregnancy, so that the child is not capable of being affected by the poison, even before the child is born enough to be affected. The poison has been expelled from the mother's body. The pox may have been the disease in so mild a form that it has left no trace behind it. The pox may arise from some unknown cause be susceptible of the affection.

There are several complications to which this disease is liable: vesiculations, inflamations of the auricular tissues leading to the formation of abscess; glandular swelling in the groins and axillae, boil sores, phlebitis. The mucous membrane of the alimentary canal is very liable to be affected, it may be in a state of...
Irritation from the first appearance of the disease, and this goes away on the coming out of the eruption, but it may continue and go on to the most severe inflammation. There is one thing remarkable about this complication viz: that it does not correspond to the severity of the disease, but rather tends to moderate the symptomatic fever. After death in these cases the intestinal mucous membrane presents traces of inflammation, and it is in many cases affected with gangrene and sphacelous, so that large patches are excoriated, or covered with dirty colored sores, as in suppuration; along with these are the inflamed follicles, glands, and petechial spots before mentioned. The most frequent complication is inflammation of the respiratory mucous membrane, differing in intensity and extent, and generally very severe in the confluent form of the disease, it is usually indicated by very great
intensity of the febrile symptoms, and is often accompanied with pneumonia. These had recorded the particulars of eleven cases in which the lungs were affected. In seven of these the mucous membrane of the larynx, trachea, and bronchial tubes was in different degrees reddened, redden, covered by mucous mucus, sometimes bloody. In three the membrane of the glottis was thickened, swelled, hard, and, more or less rough in texture. In one the membrane of the windpipe was covered with fragments of a white membranous covering. Indeed the lungs, one or both, presented marks of inflammation; in one case the left lung contained an inconsiderable purulent abscess. In four admissions connected the pneumonia to the costal pleursy. In three there was serous pleursy varying from one to three rimes found in the pericardium. In other instances the symptoms denote the existence of susceptible meningitis. But more frequently a
progressive congestion takes place causing vertigo, delirium, tending to become paralyzing by convulsions and coma. In some cases the kidneys seem to be affected, and urine is professors tinged with blood.

In the most searce forms of this disease symptoms indicative of what is called the putrid diathesis show themselves, petechiae, vesicles, hemorrhages from many parts of the body. The festoons instead of being pimple and yellow, are flat, red, purple, or blue, that is, they contain blood, as in serious illness, in the place of pus.

Smallpox is readily communicable by contagion, and it is generally believed that however it may have first arisen, it has now no other source. Facts tending to prove this may be

found in its history. Thus it was quite unknown in Europe, till the beginning of the eighteenth century, although it is known to have existed at an very early
periods. In China, for example, it is generally supposed to have been known upwards of a thousand years before the birth of Christ. That it did not sooner extend westwards into Persia, and thence into Greece may be attributed partly to the horror which the complaint evoked everywhere inspired, and the attempts that were consequently made to check its progress by prohibiting all communications with the sick, partly to the limited intercourse which then took place among the eastern nations, but principally to the peculiar situation of the regions through which the infection was diffused, separated as they were from the rest of the world by immense deserts and the oceans. When it made its first appearance in Europe it was distinctly traceable to contamination arising from the army of the Moors being affected with small-pox when they invaded Spain. The modern history of the disease tends to the same conclusion.
It was not known in the New World before its discovery by Columbus in 1492, in 1520 it seems to have been first introduced there; and it was not known in Scotland till so lately as 1707.

The limits within which the variolous poison is confined does not seem to be very great. As the peculiar smell of a variolous patient decreases as we move from him, so it has been supposed that the deleterious properties of the variolous poison decrease in a like ratio by being diluted by the air; and this seems to be consistent with the observations and experiments of most authorities. Dr. Meany exposed six children an hour daily, for a week, at the distance of half a yard, to cotton impregnated with variolous matter, without communicating the disease to them; and four an hour daily, for a fortnight, at the same distance from a person labouring under small pox, with the same result. And from the observations of many others, it seems...
probable that it can take little effect at the distance of six or seven feet. It may be communicated in every way by inoculation, by an affected atmosphere, by the vicinity of fomites, 
Dr. Henry of Manchester relates an instance of this kind: a newly married woman, dancing at an assembly with a gentleman, who remained that her person emitted a strong smell of small-pox, in a week after she sickness and died; and it was afterwards ascertained that several of the family of the dressmaker who made her clothes had the small-pox. It may also be communicated from the dead body, Mr. Caesar Hawkinis relates an instance of this, four students being affected by small-pox, from the body of a man in his dissecting room. And some observations lead to the belief that the dead body may retain this property for years; thus a case is given by Dr. Jenner, of a boy who attended as grave digger, whilst he was recovering ground, in which ten years before an
person, cases of smallpox have been noticed, was soon after attractive with the disease, which from every inquiry, it was found he could have derived from no other source. All persons are not equally susceptible of smallpox. There are three species of immunity or insusceptibility to the disease, one depending on a family peculiarity, a second on an individual peculiarity, and the third on some temporary cause. There have been numerous examples of persons that have been exposed to great deal, all their life time, to the influence of the contagion of smallpox and never affected with the disease. There have been instances likewise of persons resisting the influence of the contagion for several years, but falling victim to it at last, among nurses of smallpox patients this has often taken place. Sometimes whole families escape whilst the disease rages around them. It is generally thought that before the eruption
appears a case is not capable of communicating the disease to another person and that it may be communicated from the time the eruption first appears, till the last scale falls off, but that during the maturation of the pustules the disease is most contagious. It often occurs in the epidemic form, which usually appears in the spring, increases during summer, declines in autumn, and subsides in winter. Epidemics however sometimes take place in winter, and in these, the disease is generally more frequent, irregular and malignant; but there have been epidemics in the winter which have been quite mild. At the beginning of any epidemic the disease attacks principally infants and young persons, but afterwards adults or even old persons are liable to suffer.

The disease is generally much milder after inoculation than when it is contracted in the ordinary way, and usually is of the discrete form.
but sometimes it is unpleasant, and quite as severe as an ordinary smallpox. Some have supposed this to be due to the poison having been taken in by the cutaneous instead of through the mucous surfaces; but it is most probably owing to a smaller quantity of the poison having been admitted into the system. The Chinese have been for many centuries the only habit of propagating this disorder, by putting some of the crusts into their nostrils.

The practice of inoculating smallpox has been used for ages by the Brahmins in India, and it was practiced in Turkey at the beginning of the last century and perhaps earlier, being introduced into Constantinople by a Thessalian woman. Lady Mary Wortley Montagu was the person who was principally instrumental in introducing the practice into this country in the year 1718; she was the wife of an English ambassador to the Ottoman court.
however recommended the practice before she died, but their statements seem to have been disregarded. The first person who was inoculated in this country was Miss Wortley, afterwards Dr. India, by a physician, Dr. Keith. Then some convicts, fellow slaves who were promised their pardon if they would allow the experiment to be tried on them, and at length some of the royal family.

The eruption of smallpox is not infrequently preceded by a rash, something like that of scarlet fever, it fades in one day or two, and then the eruption comes out the same as if the rash had never appeared. It is considered as favourable sign in the disease after inoculation, whereas often times in the natural disease, but in the latter it is most unfavourable especially if the rash be of a changing colour, it being often followed by a severe confluent form of the disease. After inoculation, the periods of incubation
is generally short, the pestilence usually coming out between the fifth and the fourteenth days but they may be delayed according to some till the seventeenth, and others to the twenty-third; but selection is ever later than the last mentioned period, so that if no patient presents no signs of the disease on the twenty-third day after inoculation we may safely consider the operation unsuccessful. It is further to be observed that the duration of the latent period in inoculatia small-pox is much influenced by the climate, and perhaps by the season. In Italy the eruptive fever generally appears on the fifth day, or the sixth, at the latest, and in Greece it appears about the same time, in those who are inoculated in the spring, or the beginning of summer. In colder regions however it appears more tardily. The pestilence are few, the disease seldom confluent, and the secondary fever generally minor in the disease after inoculation. From these circumstances
we should expect the number of fatal cases to be diminished, and this is the case for the mortality in nature. Small-pox was generally thought to be one in five, whilst Gregory estimated the number of fatal cases after inoculation to be one in five hundred. Harrow Burnard, or Great Inoculator, declares that not one in fifteen hundred died.

Since then a much more safe protection from small-pox has been discovered, viz., vaccination. The first distinct allusion to this affection that had been recorded is, that when the Duchess of Cleveland, who was very proud of her beauty, was told she would very soon have to deplore its loss, as small-pox was raging in London at the time, she replied she had no fear of that, because she had had no disorder which could prevent her ever taking small-pox. Although from this time and probably earlier, it was generally known in several of the midland counties of England that
those who were affected with cow-pox, contracted from the cows while milking, were not so liable to smallpox; the popular belief was taken little notice of, and put to no quack account by the members of the medical profession, till it was taken up and investigated by Dr. Jenner. His attention was first drawn to the fact at an early age; the circumstance that first led him to investigate it, was that while he was at the house of his master at Sothbury, a young country woman came for advice, and spoke of smallpox being mentioned, she made a similar remark to that made by the Duchess of Cleveland.

Dr. Jenner found that the cows of some dairy's only, were affected, and that in these, they were milked by men who also took care of the horses; he further discovered, that the cows were affected at the same season that the horses usually had a disease called grease. Hence he concluded that the cows were not the animals in which
the disease first appeared, but they were affected by the hands of the men within them, after abusing the horses' heels. Subsequent inquiries however rather tend to prove that it is not always communicated to the horse in this way, but may appear as an independent disease. The matter taken from an eruption usually appearing on the horses' heels, when they are affected with the grease has the same properties as matter taken from the eruption on the under of the corium; and infants an eruptive disease of the kind may appear on other parts of horses besides their heels. Dr. Jenner found that some persons who have cowpox were still liable to smallpox, he traces this in a great measure to the severe eruption being used, as the cowpox tests are subject to several kinds. They all cause local inflammation, but only one has a constitutional effect, and protects the system from smallpox.

Another difficulty that came in Jenner's way, was that some persons
that were affected by the true eruption still remained liable to smallpox. It
occurred to him that the virus of cowpox itself might undergo some change,
whereby its specific virtues were lost; and that the eruption might commu-
nicate one day the desirous protection, and lose this property the next. Experience
has proved this to be the true explanation; the thin matter coming at first
being much more active, than the thicker matter coming afterwärds in
protecting from smallpox; although
the latter produces a more severe local
action. The same is the case in inocula-
ting smallpox.

The next step made by Dr Jenner,
was to determine whether the vaccine
matters could transmit the disease by
inoculating it from one human
being to another. This he did by taking
matters from the hands of Sarah Nelmes
as milkmaid, who contracted the
disease by milking her master's cows,
and inserting it into two incisions made
in a healthy boy of eight years old. He went through the disease, and when he was inoculated by virulent matter two months afterwards, it took no effect.

Cow-put however causes consists of a local inflammation of the outer surface of the cecum, which by causing the secretion of a thin transparent fluid, elevates the cuticle so as to form a vesicle. At the same time the redness, soreness, and hardness of the skin continues, and the inflammatory process denoted by these signs, causes suppuration of the cecum with some distinction of its substance, or what is named ulceration. The characters and progressive changes of a true vaccine vesicle are. On the second or third day after the insertion of the vaccine matter into the arm, the punctures look red and inflamed; and on the fourth or fifth day the vesicle becomes perceptible, as near, colored, elevation of the cuticle enclosing a minute quantity of a thin
transparent liquid. It gradually increases in magnitude till the eighth day, when it should measure from a quarter to half an inch across. Like the pustules of smallpox it is more prominent at its circumference than at its center, and it consists of from ten to fourteen small cells which communicate with each other. By puncturing carefully one of these cells a drop of the virus may be let out, the other cells remaining free. Up to the seventh, eighth, or the beginning of the ninth day, the inflammation around the vesicle should extend to only a very small distance from it. After this, it spreads, and what is called the area is formed; a circular, red border, which continues to increase during the ninth and tenth days, and begins to fade on the eleventh, passing through shades of blue as it declines, and leaving a degree of hardness behind for two or three days more. By this time a brown or mahogany coloured crust has
formed over the vesicle of a nearly circular shape; this becomes gradually harder and clearer, and finally detaches itself about the twentieth day. The disc the which it leaves should be somewhat less than half an inch broad, circular, slightly depressed, marked by radiating lines, and dotted with little pits which seem to correspond to the cells of the vesicle.

About the eighth day there is usually some slight febrile excitement manifested, which soon subsides. This is analogous to the secondary stage of small-pox; and it appears to furnish the condition of desired protection.

A very ingenious test, to see if the system is properly affected with vaccine matter, has been devised by Mr. Bryce. He applies the matter to the other arm five or six days after the first vaccination. If the constitution has been properly affected by the first, the inflammation of the second vesicle will proceed so much more rapidly
than usual, that it will lie at its height and decline, and disappear, as early as that of the first; only the muscle and its vessels will be smaller, and attended with little or no constitutional symptoms. If the system be not properly affected, the second muscle will run its natural course. If this be the case it may be tested by a third. The reasons Mr. Bryant gives for ordering it to be done, the fifth, on the beginning of the sixth day at the latest, is because if ordered beyond the sixth day, the affection will be very indistinct and of short duration; and if performed at an earlier period, the contrast between the progress of the two affections, with respect to duration, will not be so great as may be thought necessary.

Different opinions have been entertained as to the origin of mastitis in the cow; but they may all be referred to three heads. 1st. That it is a merely peculiarity to the cow, affecting them in consequence of different causes, as moist or marshy
pastures, as was imagined by Fabricius; the bites of insects in certain states; the
activity of midges retained an uneven
time in the water, and thereby irritating
the lactiferous tubules and the teats of
some certain states of the atmosphere in par-
ticular seasons. That the cow pox was
the effect of various poison exuding
itself in the system of the cow. This is
the opinion that Dr Jenner first espoused.
That it is identical with small pox
was conceived to be rejected by Loomes
and Lucas who applies to the skin of
the cow and other domestic animals
various poisons without producing
any eruption. Biborg of Copenhagen,
however, asserts that he communicated
small pox to dogs, apes, swine, and cows;
and Sayers is said to have produced
the genuine vaccine vesicle by applying
the various viruses to the cow. That it
was derived from the grease in the horse
heels.

The truth, namely that small pox
does occur after vaccination is now too
glaring to be devised, but this should
not lessen the value of vaccination. For
the disease not only occurs much more
seldom after it, but when contracted it
is much less severe than either the
natural smallpox, or smallpox after
involution. It also assumes a peculiar
form which is designated variolous
disease, or modified smallpox.

The constitutional symptoms
of the modified disease, are at the first,
early the same as in the natural form.
The eruption fever is of equal length and
intensity. There is frequently much
headache and sickness, sometimes delirium. The eruption begins about the
third day; it is often eruptive, sometimes
confluent, and in the confluent cases
the eruptive fever does not entirely
subside as soon as the papules come out.
It is in the subsequent progress that the
complaint is modified; in respect both
to the appearances presented by the
skin, and the constitutional symptoms.
In the modified disease there is no
secondary fever, but all the constitutional symptoms subside as soon as the eruption has reached its acme.

Almost always it is the modified disease that occurs after vaccination. And from the short duration of the eruption, and there being no secondary fever, in other words, the patient becoming convalescent at the time that danger is usually the greatest, there are consequently fewer fatal cases: but some do occur.

Three distinct kinds of eruption have been observed in the modified smallpox. The eruption sometimes approaches very nearly the ordinary disease, both in its character and course. The pustules fill up, here the central depression, ultimately crust over, and the face swells. But the pustules are usually smaller than in the ordinary disease, and this process goes through more rapidly. In the second form the pustules show a little fleur on their tops only, but never fairly suppurate, nor become, but the vesicles dry up, and hard
prominences, with livid bases and horny summit, remain. There are other cases in which a great part of the eruption consists of red pimplies, which soon become livid, and continue from first to last, no pimplies whatever. In as great many cases are these forms of the eruption are found on the same patient.

Shortly after the introduction of vaccination into practice, the frequency of epidemics of smallpox were much diminished. But an epidemic of smallpox is not entirely consequent on the disease of vaccination; for it is enforced by law in Norway and epidemics of smallpox have frequently occurred since.

Of later years there have been a greater number of persons affected with smallpox, as shown by statistics from London, smallpox has rapidly diminished in Copenhagen, etc. Some think that this greater frequency is to be ascribed to the virus necessarily degenerating, by passing from man to man. But that it does not necessarily degenerate has been
proved by an experiment of Lely's: he took virus from a human being and grafted it into a cow; after the cow was affected, he took some of the virus from the cow and injected it into a child; instead of the virus being increased in energy by its being passed through the cow, its energy was diminished; but it regained its former strength after it had been passed through several children. From this experiment he concluded that the virus does not necessarily degenerate in passing through several human beings, but that the principle cause of degeneracy is carelessness in selecting the virus.

There seems reason for suspecting that the protective power of vaccination in preventing smallpox gradually loses its effect on the system. In some, re-vaccination at a distant period produces the same effects as a primary one; whilst if a person be re-vaccinated soon after a former one, it has not the same result. And it is most probable that a person
in whom re-vaccination takes effect, will also be liable to be affected by the contagion of small-pox. The characters of the cica
tria were at one time supposed to show whether the person was liable to small-pox or not. The normal characters are depressed,
white, and pitted. But from late inquiries it is found that these characters do not prove that the person is not liable to be affected with small-pox; although the British army still recognize them as exempting the men from re-vaccina
tion. The pits are supposed to be caused by the cells of the vaccine vesicle.

The advantage of being inoculated with small-pox, to a person exposed to contagion, and seemingly doomed to have the disease, was great; but to the general community it was very dangerous. To a person much exposed to contagion it gave a milder form of disease, whilst if he had not been inoculated with small-
pox, in all probability he would have been much more severe in the natural way when we consider the very contagious
nature of the complaint. But as a general practice it was of great harm, instead of being useful to mankind. It was certain to cause a very disagreeable disease, though comparatively safe to the person inoculated, who might on the one hand have had the disease much more severely, and on the other might have entirely escaped, for besides those who would have escaped from not being exposed to the contagion, we know that some persons are not very liable to be affected with it. The general practice of inoculation had also the bad effect of spreading the contagion far and wide, so that although the number of fatal cases are fewer in the disease as caused by inoculation, still the absolute mortality was fearfully increased. As he ventured to prove this by referring to the London bills of mortality during the first thirty years of last century, with those of the same number of years at the close of it; and he found that they had increased from 7 1/4 to 9 5/8 per cent. If inocination be compared
with this its great superiority will soon be seen. It only causes a slight disturbance of the system—a mild form of reaction in fact—with only one eruption, is quite free from danger, and according to some protects the system from a future attack of smallpox as much as a primary one does. Another great advantage of vaccination is, if it does not entirely take away the liability to an attack of smallpox—which it very often does—it causes the disease to assume such a modified form that the most dangerous period of it does not occur at all; namely, the secondary fever.

Smallpox after smallpox is liable to occur, and when it does the mortality is much greater than in smallpox after vaccination, as may be seen from the following table.

<table>
<thead>
<tr>
<th>Secondary Smallpox</th>
<th>Authors</th>
<th>Cases</th>
<th>Deaths</th>
<th>Mortality Per Cent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thomson</td>
<td>71</td>
<td>3</td>
<td>4.2</td>
<td></td>
</tr>
<tr>
<td>Chelsea</td>
<td>24</td>
<td>3</td>
<td>11.5</td>
<td></td>
</tr>
<tr>
<td>Berlin</td>
<td>39</td>
<td>14</td>
<td>35.8</td>
<td></td>
</tr>
</tbody>
</table>
The treatment of smallpox was long conducted on an erroneous principle, viz. by promoting the eruption as much as possible, under the idea that it was caused by a pestilential poison and the majority of the older physicians thus endeavoured to expel it from the system; there were a few however who treated it by evacuations. The room was kept close, the patient warm, and sometimes cordials and wine were administered. Hydenham was the first, in this country, to employ a cooling regimen, and in only one
particularly was his treatment wrong, namely giving opiates in the inflammatory stage. But it was subsequently to the introduction of inoculation, that the cooling treatment was fairly established. But the same principles apply to cases of the casual disease, when an opportunity occurs of treating it at its very commencement, or whilst it is merely impending. The object being to keep down the eruption upon which the severity and peril of the disorder depends; by the adoption of as much of the antiphlogistic treatment as the case will admit. The face should be freely exposed to cool air, the patient should either be kept out of bed or covered only very lightly with clothes; his skin may be sponged with tepid water if the temperature be very high, saline purgatives may be given so as to cause two or three stools a day, cooling diluted sedatives given only should he allowed, and solids food prohibited. When at the very beginning there is sickness sence
vomiting an emetic may be given foll-
lowed by a cathartic. Blood letting was
thought to be very useful both by its
anti-philologic effect, and at the same
time allowing some of the virus to escape
with the blood, but probably it does
more harm by lowering the power of
the patient, than by accomplishing
the foregoing indications; when however
convulsions come on at an early stage
blood letting is required.

When the eruption has all come
out, if the pimplles on the face are few and
distinct, the change is over, and all we
require to do is to keep the house gently
open, and to continue the cooling treat-
ment. But if the pimplles on the face
are many and soupy, and in
general their influence is equally con-
spicuous in altering nervous and
cutaneous irritation, producing sleep,
and lowering the pulse. When there
is uneasiness, restlessness be about
the eighth day opiumes are also useful.

If the maturation of the prepuce
should proceed tardily, if they do not fill
up properly, and their contents become
prunent, if they are livid and intermingled
with pustules, and typhoid symptoms
occur, stimulants will be required.

The proper plan of managing the
patient during the continuance of secondary
fever, is to keep the bowels moderately
open by gentle laxatives, or by enemata;
and, to give opiumes once or twice a day.
These are the more necessary on account
of the irritations of the skin. The cooling
regimen must be given up and the
strengths supported.

Various external applications
have been tried, with the view of relieving
the intolerable itching, which often
induces the patients to scratch and tear their
faces, and so ensure the formation of scars.

Tallow cream has been used for the purpose;
or a solutions of common salt, applied
with warm, or a liniment composed
of equal parts of olive oil and lime water; and
more lately medicinal ointment with
olive oil and starch.