

3

AN
INAUGURAL DISSERTATION

ON

Cergot

SUBMITTED TO THE

PRESIDENT, BOARD OF TRUSTEES AND MEDICAL FACULTY

OF THE

University of Nashville,

FOR THE DEGREE OF

DOCTOR OF MEDICINE.

BY

R. B. Sayers

OF

Tennessee

1858

JOHN YORK & CO.,

BOOKSELLERS AND STATIONERS,

NASHVILLE, TENN.

Ergot.

Ergot is a morbid growth of the seed of *Secale cereale* or common rye. Considerable difference of opinion has existed in relation to the nature of this singular substance. It was at one time generally thought to be merely the seed altered by disease, the morbid condition being ascribed by some to the agency of an insect, by others to excess of heat and moisture. A second opinion considered it a parasitic fungus, occupying the place of the seed. According to a third and intermediate opinion, the ergot is the seed, diseased and entirely perverted in its nature by the influence of a parasitic fungus, attached to it from the very beginning of its development. This was M. Lereilles opinion. According to this

writer, a soft viscid tubercle may be seen, at the earliest stage of the flower, surmounting the germ, the character of which it changes, without preventing, its growth.

The germ becomes of a dark colour, and increasing in size, pushes the tubercle before it, which also expands, and exudes a viscid matter, which spreads over the germ, and when dry gives it a thin yellowish coating.

The observations of Mr. Duckett of London confirm this view of the nature of ergot; but he thinks differently as to the character of the parasitic plant. According to this writer, the beginning of the growth of the ergot is marked by the appearance, about the young grain and its appendages of multitudes of minute filaments like cobwebs, which run over all its parts, cementing anthers and stigmas together,

and of a white coating, upon the surface of the grain. This white coating, proves to be the reproductive agents, germs, or sporidia of a species of fungus, and may be observed to sprout and propagate under favourable circumstances. The filaments are the results of the growth of these singular germs. The sporidia and filaments do not increase with the increase of the ergot; and when the ergot has projected beyond the paleae and become visible, it has lost a portion of its white ^{coating} and presents a dark violet colour. It now increases with great rapidity, and attains its full size in a few days. But Luckett believes that the germs of the fungus emit their filaments through the tissue of the ergot when young and tender, and that, as this increases, it is made up partly of the diseased structure

of the grain, and partly of the fungus matter.
This view of the nature and cause of ergot is strongly supported by the facts, that the microscopic fungus has an existence independent of the morbid grain, being found in various other parts of the plant, and growing even when entirely separated from it, and that the sporidia or white dust, if applied to the seeds of certain plants before germination, or sprinkled in the soil at the roots of the plants, will give rise to ergotized fruit.
That the ergot is not itself a peculiar fungus, but the perverted grain, is evinced by the circumstance that in some instances only a portion of the seed is ergotized.
The ergot occupies the place of the normal seed in the husk, beyond which it projects, much the greater portion of

its length. Sometimes there is only one or two of these diseased seed in each head of rye, sometimes they are very numerous. They should be collected a little before harvest. The grains are, from one third of an inch to an inch and a half long, from half a line to four lines in thickness, threesided, furrowed, tapering from the middle towards each end, curved, so as to resemble the spur of a cock, from which they received the name of spurred rye or *secale cornutum*. They are brittle somewhat flexible, of a dark violet colour externally, and internally yellowish white. They have a smell somewhat resembling, when they are in mass, that of spoiled fish, a disagreeable acrid taste. Water and alcohol will extract the virtues of ergot. With regard to the active constituents.

Many attempts have been made to isolate the active principle of ergot, but with no satisfactory success. A fixed oil, obtained from it by ether, also an extract has been obtained, which were found not to be without activity, but certainly has not been determined to possess the whole virtues of the medicine. In this confusion therefore, we will wait for more light, and, in the meantime, use the medicine in its well-understood forms. Ergot is liable to be injured by time, especially when exposed to air and moisture. It is also apt to be destroyed by worms. But if kept perfectly dry and excluded from the air, it may be kept a long time, with little change. It is better kept in the whole state than in powder. The best plan is to collect it every year. There is no doubt that much of the difference

of opinion, as to the effects of ergot, is owing to the use of the drug in different states of preservation. The effects of ergot on the system are very decided. It is said though, if given in moderate doses, of fifteen or twenty grains, to produce no sensible effects upon the male subject. But if the dose be increased to half a drachm or a drachm, it will produce nausea, and more or less cerebral disturbance, attended with some diminution in the frequency ^{force} and of the pulse. In still larger doses, it is said to produce decided narcotic properties. With nausea and sometimes vomiting, dilatation of the pupils, ~~giddiness~~, a feeling, as of intoxication, heaviness or pain in the head, more or less drowsiness or stupor. Sometimes the bowels are disturbed, and evidences of gastrointestinal inflammation

are said to have occurred in some instances. Sensations of itching, numbness are occasionally felt in the limbs. The circulation is usually depressed. The most serious consequences have ensued from the continued use of ergot. Fatal epidemics prevailed in different parts of the Continent of Europe which were supposed to have been produced by the use of rye bread mingled with this morbid product. It is possible, therefore, that the epidemics which have been ascribed to ergot, may have had another origin; as no experiments, which have been made with this substance, would lead to the supposition that it could produce such effects. But dry gangrene is produced by the habitual use of ergoted rye. It is said to have occurred in individual cases and in communities where it has

been used excessively; and experiments on the lower animals have satisfactorily proved, that it is one of the regular results of the long continued action of the poison on the system. Ergot seems capable of producing local irritation of the stomach and bowels, as indicated by the vomiting, diarrhoea, which have been noticed as among its effects in over doses. But its characteristic phenomena follow its absorption. These are of two kinds; those dependent on the action upon the uterus, and those upon the brain. It is probable that the action on the uterus is produced by an impression on the nervous centres of the organ, and not on the muscular tissue directly; so that the influence of the medicine, is mainly, if not exclusively on the nervous system. The circulation is said to be

depressed. And as concerns the direct ~~impression~~
impression on the male system, it seems to
be one of general nervous depression of both
the animal and organic functions.
In this way may be explained the tendency
of ergotism to terminate in dry gangrene.
The organic nervous influence, under the
action of the poison, ceases to be exerted
upon the capillaries, which become paralyzed
and unable to carry on the blood. The death
of the part follows necessarily. The result
is apparently owing to a direct depressing
influence of the poison on this part
of the circulating system. The gangrene
is of the dry kind, because the vessels
in their state of nervous death, can no
longer receive and carry on the blood,
and consequently collapse. It is by this
mode of operation, that we are enabled

to explain one of the most valuable
therapeutic effects of ergot.

Ergot has been long used, in various ^{-parts} of
the continent of Europe, by midwives, for
the purpose of facilitating delivery; but
the attention of the medical profession was
distinctly drawn to the subject by Dr.
Stearns of New York. The first published notice
of it by him was in 1807. The effect of
ergot in producing uterine contractions, is
most strikingly manifested in the pregnant
state, at the normal period of delivery. The
contractions come on at a periods varying
from 10 to 20 minutes after the administration
of the medicine; and continues from half
an hour to an hour and a half. The contrac-
tions differ from the ordinary labour pains;
there is scarcely any interval of of repose,
until the gradual cessation of the influence

of the medicine. The question here presents itself, whether this influence is exerted upon the unimpregnated uterus. It is stated that bearing down pains are sometimes felt in the region of the womb. Another question of some importance, is whether ergot is capable of bringing on abortion. This has been denied by some. The truth probably is, that the peculiar influence of ergot on the womb is exerted through the nervous centres; and is likely to be most effective, when, in the normal state of the system, these very centres are disposed to the condition in which it is the tendency of ergot to place them. In this physiological state, they may be supposed to be more susceptible, than under ordinary circumstances. To an impression of the same character as that, which they are prepared to receive from the

womb at the full period of gestation. The effect of ergot will, therefore, be much more likely to be felt at this time than at others. But the fact appears to be that, though less apt to excite uterine contraction at other periods, it is capable of producing the effect, in some instances, at any stage of uterogestation, and even in the unimpregnated state of the uterus. Ergot is the most valuable of the uterine motor stimulants. It is most usually resorted to in the second stage of labour, when there is inefficient action of the uterus, indicated by the feebleness or irregularity of the pains. If administered in the dose of ten or twenty grains finely powdered, and repeated once or twice, at intervals of twenty minutes, if necessary, it seldom fails to excite powerful uterine contractions, which promptly expel the child

if all the requisites for an easy delivery exist, that is, if the os uteri be dilated, the presentation natural or such as to offer no great impediment. There must be no mechanical impediment, such as morbid growths, rigidity of the tissues, or disproportion between the size of the head and the outlets through which it must pass. These requisites for a prompt termination of the labor are so many conditions which must exist, else it will be altogether improper, and may be ruinous to the child or mother, to administer ergot. As there is reason to believe that this powerful article is frequently employed without such restraints, and that sad havoc is committed by it. From the exposition that has been made of the changes induced in the uterine circulation, by the parturient contractions, it is evident that if these

contractions were not alternated with intervals of repose, the fetus would be inevitably destroyed, in every case of parturition, before its expulsion could possibly be effected. Such unrespite^d contractions of the uterus, as we have supposed, are, it is very well known, produced by ergot; when it is exhibited and takes effect fully, the uterus is urged to one long and unceasing effort until its contents are evacuated. A radical change is, therefore, induced in the mode of uterine contraction, which is tantamount^{nt} to wresting the process of parturition from the hands of nature. There is no respite for the sufferings of the parturient woman; no time for the fetal circulation. This ergotic contraction of the uterus may, produce fatal compression of the child's brain, by the too rapid molding of the head

to the parturient passage, where there is any disproportion, or even unusual resistance, in the soft parts. The death of the fetus is supposed frequently to result from the violent and unremitting compression, arresting the circulation of the cord, or cutting off the supply of blood by temporarily obliterating the vessels of the uterus itself.

The destructive tendency of ergot, as already intimated, is not limited to the child. When prematurely or incautiously administered, it may cause rupture of the uterus, by exciting it to exert a degree of force incompatible with its integrity, but yet insufficient to overcome the obstacles that may oppose it. Especially is this true in cases of disproportion between the size of the child and that of the pelvis, and when there is unusual resistance

of the os uteri. Ergot is employed in other conditions. It is recommended when there is immediate danger from flooding, with failure of the natural pains, and without malposition of the placenta; also when the death of the fetus is well ascertained, and the patient is in danger from exhaustion or constitutional irritation; also when, from previous experience in the case of an individual, there is reason to fear alarming hemorrhage immediately after delivery. If in this last condition a dose of ergot be administered just before the expulsion of the fetus is completed; it will have the most desired effect. Ergot may be given for retention of the placenta from deficiency of uterine contraction; and dangerous hemorrhage following delivery. For the expulsion

of clots of blood remaining in the uterus, and of the dead foetus in protracted cases of abortion, in the earlier stages of pregnancy, there can be no objection to its use. Ergot is frequently employed in other conditions, than those connected with child birth. It has been recommended for the expulsion of hydatids, and for forcing out uterine polypi from the womb. But the most important application of ergot, in cases of ^{un}impregna^{ted} uterus, is to the ~~is~~ suppression of hemorrhage. It is certainly among the most efficient remedies in this affection. It has accordingly been used in haemoptesis, haematuria, epistaxis, with supposed advantage. It certainly does not act as an astringent in these cases. An explanation of its operation which

appears highly probable, is based upon the views of its action on the capillaries already given. It appears to have a direct sedative influence on the capillary circulation, which, in its greatest extent, is capable of arresting the flow of blood in them altogether. ² Though the direct and speedy suppression of uterine hemorrhage is probably ascribed to the contraction of the organ produced by it; yet the ultimate and lasting cure may be owing to the depressing influence upon the capillary circulation.

Ergot has also been used in gonorrhoea, gleet, and spermatorrhoea, with supposed advantage; and it is not impossible, admitting the influence on the capillary circulation, that it may prove useful in these complaints.