

**An essay on the medical properties of the Digitalis purpurea, or foxglove /
By John Ferriar.**

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AN
 E S S A Y
 on the
 MEDICAL PROPERTIES,
 of the
 DIGITALIS PURPUREA,
 or
 FOXGLOVE.



By JOHN FERRIAR, M. D.

PHYSICIAN TO THE MANCHESTER INFIRMARY, DISPENSARY,
 LUNATIC HOSPITAL, AND ASYLUM.

Nos institutum tenemus, nullisque unius disciplinæ legibus adstricti,
 quibus in philosophia necessario pareamus, quid sit in quaque re maxime
 probabile semper requiremus.

Cicer. Tuscul. Disput.
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TO:
MAJOR-GENERAL JAMES FERRIER,
LIEUTENANT-COLONEL
OF THE
CORPS OF ROYAL ENGINEERS,
ON THE
ESTABLISHMENT OF IRELAND,

THIS ESSAY
IS DEDICATED;

BY
HIS AFFECTIONATE NEPHEW

THE AUTHOR.

TO

MAJOR GENERAL JAMES GORDON

LIEUTENANT GENERAL

OF THE

CORPS OF ROYAL ENGINEERS

OF THE

ESTABLISHMENT OF IRELAND

THIS ESSAY

IS DEDICATED

BY

WILLIAM GORDON

THE AUTHOR

PREFACE.

The attention of medical practitioners has lately been directed to some properties of Digitalis, not hitherto generally regarded, by the observations of Dr. Fowler, and Dr. Drake, published in the *Contributions to Medical and Physical Knowledge*, and the *Essay on Pulmonary Consumption*, by Dr. Beddoes. As I have been engaged in a series of observations on these properties, for a considerable number of years, it may not be unacceptable to the profession, to be informed of the result of my experience. I have endeavoured to give a faithful view of it, in the following pages.

We are indebted to Dr. WITHERING, for our acquaintance with this valuable medicine, which had long been neglected by regular practitioners, and had remained in unskilful hands, more likely to destroy than to cure, with so powerful a substance. This able physician has taught us to use it, with safety and success. Though he treated of it chiefly as a hydragogue, he has indicated its application to the cure of pulmonary consumptions, and has expressed a wish, that the enquiry might be farther pursued. Dr. Darwin proposed to give Digitalis in consumption, with the view of promoting the absorption of pus formed in the lungs; but since that period, little has been written on the subject. I mentioned its efficacy in

active hæmorrhage, and incipient consumption, as depending on its power of diminishing the frequency of the pulse, in 1792; and several practitioners in this place have been induced to employ it, on this principle, in consequence of my recommendation.

There can be no doubt, that much experience has been acquired, respecting the use of this medicine, by many physicians in different parts of the country, during the same period. It is extremely desirable that their observations should now be made known, that the profession at large may be put in possession of all the cautions requisite in administering it, as well as of the benefit which it may be expected to produce.

I have been careful not to overestimate the powers of Digitalis, and I hope that I have not been mistaken in repeated observations : at present, I regard it as a remedy of the highest class ; its exhibition has become as familiar in my practice, as that of peruvian bark, or opium, with which it deserves to be ranked, and I give it with as little dread, (though never without caution) as either of those medicines. If I am not greatly deceived, it will be found eminently serviceable, in a wide range of diseases ; and in the present state of our knowledge, the investigation of its effects promises ample scope, for the exercise of skill and ingenuity.

ESSAY

on the

MEDICAL PROPERTIES

of

DIGITALIS.

Previous to the publication of some instances of the efficacy of Foxglove, in hæmorrhages and pulmonary consumptions, in 1792, and particularly since that time, my attention has been much turned to the effects of this remedy, on the sanguiferous system.

An extensive employment of the Medicine, during a period of nine years, has enabled me to speak of its properties with some degree of confidence; and I now lay the result of my observations before the public, because there is reason to believe, that the Foxglove will become

a popular remedy, and that much danger may arise from an ill-timed, and precipitate manner of exhibiting it. It may be useful, also, to give Practitioners in general some idea, of the degree of success which may be expected from it; that their hopes may neither be too strongly excited, by the first fortunate cases which may occur, nor too readily depressed by occasional disappointments.

My early trials of this Medicine in pulmonary complaints, were suggested by the opinions of Dr. Withering, Dr. Darwin, Sir George Baker, and other physicians, on this subject. The effect of Foxglove, in retarding the velocity of the pulse, as a direct sedative,* was too striking to be long over-looked; and when its application, to diminish morbid irritation in the vascular system, was once pointed out, the consequences of the idea were easily comprehended. The indica-

* The fact is so decisive, that I do not hesitate to employ this term, notwithstanding the jargon, with which the public has of late years been abused, on the subject of sedatives.

tion made a deep impression on my mind, which has been strengthened to a conviction of its utility, by a patient and cautious course of observations. It has increased, from the first glimpse of hope which it afforded, in diseases which were once but imperfectly palliated by the continued use of opiates, to the prospect of regulating, without evacuation, the number of arterial pulsations, of directing the movements of the heart itself; and thus acquiring the government of the springs of salutary, and morbid motion.

If any man had expressed an opinion, a few years ago, that we should discover a medicine, capable of reducing the pulse, without danger, from 120 in a minute, to 75 or 80, at the will of the Practitioner, he would have been ridiculed as a visionary. Such, however, under proper management, is the power of *Digitalis*.

I exhibited Foxglove, at first, chiefly in cases of active hæmorrhage. Its

efficacy, in this species of disease, was sufficiently established, by the facts published in the first volume of the Medical Histories and Reflections, to induce me to give it freely, in private practice, as well as at the hospital.

I had an early opportunity of seeing its effects, in a profuse bleeding at the nose. The patient was suddenly attacked by it, in very hot weather, after considerable excess in liquor, and had lost a great quantity of blood, in the course of three days, before I saw him. He had been bled in the arm, and the lixivium martis had been applied to the internal nostrils. His pulse had become sharp, but was not strong, and I thought it would be imprudent to use any farther evacuation. I ordered him a grain of Digitalis, with half a grain of opium, and as the hæmorrhage became very alarming, both by its quantity, and by the debility which it occasioned, I directed the dose to be repeated, in the course of two hours, if the bleeding did

not abate. I saw him soon after he had taken the second dose ; his pulse was then soft, and considerably reduced in frequency ; the hæmorrhage had ceased, and did not return afterwards.

I was consulted by a married woman, under 30 years of age, who had been subject, for several years, to almost constant menorrhagia. She was naturally delicate, and the irritation, and debility caused by the discharge brought on a train of hysterical symptoms. I gave her half a grain of Digitalis, with half a grain of opium, every night, at bedtime ; and during the day, she took a few drops of laudanum, with tincture of castor, every four hours. Her pulse, which had been irritable and very frequent, became soft, full, and considerably stronger, and in less than a fortnight, she was entirely freed from the discharge of blood, which had so long distressed her.

It is needless to detail a number of similar cases: I shall only observe, that in many other instances of menorrhagia, depending on increased action of the blood-vessels, I have found the Digitalis succeed completely, even in the small dose of half a grain nightly.* In some instances, I have found it necessary to repeat that dose, in the course of the day, as often as the patient's stomach would bear it.

Let me observe, once for all, that nothing is less accurately fixed in medicine, than one of its most important objects, the doses of remedies. The proper dose of a medicine, is undoubtedly that quantity which produces the effect required, whatever be its numerical denomination. A full dose of Foxglove is, therefore, merely a relative term. To one patient, half a grain may be a full dose; to another, six or eight grains may be

* I could mention cases, in which the discharge stopped by the first dose of Foxglove.

given, not only without inconvenience, but without producing any sensible effect.

These varieties of sensibility and habit can only be ascertained, by beginning with the lowest dose, and encreasing it with the most scrupulous care. That I might arrive with more certainty at a knowledge of the ordinary doses, I have, since the publication of my first cases, invariably given the powder of the dried leaves, in substance, as the preparation least liable to difference of strength. I have seldom found reason to complain of its want of power, though it may not have always fulfilled the indications, upon which it was prescribed. I have begun the use of the *Digitalis* with impunity, in so many cases,* in doses of half a grain, that I take no other precaution, than that of joining an equal quantity of opium with it, at first, to lessen the chance of nausea. To shew the necessity of paying close attention to the effects of this

* I have used it in several hundreds of cases; I cannot exactly determine the number.

Medicine, however, I shall mention a case, which occurred to me in the Infirmary, a few years ago. A young woman was admitted as an in-patient, with an incipient ascites, and swelling of the legs, which had been occasioned by exposure to cold. I ordered her to take half a grain of Foxglove, with half a grain of opium, that evening at bed-time. Next day, I found, to my astonishment, that all the bad symptoms, occasioned by an over-dose of the Medicicine, had come on. She had dreadful vomiting, cold sweats, and repeated fainting-fits. It was with the utmost difficulty that life was preserved, during three days, by the most powerful stimulants. When she revived, I found that the dropfical symptoms were completely removed. The gentleman who was at that time House-surgeon to the Infirmary, owned to me, that he suspected a larger quantity of the Medicine had been given, than I had directed. The example, however, may not be useless. I have mentioned for-

merly an instance, in which one grain of the Medicine produced considerable sickness, with the effect of removing the disease.* In that case, I believe the quantity had been faithfully administered.

Under these impressions, I have frequently ordered *Digitalis*, in doses of half a grain, to be given every four, five, or six hours, according to the urgency of the case, in active hæmorrhages, even when I was a stranger to the habits of the patient. I have always succeeded in reducing the pulse, and generally in curing the disease; and I have never seen any material inconvenience produced by this practice; a slight nausea being no unfavourable circumstance to the patient. At the same time, that I vouch for the safety of this method, it must be observed, that great attention is necessary, on the part of the physician and the attendants. The patient's pulse must be examined, from hour to hour, and on its first ten-

* Medical Hist. and Reflec. vol. 1. p. 24.

dency to flag, or on the slightest indications of sickness, the exhibition of the Medicine must be suspended. The practice, in such cases, is extremely critical: if the Foxglove be properly given, we stop the progress of an alarming, perhaps a mortal disease, in a very few hours; but the remedy, if incautiously exhibited, may become as certainly destructive as the disorder.

It is well known to every experienced practitioner, that bleeding with the lancet is very inadequate to the purpose of lessening the velocity of circulation, for any considerable time, unless it be carried to a dangerous excess. The Foxglove furnishes us with the means of regulating the pulse to our wish, and of supporting a given state of velocity, as long as we judge it proper. Though bleeding may still be necessary, in the first instance, therefore, yet I apprehend that we can now dispense with the repetition of it, and may thus relieve the mind of the

practitioner from a very nice, and perplexing question.

A great difficulty, respecting the theory of the action of *Digitalis*, has often occurred to me, on this subject. While it lessens the frequency and quickness of arterial contraction, it often encreases, at the same time, the secretion in the kidneys. I shall have occasion to mention some cases, in which these two operations were combined, in a remarkable degree. I feel it impossible to explain this phænomenon, at present. The diuretic power of *Digitalis*, does not appear to me a constant and essential quality of the plant; the power of reducing the pulse is its true characteristic. According to our general notions of therapeutics, these are contrary effects. To say that the action of the arterial system is retarded, and that of the absorbents stimulated, by the same remedy, is rather stating the fact in different terms, than explaining it. The secreting vessels of the kidneys are, in general, affected

by stimulants, which act upon the whole of the blood-vessels; but it is conceivable, that a spasmodic state of the vessels secreting urine, or a diseased action in them, may be overcome by a remedy, which lessens the force of the general circulation, as, in either of the cases which I have supposed, the *vis a tergo* (as the physiologists of the last age termed it) must act as an irritating cause, constantly supporting the disease. This reasoning, I am aware, will only apply to certain states of the kidney, and leaves many instances of the general problem unresolved.—It is the more deficient, because cream of tartar, a medicine which appears to stimulate the absorbent system in a peculiar manner, and which operates as a hydragogue, even when it does not prove diuretic, acts commonly as a stimulant, both on the intestines and on the kidneys. Indeed, its diuretic power seems to depend much, on its being given in doses so small, as not to prove cathartic. When it purges, its

hydragogue quality is not lessened ; in which it differs from most diuretics.

This double effect of Foxglove, however perplexing in theory, is extremely beneficial in practice : when it takes place, it adds, in hæmorrhages, a mode of natural evacuation, sufficiently efficacious to relieve plethora, without directly debilitating the system ; and what is of the greatest importance, continually operating while we persist in the exhibition of the remedy.

In consequence of this distinction, however, we are debarred from the use of Digitalis, in one case of local increased action, that of diabetes. I have met with several instances of this disease, within the last three years, and I have frequently been unable to make any impression upon it. Lately, however, I have succeeded in curing at least three confirmed cases of diabetes mellitus, in which the patients were greatly exhausted, by giving the yellow bark, in combina-

tion with uva ursi and opium : a scruple of bark, with fifteen grains, or a scruple of uva ursi, and half a grain of opium, were usually taken four times a-day ; and lime-water was ordered as common drink. This course is attended with the inconvenience of producing costiveness, but it is much more effectual, than any other that I have tried. The success of this plan has prevented me from trying that of Dr. Rollo.

After establishing the power of Foxglove, in cases of hæmorrhage, arising from increased action, I was encouraged to try it in the first stages of pulmonary consumption.

To prevent any misapprehension, I must observe, that the following remarks apply chiefly to that species of consumption, which is called scrofulous, for want of a better name. Several of my cases, indeed, originated in hæmoptysis, but the symptoms were nearly the same. The reasoning will apply very well to the florid consumption also.

I entered on this series of experiments, with very different feelings. In the former series, the accomplishment of one object, the reduction of the velocity of the pulse, constituted the cure of the disease: In the latter, morbid changes are to be counteracted, the nature of which we cannot ascertain, or which, at least, we can only infer, from a circuitous and doubtful train of reasoning; and some of these changes, once produced, appear to be far beyond the reach of medicine. I need only direct the reader's memory to Dr. Starke's dissections of phthical bodies, for proof of this observation. My expectations of success, therefore, in this class of diseases, were very moderate. I hoped, by diminishing the velocity of the pulse, to lessen one cause of irritation to the lungs; and it appeared possible, that the abatement of the impetus of circulation might lead to a suspension of the diseased action, subsisting in them.—I expected also to derive

some advantage from the diuretic effect of *Digitalis*, though that quality cannot be uniformly relied on.

Whenever an effusion takes place, whether in the bronchiæ, cellular membrane of the lungs, or the investing pleura, and proves a cause of cough and dyspnœa, we ought certainly to look for relief to this class of remedies. And that such effusions must exist, when the circulation through the lungs is impeded, by alterations of their structure, we are abundantly instructed by dissections.

In this view, I was influenced by the maxim of Baglivi, whom I have found a sure guide, in his practical remarks ; *in morbis pectoris semper ducendum esse ad vias urinæ*. Squills, as I have observed elsewhere, probably owe much of their efficacy, in pectoral complaints, to their diuretic power. In the more advanced stages of consumption, I supposed that the hectic fever might be mitigated, in some degree, by the use of Foxglove,

and that some of the sufferings, which result from the irritability of phthifical patients, might thus be abated.

One of the first cases, in which I tried this method, was that of a young man, who had undergone repeated winter-coughs, and had now, with a severe cough, night-sweats, and much expectoration of a suspicious appearance, acquired the phthifical aspect, and the small rapid pulse, which attends the most prevalent form of consumption, in this part of the kingdom. I began with half a grain at bed-time, and the dose was gradually increased, to two or three grains a-day; his symptoms were completely removed, by this course, even during the winter, and he remained well for a considerable time. I believe, however, that he at length fell a victim to a return of the disease.—Several other cases, of a similar nature, were treated in the same manner, and with at least temporary success. But in most instances I was disappointed.

The remedy seemed, for a while, to retard the progress of the disease, but the symptoms, at length, burst out, and seemed only to proceed with more rapidity, in consequence of the transient delay.

I have seldom found it necessary to exhibit large doses of the *Digitalis*, in this mode of practice. Three or four grains a-day have always depressed the pulse sufficiently for any useful purpose; they have brought it to 76 in a minute; and I have met with few persons, whose stomachs could bear a larger quantity. I have known eight grains a-day given, but they had no sensible effect, either from some fault in the preparation, or from the peculiar constitution of the patient.

I gave this remedy in a case of phthisis, which succeeded a copious hæmoptysis. The disease was confirmed, before I saw the patient. The *Digitalis* quieted the pulse, relieved the cough, and gave the

patient feelings of recovery. It was continued for nearly two months, and though he sunk under the disease at last, yet he certainly suffered little, compared with other consumptive persons, and much less than he had undergone at the commencement of the disease.

It is justly remarked by Dr. Beddoes, that phthical patients have many distressing symptoms, and that the progress of the disease is not that of a silent and insensible decay, which some writers would lead us to believe.

I have too often witnessed the impatience, and agony of the sufferers, and heard their supplications for relief, which our art affords but imperfectly. I was once prevailed upon, by the intreaties of a young man, and of his friends, to put him under the influence of opium, to relieve the tormenting cough and dyspnœa. The first effects of the full dose were astonishing. His troublesome symptoms vanished, in the course of a few

hours ; from being unable to move, he found himself so alert, that he dressed, and went into the street, where he took several turns, and I was blamed for having delayed the use of so powerful a remedy.

It was in vain that I represented the inevitable consequences of suppressing expectoration, which had been very copious before the continued exhibition of opiates ; his recovery was fully expected by himself, and every person about him, for two or three days, and the opiate was renewed every four hours, with great alacrity. At length the scene changed ; the lungs became gorged with matter, which no efforts could discharge, and he expired in great misery.

If nothing more were gained by the use of *Digitalis*, than the mitigation of suffering, therefore, we might still deem it a valuable part of medical practice in *phthisis pulmonalis* ; but much more extensive benefit may sometimes be derived from it.

A young gentleman, about 17, was exposed to the action of cold, soon after a severe pneumonic attack: he was, in consequence, affected with cough, pain in the side, frothy expectoration, dyspnoea, anasarcaous swellings of both legs, and swelling of the face. His pulse was frequent, generally from 110, to 120, quick, and remarkably sharp. The urine was rather scanty. He had been blistered, and had used mucilaginous medicines and opiates, with little relief. It was the opinion of the gentlemen whom I met, as well as my own, that tubercles were forming in the lungs, and I proposed the exhibition of *Digitalis*, with the view of suspending the progress of the disease, and, if possible, of enabling the patient to try the effect of change of air, and travelling. The remedy was given in small doses, but, for some time, without any sensible effect. The pulse continued rapid, night-sweats came on, the cough increased in violence, pains in the hypogastric region were felt, which

appear to me particularly characteristic of phthisis;* and at length the patient was unable to ly down in bed. In this extremity, we determined to push the dose of Digitalis, as far as the stomach would bear it, and it was advanced to two grains and a half, every day. The effect on the pulse now took place: it was reduced to 86, and was preserved at this moderate rate, till the intervention of sickness made it necessary to omit the medicine for a short time, when it increased in velocity again. Upon persevering a little longer, the diuretic action began, and in the course of a short time, all the most urgent symptoms went off.

* Pains in this situation generally accompany considerable chronic diseases in the heart. Dilatation of the heart is denoted by pain about the region of the bladder, just above the os pubis. The phthifical sympathy occasions violent pain on one side, about the situation of the waistcoat pocket in males. I have sometimes conjectured, that the pain, in affections of the heart, might be propagated along the course of the aorta; internal sensation is so indistinct, that it might be easily referred to a part anteriorly situated. Perhaps in phthisis, the uneasiness may be propagated to the peritoneum, from the inferior process of the diaphragm.

The patient could now sleep soundly in a horizontal posture, the swellings lessened, and the cough and expectoration were much abated. By continuing the medicine about three months, health was so far restored, that the patient could use exercise without any inconvenience, and the pulse was preserved in a quiet state. Some degree of dyspnœa still remains, and I apprehend a relapse on the return of cold weather, as my wishes for a change of climate have not been complied with; but the case affords a remarkable proof of the power of *Digitalis*.

About the time that the case which I have mentioned was under treatment, I was consulted for a middle-aged woman, who had every symptom of confirmed consumption. She had a deep, hollow cough, expectoration apparently purulent, night-sweats, flushing of the cheeks, and a very quick pulse: she had been ill for several months, and had been confined to bed some weeks. I advised the gen-

tleman who attended her, to try the Digitalis, in sufficient doses to affect the pulse, and left her without the expectation of hearing any favourable account of her. Some weeks afterwards, I had an opportunity of enquiring after her, when I learned, to my surprize, that she had recovered so far, as to be able to walk about, and attend to her family.

In a third case of phthisis, which seemed peculiarly proper for the trial of Digitalis, because irritability was the prevalent appearance in the disease, and the cough was long attended with very little expectoration, the pulse was reduced from 120, to 76, with great temporary alleviation of the symptoms; yet the disease ran its fatal course, though the medicine always retained some power of palliating.

The action of Digitalis on the pulse, was carried as far as was prudent in this case; it was not suspended till the pulse was disposed to intermit, and some degree

of nausea was excited (the intermission was not the effect of sickness). I was fully satisfied, that the morbid action, in this instance, was not capable of being checked, by the sedative power which the remedy exerted, on the circulating system.

I could add a long list of instances similar to the last, but it would consume the reader's time to no purpose, for the result of my experience may be told in a few words: it is, that the patient's ultimate recovery is not to be confidently expected, even when the pulse is reduced in velocity, and the symptoms are evidently mitigated, for a time, by the action of the medicine*. Many disappointments have taught me not to be elated, by one or two instances of success; and I should deceive the public, if I presented to them only examples of fortunate practice. I

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* The reader will find a case, strongly in support of what I have advanced, in the letter with which I have been favoured by Dr. Percival. See the appendix.

believe that Digitalis, properly administered at the beginning of Phthical affections, may suspend the morbid action of the lungs, by which tubercles are formed; that by its continued exhibition, after hæmoptysis, it may be possible to procure the cicatrization of the ruptured vessels, and thus to prevent the formation of ulcers; and I am even disposed to hope, that its power of soothing irritation may extend so far, as sometimes to heal ulcerations of the lungs, in the advanced stage of consumption. A remedy, from which these expectations may be indulged, is of unspeakable value, and merits the strictest attention of the physician. But, at present, I dare not suppose that many cases of confirmed consumption will be cured by it; for the extensive mass of disease, generally apparent in inspecting the lungs of phthical subjects,* and the strange formation of new morbid parts

* I use the word 'subject' here, according to the language of the dissecting-room.

discoverable in it, would require for its amelioration, an effort of the power which originally created the living body.

Though I have mentioned the Digitalis, as the active remedy employed in those cases to which I have referred, it must be added, that I have found it powerfully assisted, in some instances, by the exhibition of myrrh and the ferrum vitriolatum, at the same time. I have even remarked, occasionally, that the cough and dyspnœa were relieved, and the frequency of the pulse was diminished, by the use of this mixture alone, when opium and Digitalis had produced but little effect. The dose of the salt of iron was generally five grains, repeated four times a-day.

In this dose, I have never found it to accelerate the pulse, nor to disagree with the stomach. A patient of mine was affected with consumptive symptoms, after a copious discharge of blood from the lungs and stomach, occasioned by in-

temperance, and accidental violence. I tried the usual methods of relief, and among others, opium with Digitalis, but with very little effect. I then directed a mixture, containing myrrh and the ferum vitriolatum, in the dose mentioned above. He experienced great relief, after taking a few doses, his pulse rose in strength, and became regular, his night-sweats, which had been profuse, were suspended, and his nights were passed more quietly. But these favourable appearances were only temporary. In another case of general scrofula, where the lungs were attacked, and consumptive appearances constituted, for a time, the most formidable part of the disease, the cough, dyspnœa and night-sweats were entirely removed, by this method of treatment.

The advantage derived from this practice, induced me to give steel in substance, in considerable doses, sometimes alone, sometimes in conjunction with peruvian bark, and other tonics;

and I went through a complete course of observations on this plan, in cases where I had an opportunity of attending narrowly to phthifical patients. I found that nothing more could be obtained, than a temporary alleviation of the symptoms; and the subsequent aggravation of the disease was so severe, that I was almost inclined to doubt the propriety of the practice. I believe, however, that the combination of this plan, with the use of Digitalis, affords the best means of resisting the scrofulous consumption, provided the ferrum vitriolatum be given in sufficient doses; while the Digitalis with opium, mucilaginous medicines, and diuretics, may be opposed to the florid consumption.

I have found the conjunction of Digitalis with opium remarkably useful, in cases of spasmodic asthma. By keeping the patient constantly under the influence of the medicines, (half a grain of each being given every four or five hours) I have even seen a permanent suspension

of the symptoms of this disease. When the stomach will bear the Digitalis without difficulty, I believe that very great, and almost immediate relief may thus be obtained, even when the Digitalis does not produce any diuretic effect. One patient, for whom I advised this course, had laboured under spasmodic asthma during several years; the symptoms were suspended by a few doses, but when the medicine was discontinued, they immediately returned. After a long continuance of the course, the omission of a single dose still gives occasion to a recurrence of dyspnœa and cough; and the efficacy of the remedy has thus been demonstrated in repeated instances, by the return of the complaint, when the repetition of the Digitalis has been neglected.*

After these remarks, the reader will conclude, that I have exhibited this remedy in coughs of long-standing, which

* See the annexed letter from Dr. Percival.

form a considerable part of our objects of practice, at the Dispensary. I was more particularly induced to give it, in this species of disease, because it is probable, that some effusion into the cavity of the chest, frequently accompanies chronic affections of the lungs. Swelling of the face is a very common symptom in such coughs, and their progress is generally closed with anasarca of the lower extremities. The use of Digitalis, in such cases, has proved very beneficial; it has given, at least, more relief than any other medicine which I have employed.

The utility of Digitalis, in these cases, may be explained in another manner. The lungs may be supposed to acquire a habit of secreting a superfluous quantity of mucus, in consequence of repeated inflammatory attacks, and the stimulus of a harassing cough, continued during a great part of every year. Such a habit may be readily checked, by the sedative power of Digitalis.

Many of the cases to which I refer, are of that genus, to which the German practitioners give the title of *Phthisis Mucosa*.

I have had occasion to mention, formerly, the utility of *Digitalis* in palpitations of the heart. As the direct action of the medicine, is the salutary power required, in these cases, it is strongly indicated, and is indeed eminently serviceable. I have known it to remove the complaint entirely, where it had risen to an alarming degree, in consequence of terror, and intemperance; and even in cases depending on organic læsions of the heart, or great blood-vessels, it has relieved the symptoms, and rendered life not only longer, but more supportable. It is evident, that I mean to except from these observations, the symptomatic palpitations which accompany dyspepsia, or a state of general nervous debility.

Though the diuretic effect of *Digitalis* be more uncertain than that of some

other remedies, its exhibition ought not to be neglected in dropfical cafes. Upon fome habits it exerts an immediate and powerful action, in encreasing the urine, and as the probability of deriving this effect from it can be afcertained, after a few dofes, the experiment is always worth making. The plan of treatment which I generally prefer, is to give cream of tartar, early in the morning, in purging dofes, and to throw in the Digitalis with opium, in increafing dofes, every evening. But when the bowels are rather too open naturally, or when great debility renders purging hazardous, I give Digitalis in half-grain-dofes, at intervals of five, fix, or eight hours, with the ufual precautions. If no beneficial effect be perceivable, in the courfe of a few days, I exchange the digitalis for fome other diuretic; and I am perfuaded, that when this remedy, given in fuch quantities as to alter the pulse, does not speedily act as a hydragogue, or as a diuretic, it is merely lofs of time to perfevere in its

exhibition. Its successful operation is sometimes so quick and salutary, as to astonish the patient and his friends: I have seen all the symptoms of general dropsy, attended with a fluttering, feeble pulse, removed by small doses of *Digitalis*, in the course of a week; and in one remarkable case, to which I refer, the vigour and steadiness of the pulse increased, exactly in proportion as the water was withdrawn from the cellular membrane. In that case also, the skin of the penis was extremely distended, and tortuous, a symptom which is generally reckoned mortal, or at least extremely discouraging. There appears to be some peculiarity of structure, in the cellular membrane in this part, which renders it less susceptible of accumulation than that of other parts of the body: for it has been remarked by anatomists, that fat is not deposited under the skin of the penis, in any remarkable quantity, even in very corpulent subjects; and effused fluids do not seem to find admission into

it readily. This symptom, therefore, is only alarming, as it indicates an extraordinary disposition in the exhalents to effusion, and great want of action in the absorbent vessels. But I have much more frequently been disappointed in the operation of this remedy: it has either failed in promoting the flow of urine, or it has not reduced the swellings, when the quantity of urine has been increased.

I have had reason to regret, that the employment of this remedy does not afford the patient any security against the inflammatory, or hæmorrhagic affections of the villous coat of the stomach and intestines, which are so frequently the harbingers of death, in dropical disorders. The following case, which has just come under my observation, shews this in a striking manner, and deserves to be stated, besides, on account of its connexion with another part of the preceding remarks:

Mr. T. P. a young man, became affected with ascites, in consequence of a long abuse of spirituous liquors. His skin was hot and dry, his pulse very rapid, and rather irregular; his urine very scanty; his breathing difficult, and his thirst great. The countenance was of a dark purple hue. He took the Foxglove, sometimes with opium alone, sometimes conjoined with Calomel and Dover's powder (a formula, which I shall notice afterwards) and after some short interruption, used half a grain twice a-day, very steadily. He took, besides, small doses of oxymel of squills, spiritus ætheris nitrosi, and tincture of cantharides, in form of drops, twice or thrice a-day. Under this treatment, the enlargement of the abdomen appeared to lessen; it fell in size, from a quarter, to half an inch, daily, before any considerable increase of urine had taken place; but generally recovered its dimensions towards evening. Swellings of the feet and legs soon made their ap-

pearance, and the abdomen became more distended, though the patient was then parting with double the quantity of urine that he had formerly made. The distinction between the diuretic, and hydragogue actions was here very evident. After several fluctuations of the symptoms, during which the use of Digitalis was still continued, as the urine came off in larger quantity, he was suddenly seized with a vomiting of blood, and parted with some bloody stools. The vitriolic acid, with laudanum, was given, but with only temporary relief; blood continued to be discharged, in different states of extravasation, till the patient's death, which speedily took place.

When I have been unable to produce any considerable effect, by the exhibition of Digitalis alone, I have tried to quicken it, by combination with other diuretics. I have found the junction of Calomel and Dover's powder with it, remarkably

efficacious; the formula which I generally use, contains half a grain of Digitalis, a grain of Calomel, and eight grains of Dover's powder, made into two pills. I begin with this quantity at bed-time, and repeat it during the day, according to circumstances. It is sometimes not easy to retrace the ideas, which lead us to form particular combinations of medicines; when the *callida junctura*, which is still more desirable in medicine than in works of taste, has been obtained, we forget the imperfect attempts, that preceded our success.

It is obvious, that when much disease of the internal viscera exists, the reduction of the swellings can only be considered as a palliative measure; such it was, in the case which I have just recited: Yet life is often prolonged for a considerable time, by this mode of treatment, and the patient is thus freed from many distressing feelings. In some cases of general dropsy, where the lungs were particularly oppressed by the effused fluid,

I have known great temporary benefit derived from small doses of gamboge, dissolved in the spiritus ætheris nitrosi.

A few years ago, I was called to a middle-aged man, who had been affected with symptoms of hydrothorax, during a considerable time, and was then beginning to swell, in the limbs and abdomen. I found him labouring for breath, and his face almost black, from the retention of blood in the vessels of the head. I ordered him to take, without delay, four grains of gamboge, and two drachms of spiritus ætheris nitrosi, in a draught : this produced several stools, and relieved all his uneasiness, in about two hours. The draughts were repeated every day, with different proportions of the gamboge, according to circumstances, and they continued to keep him easy, and even to inspire him with hopes of recovery, upwards of a fortnight. The disease, at length, proved too strong for any remedy. On such emergencies, we cannot wait to ascertain the exact dose of gamboge adapted

to the bowels. I have generally found, that adults, who are not previously much exhausted, will bear four or five grains, without inconvenience. It operates, without producing either nausea or griping; I sometimes add a grain or two of calomel.

From what has been said of the sedative power of *Digitalis*, it may be expected to prove highly useful in many cases of active inflammation, particularly in pleurisy, and peripneumony, after bleeding has been practised, as far as the patient's strength will permit. We have long wanted a remedy, capable of lowering the pulse, in certain states of these disorders, without increasing evacuation to a dangerous degree. The practice of frequent small bleedings, which relieve the breathing for a few minutes after the vein is opened, often proves an inadequate resource. Hitherto, we have been only able to reduce the pulse, by two methods; either by withdrawing a quantity of the circulating fluids suddenly, or by producing nausea.

In hydrocephalus, the *Digitalis* appears adapted to some indication, in every species, and every stage of the disease; as promoting absorption, lessening irritation, and diminishing fever. Calomel, which has been found useful, in the first stage of hydrocephalus internus, may be properly combined with *Digitalis*, in this disease.

Under the circumstances of active inflammation, mentioned above, I conceive that *Digitalis*, given with the necessary cautions, every four or five hours, will supply every deficiency hitherto felt, and will afford the desired relief. Even after inflammatory exudation shall have taken place, this medicine bids fair to save the patient, by promoting absorption, and lessening the general irritation. On this subject, I do not possess a sufficient number of facts to speak positively. Genuine inflammation appears so seldom, in this part of the country, that I have met with few cases of pneumonia, since this application of *Digitalis* has occurred to me. From the

few trials which I have made, however, I should be disposed to place great confidence in it, upon such occasions.

Upon the same principles, I should think that *Digitalis* may be properly joined with opium, in cases of gangrene, proceeding from excessive irritability. In croup, also, in the inflammatory fore-throat, and other diseases, consisting in active inflammation, its exhibition may be expected to prove useful.

What would be the effect of an injection, composed of the infusion of *Digitalis*, in virulent gonorrhœa? The solution of opium is sometimes too irritating. I throw out these observations merely as conjectures, to be contradicted, or confirmed by future experience; they appear to be probable results from the ascertained properties of the remedy, but they can only be considered as opening new tracks of enquiry, till they are verified by careful trials. A striking proof of the fallacy of conjecture,* appears in the

* Some recent information has induced me to think of trying this medicine again, in mania.

failure of *Digitalis* in maniacal cases; with me, at least, it has not yet succeeded in this apparently promising application.

It would, indeed, be extremely rash, to decide at present on the various indications which may arise for the exhibition of this remedy, from the general principle of suspending increased action. If any medicines have been serviceable, on this principle, in cases of scirrhus or cancer; if *cicuta* have ever cured such diseases, in any stage, which I confess appears very doubtful, we may resort to *Digitalis*, with rational hopes of finding it a still more powerful agent, in the state of irritation, or ulceration.*

It may also be interesting, to ascertain the effects of the external application of *Digitalis*, in tumors, or ulcers,

* In cases of internal suppuration, in lumbar abscess, for example, and collections of matter in the *bursæ mucosæ*, or cavities of the joints, it would be worthy of enquiry, to ascertain the power of *Digitalis*. The effect of sea-sickness, in removing such accumulations in the joints, is well known; if some degree of nausea were to be produced, by the exhibition of *Digitalis*, it might occasion absorption of the effused fluid.

accompanied with much pain and irritability. It promises to be of service in painful herpetic affections, when employed as a lotion.

These hints may give the reader some idea of the range of enquiry, which I had projected, on the subject of this medicine; the most important and obvious parts of this investigation have occupied a great share of my attention, during several years, and it would evidently require many more for its completion. The facts which have been already ascertained, however, appear to deserve publication, even in this imperfect state; and I have not hesitated to lay open my farther views, which I have not yet been able to verify, because they may facilitate inquiry, to those who may be less familiar with the exhibition of the remedy. Conclusions of so much moment to the welfare of mankind, cannot be formed from the events of a few weeks or months. They must depend on an estimate of the greater number of

results, from many cases, under circumstances nearly similar. This is the foundation of experience with every rational man, not only in medicine, but in all reasoning concerning probable evidence.

The mischief of precipitate conclusions is no where more sensibly felt, than in medical practice. A rash induction, may, before its fallacy be properly exposed, occasion the sacrifice of many valuable lives; and a fact inaccurately reported, may prove a source of false reasoning, and of practical error, to several generations.

From the evidence which has been produced, I think we may conclude;

I. That *Digitalis* is a direct remedy in active hæmorrhage, by its proper action in retarding the velocity of the circulation.

II. That the diuretic action of *Digitalis*, though independent of its sedative power, may sometimes take place in conjunction with the latter, and may even

co-operate with it, by its effect on the system as an evacuant.

III. That in pulmonary consumptions, arising from hæmoptysis, or tubercles, much relief may be obtained from the use of Digitalis; and that even a cure may now be hoped for, under circumstances which formerly precluded all expectations of recovery.

IV. That in anasarcaous affections of the cellular membrane of the lungs, or in cases where effusion, or inflammatory exudation shall have taken place, Digitalis promises to prove an useful medicine.

V. That upon the principle of diminishing irritability, Digitalis has been very useful, in chronic coughs, in spasmodic asthma, and in palpitations of the heart, not depending on simple debility.

VI. That the hydragogue and diuretic powers of Digitalis, although not invariably exerted in consequence of its exhibition, are sufficient to render a trial of it proper, in most cases of dropsy; but

that it seems to operate most beneficially, when combined with other hydragogues, or sudorifics.

VII. That when *Digitalis* is to be exhibited repeatedly, during the day, and especially if it be thrown in at short intervals, in cases of urgency, the strictest caution is necessary, on the part of the physician and the attendants, to prevent the alarming, and even fatal consequences, which may arise from administering this powerful medicine incautiously.

VIII. That in simple inflammatory diseases, the use of *Digitalis* may perhaps supersede the necessity of repeated bleeding and purging, and may save the practitioner from much anxiety and embarrassment, which attend the present practice, in such complaints.

APPENDIX.

A NOTE

from

Dr. PERCIVAL to Dr. FERRIAR,

on the

PROPERTIES OF DIGITALIS.

August 12th, 1799.

I am much inclined, with my venerable friend Dr. Darwin, to congratulate the faculty, on the acquisition, or rather the revival, of so valuable a remedy, as the Fox-glove. Your experience of its efficacy both in hydropic and pulmonary disorders, is consonant to mine; but I entirely agree with you, that in the latter cases, it has been extolled too highly, and that danger may arise, from unreserved confidence in its powers, and from the want of due discrimination in applying them. I have now under my care a lady, who labours under phthisis pulmonalis, arising pro-

bably from tubercles in the lungs. She is harrassed with incessant coughing, which is not attended with much expectoration. The matter discharged, however, has a purulent appearance. I directed for her the following pills, in conjunction with the daily use of Griffith's myrrhand chalybeate mixture, now so well known, and so generally approved. R. Pulv. Digital. purp. Opii purif. Flor. Benzoes \bar{a} \bar{a} gr. j. Mucil. G. Arab. q. s. M. ft. Pil. ij. Capt. j. meridie et alteram hora decubit. omni nocte. This plan was pursued some time, with little or no alteration of the cough, or abatement in the quickness of the pulse. A fuller exhibition, was therefore adopted, according to the following formula; other medicines being discontinued. R. Pulv. Digital. Opii purif, \bar{a} \bar{a} gr. ij. Flor. Benzoes gr. iiss Mucil. G. Arab. q. s. M. ft. Pil. iij. Capt. j. 8va. quaque horâ. Two grains of Fox-glove, with the same quantity of opium, were thus administered every

twenty-four hours, for the space of two days. At this period, I found the pulse feeble, irregular, and tremulous, and reduced from 120, to 56, or 60 strokes in a minute. The Digitalis had produced neither nausea, vertigo, nor palpitation of the heart; but as the cough was in no degree mitigated, by its powerful action on the arterial system, I judged it wholly improper to persevere in the exhibition of it.

You desire me to state to you the particulars of a case, which some time ago interested my tenderest feelings, and in which you favoured me, with your kind and judicious assistance. Mrs. P. has long been subject to very severe paroxysms of asthma. In the spring of 1797, I was alarmed with the recurrence of this disease, accompanied with symptoms, which appeared to threaten pulmonary consumption. You encouraged me to make trial of the Fox-glove, which I did, by administering it, under the 1st formula set down above.—In this way

she took Fox-glove, opium, and flowers of Benzoës, of each one grain, in the course of every day. No inconvenience was experienced from the use of this remedy; though opium, in almost every other combination, was wont to occasion the most distressing oppression of the breast. In a short time the cough became more composed, the dyspnœa ceased, and the pulse lost its febrile quickness, without becoming either too slow, or depressed. Her health was gradually re-established, and has continued tolerably good ever since, with the exception of a few slight interruptions. But the pills are become necessary to her, for if they be omitted two nights successively, the cough never fails to recur with violence. Dr. Darwin's theory of the nocturnal asthmatic paroxysm, appears very applicable to this case: "It is probable," says he, "that the fluid which is perpetually secreted into the cavity of the chest, or into the cellular substance of the lungs, is not

duly reabsorbed during the less irritable state of our system in sleep."

I feel much satisfaction, that you have directed your attention to this interesting subject of enquiry, knowing as I well do, your talents for, and extensive opportunities of observation. It may be worthy of your consideration, whether the action of Fox-glove in Hæmoptöë, is not analagous to, though much more efficacious than that of Ipecacuan, administered many years ago, with success, by Dr. Bryan Robinson, of Dublin. Both medicines diminish the action of the heart, and thus afford time for the bleeding vessel to contract, and a coagulum to be formed, at the orifice of it. I am particularly solicitous, that you should point out the *cautions* to be attended to, whenever Digitalis is prescribed in phthisis pulmonalis. Under the earlier stages of this disorder, and especially when the mucous membrane of the lungs is affected, by an acrid defluxion, or inflammatory exudation, this

remedy promises to be highly beneficial: But when the cough is dry, and proceeds from tubercles, in languid habits, I have remarked, that it is not only unavailing but injurious. The fever, in these circumstances, is of a very depressing and debilitating kind; and Fox-glove must be as improper as if administered in typhus, or the angina maligna. I am impatient to see the work of Dr. Beddoes on this subject, as I promise myself much information, from the perusal of it; but it cannot supersede the propriety of offering to the public, the result of your observation and experience.

THO. PERCIVAL.

OBSERVATIONS
ON THE USE OF DIGITALIS,
IN LUMBAR ABSCESS,

BY MR. SIMMONS.

P. F. æt 27, was admitted under my care, in the Infirmary, in March 1799, for a collection of matter in the upper part of the left thigh, under the fascia. His disease had been of two years continuance, and having, at first, put on the appearance of the sciatica, it had been treated accordingly. This I learnt only after his death, for he gave me but an indistinct account of his early complaints, and kept from me any mention of the sciatic affection, which would have immediately determined the character of the abscess. From the distinctness of the fluctuation between the bellies of the triceps on the inside, and in the direction of the great trochanter on the outside of the limb, (the leading feature of the case

having been suppressed,) I was inclined to think it a lumbar abscess; but it wanted the characteristic signs of that complaint, neither pain in the loins having preceded, nor any uneasiness attended the turning of the knee outwards.

Whatever might have been the original seat of the complaint, the indication now to be pursued was clear, and I proceeded to let out the matter, on the principle recommended by Mr. Abernethy.

By the first operation, at least a quart was discharged, and as successive collections afterwards formed, at the interval of a few weeks, it was repeated several times. The quantity of matter evacuated, at each perforation, varied from a quart to nearly three pints, of a thin sanious appearance, though not fetid; and sometimes tinged with blood. The latter circumstance might be occasioned by gentle pressure on the limb, which was employed to facilitate the discharge of the matter from between the muscles

on the inside of the thigh. During this time, he took such internal medicines as were indicated by the symptoms.

As his strength continued to fail, and a natural opening had formed itself, through which the matter was occasionally pressed out, I sent him into the country for the benefit of pure air; but he returned to the hospital again, in a few weeks, more feeble and emaciated than before; and with a considerable collection of matter in the tumour, the natural orifice having latterly closed.

The *Digitalis* now offered itself, as calculated to abate the hectic frequency of his pulse, and as likely to promote the absorption of the accumulated matter. With this intention, it was directed to be taken, in half-grain doses, once, and then twice a day; at first combined with aromatics, and then with opium.

The first effect of the medicine was, to reduce the frequency of his pulse; and to induce a relish for food, which he

had loathed for some time ; and also to moderate a very distressing thirst. The sickness then came on, and continued with so much violence as to resist the exhibition of cordials, opiates, and aromatics. The remedy that first afforded even temporary relief was *burnt brandy* ; but the patient's situation becoming more and more critical, a blister was applied between the shoulders, which gained a truce with the disorder for some hours ; and, to supply the exhausted state of the system thus brought on, glysters of broth, and of wine-whey, were ordered to be injected frequently : notwithstanding the assiduous application of these means, and the continuance of the opium, which had been increased to one grain every four hours, on the second day of the sickness, he sunk under it, and died on the fifth day.

On the second day of the sickness, he was sensible of a diminution in the size of the swelling ; and on the third, he told me that it was entirely gone.

I inspected the body the day after his death, and I examined the abdominal viscera with particular attention, as I do not recollect the account of any dissection published, in which the Digitalis had exerted so virulent an effect.

No appearance of disease presented itself on a general view, or on a more particular inquiry; nor did the stomach, on laying open its cavity, manifest any other change from its natural state, than a slight suffusion of redness, irregularly scattered over its internal surface, but by no means approaching to the appearances exhibited, by that organ, on dissection, after acute inflammation.

Though the sickness had been almost incessant for several days, yet the gall-bladder was found distended with bile.

The contents of the chest, however, had undergone a considerable morbid change, for its cavity was completely obliterated, by an adhesion of the external surface of the lungs to the pleura

lining the ribs ; and the pericardium had also become every where adherent to the substance of the heart ; yet he had neither cough, difficulty of breathing, nor palpitation of the heart. These changes must have been very slow in their course, not to have produced irregularity in the action of the heart, nor any disturbance in the office of respiration ; but it must be observed, that the lungs were otherwise perfectly sound.

The original disease was discovered to be a caries, in the upper end of the thigh bone.

I did not expect so violent an effect to ensue, from so small a dose of the Digitalis ; for, in general, it may be administered in a much larger quantity, by gradually increasing the dose ; and even when the sickness is brought on by an over dose, it rarely continues longer than three days. Its effect on the stomach, however, is extremely various ; the smallest dose shall, in one instance, excite

alarming symptoms; and, in another, several grains may be taken without producing any sensible effect.

In the year 1786, (for I have used the *Digitalis* many years) I gave the powder of the dried herb to a dropfical patient, in increased doses, till she took seven grains and a half, twice a-day, before any impression could be made on the stomach, or on the circulating system; the sickness then came on, and continued the usual time; but the water was absorbed, and the patient recovered. There could be no doubt of the preparation exhibited in this case being good, because half a grain of it, taken twice a-day, for a few days only, completely emptied another dropfical patient.

I once promoted the absorption of a large collection of matter, in a lumbar abscess, which originated from an internal cause, and pointed in the upper part of the thigh, by the use of calomel in small doses; as soon as the gums became

affected, the matter was taken up, and deposited with the urine.

The hectic state of such patients, however, contra-indicates the exhibition of mercury, and directs us to the use of the *Digitalis*; which, from its known sedative effect on the arterial system, and its powerful excitement of the absorbents, promises, not only to calm the increased velocity of the pulse, but to promote the absorption of the matter; and thus, to supersede the making of an external opening. Perhaps absorption might be promoted in this case, by giving it in such small doses, as to preclude, as much as possible, all risk of inducing sickness, which does not appear to be at all necessary, to get rid of the water in dropsy.

The lumbar vertebræ are very commonly affected with caries, in this disease; and hence permanent relief will scarcely be expected from any means employed. I have for some time back, inserted a couple of issues opposite to the original seat of the complaint, in conjunction

with the usual treatment ; and, I think, in some cases, with a manifest suspension of its progress. If issues and the Digitalis were early employed, in collections of matter formed under the psoæ muscles, a cure might probably be effected, the caries being consequent to the formation of matter. But, when caries of the vertebræ is the primary affection, or has been induced by the pressure of a collection of matter, our expectations of ultimate success will not be very sanguine. Even in the worst case, I shall, in future, be disposed to pursue this method, in preference to any other yet proposed ; issues have sometimes wrought astonishing cures in the incurvated spine ; and, if they should fail, the Digitalis will quiet the hectic symptoms better than any other medicine with which we are acquainted. But this case shews the necessity of beginning with very small doses, and of increasing them with great circumspection.

W. SIMMONS.

Since the preceding sheets were printed, I have had an opportunity of ascertaining the efficacy of an infusion of Digitalis, applied in form of a lotion, from which I conceive sanguine hopes of its advantages, as an external application. A very painful and ulcerated herpetic affection of the face, which was irritated by the most simple applications, and which would not bear the mildest preparations of lead, was relieved, immediately on the use of a simple infusion of Digitalis in water; and in a few days was reduced one half in size. I am happy to find, that no inconvenience has arisen, from continuing to apply it freely. I should suppose, from its action in this case, that Digitalis will prove a valuable cosmetic, in those irritable, inflammatory diseases of the face, which were said formerly to depend on acrimony

of the fluids. A more philosophical pathology has now referred the diseased action to the containing vessels; yet to be generally understood, it is necessary to recur to the old, erroneous phraseology.

This experiment, to which I was driven by the failure of every method previously known, has encouraged me to hope, that the lotion may at least give relief, in cancerous cases. Probably also, the anthrax may be palliated, if not cured, by this application.

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