Inaugural dissertation

on the

Modus Operandi of Mercury

by

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Dignus est exemplo femina laboris.
Ore trahit, quidemque potest, alque addit accensa.
Quem struit.

Horat. Satyr. Lib. i. Sat. i.
Among all the different articles of the Materia Medica, perhaps none has excited more attention, nor has enjoyed a greater reputation than Mercury. Since the uncertain period of its discovery, this metal seems to have been a subject of wonder & a puzzle for mankind. The Egyptian Magicians, in their endeavours to imitate the miracles of Moses, used to fill with liquid Mercury winds & ropes, which, under the influence of solar heat, produced movements analogous to those of serpents; and Baculius, after them, succeeded in communicating motion to wooden statues by pouring quicksilver into them, thus astonishing superstitious minds. In more enlightened ages, & among less credulous nations, it was in the hands of medical men that Mercury was made to perform its wonders. The two celebrated Arabian physicians Avicenna and Rhazes owed the greater part of their fame to the skilful employment of that celebrated remedy. It appeared to less wonderful in the hands of Paracelsus. Many empirics, after him,
proposed it as a remedy for all disorders, and when, about the end of the fifteenth century, the wide-spread ravages occasioned by syphilis excited alarm and dismay in Europe, mercury was thought to be the only means of counteracting the fearful effects of that dreadful scourge. So great seems to have been the faith reposed in that powerful antidote that syphilis was almost divested of the terrors excited on its first appearance.

But if on the one hand most unreserved praises have been lavished on mercury by enthusiastic partisans, it has also been condemned inconsiderately, and often perhaps unjustly, as a useless remedy and a pernicious poison. If we are to believe all those who wrote in its favour, there seems to be scarcely a disease which it has not cured, while the opposing party pretends that there is scarcely a disorder which it has not been the means of exciting. A valuable remedy, according to some, it ought to be extensively employed—a deadly poison according to others it should be entirely
discarded. - Between these two extremes what is the proper medium?

Even in our enlightened age, although much has been done to determine the modes
operandi of mercury, there is still a great
obscurity involving many of its physiological
and therapeutic actions, & hence, great
uncertainty still prevails as to its real efficacy
in many disorders. - To endeavour to determine
them from all that is known on this subject,
what is the true action of mercury in the
human body, & in what diseases they are
likely to prove successful, will be the
object of this thesis.
Mercury in the Metallic State.

In the metallic state mercury seems to be quite inert, for it has often been given internally, as a mechanical agent to remove obstruction of the bowels, without any apparent effect on the system.

Sulphate states that a patient took two pounds daily of crude mercury for a long time, without injury. Sweeney, however, gives an instance where four ounces of metallic quicksilver brought on salivation. Laharde mentions another case where seven ounces were taken daily for fourteen days, after which period salivation came on, and was quickly followed by ulceration of the mouth and paralysis.

But if a greater or less portion of the metallic mercury lodges itself for some time in some part of the intestinal canal, it will gradually

become oxidised, and thus ultimately affect the system. Various causes, such as the kind of food used, the state of the secretions, could, in many cases, promote the oxidation of the metal in its passage through the alimentary canal, thus converting an innocuous substance into an active agent. These cases, then, mentioned by Zwingler, Labarte, and others, can be accounted for, and do not prove at all that metallic mercury itself is an active agent. The mere circumstance that quicksilver had proved innocuous in many instances is a sufficient argument in support of the view that metallic mercury is incapable of acting on the system.

Some authors, however, such as Ogieta, Bruchner, and others believe that mercury in the very finely divided state, in which it must exist as vapor, is really poisonous. The injurious effects of mercury, or vapor, when inhaled, have been long known. They are observed in those persons whose daily employment necessarily exposes them to the fumes of this metal. In the 26th volume of the Edinburgh Medical and Surgical Journal, there is an account of a case, the 'Triumph, man of war, who...
barrels of quicksilver having been received on board, & some of them broken, the whole crew became more or less affected by the poison. Two hundred men were salivated, two of them died, & all the cattle, the poultry, cats, dogs, even rats met with the same fate.

Most lamentable effects of exposure to mercurial vapours are also witnessed in the mines of Elba, & those of Almaden, in Spain. They are, at first, affected with acute diarrhoea, then their teeth begin to fall out gradually, one by one. After the lapse of a certain period, slight tremors come on, which first begin at the upper extremities, & if they still continue, to be exposed to the exciting cause, convulsive movements ensue, attended with loss of reason & insensibility. Thus these helpless creatures, incapable of making any regular movement, of performing any mental act, creeping along the walls with the help of a stick, ultimately sick at a period of their lives when they should have been still vigorous & healthy.

(J. From the "Union Medica, 1848.

6)
Are there dreadful effects to be ascribed
to metallic mercury? — The answer would
be, yes, if we could prove that mercury,
when in vapour, entirely retains its regular
state, i.e., the negative if the presence of the
oxide in mercurial vapour was ascertained.
Now this has been often done. "Samuel Wright"
& other experimenters found that oxide
existed in mercurial vapour even at common
atmospheric temperatures. — A more direct
experiment has been also performed: mercury
in a state of very fine division as obtained
by the decomposition of calomel with proto-
chloride of tin, carefully deprived of its
oxide, has been administered to animals without
effect. 1) We have, therefore, no reason to
suppose that mercury in the very finely divided
state is poisonous. Since the oxide found in
its vapour will account for its action.

It seems to be a fact, that, whenever mercury
has produced any effect on the human body,
the oxide, or some other of its compounds have
been found present. 2) That, when given in

1) J. Christian's Dispensary, pp. 503-4. 2nd ed.
the pure metallic state it has proved innocuous, except in a few, obscure cases, where we have every reason to presume that it has been oxidised in the alimentary canal. We cannot, therefore, but infer that mercury in the metallic state is perfectly inert. Indeed, it would be strange were mercury, the only metallic substance capable of acting on the system in the uncombined state, we know that other metals do not by analogy should have brought us to that conclusion.
Action of Mercury

in the combined state.

In a state of combination Mercury produces on the human body various effects which may be classified under two large heads: 1. Primary or physiological effects. 2. Secondary or curative effects.

By physiological effects I mean the local action of the medicament on the tissues with which it comes in contact, and the reactions it develops by absorption or through the nervous system. The curative effects are only the consequences of the former; they cannot be discussed without first speaking of the actions which give rise to them. Unfortunately Mercury is one of those substances whose primary effects on our body are so difficult to analyze, that it is scarcely possible, in many instances, to indicate
the relation which may exist between the primary action of the remedy and the relief it brings to the affected organ. Circumstances also seldom allow the observer to determine precisely the curative effect of this drug: the purity of medicine, its composition, the dose, the mode of administering it, the stage of disease at which it is given, all being important and numerous conditions which must modify his conclusions, and often render them uncertain. The problem is, no doubt, very complex and worthy of the considerations of the most experienced observers.
I

Primary or physiological effects.

By virtue of its irritating action, tarry when taken internally causes in the intestines copious discharges which carry along with them the contents of the bowels, also a portion of the medicine itself. In its course through the alimentary canal, more or less of the medicinal compound is generally absorbed; this, introduced into the blood produces wherever it is carried, if not too much diluted, stimulating effects. Under its action all the glandular organs in which the blood enters largely, increase their average secretion: the quantity of sweat, bile, saliva, pancreatic liquid, is augmented. The pulmonary, urino-genital and conjunctival membranes become moist: the skin damps: the urine is increased & catamenial discharges sometimes
brought on. If the irritation be continued for a certain length of time inflammatory action results in these organs in which, from peculiarities in their structure, it is most sensibly felt. Thus mercury causing so many copious discharges from all the existing secreting organs it follows that it must reduce the amount of blood in the system, blanch the skin, diminish the vitality of the body, and cause absorption of cellular tissue. Dr. Farr, who has paid great attention to the effects of this remedy, used to say in his lectures, talking of a pale phlegmatic woman: "Her complexion, compounded of the rose and the violet. Under a course of mercury, she was blanched, in six weeks, as white as a lily." Such is a rehearsal of the manner in which I conceive mercury acts on the human body. I shall, now, proceed to consider, in detail, the whole of my statements, under four different heads: 1st. Mercury an irritant. 2nd. Mercury absorbed. 3rd. Effects of mercury after absorption. 4th. Natural results from the effects of mercury.

I. Mercury an irritant.

Numerous are the properties attributed (1) mentioned in Dr. Purkis's work.
to the preparations of mercury. They are said to be cathartics, diuretics, irritants, choleragogues, acrids, astringents, hoarsiness, antiphlogistics, antitonic, sedatives, debitters, antispasms, contra tremens, etc., etc., etc. -- Calomel, one of the compounds of mercury, being capable of performing itself all the actions I have enumerated, it occurs to the mind that all these different physiological and therapeutic phenomena which follow its use must only be the results of a first primary action, which must itself depend on some important chemical or mechanical property of the remedy. This primary action of mercurial seems to be irritation, from this property all the subsequent phenomena take rise.

We know that when compounds of mercury are introduced into the system symptoms of irritation follow. The watering of the eyes, the griping which follow moderate doses of calomel, evidently point out this fact. The more evident symptoms of inflammation after the exhibition of large doses of the same drug, particularly after the introduction of the bi-chloride into the system, various examples of death from poisoning by calomel & corraline sublimate, while the stomach & intestine
were found greatly inflamed, all these facts tend to show that the primary action of mercury is that of irritation.

We have often to contend with the irritative effects of this drug on the alimentary canal, when it is introduced by the skin. Showing that when applied to the bowels either locally or through the medium of the circulation it tends to produce the same irritating effects.

This property has been often more palpably noticed on the tongue and mouth of patients who when swallowing calomel pills or pasteure, or other preparations of mercury have chewed or retained them for some time in their mouths. Hemorrhage more or less violent speedily resulted.

Dr. Bright mentions a case where five grains of calomel placed on the tongue of a patient who lay insensible after an apoplectic attack, and, not being washed over, excited in three hours most violent salivation.

When applied to ulcers mercurials also cause them to inflame by virtue of their

(1) Dr. Wilson Philips. - One Minute Doses of Mercury.
(2) L. Lemaire. - Des effets du Mercure et de ses preparations. p. 300.
(3) Reports of Medical Cases. - II. 387.
irritating power. The intensity of the action of
mercurials will vary, however, with the different
compounds employed, or in the same compound,
according to the dose.

Whenever an irritating substance is to a certain
degree diluted it acquires the milder properties
of a stimulant; on the reverse, prove true: if a
stimulant could be concentrated it would
become an irritant. — A familiar example
of this fact is what we witness every winter
day whenever we approach the fire. Under
the stimulating action of heat our cold limbs
regain new vitality, the capillaries dilate, blood
circulates freely, and, no doubt, the secretions and
excretions of the skin acquire greater activity. But
if, desirous to increase that pleasant sensation,
we gradually draw closer to the grate, the once
stimulating effect ceases to be pleasant; nay, it
soon becomes painful; the heat is now concentrated
it is no more diluted and stimulating, but strong
and irritating. This appears to me a fair illustration
of the mode of action of mercurials: they irritate
only in large or moderate doses, but in minute
ones they stimulate.
In India, also in Europe, mercury has been administered in Cholera, with the view of producing a sedative effect, and this practice seems to have been attended with great success. It must be remembered, however, that this is but a therapeutical action, a mere consequence of the primary irritation. Acetate of lead, a substance well known to be an irritant, has also the same property of allaying vomiting and diarrhoea. When sulphate of copper or nitrate of silver are applied to an inflamed mucous surface, do they in like manner produce irritation, diminish the amount of the discharge, recall healthy action? And yet, these substances are well known to produce, at first, an irritant effect. The beneficial effect which mercury has been observed to have in an inflamed state of the intestines is no objection, then, against its irritative power.

The tincture sedative has been also applied to incendiaries, by some authors, in a different sense. Under a course of enemias the body being greatly weakened by constant depletion, it is to this property, I suppose, that Comradic,
Bertle & Horn alluded when they pro-
nounced mercury to be "a weakening or sedative agent." This debility is also a result of the
primary property.

I cannot refrain here from saying a
few words on the mode of action of calomel, in
particular, which, being an exceedingly insoluble
compound, according to a well-known principle in chemistry
could not produce any purgative action unless
it be rendered in some way soluble in the
intestinal canal. According to Dr. Wieland, the
calomel transforms itself into corrosive sublimate
under the influence of the chlorides of sodium and
ammonia which are well known to exist in the
liquids of the alimentary canal. This supposition
is rendered probable by the irregular and capricious
evacuations which follow the use of calomel, and
which seem to depend on the amount of salts
contained in the food of the patient.

Vogel mentions the case of a boy for whom a doctor
prescribed twelve powders containing each about
4 grains of calomel, 91/2 of hydrate of ammonia, and
1/2 of sugar. The child died after having taken five
of these powders. Peter-Koller, a German chemist.

(1) Quoted by Ritcher.
showed that in that case, the colonel had been transformed into corrosive sublimate by the action of sal ammoniac.

In performing some experiments on rabbits with colonel, I was struck by the curious circumstance that I could administer fully two drachms, or more, of that substance to those animals without producing the least effect. Nay, these creatures seemed as lively after their dose of colonel as if they had partaken of a favourite meal, and their faces were quite natural.

The fact that a single grain of that drug will prove a laxative to a man, and that, such an enormous dose on a comparatively small animal, had no action, reminded me of the opinions of Mlle. & Pettenkoffer above quoted. I thought that in this case the colonel passed off, by the feces, insoluble and unabsorbed: the salts present in the alimentary canal of man, perhaps necessary for the solution of this substance, being absent in that of the rabbits; for these animals were fed on vegetables exclusively. Their diet was therefore changed, they were fed on milk &
bread, & since that period the calomel began
to produce on them its required effects, & in
far smaller doses.

This circumstance induced me to perform
the following experiments, in order to see how
far my suspicions were correct.

Exp. i. — One dram of calomel was administered
to a healthy rabbit, & after half an hour a
mixture of chloride of sodium & nitrate of ammounia
was given. The result was speedy — The animal
expired nine hours afterwards.

The same dose of chloride of sodium & hydros-
chlorate of ammoniac administered to another
rabbit, produced some more-irritating effects which,
however, lasted for a few hours only — & the
rabbit ultimately recovered.

Exp. ii. — Two drachms of calomel were first given
to a healthy rabbit, & the same dose of nitrate
of ammoniac, administered in the preceding experi-
ment, was, after some time, exhibited. The effect
was immediate, — the rabbit died in half an hour.

Exp. iii. — Chloride of sodium was alone administered
after a dram of calomel, & though the effects of
the poison were apparent, the animal did not
die. The same dose of salt was then given to the rabbit which had survived the experiment of, with comparatively little effect.

These experiments, I think, show that calomel is an inert substance so long as it is insoluble, and that it is converted to the liquid and active state, if not exclusively by the chloride of sodium and hydrochlorate of ammonia present in the intestinal canal, at least principally by them. Calomel will, therefore, act more powerfully, according to the smaller or greater proportion of these salts present in the food of the patient. The action which alkalies have over calomel comes also, perhaps, often into play in the solutions of the substance in the intestinal canal. In the process of obtaining the peroxide by precipitating it from calomel with the aid of alkalies, Mr. Donovan showed that if the decomposing heat be not in excess, if moderate heat be employed, the precipitate is a mixture of the peroxide and metallic mercury. Now, the peroxide is entirely soluble in chloride of sodium.

I administered to a rabbit one draught of
Colonel mixed with magnesia, & the animal died after ten hours. This experiment was most conclusive, for double the dose of magnesia did not produce the slightest effect on another rabbit.

The facts, then, in chemistry, that colonel is decomposed by alkalies yielding the black protoxide, or, under favourable circumstances, the peroxide, & that it is converted by hydrochlorate of ammonium & chloride of sodium into corrosive sublimate might serve to explain this pungent & irritant action of that most insoluble compound, if we are to judge of vital chemistry by that chemistry which the genius of Fourier created.

But whatever be the chemical changes which render colonel soluble and capable of acting on the living tissues, it is first effect on the alimentary canal, when not taken in stomachic doses, is that of an irritant. The exact nature of irritation is very difficult to determine. Irritation being a very obscure condition of the living tissues we can only infer its presence by watching
its effects, just as from certain phenomena we infer gravitation. Either a change in the blood vessels will lead to irritation of the nerves of a part, or irritation of the nerves will lead to a change in the blood vessels. Reil, "A. William Philip," and most of the authors who have considered this question, incline to the opinion that, at least, the saline preparations of mercury act on the nerves at first, and, when we see a substance increasing mysteriously the activity or various vital functions of the body without producing apparently any immediate chemical action on the tissues to which it is first applied, we cannot but infer that it acts, at first, by stimulating the nerves, one of whose offices is, no doubt, to regulate the various sensations and emotions.

The exhibition of very large doses of mercury have often been followed by violent convulsions, a circumstance showing that they are capable of exciting their irritative action on the brain and spinal cord. Malpighi mentioned a case in his lectures where the patient afterward became maniacal after the exhibition of minute doses of mercury.
use of mercury. Dr. Stilley has been produced by this sensibility, which relates the case of a gentleman who after swallowing by mistake an alcoholic solution of corrosive sublimate was attacked with twitching of the face, rather than convulsive contractions.

The nature of the irritation which mercury produces on the sensitive twigs must be either chemical or mechanical; but, since that drug must always be in a state of solution in order to act on the tissues, the irritation it causes cannot but be of a purely chemical nature.

As a consequence of this irritative action which mercury produces on the intestinal canal after its administration, all the glands of the lining mucous membrane are stimulated to an increased activity. Abundant discharges carry along with them the contents of the bowels, and also, we may naturally infer, a great portion of the mercurial compound is likely excreted at the same time. In its course through, however rapid, through the alimentary canal a varying proportion of the drug is absorbed and carried into the general circulation; but this brings it
to the consideration of another statement:

II Mercury is absorbed.

It may be first remarked that the different compounds of mercury vary much in the intensity and nature of their immediate or local action on the tissues to which they are first applied. While calomel proves a comparatively mild irritant in its course through the alimentary canal, corrosive sublimate desorganizes the animal tissues, unites with their proximate principles, causes deep ulcerations and violent inflammation on the parts to which it is applied. Even if absorbed or introduced into the blood in sufficient quantity, it produces its desorganizing effects wherever it is carried. Such an action is purely chemical and local. The difference between the immediate effects produced by calomel and the bichloride will depend on the fact that the one is rendered soluble slowly, and its local action on the tissues is not violent and corrosive, and that the other readily combines with the animal tissues, destroying their vitality and hence, causes speedy death, or great constitutional disturbance. But if Corrosive
sublimate was given so diluted and in such minute doses so as not to produce on the parts to which it is applied a more active action than that of calomel, its ultimate effects would be precisely the same as those of the last named compound. Minute doses of the bicloride of mercury produce phytalgia, stimulate the secreting and secreting organs and present the same series of phenomena as course of calomel does. This proves also true in regard to the other mercurial compounds which vary in the intensity of their action occupying an intermediate position between calomel and corrodive subliminate. While, these, mercurials produce, at first, different symptoms when taken internally, their ultimate effects are all the same, and a distinction must be drawn between their primary or local action on the tissues to which they are first applied, and the consequences of that action, and their effects after they have been absorbed. The first is purely chemical, the second of a more complex nature; the one important
to the toxicologist, the other to the medical practitioners.

That mercury is absorbed and carried by the blood to the different parts of the system is, I think, a well established fact. Some chemists, unable to detect it in the tissues of the body, have denied that it is absorbed, but others, more successful in their analysis, have repeatedly detected the presence of mercury in the organic solids & fluids of the system. Thus, Lellé found it in the blood & bile... Parker occasionally detected its presence in the urine... Meibert detected it in the blood. Colson & Dietrich also found it present in that fluid. Bürckner extracted it from urine, also salivary & blood. Olfila found it in the urine & liver... Mr. Andesward in the urine & saliva... Harrold also... mention cases that had been treated with sulphur, where the subsequent administration of mercury produced blackening of the skin. This fact establishes the presence of mercury in the cutaneous transpiration, where it could not have found its way without being previously absorbed.

Had Mercury been detected in the blood only once or twice, by chemists worthy of credit it should I think suffice to establish the fact that this
Metal is capable of being absorbed, but, instead of this, we have the results of the experiments of a great many inquirers who lived at different epochs, and in different countries, and who have all discovered mercury in the tissues and liquids of the body.

Besides, we have also the more evident demonstration of mercury found, in many instances, in the regular state, in the organic solids, namely, in the lungs, the pleura, the bones, the brain, synovial capsules, the eye, etc., and where it could not have gone without having been first absorbed. Quantities of metallic mercury have also been found, after death, lodged in cavities, which gave no unusual evil through life."

All these facts, thus, concern in establishing that mercury is really absorbed.

The fact that being very selective in the choice of the materials they absorb, we infer from this well-known physiological fact, that, when mercurials are introduced into the alimentary canal, they are taken up, in the process of absorption, to Dr. Parina. — Webmer. — Winkung d. Chrysem. III.

II. Mead, on poisons.
by the capillaries alone, the insoluble preparation of mercury being previously reduced to the liquid state.

Detersen states that, after administering charcoal to rabbits for some days, he could detect, after the animals were killed, particles of that substance in the blood of the portal vein, by the aid of the microscope. Whether in the process of digestion the blood drawn from the portal vein was adulterated with a small portion of charcoal, or whether insoluble substances are really capable of being taken up by the capillaries and carried into the general circulation, I will not pretend to say. But if the experiments of Detersen be correct, it follows that carbon, also an insoluble substance like charcoal, is capable of being absorbed in the solid state.

Mr. Headland, in an Essay on the Action of Medicines on the System, mentions some experiments which tend to show that carbon is not absorbed in an insoluble state. But in the Medical Monthly Journal for February 1853, his experiments are considered as inconclusive, not reflecting those of Detersen.
Be this as it may, whether, in general, insoluble substances are capable of being absorbed in the solid state or not, we have seen how calomel can be rendered soluble in the alimentary canal; we know that no substance can produce any action on the living tissues in an insoluble state, and, as calomel has a decided purgative effect, we infer that it is rendered soluble in the intestines. We may go further: knowing that it exists in a liquid form in the alimentary tube, it is more than probable that it is taken up by the capillaries in that form.

**III. Effects of Mercury after Absorption.**

The first effect of mercury after its introduction into the circulation is to excite the glandular organs to increased action, and the first secreting organ it affects is the liver. From the capillaries, by which we have seen it is absorbed, it is carried with the mass of blood which comes from the intestines, through the mesenteric and portal veins, to the liver. There, the blood being diffused to the scintillating parts of the organ, the mercury contained in it...
comes, gradually, in contact with all the little secretory apparatuses or materials for secretion, & by its irritative property which soon, of course, must be greatly excited, it stimulates the nerves of the gland. The secretion becomes hereby more active & a great portion of the irritating substance is carried away by the bile, back to the intestines. The green stools of patients under a course of mercury show the abundant secretion of bile; & the presence of the metal in question, in the liquid thus abundantly secreted has been attested, as already said, by Goldenberg, Brücker, and others.

The mercury, in the mean time, which is not eliminated by bile, of course, recurs into the general circulation, & makes its presence sensible by stimulating, in the same manner, the various glandular organs, to increased action. The kidneys begin to excrete a greater proportion of urine, clearing, at the same time, the blood of a portion of the drug. Brunner, Brücker, Amandt, have all detected mercury in the urine of patients to whom this remedy had been previously given. The pancreas, likewise,
is affected by mercury. "In some cases there is fulness of the left hypochondrium, burning pain and tenderness of the region of the pancreas & the convolutions are frothy, whitish, tough & often greenish, at least; in the commencement, from the intermixed bile. The symptoms may be fairly referred to an affection of the pancreas, analogous to that of the salivary glands. Aristotle terms it phlegmatic pancreas uræus uræus." III

It is a question whether the spleen is in any way affected by the exhibition of mercury. Little mention is made of this organ by authors, in connection with the effects of mercury; yet, analogy should bring us to the supposition that the Spleen is affected by this metal as well as other glands. Pain being generally complained of, by salivated persons, over an indefinite region of the abdomen, it is not only to distinguish whether the spleen is in cases of the general tenderness, unless the attention of the physician be particularly directed to that organ.

(3) Dr. Penrice's Practice of Medicine, Vol. i
In a Dispensary patient, salivated by accident, I remarked, particularly, that there was much pain felt precisely over the region of the spleen. In the Clinical wards of the Royal Infirmary, I saw a man, John Martin, aged 29, admitted on the 12th August 1858, labouring under chronic pleurisy, who was put under the influence of mercury. As soon as his gums became affected, he began to complain of a deep-seated pain over the heart by pleurisy - region; this pain, gradually, increased to such a degree that he had to be applied over the part. On examination a swelling was detected which was referred to the spleen.

A man, named William Baillie, a water, aged 43, was admitted on the 18th January 1858 into ward 605 of the Royal Infirmary. On examination, his spleen was found greatly enlarged. He stated that previously to his noticing a swelling in his abdomen, he had been severely salivated on two different occasions, having had much bleeding from the gums, insatiable to swallow, looseness in stools.

A woman, named Helen Eastain, aged 46, residing at Bull's Close.
of the teeth, &c.

Were these cases mere coincidences, or is the mercury capable of affecting the spleen even to a painful degree, and, sometimes, inducing in that organ a permanent disorder? Certain it is that in splenic disease mercury always proves highly injurious. As the cronicis enforcing the caution that in this form of complaint the use of this mineral should be carefully avoided.

Mercury being applied a second time to the intestines through the medium of the circulation, the quantity of mercury is thereby increased. All the mucous membranes of the body, and the skin too, become tender. But the part on which this substance seems to exert a most peculiar action is the salivary organ.

Generally, as it is well known, when the system has been subjected, for some time, to the influence of mercury, the mucous membrane of the mouth begins to be sensibly affected by it. The gums become painful and swollen, the salivary glands, at the same time, engorged, pour out an unusual amount of secretion.
The appearance of this phenomenon has no definite period; it comes sooner or later, according to the dose, the state of health, the contents of the alimentary canal, or some peculiar irritability of the gland which makes some liable to be easily affected by mercury. Various cases are mentioned by different authors of patients salivated in nineteen hours, seven hours, and even in four hours after the exhibition of calomel, stomatic, more or less violent, generally precedes or accompanies salivation. The gums swell, the teeth become loose, the pharynx inflamed, the breath is fetid, the tongue protrudes between the teeth, and the patient is unable to swallow, sleep, hear, or speak.

Now, why does mercury affect so severely the salivary glands? Why should a remedy which only excites a comparatively mild action on other glandular organs, excite violent inflammation in that particular one?

Various theories have been brought forward to account for this action. Thus, Dr. Culley endeavours to explain it by attributing it to mercury a peculiar disposition to unite

(1) Treat. of Mat. Med. ii. 446.
with ammoniacal salts, in combination with which, according to him, this metal passes off by the various excretions, and he further supposes that saliva contains a great amount of these salts. But that mercury has no particular disposition to unite with ammoniacal salts, is well known. Besides, other secretions in the body contain as much, and perhaps more, of these salts than saliva.

Dr. John Murray says that mercury, forming with phosphoric acid, an insoluble compound cannot pass off by the urine, it is thrown out of the system by other secretions, particularly by the saliva, which, containing hydrochlorate of soda and ammoniac, facilitates the excretion. But, as already said, mercury passes out of the body as abundantly by the urine, as by the saliva. On the other hand, according to Tiedemann, this last named secretion contains also phosphate salts.

Dr. Robert Maywood of the Isle of Wight believes salivation to be a result of the debilitating effects of mercury on the system. He supports his theory by stating that mercury generally excites.
its peculiar action on the salivary organs in persons greatly weakened, and he further observes that "many of our secretions are greatly increased in low diseases, as urine, in diabetes, bile, in the yellow fever of the East and West Indies." But in an account of the diseases of the mercury mines at Almaden by the Correspondent of "Medical and Physical", I find stated that healthy, phthisic individuals were more commonly salivated than weak workmen who were more liable to the trembling. So that this theory does not seem, in this instance at least, consistent with fact. As to the observation that many of our secretions are greatly increased in low diseases, it may be answered that the abundant secretion in such diseases is the cause of the debility, while, in the case of mercury, it may be supposed the debility to be the cause of salivation. Besides if salivation followed the exhibition of mercury from the debilitating effects of this drug, any weakening cause would induce salivation — all convalescents from fevers would be properly salivated — all phthisical patients would be troubled with a post-trumatic flow of saliva...
But supposing salivation to be a result of weakness why should an organ become engorged with blood & throw out an unusual secretion because the rest of the system is debilitated? - Or, in other words, how is salivation produced? - Here we come again to the same question.

According to the principles laid down by Garrod, Wright, Hamilton, Lardner, Home etc. etc., we know that the secretion of an organ may be increased by four different causes: 1. By an accumulation of blood in that gland; the amount of blood in a part being regulated by the nervous system. - Irritant emotions, irritation of individual nerves, as showed by Lardner & Home, cause an efflux of blood in an organ & thereby increase the quantity of its secretion.
2. By conditions proper to the secreting part; inflammation of an organ will alter the quantity of its secretion. 3. By different states of the blood, if materials for secretion or secretion present in the blood. 4. By mechanical causes, affecting the quantity of blood in the part. - Now, we cannot suppose that mercury affects the salivary organ by causing
in it any such obstructions, for besides existing in the blood in a fluid state, we do not see it causing a similar action in other organs provided perhaps, with narrower channels than those of the salivary glands. We cannot suppose either that it accumulates in the blood, materials which the salivary organ alone can excrete, for, as we already stated, other glands free the body of as much (or perhaps more) mercury, as the Parotid and submaxillary, and analysis of saliva during mercurial potialism does not show any substance incapable of being excreted by any other organ. 1856. Thou, however, gives the following analysis of mercurial saliva:

- Congelated albumen       0. 257
- Mercury, with a little albumen    0. 367
- Chloride of sodium        0. 090
- Water                    99. 286
- 100. 000.

Two modes then remain by which the secretion of the salivary organ could be affected by mercury, namely: either by an inflammatory action being set up in that
gland, in a direct manner, by the last named
mineral, or by indirect irritation of the nerves
which govern its secretion. Now, mercury can
fulfil both these conditions by its irritative
property alone. Carried by the blood into the
substance of the gland, it will irritate the nervous
fibres distributed to its tissues, or by continued
irritation it may induce inflammatory action.
Here then again, irritation, that great property of
minerals, can alone come into play for the
production of physiализ.

That the peculiar action of mercury on the
salivary gland depends merely on its irritative
property, and not on any specific effect of
that metal, or on any chemical action between
it and the saliva, is, further, rendered probable
by the fact, that other irritating substances are
capable, when absorbed in sufficient quantities,
of exciting the same phenomenon. Thus nitric
acids, croton oil, fox-glove, hydrocyanic acid, iodide
of Potassium, & preparations of gold & copper
have often produced salivation. Bismuth
deems to have also the same property.

Physialis is also, apt to arise spontaneously,
produced by cold or any other irritative cause. In the 26th Volume of the London Med. and phys. Journal, Dr. Davies describes an instance of the kind, in which the patient discharged daily two or three pints of saliva. Dr. Boyle mentions two similar cases. In the Transactions of the college of physicians, 2nd vol., Mr. Power relates a remarkable example of the same nature. Dr. Pietranici, an Italian physician, mentions a case where salivation followed an hysterical attack. Dr. Pereira states that he has seen a great many similar examples. Dr. Christian mentions a singular case where salivation was produced by the influence of the imagination: a woman who had a great aversion to calomel was taking it with digitalis for a dropsical complaint. Someone happened to tell her that she was taking mercury, salivation came on although she had only taken 2 grains of calomel. On being persuaded that she had been misinformed the salivation ceased, it came on again as soon as the hearing on good authority, that she had really been taking a preparation of mercury.

* Mentioned by D. Christian.*

*Christian, on Poisons, p. 382.*
In one of the volumes of the Medico-Surgical Journal there is contained a curious case of an hypocondriac who fancying himself syphilitic, and imagining that his medical attendant had been giving him mercury, was attacked by profuse salivation.

In the douleurenous salivation is of common occurrence.

In the lowest there is case related where syphilis alone, without any mercury, produced stygism.

As salivation is, then, capable of being excited not only by mercury alone, but by a variety of other substances, it is reasonable to infer that it is not due to any specific property or obscure chemical action of mercury in particular, but that it is the result of a certain amount of continued irritation applied to the salivary organ.

In the case of mercury, as well as other drugs, that irritation would be produced by the substances themselves absorbed in the blood, and thus brought in contact with the minutest parts of the salivary glands. And, if we reflect that what requisite sensibility those organs are provided; how closely connected are the nerves of taste and smell, and those that regulate their
Secretion, — here it is excited to undue action, — if we think, I say, that any slight irritating substance when introduced into the mouth increases the discharge of saliva, — that any rapid substance causes a profuse flow of that liquid, — say, that even thought alone excites the salivary organ to increased action, — it will not be difficult to conceive why mercury should act more particularly on the parotid & labiomial in preference to any other glands, and why an irritation, which proved only a stimulus to the renal & hepatic organs, should kindle inflammatory action in the salivary organ. — How many substances are there not, which produce violent irritating effects on the Schneiderian membrane & sensitive conjunctiva, while their effect is comparatively slight on other mucous surfaces? — The sensibility of a part, and not the degree of irritation, should be taken into account.

A curious fact connected with this is, that as we descend lower in the scale of beings, so seems the power of mercury in producing phthisis, to decrease. Dogs might be readily
made to salivate, but granivorous animals, whose nervous irritability, in these parts intimately connected with the salivary organ, is doubtless very inferior, are with very great difficulty indeed subjected to the influence of mercury. Better even states that they cannot be made to salivate.

I killed a rabbit by giving it during the course of a fortnight repeated doses of mercurials, and its mouth was scarcely at all affected previous to its death.

Under action of amyloidular organ with great delay salivation, and, vice versa, diminished or suspended activity of any of the secreting organs will stimulate the salivary organ the sooner to increased action. Might not the well known liability to be affected by mercurials in Bright's disease be thus explained? Increased dryness of salivation is also apt to be produced by a small quantity of this drug and is unusually troublesome. It is said that the urine of children, particularly among those of the poorer classes, who are generally badly fed and unhealthy, is loaded with an unusual amount of solid materials. Now Dr. John Clarke who employed mercury largely in a variety of disease
Stated that he never saw but three instances in
which children were salivated, & Mr. Collins asserts
that salivation is never produced in them.

Various asserted peculiarities & idiosyncrasies in
connection with salivation might be, on this
principle, accounted for.

But an increased flow of saliva is not the
only inconvenience to which mercury puts the
patient. Whether from sympathy or direct irri-
tation, all the parts of the buccal cavity suffer
more or less, - the tongue often inflames, the
gums swell greatly, and the teeth become loose.
Indeed, the gums are the first parts of the mouth
generally affected, and this circumstance shows
that mercury must have some direct action on
them. - Such swelling of the gums is often produced
when the extremity of a dental brace is irritated by
a decayed tooth, - and perhaps mercury causes
the same phenomenon - by producing the same
effect. - I have noticed in the account of the disease
of the mercury smiers at Blundon, already referred
to, that the workmen enjoy immunity from
suffer all affections of the mouth after they had lost
all their teeth; - this circumstance clearly shows
that he is not to have something to do in mercurial stenocardia.

But why should an irritant substance which is so largely evaporated by all the secreting and excreting glands be retained at all in the system, as the various phenomena which follow its introduction are clearly shown? - No doubt, that if mercurial preparations retained their active form they would be incapable of remaining in the system, but it is in consequence of their being reduced to the metallic state that they are retained at all in the body. Abundant proofs exist that mercury is reduced to the metallic state, and often excreted in large quantities in the living tissues.

Mr. Hales's experiments illustrate very well how a substance thus reduced to an inert state might last a long time in the system, and how, when rendered active it is quickly expelled. Mr. Hales gave lodide of potash to a patient whose system was chronically poisoned with mercury, and immediately the urinal appeared in the urine although it could not be detected previously. He showed that if a large dose of lodide of potash be given to a person whose organs contain a

considerable amount of this metal, acute poisoning might arise. He introduced into the system of a dog an insoluble preparation of lead, the animal lived for several days presenting only slight symptoms of chronic poisoning, when Jodide of Potassium was administered to the animal died. The same dose of Jodide of Potassium given to another dog occasioned very little arrangement. Mr. Miller supposes that Mercury and Lead form insoluble compounds with the albumen and fibrine of the blood, & are thus retained in the system, and that Jodide of Potassium renders those compounds soluble and thereby active, by uniting with them.

It is, however, made consistent with fact. I think, to infer, in the case of mercury at least, that the metal, without forming any supposed insoluble compound with the fibrin & albumen of the blood, is simply reduced to the regenerative state and, hence, rendered inert. Mercury, as already said, has often been found embossed in the tissues of the body, after long continued doses of calomel, and such a reduction of the corrosive compound is, I suppose, more apt to occur when very small repeated doses of it are given.
Such are the doses that persons exposed to the
fluence of mercury most continually take, and thi
is, perhaps, why, in them, the poisoning is generally
chronic, and not acute.

Let us suppose a man whose daily occupation
necessarily expose him to mercurial fumes. The
poison is slowly absorbed in his system, and all
the while slowly deposited by degree in the
tissues of his body. The cellular, the areolar, the
muscular tissues would perhaps be capable of
decommodating a few particles of the metal
without much inconvenience. But if one or more
of these minute metallic deposits lodge themselves
in the substance or in the immediate vicinity
of a nerve, so as to prove a source of irritation,
supposing that nerve to be one of motion, the
result is evident. At every movement, the
foreign substance mechanically irritating
the nerve, a series of automatic muscular
movements would follow, or interfere with,
the voluntary act. If the person still
continues to be exposed to the exciting cause,
and a great many nerves of his body became
similarly circumstanced, convulsive movements
would ensue, and pains would be added to them; and supposing that, through time, the metallic particles are deposited in his brain in sufficient quantity to cause a disturbance in the functions of that organ, imbecility, insensibility, loss of memory, & want of skill would ensue. How such are precisely the phenomena which follow a long exposure to mercurial fumes, and which, as I said, can be attributed to the deposition of the metal in the tissues of the body.

Mercurial tremors have also, sometimes, followed a long continued course of calomel. According to Merat, mercurial frictions have also caused tremors. The oxide, however, the form in which miners, water-gilders, &c. doubtless take mercury, seems to be particularly capable of causing tremors, & indeed, it is the compound the most liable to be reduced to the metallic state.

IV. Natural results from the effects of Mercurials.

If, as we have seen, mercurials, when.
Introduced into the system cause abundant watery and serous discharges in the intestinal canal; if they increase the secretions of the liver, that of the kidneys, the salivary organs, the pancreas, the skin, & mucous glands, it follows that the nutritive materials of the blood must be reduced to a smaller proportion that is consistent with health, hence the paleness & evaporation which follows a course of mercury.

It has been often remarked that the blood of salivated individuals was somewhat thin & watery, and judging from this appearance it has been generally taken for granted, that the amount of its fibrine was to a great degree diminished. Relying on this evidence the beneficial effects of mercurials in inflammatory disorders have been by some accounted for. But when direct proofs of the diminished coagulability of the blood under the influence of mercury are sought, we find that the experiments made in order to decide that question are very few, and very contradictory.
Bretanvan made some experiments, which tend to show the great influence of the blow in animals, submitted to mercurial action. He never had recourse, however, to chemical analysis, at least he does not mention it in his works. He merely indicated the physical characters of the clot, which, as it is well known, vary according to a variety of accidental circumstances.

Dr. Christian mentions the experiments of Dr. Samuel Wright, who found the blood "less charged with albumen, colouring globule, & fibrice and loaded with a very little fatty matter."

Mr. Aymes has, more lately, found the blood under mercurial action to contain a great amount of colouring matter, while the fibrice & albumen were very little diminished.

In a mémoire crowned by the Faculté de Medicine of Paris in 1843, by M. A. Perrina, I find the following experiment, which the author performed together with Mr. Ge's.

A healthy dog, 2 years old, was the subject of the experiment. - On the 20th of August (1843)

60 grammes of blood were taken from one of his veins. The analysis of that blood gave the following proportions:

- Fibre: 3,353 mill.
- Globules: 187,740
- Albumen: 103,950
- Water: 754,957

Total: 1,000,000.

The dog was well fed and allowed plenty of exercise and freedom, in order to bring back the blood to the same conditions in which it must have been before the bleeding. On the 23rd the dog was subjected to incertorial friction, which were continued on the 24th and 25th, when the animal seemed to be very much affected by the poison. Ulcerations had gone on various parts of its body, its gums were painful and swollen. A second bleeding was then performed, and, to the great astonishment of both experimenters, the analysis of that blood gave the following results:

- Fibre: 6, 71 cent.
- Albumen: 101, 68
- Globules: 142, 00
- Water: 750, 84

Total: 1,000,000.
If the result of this analysis is compared with that of the former, it will be seen that the amount of the fibrin in the blood, drawn during mercurial action, was found to be exactly the double of what it was during health. So that, far from rendering the blood less coagulable, this experiment would tend to show that mercury increases the amount of its fibrin to a great degree.

The different results obtained by the various authors I mentioned, induced me to try some experiments. The question to determine was whether the solidifiable materials of the blood were really diminished, or not, under mercurial action, and, if so, which of these constituents it is that suffer diminution.

I therefore chose a strong healthy rabbit, and first proceeded to examine its blood under the microscope. I tried to represent here as faithfully as possible the appearance of that blood.

On the 27th December (1852)
the day after the first examination of the blood, I began by administering to the animal 10 grains of salicylic acid twice a day, and I gradually increased the dose to one dram. The animal died on the 11th January 1853. But previously to that event, on the 5th January, the rabbit had begun to be sensibly affected by the mercury—being very emaciated and extremely weak—a drop of its blood placed under the microscope gave the following characters:

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On the 11th January, a few hours before the animal expired, its blood, again examined, presented the following appearance:
Immediately after the death of the rabbit, I took from its heart four fluid drachms of blood, which I proceeded to analyze in the following manner:

The blood was kept for some hours exposed to atmospheric air, till the serum had quite separated from the coagulated fibrin. The whole was then placed on a filter, and the remaining clot well washed, till it presented almost a whitish appearance; it was moreover freed from fatty matters by means of ether, & carefully dried. All the fluid that passed through the filter was subsequently boiled, & the coagulated albumen together with the colouring matter of the blood, separating into a greyish precipitate, were carefully collected on a filter & allowed to dry.

The fibrin thus obtained was found to weigh 3 grains and the albumen, together with the blood globules, 8 grains.

On the 12th day I analyzed, in a similar manner, four fluid drachms of the blood of a healthy rabbit, and I found them to contain:--Fibrin 3 3/4.


Four fluid drachms of another healthy rabbit were again analyzed next day, and found to consist of Fibrin: 31/4 grains -- Albumen & blood globules 19 3/4.
The same quantity of the blood of a third rabbit was again examined. It contained:

Iron: 1.5 g. - Albumen & blood globules: 15 g.

I may mention that this last animal was only five weeks old & very thin.

From the microscopical examination of the blood we derive some interesting results. First, the gradual diminution in number of the blood cells is remarkable. I always endeavoured to use the same sized drop, and the upper glass was, every time, simply allowed to fall on it, without further pressure. I am, therefore convinced, that the apparent decrease of the blood corpuscles was real, not attributable to any other cause but mercury.

And this curious fact is the final disappearance of the white corpuscles. In fig. 1, about eight or nine of them are represented; in fig. 2, there are only two; and in the last examination of the blood, I could find none. Cautiously did I search for them in different quantities of blood.

The skilful appearance of the blood-globules during health, and their spherical form in
the subsequent examinations, point out, I think, that the specific gravity of the liquor sanguineus decreased under inercural action. For the process of osmotic in which, I suppose, rendered the corpuscles detached in the healthy blood, did not take place after the exhibition of carbon. Simple exposure of blood to atmospheric air will, it is true, give it the unsettled form, but the blood as presented in fig. I was not more exposed to atmospheric air, than that of the two following examinations. The production of that appearance, in this case, must then be assigned to a different cause.

The increase of the fibrine as shown by comparing the analysis of the blood of the rabbit subjected to inercural action, with that of the three healthy ones, is remarkable. These experiments would lead to show that while the fibrine under inercural action greatly increases, the albumin and blood globul.on the contrary, diminish in quantity. But the decrease of these two last named constituents is far more rapid than, and not the least proportionate to, the increase of the fibrine. So
that on the whole the blood is improved to a great degree, though one of its constituents is augmented. The fact is pointed out by comparing the same of the amount of the fibrin, albumen, and blood globules of the anaerobically blood of each of the three healthy rabbits with that submitted to mercurial action. The sum of the first healthy rabbit is: 20½ mg., in the second: 20⅔ mg. in the third: 15⅓ mg. While that of the poisoned animal is only 10⅔ mg. a proportion very inferior to that which seems consistent with health.

Does mercury act by destroying the blood corpuscles, producing this, by their solution an increase of the fibrin, or does it only cause a diminution in their number by preventing their formation, that is, by interfering with the process of absorption in the intestines, and the elaboration of albumen for its conversion into blood? The latter opinion seems to be supported by the fact of the disappearance of the white corpuscles. If these globules are identical with those of the horse, and the primary forms of the yellow blood-cells,
the cause of their diminution must be attributed to the checked elaboration of that liquid. We can easily conceive that the whole process of nutrition must be greatly impaired under mercurial action, and how this metal might impoverish the blood not only by the constant depletions it occasions, but by preventing, or partly impeding, the ready reproduction of this nutritive fluid.

But if the view we have taken of the physiological effects of mercury be correct, how does this mineral act in the case of disease? This is the next important question which now naturally arises, but this consideration shall be subject of the second part of this thesis.
The curative effect of medicines is still the most obscure part of the Materia Medica, and the experience of ages has thrown very little light upon it. We scarcely at all excel our forefathers in the knowledge of the modes operandi of medicines in the case of disease. While by united efforts of numerous observers other sciences are progressing fast, and new light is daily thrown into the most dark recesses of Pathology, Physiology & Chemistry, this subject, so important, and for the advancement of which our ancestors were so eager, still remains nearly where they have left it. The history of every medicine is a continued series of controversies, — the most useful remedies still have their enemies, also the most inert substances, their supporters, and
the contradictory results daily obtained in the practical application of therapeutics leave scarcely any ground for a logically deduced argument.

Although, every day, most experienced observers attest the efficacy of mercury in many disorders, still how many practitioners are there who, failing to attain with it any satisfactory result, question its curative power? Detractors and supporters, however, have alike, a claim to our consideration; for, between these two extremes, there must be a just medium, a modus operandi which should be sought rationally, not empirically as it has hitherto been done. Now that Diagnosis and Pathology are making rapid progress, the knowledge of the agency of medicine in the cure of disease will be found highly necessary for the perfection of medical science. It is a difficult subject of inquiry, a complex problem which well deserves the attention, time, and talents of the most experienced investigators.

Sensible, therefore, of the difficulties I have
To encounter, I shall confine myself in the following pages to a short consideration of the relative effects of mercury, and, taking my stand on facts already observed, it will be my endeavour to show how far the action of this metal in disease can be traced on the supposition, be it understood, that my view of its physiological effects be the true one.

I. Antiphlogistic prop. of Mercury. Since Dr. Hamilton’s time, many practitioners have become convinced that mercury has really the power of arresting inflammation. Dr. Yeats, Dr. Wright, and Hambach, who published a dissertation on the use of mercury in inflammation, were among the first to observe the peculiar virtue of this metal in that form of disease. Still more lately mercury has been considered by many authorities, next to blood-letting, as a cure for inflammation the most useful remedy in this disorder.

Many, however, question the antiphlogistic effect of mercury. ‘’That a power of this kind
is exerted over the inflammation of the iris, in many cases of that disease, says Barletton, no one can doubt. But that a similar power is exerted in a degree adequate to the object required, in any inflammation of internal parts is much more doubtful. In similar opinion is expressed by Audoral, when he says: "L'action du mercure dans les peritonites ne me parait par bien demontree et je ne crois que peu de confiance en ce moyen." (2).

Whenever we find the action of a medicine in a disease, extolled and reviled alternately by different parties, a certain degree of correctness generally attaches to either opinion: the remedy being beneficial only in certain stages of the disorder, and useless or injurious in others.

A disease, such as inflammation, progressing, since its outset, either towards final cure, or towards suppuration and gangrene, passing through various stages, assuming different forms and characters according to the part, the constitution

(2) - Pathology and practice of Physic. p.26.
(3) - Cours de Pathologie generale, lecons orales. Mars 1861.
of the patient & causes which give rise to it, cannot
be invariably discussed with one remedy alone,
for what is indicated, at first, may be fatal in
the subsequent stages of the disorder. -- If the true
mode of action of mercury had been demonstrated
& the remedy rationally given only when required,
not empirically in every case of inflammation,
no ground would exist any longer for such
widely opposed opinions on this subject, nor
would the profession continue to divide into
two hostile camps. But the results of the application
of mercury as stated by different parties naturally
constrain us to admit that in certain stages & forms
of disease can it, or could it ever, have proved
beneficial.

Supposing that mercury acts on the healthy
human body as I already stated, we should
infer that the increased afflux of blood to all
the secreting & excreting glands during therapeutical
action would tend to relieve an inflamed
part from an undue amount of this liquor.
and that the saline discharge, together with
the increased secretion of all the glandular
organs would impoverish the blood.
diminish the vitality of the system, thereby lessen the activity of the inflammatory process & prevent further exudation of lymph. We would also suppose that the marked diminution in number of the yellow & white corpuscles of the blood which occurs under mercurial action, has likely also an effect in controlling that disorder. The increase of the amount of fibrin in the blood during mercurial action, if it really does always occur, would seem to be a fact somewhat inconsistent with the antiphlogistic effect of this metal, but the accumulation of fibrin in inflammation is only a result of the morbid process and not an exciting cause of it; and this result might be, for all we know, a beneficial effect.

By the same process of reasoning, we would not, however, expect the mineral in question to prove in the least successful in the second stage of some inflammatory disorders where strength and vitality are required for the organization or reabsorption of the exuded lymph, nor in the suppression
stage, where the body is weakened & the force of life impaired. On the same ground we should also expect mercury not to prove beneficial, but even hurtful, in suppurative inflammations, where the frame is generally debilitated and the process of nutrition impaired, nor in other inflammations or ulcerations still depending on a morbid or vitiated state of the constitution, in persons weakened by previous disease. But we should expect some benefit from it in the first active stage of a healthy inflammation, if it may be so called, where depletion is demanded, and where blood-letting, if it has already been resorted to, has been followed by good results.

Now, practice has to a degree confirmed the results which reason would lead us to expect. Every author, whose experience had brought him to consider mercury a valuable remedy in inflammation, found it mostly beneficial in the acute forms of the disorders, and injurious in suppurative, in weak & debilitated persons, etc. etc. — "This mineral," says D'Ewatt,
"It is really a very powerful agent in controling inflammation, especially acute adhesive inflammation." And he further down adds: "You must not expect any good, but the contrary, from the exhibition of mercury in suppurative inflammation."

The same idea prevails in almost every sentence of Dr. Parer's rules for the exhibition of mercury, given in Dr. Ferguson's work. "Mercury," he says, "should be used in all active congestions. ... In the adhesive stage of dysentery, in the phlegmasia where there is inflammation with power in tetanus, hemiplegia, paraplegia, neuralgia in their states of active congestion."

"Mercury is hurtful or doubtful in the malignant or asthenic forms of pyrexia. ... In asthenic paraplegia it is bad. ... It is hurtful in the incoherent forms of toxoplasmic ophthalmia. ... It is bad in the amaurosis of depletion."

"It is useful in purpural peritonitis, and hurtful in the typhoid form of it; as also in the ulcerative stage of dysentery."
"In general it is doubtful in the suppurative stages of inflammations, and in all erysipelatous and erythematous inflammations, or those tending to gangrene. It is doubtful in all cases of purer asthenia, from deficiency of red blood."

It seems to flow from the above considerations that the action of mercury in inflammation, generally speaking, is almost of the same nature as that of general blood-letting, and only admissible when the latter remedy is demanded. In fact, by increasing the amount of secretions and excretions, by causing a diminution of blood globules in the circulation, mercury would act on the system as continued small bleedings, whose effects, far less rapid than those of a general blood-letting, are more nearly adapted to the state of the patient. "Undoubtedly," says Dr. Husgrive, "does mercury obviate the necessity of recurring again and again to the lance. This is an advantage of the highest importance, for I know of no practice more fraught
with perils to the patient than that of
secreted bleedings..."

But a particular kind of inflammation, mercury seems to act in a more
complicated and more powerful manner. In idiopathic irritation, for instance, mercury is
well known to be as beneficial as bark in
ague. "Full salivation," says Mr. Ramon,, "quickly
produced cuts short the recent disease as if by
a charm." That is in acute cases. This remark-
able virtue of mercury in controlling inflam-
ination of the iris has been considered due
to a specific action of the remedy. But the
effects of this mineral in iritis could, I think,
be accounted for without having recourse
to such a dark conjecture. It is observed
that the disease begins to yield whenever
salivation commences. Now, under the
influence of this new action, the capillary
circulation becomes necessarily, more rapid;
the fluids, obeying a greater stimulus than
that which had first called them towards
the eye, abandon that organ to be propelled

towards the new inflammatory source placed in their vicinity. Besides, then, the
general effects of mercury on the system, by
which, as we already said, it tends to control
inflammation—a new curative effect is
added in this particular disease, namely:
counter-irritation. This would explain why
mercury is far more beneficial in ulcers
than in other inflammatory disorders.
If this explanation, however, be the true one
we should expect to find the metal in
question equally beneficial in every active
inflammation seated in the vicinity of
the salivary organs & mouth. Now, such seems
to be the case. The good effects of mercury
in ulceration of the tongue are well known.
In an acriditis dependent on an inflamed
state of the retina, this drug has proved highly
serviceable. “We need not be surprised,” says
Dr. Watson,” as that a remedy, the curative effect
of which we can see in inflammation of the
iris should be equally serviceable when the
same diseased process is set up the retina

which we cannot see." - Mr Allan, Mr McKenzie, Mr Lawrence & others, all mention numerous cases where mercury cured such an inflamed state of the retina. Experience has also shown mercury to be very useful in affections of the throat. "Have again & again," says the author above quoted, "the uneasiness about the throat, the noisy inspiration, the cough or whispering voice, all cease as if by enchantment, so soon as the specific influence of mercury became manifest." (1)

In cases mercury has also proved very beneficial whenever the disease was slow enough in its progress to be overtaken by the remedy. In acute scaly perhaps depending on some inflammatory lesion, mercury has been found also very serviceable. In epistaxis caused by an inflamed or engorged state of the nasal mucous membrane, this mineral has proved highly useful. Dr Nathan speaks highly of this remedy in the last named disorder, and Dr Saughton was lead by experience
to rely upon mercury as almost a specific for obstinate hemorrhage.

Analogies, then, tend to show that the great beneficial effects of mercury in irritis are not owing to any specific influence of the remedy in that particular disorder, but to the counterirritant action produced by pyrazolism added to the other general anti-phlogistic effects of that mineral, by which it cure other inflammatory disorders not placed in the vicinity of the mouth.

Iritis has been actually ascribed to mercury as a cause. But as syphilitic patients are very liable to irritis, and as mercury is so often exhibited for that complaint, this disease has been laid to the charge of mercury instead of syphilis. Mr. Lawrence tells us that he never saw any kind of irritis which could be attributed to mercury. Thousands of persons take mercury for different purposes and never suffer from irritis, & many have irritis who never took a single grain of mercury.

This mineral, then, should be expected
to prove of great service in all inflammatory disorders of the eye, the face, the throat, in fact all those parts placed in the vicinity of the salivary organs, whenever the disease is not of an articular character, or in the stage of suppuration.

On this principle we should not expect to find useful in pusulent ophthalmia, the disease is too rapid in its progress to be arrested by the remedy, besides it is caused & aggravated by a poison & mercury cannot produce any good effect on it, unless the exciting cause be removed. "I believe," says D. Watson, "that mercury is quite useless in that complaint (pusulent ophthalmia), and if useless, mischiefous." (1) M. Lawrence asserts having seen pusulent & gonorrhoeal ophthalmia proceeding unchecked under full mercurial action.

Perhaps the same powerful cause which comes into operation in the cure of sciti and other inflammatory disorders situated in the vicinity of the mouth, can also extend its influence as high as the brain.

and take part in the well-known beneficial effects of mercury in affections of that most important organ. Dr. Abercrombie regards this mineral as a very useful remedy in cerebral disorders. Dr. Watson says, under the subject of Incephalitis: "I must not conceal my persuasion, that in the early period of acute inflammation, if the remedy comes in a short time to produce its specific effect upon the gums, a great change for the better will often be perceived. Such is the result of my own observation."

In other inflammations situated at a distance from the mouth, the relief occasioned by mercury does not coincide so accurately with the phenomenon of salivation, and is to certain degree more uncertain.

Most satisfactory results have been achieved by the exhibition of mercury in pneumonia, pulmonary haemorrhage, pleurisy, carditis, pericarditis, and other inflammatory affections of the chest. In Rheumatism, Peritonitis, & Enteritis alike has it been found by
Many excellent judges, who have much employed it, remarkably efficacious. But whether from the too cautious or too cautious use of this remedy or the untimely employment of it, so many contradictory statements have been made that great uncertainty still prevails among the profession, in general, as to the real efficacy of mercury in these disorders. Time and further experience must needs decide that question.

Ⅱ. Antisyphilitic prop. of Mercury. But among all the inflammatory disorders in the treatment of which mercury has been thought successful, in none has it been so extensively and so invariably employed as in syphilitic inflammation. Not long after the appearance of syphilis in Europe, this metal was generally admitted to be a specific for that disorder. But the experience of nearly three hundred years since the introduction of this remedy for the cure of syphilis, has taught us how cautious we must be in its employment.
Thus often been observed of late years that the dreadful effects attributed to syphilis were in fact those of mercury, and that the simple method of treating this disease was generally more effectual than the mercurial treatment. It is well known that in the different hospitals of Sweden 40,000 syphilitic cases were treated, the one half by mercury, the other half by the simple method, and that the proportion of relapses has been five per cent greater in those subjects to mercurial treatment than in the other. It would also seem by the different reports from Paris, Strasbourg, etc., in France, and various towns in this country, that the simple method is generally more efficacious and ultimately curative with greater certainty than the mercurial treatment.

It is not easy, however, to get rid of the conviction impressed on the mind by the records of three hundred years of experience, so many severe cases of syphilis have been cured by mercury that we
cannot discard this remedy as altogether unnecessary in that disorder. A few syphilitic patients are still cured with whose disorder does not yield to the simple treatment & who are benefited by the cautious exhibition of mercury. In France, generally, & by many practitioners in this country, the mercurial treatment is still preferred, and the fact that there are some constitutions adverse to that remedy does not warrant us to deny its beneficial effects in others.

What is then the nature of the curative effect of mercury in syphilis, if such exists? It has been said to be owing to the incompatibility of two actions, the mercurial & venereal, either of which must yield its place to the other. Priestley(1), and Swerdra(2) endeavoured to explain the curative effect of mercury in syphilis by assuming that it combines chemically with poison as alkalies with acids. Mr. Hunter(3) accounts for it by saying that "it produces an irritation of a

(1) Quoted by Richter.

(2) Pract. observations on venereal complaints.

(3) Treatise on the venereal disease."
different kind to that caused by the general
disease & counteracts the latter by destroying
the diseased action of the living part."
The old idea that two diseased actions cannot
exist at the same time in the body has been
often shown to be fallacious, and any
theory repelling on this exploded doctrine
must be itself untrue. If, however, mercury
acted like an antidote to syphilis, the more
we gave of that drug, the worse we would
exacerbate the disease. We would also be
able to destroy, at once, the disorder at its
very root, by applying mercury to the primary
syphilitic particle. The fact that many cases
of syphilis can be cured as speedily & as
effectually by the simple method of treating
the disease, furnishes another argument
against this theory, for if mercury acted on
syphilis by neutralising the poison this
would never have been the result. No case
of poisoning can be treated as successfully by
attending to the general health as by
administering the antidote. Again, if the
action of mercury on syphilis was similar...
To that of acids upon alkalies, the dreadful disease mercury-syphilis could never have occurred, for the two poisons would be incompatible with each other, the would destroy and neutralize the other, while they often exist together in the system producing a fearful disorder by their combined effects.

It must then be admitted that mercury does not act on syphilis as an antidote, but the mode of cure by this remedy in that disorder must be sought elsewhere than in Chemistry.

Assuming that the physiological effects of mercury on the body take place in the manner I have endeavoured to account for them, and taking for granted that mercury has no chemical action on syphilis by which it neutralizes the poison, we must infer that mercury proves beneficial in syphilis by preventing, or controlling the inflammatory tendency, by regulating the secretions, helping the excretion of the poison by exciting to renewed action the various secretory organs, so that, while nature strives to expel one
active irritating poison, the mercury, the
other is also, by the very same means—passive,
possibly & indirectly expelled.

If this be the true mode of action of mercury
in venereal disease, any irritating substance
which stimulates the glandular organs to
increased activity, & whose action is in
some respects like that of mercury, should
be expected to have on syphilis the same
curative effect. Now Saline of Potassium,
whose effects on the human body are to a
certain degree similar to those of mercury
is well known to have proved a useful
remedy for syphilis. And if another substance
were found to produce on syphilis the
same action, that substance would most
likely be no less useful in this disorder.

Again, if the action of mercury on syphilis
is as already supposed, we should expect
this mineral to prove beneficial in all
chronic poisonings of the body, for having
on the venereal poison & expelling it by
a kind of general stimulant to the secreting
organs, it should, also, rid the system of
of other lasting poison by the same process, not when the body is chronically poisoned by lead, mercury proves very serviceable. Dr. Newgrove highly recommends it in Dry belly ache, Jaunicee, and many others, also found it very useful in the same complaint. This last, in his report at La Charite, for 1825, mentions the case of a young man who had the colica pictorum, peritonitis, had also supervened in the course of the complaint. Large mercurial frictions were employed, & Jaunicee says: "le malade se trouva parfaitement gueri et de la peritonite et de la colique de plomb des qu'il eut commencé a saliver. Ce succes "addit" des frictions mercurielles dans un cas aussi grave, prouve assez combien elles meritent de confiance". It seems natural enough to suppose that mercury proves beneficial in colica pictorum, as we already said, by helping nature, so to speak, to get rid of a comparatively inert, non-irritating poison, by the introduction in

the system, of an active irritant; one of the same process by which the one is removed, the other is expelled, at the same time. Putting syphilis in the place of lead, why should not mercury act, for its expulsion, in the very same manner?

The curative effect of mercury in fever would also, to a certain degree, take place in the same way. P. Copland states that death from fever is rare after vaccination has been once established. P. Paripire seems to be of the same opinion. P. Macartney says: "In no single instance have I discerned it (mercury) fail in arresting the process of the disease, provided the fever be not combined with visceral affection." P. Johnson and Mansley also speak favourably of the employment of mercury in fever.

It is a question whether mercury has the same power of relieving the body from the cholera poison, as well as from the syphilitic lead, fever poison. Some practitioners have employed it with apparent success.

2) Diseases of Tropical Cholera. p. p. 31, 32, 122. 3) Ibid.
3) Diseases of India. p. 348. 4) Ibid.
success, others failed to obtain with it any beneficial effects. Reason would lead us to expect that an active poison like that of cholera, so quick in its effects, producing by itself all the phenomena in a far severer form, that a course of mercury would cause, exciting all the glandular organs to renewed action, and causing profuse discharges, cannot be beneficial by colostrum or other mercurial preparations, after the disease has fairly set in. "What benefit," says Dr. Groves," can be expected from colostrum & stimulants, when every function of the digestive mucous membrane seems to be totally extinguished except that of exhalation, and while profuse discharges, occurring every five or ten minutes, are reducing the patient to a state of alarming prostration?" — When the cholera existed in Dublin in 1832, colostrum was, above all remedies greatly employed, but it failed to produce any good effects. In an account of the Practice in the Cholera Hospital, in Surgeon Square, by Dr. Williams.
Robertson P.R. C.P. - this physician states that although he has given calomel to most of his patients, in various doses, he could never see any good effect resulting. The simple dose of calomel has proved quite inert, when given with the view of checking vomiting. A drachm, or even two drachms of calomel have been exhibited, by others, for the same purpose. Absorption in the intestines taking place with great difficulty in cholera, it is hard to conceive a worse form for conveying mercury into the system than that of calomel. The administration of corrosive sublimate has been, for this reason, recommended by Dr. Flemming, & others.

It might be conceived, however, that, by an action purely local, in virtue of their irritating property, calomel, & other mercurial preparations, might prove a useful means of arresting vomiting in this dreadful disease. In India, this mode of treatment has been widely recommended. - Dr. Agnes of Leeds, Dr. Peacock, James Maxwell Adams, Surgeon.
of Gloucester, Dr. Griffin, &c. Charle Berrage, &c.
and others, all found large doses of calomel to have a decided effect in allaying vomiting, much more so than any other remedy.

If not, however, a remedy for cholera, mercury might prove a useful preventative in this, as well as in other contagious diseases. The various constant depletions it occasions would prevent the accumulation of the poison, if the body be predisposed to receive it, or, at least, expel part of it, if already present in the system, but has not yet made its presence evidently manifest.

This will seem more than a mere speculation, if we mention the curious fact that when cholera lately prevailed in Paris, of the numerous private patients of M. M. Bonv. Cidal (de Callis) not one has been attacked with the disease. Now, in Paris almost all these syphilitic cases are submitted to the mercurial treatment. This remarkable exception must, then, either be ascribed to the exclusion of mercury, or it must be supposed that the

(1) London Medical Gaz. xxi. 53.

(2) Epidemic of 1834. Cholera Hospital at Bethnal Green, London.
Venerable poison is an antidote to that of cholera. But it has also been observed that many syphilitic persons, in different hospitals and in private practice, not subjected to the mercurial treatment, have been attacked by cholera. So that mercury then remains to be the sole rational cause of this preservation.

In the Dispensary practice I saw a child who was attacked several times during the course of the day (19 Nov. 1852) with severe convulsions. Inquiring them to depend on gastric irritation, three grains of hydrastis, c. cret. were ordered, - the same dose was to be taken twice a day. The child took six of these powder, the convulsions ceased; and on the 22nd day, small-pox of the most benign kind appeared. Not more than two spots were to be observed on the face, and very few on the rest of the body. The child got well in a few days. It cannot be doubted that the convulsions in this case were caused by the incipient variola, and it seems to me that the disease, which, in this case, presented such severe symptoms at its outset, would...
is allowed to run its course, have been remarkably severe. Now, can we not reasonably ascribe, in this case, the mildness of the disorder to the mercury?

I observed, also, another case, precisely similar, where exceedingly mild scarlatina supervened after the exhibition of mercury, though the primary symptoms of the disease seemed to announce, by their violence, a severe attack."

"It seems, therefore, to me, that in these disorders, depending on the introduction of a particular poison in the system, which are too acute, too quick in their action to be arrested or overtaken by the mercury, — this mineral, though it cannot prove useful as a remedy, might serve as a preventative, & that, whenever their presence is suspected, before their more evident symptoms become manifest, the exhibition of this drug is highly commendable.

But to return to syphilis from which I digressed, if all that has been said be correct, the same cautions given for the employment of mercury in inflammation,

(1) The subject of this observation is named Jane Smith, aged 8 years, living at Bell’s Wynd[.]
are for the same reasons admissible in this disorder, with this important addition: that its long continued and free use might prove exceedingly hurtful; for, if, by imprudence, the system becomes chronically poisoned by mercury, we would have two poisons lurking at the same time in the body, and undermining the constitution by their combined effects. The dreadful disease, syphilis, it is well known.

One question remains here to be asked: Does mercury, when exhibited with care, prove at all injurious to the constitution after curing inflammation? — Hear Dr. Graves, who put to himself the same question: “With the greatest confidence,” he says, “I can answer, it does not. I never saw a single bad effect follow the use of mercury in cases where the first consequence of its exhibition was the rapid and complete removal of a dangerous inflammation; a remedy can scarcely serve and hurt the constitution at the same time. Mercury, when it abates inflammation, never irritates the system, and if it be discontinued as soon as it has performed this important office, it is after
effects will be employed in the same way, in curing the remnant of the inflammatory action. Whatever cuts short the inflammation provided it be applied in due proportion, cannot injure the constitution." (1)

In general disorders, if cautiously employed & its administration regulated both by reason & by the experience of others, avoiding its use in constitutions in which it is apt to prove injurious, such as the scorbutous, & in peculiar cases, such as the irritable, mercury cannot be injurious to the system, particularly after curing the disorder.

"I would ask to persons prejudiced against mercury," says Dr. Lewis, "as how many instances they have met with, where mercury has produced mischievous effects in general cases under their own direction, for I must altogether exclude from our present consideration its consequences when exhibited by quacks, or when taken by patients themselves without proper advice. I think that there will be a general desire to this interrogatory,


(2) Examination of the prejudice commonly entertained against mercury.
and that each will allege;—though it has seldom or never occurred within his own
practice, yet that it has happened to others.
Let those again be asked the same question,
and we shall have the same answer, so
that in the end, though all may affect to
dread the remedy under other's hands, yet
all continue to employ it.... "It is thus
virtually admitted," adds he further that it
is not the remedy that does the mischief
but the mismanagement of it.

Deobstructive action of mercurials.
The amount of nutritive materials in the blood
being lessened under mercurial action, the
vitality of the system thereby lowered, the
skin blanched, the anecule tissue to a great
degree absorbed by the same process,
together with the healthy tissue, glandular
swellings & morbid deposits are also seen
to disappear & gradually melt away. It is
to this property of mercurials that the term
Deobstructive has been applied.

The gland on which mercury is generally
recognised to exert more particularly this therapeutic action, is the liver. In congestive enlargements of this organ, this mineral is said to reduce it to its natural dimensions. This, no doubt, mercury would effect by causing an increase in the amount of its secretion. Under this action new vitality would be added to the gland, new contractile power to its distended ducts, and the bile, flowing in greater quantity, would propel the obstructing materials, which a previous slow and languid action of the organ, caused to stagnate.

If, however, the biliary canals be permanently obstructed either by a calculus, or otherwise, the effect of the drug would in that instance be to distend them still further, or instead of proving a remedy, mercury would, in this case, aggravate the disorder. Enlargement of the liver, being, then, a pathological state of that organ which may depend on various causes, no remedy can be applied in that affection with certainty, and it is not astonishing to find a medicine
hitherto reported, infallible, failing, all of a sudden, to produce in that disorder its required effects. — The peculiarity that the liver’s secretion is destined to be both excreted & reabsorbed, renders the propriety of exhibiting mercury more problematical. — We cannot always judge by the colour of the stools, if the secretion of the bile is suppressed or not. In many cases, perhaps, an increase secretion of mucus from the intestines has produced light coloured stools, & the mercury exhibited, has improved only the functions of the latter, & not those of the liver, deceiving the practitioners by fulfilling his expectation. Hence it is therefore the ambiguity attending this matter, and this is perhaps, one of those rare instances where Diagnosis is at fault, & not the knowledge of the therapeutic effect of the remedy. — In affections of the liver we find, then, ourselves more or less compelled to give mercury in an empirical manner. Administered in this way it might serve as a means of Diagnosis, & if, as remarks Dr. Wattson, this drug has no beneficial effect at first, it
ought not to be persisted in.

The control, however, which mercury has over the secretion of the liver would, no doubt, make it a useful remedy in many affections of that organ, depending on a disordered state of its functions, and the examples are numerous where it cured various such affections. In many species of stones, in specially complicated with disordered liver, mercury is well known to have been highly successful.

It is impossible, though, to imagine how this mineral could prove useful in organic disease of that gland, & there are not to my knowledge, any cases recorded furnishing direct proofs that it has ever done so. What effect can a stimulating remedy have on an organ whose tissues are either hypertrophied, or ulcerated & diseased, or become the seat of morbid deposits? On the contrary that substance will hurry on the disorder, increase its activity, & far from being of any use, might prove hurtful.

The degradant action of mercury is not, however, limited to affections of the
liver. This remedy is said to remove all swellings, all fluid accumulations, all morbid enlargements & growths. It is supposed by many that it acts in this way by stimulating the lymphatic system. Dr. Billing "supposes that mercury removes growths "by starving them which it effects by contracting the capillaries." Dr. Periera is of opinion that this effect is an alterative action, & that this mineral acts by destroying the morbid tendency. Thüllier says that an alteration in the composition of the tissues is produced by this medicine, and "that the affinities already existing are annulled & new ones induced so as to enable the vital principle to effect the further restoration & cure; the mercury itself does not complete the cure." These are however mere hypotheses; by what facts can they be supported by what analogies are they rendered probable, or even, by what means they can be refuted, I know not. But if we inquire into the physiological action of this drug, in order to search for a rational mode.
of explaining this therapeutic effect we came upon a fact which might so far give us a clue to the mystery. When mercury is administered to a healthy, phthisic individual he becomes, as it is well known, thin, emaciated & weak. No doubt that the same cause which comes into operation for the absorption in the healthy body is the same which removes morbid accumulations when the system is diseased. Now the experiments of Magendie show us that the process of absorption takes place more readily when blood is withdrawn from the system, and that it increases in activity in proportion to the removal of the nutritive fluid. We showed how the effect of inunctions on the body is the same as that of continued small bleedings; if, then, removal of blood promotes absorption, the exhibition of mercury must have the same effect. & by the same cause.

The morbid liquid accumulations such as occur in the pleurae & peritoneum, this effect of inunctions would then be far more evident & prompt than in solid growths, for
it is a fact in experimental physiology that as blood is withdrawn from the veins the same amount, or nearly so, of fluid remains in the circulation. how this enormous quantity of liquid must be, in that case, taken up by the capillaries from the surrounding tissues, and if a part of the body contains an unusual & unnecessary portion of fluid it will yield it far more readily than the other structures.

If, however, we compare the quick action of a general blood letting with that always slow & gradual of mercury, it will be readily seen that we would expose ourselves to a sad miscounting if we expected any good effect from this treatment in pleuritic & peritonadal effusions, before the employment of a general blood letting, unless the patient be already very weak.

It will, their, generally be found, if we compare the treatment adopted in various cases of the kind, that those in which mercury proved useful, the
Exhibition of this mineral had been preceded by continual & profuse bleeding, and that those in which it failed, this remedy was alone administered without any preparatory treatment. The length that this thiosulphate had already attained hardly permits me to enlarge upon this subject, but I cannot, however, refrain from mentioning an instance at least of the kind which I saw myself.

A man, named Martin, aged 25, labouring under & fever, was admitted in the clinical wards of the Royal Infirmary on the 16th August 1857. The left side of his chest was elevated & dull on percussion, no respiratory murmur were heard, in fact all the signs of an extensive pleuritic effusion were present. In other respects the man seemed robust and healthy. The mineral treatment was adopted, & in consequence 1/2 of a grain of calamine, to be taken every four hours, was prescribed. This dose was afterwards increased. In five days the gums began to be a little affected, but the effusion did not seem to
diminish. He was kept under mercurial action till about the end of the month, when the fluid accumulation was but a little, if at all, reduced. Mercury was then abandoned, and another treatment resorted to. In this case the employment of this drug was considered to be a failure, and its beneficial effects in pleuritic effusions questioned.

Let us now contrast the treatment adopted in this case with that in which mercury terminated the cure. I take three cases treated at the Hôpital de la Charité, in Paris, reported by Mr. L. Lemaitre, as illustrative of the subject.

Case 1. — Augustin Leffeve, aged 59, was admitted to the Hôpital de la Charité on the 8th Jan. 1841. (Salle St. Jean de Dieu, No. 16).—Diagnosis: chronic pleurisy with extensive effusion in the left pleura, and displacement of the heart.

Treatment. — 8th Jan. — 180 grammes of blood taken from the arm of the patient.
10th Jan. Respiration a little easier heard faintly at the inferior third of the thorax... Cupped at the anterior lateral part of the left side of the chest.

36° from 36° of blood were taken by that operation.

15th Jan. 2 calomel pills - one decigramme each.

On the 16th, 17th, 18th, the patient continued to take the same dose of calomel.

On the 19th, 20th, 21st, he took three of those pills.

On the 22nd the gums were tender. - 2 pills again.

On the 23rd the administration of the mercurial was suspended.

On the 24th the respiration was heard everywhere.

9th March. - Patient dismissed completely cured.

Case III. - Jean Bérenger, aged 27, admitted at the Hôpital de la Charité (salle Saint-Jean de Dieu) on the 2d June 1841.

Diagnosis: Pneumonia at the inferior posterior part of the left pleura, with notable effusion.

The patient was first bled & cupped largely & was going on well till the 17th June when he caught cold & had a second attack with calomel effusion.
He was bled again & blistered.

25th June - 2 calomel pills 2 drachmums each
26th - 2 calomel pills.

The pills were continued till the 2d July.

4th July - He asks his retreat, & gaunt well cured.

Case 111. - Philippine Simonin, aged 31, admitted on the 7th April 1841 (halle St. Madeleine).

Diagnosis: - Pleuritic effusion filling the right side of the chest. - She had been in that state for three weeks.

Treatment: - 7th April, bled. - 8th April, bled again. - 9th April, a blister was applied on the anterior part of the right side of the chest.

10th April - The patient very much reduced, the mercurial treatment began.

On the 12th she was salivated.

In the beginning of May she was dismissed completely cured. - The chest was contracted on the side of the effusion.

The difference between the treatment adopted in these last three cases, & in that of Martin is evident. - What good could be expected from a mercurial course in an extensive pleuritic effusion, in a person in these respects healthy & robust, before
the employment of a general blood-letting? The abatement power of mercury so marked in the removal of fluid accumulations is, however, far from being so evident, and much more doubtful when applied for the destruction of morbid growths. We have, though, many examples illustrative of such an action, and it might be conceived how mercury can stop the progress of such growths as are not malignant, by starving them, as remarked by Billing, not by causing contraction of their capillaries, we have no evidence of this, but, as already explained, by a general interference with the process of nutrition and assimilation which is greatly impeded under morbid action.

But if there are the only means by which the metal in question promotes absorption, what are we to think of its alleged effect on masses of lymph which are felt to disappear rapidly and melt away under its action? Are we to attribute to mercury the merit of that accelerated absorption?
arresting the effusion of coagulable lymph, in fact subduing the inflammatory process, we might clearly infer from such facts. But that it promotes the absorption of coagulated lymph, we have no reason to believe; nay, we have every reason to doubt it, because it is frequently seen in practice that when pieces of or cataract that had been broken up pass through the pupil and show themselves between the iris and cornea, they melt away and disappear as quickly as the lymph in uveitis, although not a particle of mercury is taken. Mr. Lawrence mentions a case of syphilitic iritis which got well without any mercury, and which had been marked by the deposition of a large mass of lymph on the iris. The lymph, he states, was absorbed as soon as the inflammation ceased, and he never saw it disappear so rapidly under any circumstances. Now had mercury been given in this case, the drug would have got the credit of such an accelerated absorption. I think that in all extensive exudations of lymph after the inflammatory process had subsided, and
when strength & vitality are required for the softening & reabsorption of these worms. Mercury, that weakening agent, cannot but prove hurtful, and much less can it be beneficial.

In aurate, this mineral has sometimes been given with success, but, as already referred to, a very small quantity of this drug is apt to produce severe salivation in this complaint, so that its employment is perhaps with reason seldom resorted to in this affection.

The antimonials, power attributed to mercury seems hardly to be well founded upon fact. Ascariids have been found in the soakers of the quick silver mines of Sicilia, and many practitioners often administered calomel for the destruction of intestinal worms with any effect. It may therefore, be questioned whether the alleged antimonials properties of mercurials exist independent of their cathartic action.

I do not conceive that the limits of this thesis will admit of a discussion.
on the doses & forms in which mercury is conveyed into the system, or applied to the skin.

The external use of this remedy for cutaneous diseases has been so often resorted to, that has proved so successful, as to add a new importance to it. It is a virtue purely local & altogether distinct from its physiological action on the system. Of all the numerous skin diseases for which it has been proposed, perhaps none called for its greater excitement among the medical world than Syphilis. More than were the observations of Mr. Bierou & Bébécan published, than this adoption was enthusiastically pleaded on all sides, and not a few brought before the public. Many facts in support of this new method of cure, a more strict observation, however, & further experience was not long in showing that this treatment did not merit all the praise that had been lavished on it; and in 1837, Mr. Bébécan, one of its most enthusiastic partisans acknowledged
himself, the inefficacy of this method. Since then this treatment has been gradually abandoned, & it offers, now a day, but a secondary interest.

The Augmentin' hydroxyprine nitrate has been found of late years a very useful application for prurigo. It is said by many to be an infallible method of cure.

The abortive action of mercurial preparations in variola is also, a fact henceforward acquired by science, & against which no one can have the least doubt. According to Mr. Gabriel, the abortion of the pustules does not depend on their being excluded from atmospheric air; he tried numerous experiments to decide that question. If we are to believe Mr. Mr. Verres & Gabriel, who made for a long time numerous observations on this subject, the abortion of the small-pox pustules, even in a state of suppuration, was never followed by a bad result. Mr. Gabriel even thinks that the abortion of the pustules renders the disease milder. This treatment has been sometimes.
objected to an account of the salivation it induced. But whatever might be said against it, the crotic treatment when directed with prudence will always be found of great service in practice, and deserves to rank among the most useful discoveries which every day enrich the science of Therapeutics.

Such is a very imperfect sketch of the physiological and curative effects of Mercury, a remedy very extensively employed and about which many controversies and discussions have arisen and still continue to take place. But in spite of the visionary terrors of timorous minds, which are entirely attributable to the unskilful management of this drug, the fondest wish of every liberal-minded philanthropist should be, that its rational and cautious employment may get alone for the faults which earned for it so much hatred and obloquy.
and in justice to mankind it should be our constant endeavour to render what formerly was an affliction, a means of alleviating their sufferings.

C. M. Chafscrood