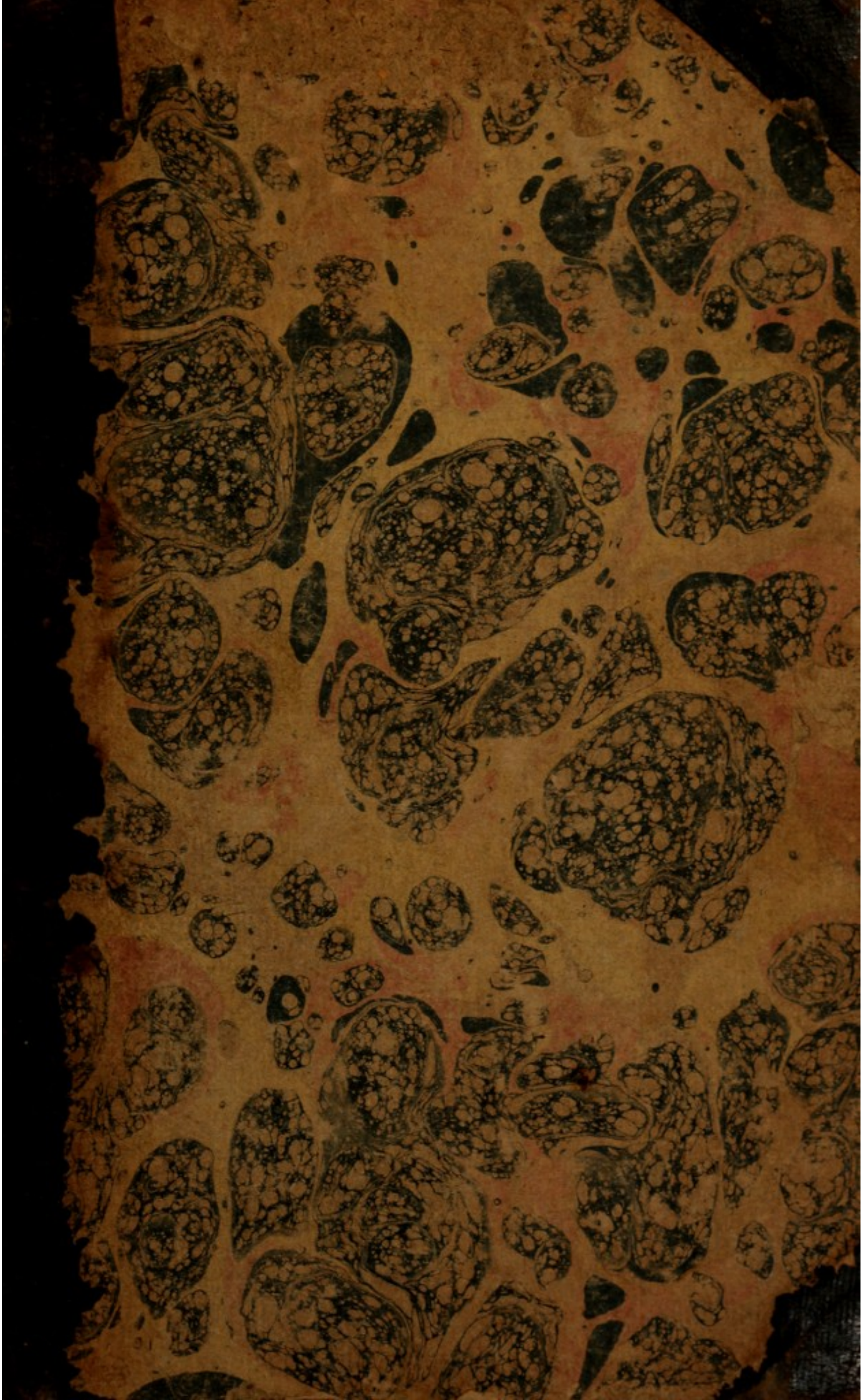
Three dissertations on Boylston prize questions for the years 1806 and 1807 / By George Cheyne Shattuck, M.D. Being the dissertations to which the Boylston prize medals were adjudged. To which is prefixed the public account of their adjudication.



Benj R Baird
July 1840

THREE

DISSERTATIONS

ON

BOYLSTON PRIZE QUESTIONS

FOR

THE YEARS 1806 AND 1807.

BY GEORGE CHEYNE SHATTUCK, M.D.

BEING

THE DISSERTATIONS TO WHICH THE BOYLSTON PRIZE MEDALS WERE ADJUDGED.

TO WHICH IS PREFIXED

THE PUBLIC ACCOUNT OF THEIR ADJUDICATION.

.....

1.

.....TRAHIMUR OMNES STUDIO LAUDIS.

Cicero pro Poeta Archia.

2.

TEMPERAMENTORUM INSTRUMENTUM EST CUTIS.

Riverius.

ME PINGUEM & NITIDUM, BENE CURATA CUTE, VISES.

Hor. Epist. 1. *lib.* 4. *l.* 15.

3.

VESTRÆ PETITIONI RESPONDEO DILIGENTER.

Roger Bacon.

PUBLISHED BY FARRAND, MALLORY, & CO. AND HASTINGS ETHERIDGE, & BLISS, BOSTON; BY HOPKINS & BAYARD, NEW-YORK; AND HOPKINS & EARLE, PHILADELPHIA.

.....

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1808.

TO

Ward Nicholas Boylston, Esq.

THE FOUNDER OF THE INSTITUTION FOR THE ANNUAL DISTRIBUTION OF PRIZE MEDALS TO THE AUTHORS OF APPROVED DISSERTATIONS UPON IMPORTANT MEDICAL SUBJECTS COMMUNICATED FOR DISCUSSION.

Dear Sir,

I EXPERIENCE a peculiar pleasure in inscribing to you the following sheets. From you, as the author of that Institution, whose committee have set in judgment upon them, they originated in the germ, and, to you, as now unfolded, they are most naturally dedicated. This pleasure would be much increased, if they were more worthy of inscription to the man, who has been so eminently distinguished in the exercise of that god-like virtue, *benevolence*. The disciple of eloquence and the student at medicine alike hail you as their patron* and benefactor.

That your benevolent wishes to subserve the good of the republic by rendering our young men

* Harvard University is indebted to Mr. BOYLSTON, not only for its Professorship of Rhetoric and Oratory (the chair of which is filled by the Hon. John Quincy Adams), but for its Anatomical Collection and Medical Library.

eloquent, and to diminish the sum of *physical suffering* by your attempt to promote discovery in the divine art of healing, may all be realized, is the fervent prayer of every *friend to man*, but, be assured, Sir, of no one more sincerely, than of

Your obliged and

very humble servant,

GEORGE CHEYNE SHATTUCK.

No. 13, *Middle Street,*
October 3d, 1808.

PREFACE.

A PHYSICIAN, in submitting his labours to public examination, should feel the same unconcern for the consequence to his reputation, as the chemist feels, for the result of the analysis, on putting his materials into the crucible. Both hold departments within the province of natural philosophy, and *truth*, as it relates to discovery, to its establishment after discovery, or to the correction of pre-existing error, should alike be the object of both.

A writer in appearing before the bar of the public should therefore reap a triple advantage from his exposure, in the communication of truth, in provoking a *righteous* criticism for the *mortification* of his *sins of ignorance*, and in awakening the attention of the public to *desiderata*, the solution of which involves principles, which are essential to a lucid and satisfactory discussion of his subject.

Respecting the first object, *the communication of truth*, it is presumed, that the simple collection and systematic arrangement of what has been written upon these interesting subjects would not be altogether inutile, particularly to the younger members of the faculty.

All pretensions to *originality* the writer entirely disclaims. If he have taken acknowledged first principles, and applied them by regular induction to the discussion of the questions proposed, he can see no cause for *self-crimination*, nor does he discover, that the reader should find any for *complaint*.

Respecting the accomplishment of the second object a writer should gain in appearing before the bar of the public, the author feels more confident of success. Any candid exposition of error in the following dissertations will meet due attention, and the error shall be corrected with a becoming readiness. The fear of exposing our ignorance implies an unwillingness to be instructed, and an unwillingness to be instructed ever presupposes a willingness to remain in ignorance. A man must feel the smart of *conscious ignorance*, or he will never cheerfully submit to the privations, to the toil, and pain, which are necessary to ensure his success in traversing the steeps of science.

The importance of awakening inquiry to the *desiderata* in physiology and pathology is too obvious to admit of illustration.

In that species of mortification, which Mr. Pott has denominated "Mortification of the toes," usually occurring in very aged people, a remedy, which is adequate to arresting the progress of the disease in all cases is very much wanted. Although Mr. Pott's

name will ever be entitled to honourable mention among the faculty, for the successful application of opium to the cure of the disease in question, and Dr. Physick to the gratitude and respect of every practitioner in medicine for the successful application of blisters to the cure of the same disease ; still these medicines do not act in all cases with a force and certainty, entirely satisfactory to the anxious physician, upon whom is cast the look of distress, imploring relief.

The external application of cantharides has been proved to be an efficacious remedy in the cure of certain species of mortification. Does not the feeble state of animation at the time mortification commences its attack upon the toes of people, advanced in life, call for the internal administration of a medicine as powerful as the cantharides? To those gentlemen, who have the medical care of infirmaries, hospitals, and almshouses, the question is respectfully submitted for solution, to be founded upon a variety of judiciously conducted experiments. Any communications to the author, which shall reflect light upon this intricate and perplexing subject, will be gratefully received and duly acknowledged.* It is not impossi-

* Nitrate of potass has been *said* to be a valuable article upon the list of *antiseptics*. No mention has been made of it, because no *certain* information could be procured respecting its *antiseptic* action upon the living fibre. Cicuta has likewise been *said* to have been administered with very considerable success in "gangrene of the toes ;" but *certain* information respecting the mode of its exhibition, and the extent of its antiseptic power, was not in my possession. This must form my apology for its omission.

ble, that some enquirer after medical truth, more fortunate than his fellows, may already have discovered a remedy, superior to any at present *generally* known, in the cure of this *often* deplorable malady. The medical philosopher has done but half his duty in completing the discovery, while its communication to the public is still kept back.

In discussing the chemical remedies to be employed in the cure of biliary concretions, it may be thought too much stress has been laid upon remedies, which act without reference to any influence they may exert upon the living fibre. Although nothing can be received into the stomach without producing some effect upon the actions of the living fibre, still remedies which have an action more decidedly chemical than stimulant, the chemical properties having the ascendancy, the remedy should receive its title from its most prominent qualities.

Do alkaline medicines, when taken into the stomach, increase the alkalescency of the bile? It was the intention of the writer to have solved the question by an experiment, which would have amounted to demonstration. It was his intention to have selected four pups of the same litter, and to have fed them upon the same kind of food, and in the same quantity, to three of which alkalies were to have been administered in as large doses as they could have well borne

for a week, each one taking steadily of some alkali, but no two of them taking of the same. The animals were afterwards to have been killed, and the bile of each of them to have been submitted to chemical analysis, that the constituent principles in the bile of the animal taking no alkali might have been compared with the constituent principles in the bile of those which took of the alkalies, and that the different constituent principles in the bile of those which took of the different alkalies might have been determined.

In this way the fact might have been ascertained. This mode of experimenting, which the writer never carried into operation from the influence of circumstances beyond his controul, is here proposed, that the reader, who has the inclination, may prosecute the experiment at his leisure.

In the discussion of the structure and physiology of the skin, as preparatory to the treatment of its pathology, the process pursued by nature in the reproduction of skin, after it is once destroyed, necessarily claims our attention. It is a well established fact, that the blood is the *only* material not only for the *original* fabrication of parts, but for their renovation, after they are once destroyed. It is a fact equally well established, that the qualities of the blood depend upon the state of the fibre, whose actions are concerned in its elaboration from the aliments and

drinks taken into the stomach ; and that the actions of the fibre, *cæteris paribus*, depend upon the quality and quantity of the aliment and drinks, which constitute the ordinary diet. The blood, previously to its *chrystallization*, or *conversion into contractile fibres*, must undergo the process of coagulation. Here inquiry is naturally instituted, upon what principle does the coagulation of the blood depend: Mr. Hewson thinks he solves the question by the aid of reduced temperature, of rest, and of exposure to the action of the atmosphere. Although in a great majority of cases these agents are apparently sufficient to solve the phenomena of coagulation, they are insufficient in every instance to produce the effect. Mr. John Hunter, to rid himself of this difficulty, resorted to the *vitality* of the blood, as an immediate agent connected with its coagulation; but, in this solution, he has entangled himself in other difficulties, as inextricable as those from which he thinks fortunately to escape.

Mr. Hunter should not only have proved the *real life* of the *circulating blood*, but likewise, that its powers of life are stronger than those of the fibres, whose vibrations commence and maintain its motion; for the *living* animal may be made to part with its principle of animation in many instances, before the blood shall be completely coagulated: the life of the blood admitted, it cannot be reasonable to suppose it should have lost its *vitality*, before the process of coagulation is completed. The principle granted, the

blood must entirely lose its vitality in the completion of the process, because the putrefactive fermentation soon follows. In those animals destroyed by lightning, or killed suddenly by other agents, the blood cannot be made to coagulate. Do lightning and these other agents cause the blood to pass immediately from its circulating state to that of putrefaction without going through its usual intermediate stages? Putrefaction, it is well known, is very rapid in those cases, where the blood cannot be made to coagulate: or do lightning, running to death, &c. cause a chemical combination to take place between the constituent parts of the blood, whereas they had previously been kept together by simple mixture? Coagulation, it is well known, is but a *separation* of the blood into its *several parts*. If a *chemical* combination take place between the constituent parts from the action of these causes, a question naturally arises, what are the new products formed by that combination?

The disposition of the blood to coagulate is, without doubt, intimately connected with the force of the vascular action, which maintains its circulation. Hence every petty phlebotomist pretends to measure the degree of *inflammatory* action by the appearance of the coagulum and the time consumed in its forming.

Although Hewson and Hunter have done *much* towards explaining the principles regulating the coagulation of the blood, still *much*, *very much* remains to be investigated, before all the principles concerned in the process can be satisfactorily applied, by the practising surgeon, to the restoration of destroyed parts. After the coagulation has formed, vascularity soon commences, and granulations are seen elongating into fibres. In the process of skinning, Mr. John Hunter says *a kind of chrystallization* takes place. If the blood must undergo *a kind of chrystillization* to renovate destroyed organic fibre, then, in the solution of the food in the gastric liquor, in its elaboration into blood, and in the coagulation of that blood to reproduce lost parts, very little more is to be seen, than may be discovered in the *previous* solution and *subsequent* chrystallization of the neutral salts. At least there is a striking analogy between the modes of forming the *animal* and *saline* chrystal.

The successful practice of surgery rests entirely upon a knowledge of those principles of the animal economy concerned in the reproduction of parts, which have been once destroyed. The subject merits the *genius* and *labours* of a second John Hunter.

The pathology and curative treatment of many of those obstinate cutaneous diseases, which are the

scourge of *several warm climates*, are still involved in much obscurity.* There is a combination of causes, which prevents such an investigation of them, as their importance demands.

Many physicians who visit those warm climates, are more influenced by a love of gain than by a thirst for discovery in their professional pursuits. Besides, the syren notes of pleasure, the tyrant *custom*, and the influence of excessive perspiration for maintaining animal temperature at its proper standard, palsy those *manly* powers, which alone can give a *buoyant* support to that indefatigable spirit of inquiry, which penetrates the *profound*, and unravels the *mysteries*, of disease. Another barrier, still more formidable than any of the preceding, opposes an accurate discussion of the subject. The people, who are afflicted with these diseases, are generally so depraved in principle and corrupt in practice, are so indifferent to the present and stupid to the future, that they cannot be induced to submit to the persevering use of those means, which are best suited to the violence and obstinacy of their complaints.

Dr. Winterbotham, who was for several years a resident practitioner of medicine and surgery at the British Factory upon the coast of Sierra Leone, and

* They remain to be discussed by Willan ; and the splendid treatice on Cutaneous Diseases by M. Albinus, a part of which is now in the press at Paris, could not be procured.

Dr. Thomas Herberden and Dr. Joseph Adams, both of whom were practitioners of medicine some length of time upon the island of Madeira, have described, with more accuracy than any other authors whom I have had the opportunity of perusing, the *modern* cutaneous diseases of warm climates. But they have by no means exhausted their subject; for their reader, dissatisfied with their imperfect accounts of yaws and of elephantiasis, cannot withhold the following inquiries; answers to which are essential to a clear understanding of their nature and cure.

Is yaws an eruptive fever, that runs a certain determinate period, after which it *invariably* declines, until it is cured by the powers of the constitution, and what is the length of that period? *How far* is the disease contagious, and who are most exposed to its attack? What are the palliatives, which have been proved by experience to be most effectual in obviating its violence, until it shall have attained its height and completed its course? Is the constitution *ever* susceptible to the action of its poison a second time? What proportion are destroyed by it, in relation to the number *cured* and to those, who are *incurable*, but eventually fall victims to other diseases?

Does elephantiasis originate from obstructed perspiration in the parts diseased, or from obstruc-

tion to the flow of lymph through the lymphatic glands in the groin? In Barbadoes it is called the *glandular* disease from its beginning in the inguinal glands. Does the long stagnation of the lymph in its vessels produce extravasation and subsequent coagulation, and, in this way, effect the enormous increase in the thickness of the skin and bulk of the limb? To this opinion Dr. Adams, in his *valuable* treatise On Morbid Poisons, seems inclined. Are there no remedies adequate to the removal of this *glandular obstruction*, which admit of internal exhibition or of external application, the requisite length of time to effect a cure? Is the disease in the *least* contagious? Are there *any*, and *what* are those changes of constitution, which are observed to precede the attacks of this *hitherto uncured* disease?

The *cow-pock*, which of late has attracted so much attention from the faculty, and from all the benefactors of mankind, which is more interesting to the lives and health of our race than any discovery in the preceding century, which transmits in imperishable characters to the annals of *benefaction* the name of Jenner, merits still further investigation. It remains to be determined, whether the real kine-pock *ever* predisposes the system to cutaneous eruptions, and likewise whether the *spurious* disease operates any change upon the constitution, that will make the *true* vaccine pustule afterwards exhibit different phenomena from those exhibited in consti-

tutions, which have not previously been subjected to the actions of the *spurious virus*.

The only wish of the writer in stating these *desiderata* in the pathology and curative treatment of these cutaneous diseases is to awaken a spirit of enquiry in such of his readers, as may have the opportunity, towards the accurate investigation of what long has been involved in an obscurity, as *perplexing* to the intelligent and conscientious practitioner, as it has been *distressing* to the unfortunate patient.

To the Boylston Medical Committee, who have affixed to these pages the sanction of their approbation, the author would apologize for the corrections, emendations, and additions he has taken the liberty to make, since they passed their hands. No material alterations have however been made in the two last dissertations, although they have been somewhat enlarged. In the dissertation on mortification, the most material alterations of the *original* paper were made at the suggestion of its chairman, and have since received the private approbation of several of its members. The introductory remarks at the commencement of this paper relative to the principles of animation, may perhaps be thought to wear the stamp of originality. If there be any merit in them, it is due to the genius and labours of a *highly* eminent physician of our country, whose name I am not at liberty to communicate to the public. If

they contain no merit, it must be, because their *original clearness* has been obscured by their medium of communication. In the communication of another man's thoughts, particularly if they are the thoughts of a *great* and *original* genius, and have been received only in desultory conversation, there is an intrinsic difficulty in the nature of the undertaking, to which few are equal, and to which the writer feels very inadequate. The *obvious importance* of the *principles* to a satisfactory discussion of the curative treatment of the subject must form his apology to the reader for having attempted *so much*, and the *difficulty* of its execution, to the original mind in which they were matured, for having accomplished *so little*.

Before coming to a close, the respectful acknowledgments of the writer are due to Dr. Thomas Danforth, whose *liberal* conduct and *gentlemanly* condescension in waving the discussion of one of the questions* of last year, after he had *nearly* completed an elaborate paper upon it, will ever entitle him to the *grateful* remembrance and *respectful* esteem of the author.

* On the structure and physiology of the skin, with a view to the diagnosticks and cure of diseases, usually denominated cutaneous.

ADJUDICATION.

WITH the beneficent and laudable view of improving the art of Medicine, and to excite practitioners to bring those talents to light, which might otherwise be useless to the community, WARD NICHOLAS BOYLSTON, Esq. hath, by an instrument under his hand and seal, given to the President and Fellows of Harvard College, in *Cambridge*, bearing date January 20th, 1803, empowered and enabled that Corporation to appoint annually a Committee skilled in subjects connected with Medical, Anatomical, Physical, or Chymical subjects, as they deem most useful, and the several Authors of the best Dissertation, (in the judgment of a majority of said Committee) upon each of said subjects, which shall be transmitted or delivered to them, on or before the 20th of November next, after public notice given of said Questions, are entitled to receive of this Committee a Prize Medal (or the amount in money at their option), of such value as to said Committee shall seem proper; provided the value of all the Medals distributed, and the money thus paid in any one year, shall not exceed *one hundred dollars.* And the corporation having appointed

ISAAC RAND, M. D.	B. WATERHOUSE, M. D.
DR. LEMUEL HAYWARD,	AARON DEXTER, M. D.
JOHN WARREN, M. D.	WM. SPOONER, M. D.
DR. WILLIAM EUSTIS,	and
DR. JOHN BROOKS.	DR. JOSIAH BARTLETT,

to be a Committee to propound the questions above mentioned, and to carry into effect Mr. BOYLSTON's benevolent purpose, they do hereby propose the following Questions to all, who cultivate Medicine, or the sciences connected with it; and do invite their attention to a discussion of the several subjects here laid before them.

ADJUDICATION.

QUESTIONS.

1st. For the best Dissertation on the difference between Mortification produced by an external cause, and that which arises from a constitutional defect, the diagnosticks, and proper mode of treatment of each.

2d. For the best Dissertation on the structure and physiology of the skin, or external surface of the body, with a view to the diagnosticks, and cure of diseases usually denominated cutaneous.

3d. What are causes of the varieties observed in Dysentery, and what the method of treatment adapted to the cure of these varieties ?

At a Meeting of the Committee on the BOYLSTON Prize Questions, at Boston, December 31, 1806.

A Dissertation on the first Question relative to *Mortification ;* and one on the second relative to *Dysentery,* having been read and considered, the question was taken, whether they were respectively entitled to the premiums offered, and determined in the affirmative.

On opening the papers accompanying the Dissertation, it appeared that the one on *Mortification* was written by Dr. GEORGE CHEYNE SHATTUCK, of *Templeton*, in the county of *Worcester ;* and the one on *Dysentery*, by Dr. JAMES MANN, of *Wrentham*, in the county of *Norfolk.*

Extract from the Record.

ISAAC RAND, *Chairman.*

Boston, January 1, 1807.

The Printers of this Commonwealth, and in the neighbouring States, are requested, for the benefit of medical science, to publish the above for three weeks successively in their respective papers.

ADJUDICATION.

AT a meeting of the Committee of *Harvard University*, for adjudication on the BOYLSTON Prize Questions for the year 1807.

Present, ISAAC RAND,

LEMUEL HAYWARD,	:	JOHN WARREN,
WILLIAM EUSTIS,	:	THOMAS WELSH,
AARON DEXTER,	:	JOHN BROOKS,
JOSIAH BARTLETT,	:	WM. SPOONER.

The several Dissertations exhibited within the period specified, having been read, and examined, PREMIUMS were adjudged to the following:

On the structure and physiology of the skin, with a view to the diagnosticks and cure of diseases usually denominated cutaneous, designated, "Temperamentorum instrumentum est cutis." The letter accompanying the same, having been examined, was found to be the production of GEORGE CHEYNE SHATTUCK, of Boston.

On the causes, diagnosticks and cure of biliary concretions, designated, "Vestræ petitioni respondeo diligenter." The letter accompanying the same, having been examined, was found to be the production of GEORGE CHEYNE SHATTUCK, of Boston.

ISAAC RAND, *Chairman.*

Boston, January 4, 1808.

ERRATA.

P. 75, l. 21, *for* phenomanon *read* phenomenon.
79, 18, alescent *r.* alkalescent.
86, 1, *add*, and imperfect excretion through the insensible pores of the skin.
88, 6, *for* cognocere *r.* cognoscere.
102, 4, Previous *r.* Previously.
107, 18, fibrile *r.* febrile.
.. 23, do. do.
110, 18, *varicla r. varicella.*
120, 22, *porta r. portæ.*
.. 25, do. do.
137, 24, *hepatius r. hepaticus.*
148, 13, conantric *r.* concentric.
150, 19, porta *r.* portæ.
151, 24, npon *r.* upon.
163, 6, considerable *r.* considerably.
170, 15, fo *r*, for.
175, 2, articulors *r.* articulos.
190, 11, Junioris *r* Juniores.

CONTENTS.

A

DISSERTATION

ON

THE DIFFERENCE BETWEEN MORTIFICATION PRODUCED BY AN EXTERNAL CAUSE, AND THAT WHICH IS PRODUCED BY A CONSTITUTIONAL DEFECT, THE DIAGNOSTICKS AND PROPER MODE OF TREATMENT OF EACH.

ANIMAL life may be defined a certain power to act, which is every where diffused throughout the animal machine. Mortification, or the death of a part while the rest of the system retains life, is a complete loss of this power in the part mortified, and a consequent entire cessation of vital action in all its vessels. In order to comprehend the means best adapted to the support of life and to the restoration of the body to health, when so direct an attack as mortification is made upon it, previous discussion of animal life and of its various supporters is essentially necessary.

Mortification bears the same relation to the regular actions of the healthy animal economy as darkness bears to light; and as well might the man,

blind from his birth, point out the means of obviating darkness, as the physician, ignorant of the principles of animation, prescribe for the cure of mortification.

The human body is composed of bone, cartilage, muscle, tendon, nerve, &c. These several parts admit of subdivisions, and these subdivisions may again be resolved into their constituent parts. The muscles furnish an example in point. Each muscle is composed of bundles of fibres, and each fibre of its constituent particles. These particles maintain certain determinate distances, to which they readily tend upon the least displacement.

The constituent particles of the fibre retain their relative position to each other by the electrical atmospheres subsisting between them; which electrical atmospheres are preserved by the actions of the corpuscles.

Too great electrical atmospheres between the constituent particles constitute what is generally understood by a lax fibre. Too small electrical atmospheres between the constituent particles constitute what is generally denominated a rigid fibre. Too great electrical or caloric atmospheres surrounding the particles of the fibre prevent them from approximating to that degree requisite to render the vibration vigorous. Too small electrical or

caloric atmospheres surrounding the constituent particles of the fibre prevent the degree of expansion requisite to a vigorous vibration. The cure of the *unstrung*, *lax-fibred* splenetic by the cold bath and the refrigerant tonics, and the cure of the *too-tightly-strung*, *rigid-fibred* tetanic patient by the warm bath, electricity and the relaxants, furnish proofs in point of the correctness of the positions above laid down. The electrical or caloric atmospheres surrounding the corpuscles of the fibre, either by the violence of vascular action or by communication from without, may be so far increased as to dissolve the fibre, when man either evaporates, or becomes a *caput mortuum*.

A certain degree of cold, whether proceeding from the languid actions of the vascular system, or applied from without, approximates the constituent particles of the fibre, by diminishing in size the caloric atmospheres surrounding those particles, until the actions of the system are entirely suspended by the abstraction of the principle essential to its mobility.

All the component fibres of the several parts of the body are connected in the brain and heart through the media of their nerves and vessels. If the motions of life are but interrupted in a single fibre, the whole system is made to feel it. The tickling of the foot with a straw, or of the nose with

a feather, will produce severe convulsive laughter, or cause the most violent sneezing; both of which are but efforts of nature to restore the natural actions to parts primarily affected.

The supporters of life are internal and external, both of which are essentially important. The internal supporters of life are the aliments and drinks received into the stomach, which operate as stimuli upon its excitable fibre, and upon that of every part, through which they traverse in the routine of the circulations. The external supporters of life are the atmosphere, with all the foreign materials it may hold in solution, light, and indeed all foreign bodies, which ever impress either of the senses. The motions of life are most vigorous, when the force of the internal and external stimuli is most nicely adjusted to the excitable state of the animal fibre. The economy of animation consists in varying the several stimuli, which are its supporters, to the varying excitability or sensibility of the animal fibre. Different parts of the body possess different susceptibilities to the action of the same stimuli, and the same part to the action of the same stimuli at different periods of life, and under different circumstances at the same period of life. The sensibility or excitability of a part is in an inverse ratio to the force of the several stimuli, which have been applied to it—Thus the sole of the foot, which in the person that never walked, shall have as much sensi-

bility as the skin upon any part of the body, in the hardy pedestrian, long accustomed to travel with uncovered feet, shall possess little more sensibility than the hoof of the horse; likewise the eye, which *never* received a ray of light, upon the removal of its cataract will be pained excrutiatingly by the beams of the sun.

Different parts of the body will therefore possess different powers of life according to the different previous exposures of their excitability to the action of the various stimuli concerned in its support.

The feet, which are exposed to greater vicissitude in temperature, and to the action of more mechanical stimuli, than most other parts that are situated nearer the source of the circulations, must necessarily be most exposed to the attacks of mortification. When the system labours under severe febrile disease, and the powers of animation seem almost exhausted, a sinapism or a blister may cause the parts, to which they are applied to change their colour, turn flaccid, and assume all the appearances of gangrene. In such a case mortification is produced in that particular part, before death has generally taken place, in consequence of the exhaustion of its excitability by the stimulus of the flies or of the mustard seed. When the motions of life in a part have been once so completely interrupted as to have become incapable of being re-excited, the rest of

the system takes the alarm, rallies its shattered forces, and maintains a combat with the inanimate portion, until it either expels it from the surrounding sound parts, or falls with its enemy to resume its original circulations with the rest of dead matter. In this case decomposition takes place in the mortified part from the increased caloric atmospheres furnished by surrounding matter to the particles of the part mortified; it being an established law of chemistry, that bodies in passing from the solid to the fluid, from the solid to the aeriform, or from the fluid to the aeriform state, invariably absorb caloric from surrounding substance. During the putrefactive fermentation, a great proportion of what was originally solid is converted into vapour.

This is the routine pursued by mortification whether proceeding from constitutional defect or from an external cause. The principal characteristic difference between the two kinds of mortification consists in the different states of the system, when attacked by the same disease, originating from different sources. When mortification takes place from an external cause, it is presumed, that the system was in a healthy state at the time the cause producing it commenced its operation; whereas, when mortification comes on from constitutional defect, it is implied, that the general health of the system had been previously impaired. The difference between the two species of mortification will

be best understood by a separate discussion of each branch of the subject in detail.

1. Mortification from constitutional defect presupposes the operation of certain causes to impair the power of vascular action in the part mortified. Its being attended with two states of arterial excitement requires a subdivision into 1. Mortification from constitutional defect attended with increased arterial action, and 2. Mortification from constitutional defect attended with decreased arterial action.

1st. Mortification from constitutional defect attended with increased arterial action may be produced either by an excess of stimulus applied to the irritable fibre of the part mortified, or by a deficiency of stimulus applied to the irritable fibre of the part mortified. The treatment being precisely the same from whichever cause originating, it becomes unnecessary, in a practical point of view, to maintain the distinction.

The different susceptibilities of different parts of the body to vital motion, from the different stimuli previously applied to them and from their different distances from the source of the circulations, are proved in the history of the disease the ancient Romans called *podagra*. Free living and the liberal use of generous wine will first cause an interruption to the motions of life in the great toe; whereas the

food and the wine, which were the predisposing causes of the disease, had been first applied to the stomach. The great toe from the servile treatment it receives must have a portion of its excitability battered down by the mechanical stimuli, which are almost constantly acting upon it. From the diminution of its excitability, its vessels must possess less power to propel forward their circulating contents, especially when the blood is their only stimulus for the maintenance of their actions. Languid circulations favour the deposition of the tartar of the wine and of the earthy parts of the blood in the minute vessels. These concretions become the sources of painful irritation and of violent inflammation, which continue, until the minute vessels have absorbed and reconveyed into the circulating system all the foreign matter, or until the sensibility of the part is completely destroyed.

Likewise in inflammation which precedes and accompanies this species of mortification, there is first a deficiency of power in the minute vessels of the part mortified to propel forward their circulating fluids.

This favours the deposition and coagulation of the lymph, which may become the source of painful irritation, that will continue until the corpuscles of the fibre become so far distanced by the violent vascular reactions excited for the removal of the ob-

structing cause as to render the fibre incapable of further vibration, when the parts thus inflamed change their colour from a deep red to a dark purble, become flaccid, and lose all their sensibility. This obstruction to the flow of arterial blood from the surrounding sound parts necesssarily fills the arteries of those parts with blood ; and this increased fulness of the arteries necessarily increases their actions from the increased quantity of stimulus applied to their irritable fibres. This increase of arterial action, if it be allowed to proceed too far, will extend the mortification. It will generate caloric in such quantities as so far to increase the distances between the corpuscles of the fibres as to destroy their power of vibration. There is another principle which demands discussion in the treatment of inflammation besides increased arterial action.

Mechanical stimuli, as walking, running, labour, &c. increase the force of arterial action, but excite no inflammation. In the healthy animal economy all the vessels, whether of circulation, absorption, secretion, or excretion, are nicely balanced in their respective actions. An increased action in the one set of vessels, which shall be attended with a corresponding increased action in the other sets of vessels, will produce no derangement in the functions of health. It is necessary that the balance of action between the different vessels be destroyed to excite inflammation. In that inflammation, which precedes

and accompanies this kind of mortification, the veins and absorbent vessels discover a want of action, which is in some degree proportional to the increased force of arterial vibration.

In the cure of mortification attended with increased arterial action, which originates in *constitutional defect*, there are two indications to accomplish. The one consists in the reduction of arterial action, and the other in the increase of venous and lymphatic absorption. The accomplishment of these two indications restores that balance of action, which constitutes exemption from disease.

The increase of venous and lymphatic absorption implies a diminution in the force of arterial action, for the accumulation of blood in the arteries, which increases their actions by increasing the quantity of stimulus applied to their irritable fibres, is produced by a diminution of venous and lymphatic absorption. Increased arterial action generates an increase of caloric, which increase of caloric must necessarily increase the caloric atmospheres surrounding the corpuscles of the fibre. These increased caloric atmospheres surrounding the corpuscles of the fibres must necessarily increase their mobility, provided they are not carried to such a distance as to be removed beyond the sphere of each other's influence; and likewise thin the blood. The increased mobility of the fibre from inflammation

is proved by the exquisite pain, which the least irritation shall excite in an inflamed part, sensibility always being implied in pain, and mobility in sensibility.

A certain increase of arterial action is absolutely necessary to the cure of mortification, but this may, and often does, proceed to a dangerous extreme; in which cases it requires moderation. The position respecting the necessity of an increase of arterial action in the cure of mortification is proved in the history of the sloughing process carried on for the removal of the dead portions of flesh.

In the sloughing off of dead portions of flesh from the neighbouring sound portions, the arteries in the neighbouring sound portions are necessarily increased in the force of their vibrations. The * coagulable lymph in all cases of healthy inflammation becomes thinner, which facilitates its entering minute vessels, which had previously been filled with serum only. There is likewise an enlargement in the size of the minute vessels. "The very first act "of the † vessels, when the stimulus which excites

* That the blood is really attenuated in inflammatory disorders, when the whitish crust or size appears, is probable from the followlowing circumstances; 1st, it even seems thinner to the eye; 2d, the red particles or globules subside sooner in such blood, than that in an animal in health. *Experimental Inquiry into the properties of the blood by Robert Hewson, page* 50.

† Hunter On The Blood, vol. 2d. p. 5.

"inflammation is applied, is, I believe, exactly similar "to a blush. It is, I believe, simply an increase or "distention beyond their natural size."

The coagulable lymph, after protrusion through the minute serous vessels to the termination of their living parts, gradually coagulates to form the *wedge of separation* and the *wall of division* between the living and dead portions of flesh. It is to the coagulation of this lymph, that we are to attribute the closure of all the vessels to secure the part against hærmorrhagy upon the removal of the mortified parts from the sound. The force of arterial action, requisite to carry forward the coagulable lymph into the minute serous vessels for the purposes above specified, is what John Hunter calls adhesive inflammation; which is the lowest species of the healthy inflammations designed by nature for the restoration of lost parts. When arterial action shall transcend in force the adhesive and suppurative stages of inflammation, it must be reduced down to, and maintained at, the suppurative stage, that the mortified may slough off from the living parts, and that the process of skinning by granulations may go on for healing the external surface of the sore.

Such are the sympathies between one set of vessels and the other sets of vessels concerned in the maintenance of the circulations, that the same remedy which shall affect one set of vessels, invariably

affects more or less all the other vessels. The drastic purge, which shall increase venous and lymphatic absorption, almost invariably diminishes the force of arterial action. This is evinced in the cure of ascites by gamboge when taken as a purge. Nitre, which shall materially lower the pulse, increases the urinary secretions; which it probably effects by promoting lymphatic absorption.

Blood-letting likewise, which lessens the force of arterial action, under proper regulations in cases where the inflammatory action shall transcend in its effects the point intended by nature in its increase, may contribute much towards harmonizing the actions of the several vessels. But the strength of the system is too much impaired, when attacked by this species of mortification, to bear blood-letting in any considerable quantity, or the use of drastic purges. In some rare instances, where the system shall generally exhibit appearances decidedly inflammatory, it may be, and sometimes undoubtedly is, necessary to use the lancet; and if the bowels are so constipated as not to be operated upon by the common laxative cathartics, drastic purges should be used. After arterial action shall have been reduced in force to the degree of action, constituting suppurative inflammation, by the use of laxative medicines judiciously administered, by abstinence, by rest, and a general adherence to the antiphlogistic regimen usually prescribed in cases of arterial excitement, the system is

to be maintained at that standard of action by wine, by bark, and by a nutritious diet accommodated to the state of the fibre. If the stomach be too irritable to retain the bark in a large dose; it should be tried in a smaller dose; and if one preparation of the bark produce distress, it should be administered in another form.

When bark in substance cannot be retained by the stomach, bark in tincture or decoction may set gratefully upon that irritable organ; and, when bark in tincture or decoction uncombined with any other substance is ejected from the stomach, the tincture or decoction of the bark combined with laudanum may be retained without producing any unpleasant sensations. The patient may take freely of the acid drinks, as vitriol water, &c. according to the degree of thirst attending his febrile diathesis. The local remedies to be applied to the seat of mortification, for stimulating the venous and lymphatic absorbents to take up and reconvey into the system of circulations the stagnated blood, and likewise to cast off their continuous dead parts, are steam, the fermenting poultice, and blisters.

That steam stimulates the venous and lymphatic absorbents is evident from the following considerations.

1st. The veins and absorbent vessels are situated nearer the surface than the arteries, and, of course,

must be most stimulated by what is applied superficially. 2nd. In cases of inflamed joints, where there is evidently an effusion of coagulable lymph, and, in consequence, a loss of the power of motion, the application of steam to the joint diminishes the size of the tumour, and increases the power of motion. 3d. Experiment, which is the only sufficient test of principle, demonstrates the efficacy of steam in arresting the progress of mortification; which it probably effects by stimulating the venous and lymphatic absorbents to that increased action which restores harmony to the actions of the several vessels constituting the circulating system, and likewise by rendering the vibrations of the fibre more vigorous for casting off the continuous dead parts.

In consequence of the diminished actions of the veins and absorbent vessels in the living parts surrounding the mortified, there must necessarily be a diminution of caloric. This dimunition of caloric must necessarily diminish the disposition of the fibre to vibrate. This diminution of disposition in the fibre to vibrate is removed by increasing the caloric atmospheres surrounding its corpuscles. This increase in size of the caloric atmospheres, surrounding the corpuscles of the fibre, is readily and conveniently accomplished by the judicious application of steam.

The steam of vinegar or of ardent spirits is more powerfully stimulating than that of water, and con-

sequently should be preferred in cases of mortification, where the actions of the minute serous vessels, near the surface of the parts surrounding the mortified, are extremely languid. Flannels wrung out of heated spirits, vinegar, water, or a hot decoction of the white-oak bark, and applied around the parts adjoining the one mortified, furnish a mode very convenient for administering steam. These flannels must be removed and supplied by others as often as they become cool or dry.

When these shall have disposed the living parts to slough off the dead, they should be discontinued, that the common dressings may be applied to the external surface of the sore. In the mean time, the system is to be supported by stimuli agreeably to previous direction. If the excitability of the system have been much worn down by the habitual use of the *diffusible stimuli*, after the first inflammatory symptoms have abated, opium, brandy, &c. should be used to maintain the force of action requisite for the separation of the dead from the living fibre.

The following case establishes the efficacy of steam in promoting the sloughing process for the separation of mortified parts.

Mr. B—— between forty and fifty years old, who had long been a free liver, upon exposing himself in an open boat to a temperature considerably be-

low his standard temperature, was attacked with pain and inflammation in the right leg, which soon assumed all the appearances of an incipient gangrene. Bark in tincture and the antiseptics in common use were administered to arrest the progress of the disease; but were ineffectual in their operation, the stomach being too irritable to retain bark in that form. The tincture of bark combined with laudanum was then prescribed, and, in that state of combination, it set well upon the stomach. Flannels wrung out of hot spirits were applied to the living parts surrounding the mortified, and changed as often as they became dry. The steam exhaling from these, additional to the tonics used and a nutritious diet, produced the desired separation of the dead from the living parts, and thereby effectually prevented the spread of the disease. Many other similar cases, in which the virtues of steam, have been equally well tested and with similar results, might be adduced, were it necessary.

The fermenting poultice forms an application peculiarly suited to the state of the fibre in parts adjoining those mortified. It stops the progress of mortification by stimulating the living parts to a more vigorous action for casting off the surrounding dead parts. The carbonic acid gas, with which the fermenting poultice is abundantly impregnated, tends likewise to correct the stench of putrefaction; which it probably effects by combining with

the ammoniacal gas eliminated from the parts passing through the putrefactive fermentation and thereby forming carbonate of ammonia.

The common wheat-bread and milk poultice medicated with pulverized charcoal is many times a valuable external application for the seat of the mortification. When the inflammation runs high, the above poultice should be medicated with lead-water. The poultices to be applied to the parts surrounding the mortified may often be advantageously medicated with the powder or decoction of the white-oak bark. The antiseptic virtues of the above poultices are too well known to require the report of any cases in proof of their efficacy in the cure of mortification.

The mineral acids, diluted, or alkaline solutions, should be used to wash the parts already mortified for destroying the fetor, which is sometimes insupportable, while animal matter is in a state of decomposition.

The Spanish fly not only makes a powerful impression upon the system generally, but it exerts such a peculiar influence upon the absorbent vessels, that it is placed high upon the list of absorbent remedies by many writers upon the *materia medica*. This medicine in the form of an epispastic was first applied to cure mortification by Dr. Physick. As

this remedy must be considered in many respects a novel one, and as this paper may fall into the hands of those, who have never had an opportunity of perusing an article upon "The use of blisters in checking the progress of mortification by Philip Syng Physick, M. D." (which was published in the Philadelphia Medical Museum, vol. 1st, p. 189, &c.), the history of the cases of mortification treated with blisters by *that eminent surgeon* is here copied in the precise language of the author.

"The practice of curing erysipelatous inflam-
"mation by the application of a blister over the inflam-
"ed part originated, as far as I know, with the late Dr.
"Pfeiffer. From having employed blisters in the treat-
"ment of that complaint with great success, I was in-
"duced to suppose some years ago, that they might
"be used with advantage in arresting the progress of
"mortification. The first opportunity I had of apply-
"ing a blister with this intention was with Captain
"Stokes, a gentleman between forty and fifty years of
"age, whom I was desired to visit, in consultation with
"Dr. Rush, in January, 1803. After an inflammation
"about the anus, which had been supposed for several
"years by the patient an attack of the piles, a mortifi-
"cation was observed to have commenced in the pe-
"rineum and on the side of the scrotum. At my first
"visit I proposed the application of a blister, to ex-
"tend from the edge of the mortification in the perin-
"eum backwards over the buttocks; this being agreed

"to, was immediately applied; the following day, "when the blister was dressed, we both were well sat- "isfied with its effect, as it had prevented the mortifi- "cation from spreading backwards; but so extensive "was the mortification of the skin and anterior part of "the scrotum, which appeared to extend upwards in "the course of the spermatic chords towards the abdo- "men, that his recovery was not to be expected. Af- "ter a few days he died. Dr. Rush being struck with "the good effect of a blister in the preceding instance, "has lately employed the remedy in a case of mortifi- "cation, the history of which is contained in the fol- "lowing letter."

"DEAR SIR,

"I was called upon by Dr. Bleight on the 29th "of last July to visit with him Captain R. A. who in "consequence of applying a handful of polygonium "persicaria, instead of paper, to a common use after "going to stool, was affected with an inflammation in "the extremity of the rectum, which extended around "the adjoining parts, and along the perineum so as to "affect the integuments of the scrotum. Bleeding and "other depleting remedies had been used to no pur- "pose in order to cure it: a partial mortification had "taken place. I concurred with Dr. Bleight in ad- "vising leeches to the sound parts; and recollecting "the high terms in which you spoke of the efficacy of "blisters in preventing the progress of mortification in "the case of Captain Stokes in January 1803, I advised

"their application to all the diseased parts, which had "not put on a gangrenous appearance. They had the "wished-for effect; the mortified parts were after- "wards cut away, or gradually sloughed off; and, un- "der the faithful and patient subsequent attendance of "Dr. Bleight, the captain happily recovered and now "enjoys his usual health. In the most dangerous "state of the disease we gave him bark; but its dis- "tressing effects upon his system obliged us to lay it "aside.

"From, dear Sir, your sincere friend,

"BENJAMIN RUSH.

"DR. P. S. PHYSICK.

"*Nov.* 15*th*, 1804."

"On the 24th October 1804, I was desired to "meet Doctors Wistar, S. P. Griffits, and Stratton "in consultation concerning the case of Mr. Charles "French, who was afflicted with a mortification of "the foot, which was advancing daily upwards, un- "checked by the liberal use of the bark. On the "27th October I proposed the application of a large "blister around the leg below the knee; this being "agreed to, was applied in the evening; when "dressed the next morning, it was observed the "mortification had not increased; encouraged by "the benefit derived from it, I proposed on the 29th "the application of a second blister to cover all the "living parts below the edge of the first; this blister "also rose well; in a few days a distinct line of sep-

"aration between the living and dead parts was ob-
"served; the blisters were dressed with a mixture of
"spirits of turpentine and basilicon. I avoid relat-
"ing further particulars of the case, as Dr. Griffits
"proposes to publish a circumstantial detail of it.

"Since writing the above, I have been favoured
"with the following history of a case from Dr.
"Church, containing additional testimony in favour
"of the use of blisters in arresting the progress of
"gangrene.

"On Monday —— of November, I was desired
"to vist Mrs. Y. in the country, about sixty years of
"age, of a fair complexion, and delicate constitution:
"has had several children, and heretofore enjoyed
"good health.

"She had been taken on Saturday with frequent
"chills, with irregular febrile flushings, pain in the
"limbs and head, which continued increasing for
"nearly thirty-six hours before I saw her, when she
"was delirious, with flushed countenance, irregular-
"ly frequent and tense pulse, tongue furred, respira-
"tion frequent, with great general uneasiness.

"The loss of ten or twelve ounces of blood, with
"a saline cathartic, abated in some degree the fibrile
"symptoms. The delirium still continuing in the
"evening, blisters to the wrists, with a continuation

"of the saline mixture, produced an alleviation of "all the symptoms, so that towards morning she had "a few hours sleep.

"When she awoke, she was perfectly collected, "complaining of great soreness in her body and "limbs, particularly in one ankle which she said was "painful; her skin was cool, and her pulse frequent "but soft, easily yielding to the least pressure. The "family informed me, that the ankle she complained "of had had an ulcer on it for fourteen years, which "had been brought on by a slight injury after one of "her deliveries; that it had within the last two weeks "been healed. On examination the ulcer appeared "to have been of the size of a dollar, above the in- "ternal ankle, which was now quite livid, with some "swelling around the edges, having the appearance "of a vesication, and a deep purple blush, extend- "ing an inch or two beyond it, attended with a dis- "tressing, burning sensation. The leg at this time "was quite cool and somewhat swelled. The med- "icines she had been taking were omitted, and the "tonic cordial plan substituted; bark, wine, and "opium were administered freely, and cataplasms of "bark with yeast were applied to the part, and chang- "ed frequently. This treatment was followed until "Thursday with an increase of the lividity and ve- "sications on different parts of the ankle, filled with "a bloody-coloured fluid. On Thursday the ap- "pearances were indeed unpleasant; the lividity of

"the ankle had extended, and the deep purple col-
"our of the skin was near the middle of the leg, with
"very great tumefaction. The pulse was frequent,
"the skin cool, tongue dry, and much apparent in-
"sensibility of the limb. The bark was continued
"internally, and the fermenting cataplasm of pow-
"dered carbon, with meal, honey and yeast was ap-
"plied in large quantities over the part affected, and
"was repeated or changed very frequently. This
"plan was rigidly adhered to all Thursday and Fri-
"day, changing the bark (which had now been taken
"in such quantities as to sicken the stomach) for
"some other tonic.

"The deep and burning redness still however
"progressed towards the knee with an increase of
"those unpleasant vesications; the pulse on Satur-
"day was much more frequent; the skin cool;
"tongue dry, and covered with a dark coloured
"crust; very great restlessness, with a constant in-
"coherent muttering.

"In this situation I recollected a conversation I
"had had sometime since with Dr. Physick, in
"which he mentioned the good effects he had ex-
"perienced from blistering in a case of gangrene.

"The critical and dangerous state of the patient
"required something to be promptly done. The
"blister was proposed with considerable hesita-

" tion, as I could not recollect in what stage or what " species of gangrene Dr. Physick had used it.

" A large blister was however applied on the in- " side of the leg below the knee, one part on the " healthy portion of the leg, and the remainder im- " mediately on the diseased part. After twelve " hours it rose very well, and, contrary to what I " dreaded, assumed a very pleasing aspect, and with- " out the least increase of disease. The pulse still " continued frequent and the skin cool, although the " patient in every other respect was much more com- " posed—On Sunday the leg was much more fa- " vourable; the lividity and vesication had not in- " creased, and the tumefaction, which was very con- " siderable, had subsided much. The foot though " much swelled before, did not until this period, " shew the least disposition to take on diseased ac- " tion. It now became covered with a deep purple " shining appearance, with a distressing vesication, " which, together with the increased tumefaction, " occasioned much uneasiness. The bark, with " elixir of vitriol, was persevered in freely, and, " from the pleasing effects of the blister in arresting " the progress of the disease in the leg, I applied " a large one covering all the upper part of the foot, " including that part of the ankle where the disease " first began.

"The effects were equally as pleasing as in the "first instance, producing an almost immediate ces- "sation of the progress of the disease.

"The parts of the ulcer, where the disease first "began, separated to some depth; the cuticle from "below the knee separated, and in some places on "the leg; and the separation extended even through "the cutis and adipose membrane. The tumefaction "of the leg gradually diminished, and the patient is "completely free from every danger.

"Impressed with an idea that blisters will often "be found useful in preventing the progress of "mortifications, I have been induced to publish the "preceding cases as early as possible.

"PHILIP SYNG PHYSICK.

"*Philadelphia, 24th November*, 1804."

II. Mortification from constitutional defect attended with decreased arterial action, usually first discovers itself in an increased redness and sensibility of the part primarily affected. The sensibility oftentimes increases, until the pain becomes excruciating. From this severe pain and deep red colour, the part affected passes to a livid hue and to a state of complete insensibility. The powers of animation are so extremely languid in their operation, that the increased sensibility and redness, followed by a dark purple colour and insensibility,

progress, until life is attacked too near its source to be able longer to resist the encroachments of death. The typhus pulse, usually attendant upon this kind of mortification in its first and second stages, at length becomes intermittent and convulsed, when it beats the alarm of death—and stops. This is the course pursued by the disease, when the cure is left to the operations of nature.

The principal indication to accomplish in this case is to render the vibrations of the fibres, in the parts contiguous to the mortified, sufficiently vigorous in their alternate relaxations and contractions to break their hold upon the dead parts, and thereby dispose them to fall off.

The remedies to be used in effecting this are internal and external. The internal comprise, 1st. cordial drinks and aliments, 2d. the tonic and astringent barks, and, 3d. the diffusible stimuli.

1st. The aliments taken should be as stimulating as the stomach can bear. If the stomach be not too irritable to receive solids, animal food highly seasoned with mustard, pepper, and salt, should be taken—highly seasoned broths or soups, impregnated with aromatics, as cloves, &c. may also be taken according to the state of the patient's stomach.

The cordial drinks should consist of vitriol water, generous wine, &c. which should be used with

much freedom. Well preserved cider impregnated with large quantities of the carbonic acid gas, and the best London porter may likewise be used with much advantage.

2d. The tonic and astringent barks comprehend cinchona, white-oak bark, the bark of the Spanish oak, &c. In this kind of mortification, the cinchona, or Peruvian bark, should be administered in as large doses as the stomach can well bear. According to Mr. B. Bell the pale bark is much the most efficacious.

Dr. Physick in one of his lectures upon mortification, in his course of 1806—7, related a case from the annals of his own practice in which bark from ℥vi to ℥viij was administered in the space of twenty-four hours without its exciting any very unpleasant sensations.

The bark, which has long stood at the head of the list of antiseptics, in this case, although administered in such large quantities, produced not the least good effect in stopping the progress of the mortification. According to my best recollection, Dr. Physick observed, that the disease finally yielded to blistering.

Mortification of the toes, as it occurs in aged people, frequently furnishes examples, wherein bark,

in however large doses it be administered, and however often their repetition, is attended in its operation with similar ill success. In many instances Mr. Pott cured mortification of the toes with opium, after the bark had been unsuccessfully tried.

Cortex quercûs albæ, white-oak bark, possesses great astringent and very considerable tonic virtues. From the chemical nature, and effects of this medicine taken internally, it may with propriety be placed high upon the list of tonic remedies under the class of antiseptics. In one case of erisipelas, which threatened immediate mortification, I have seen it, conjoined with an external application to the part inflamed, have a most salutary operation in strengthening the system, and subduing that kind of diseased action, which had it not been seasonably restrained by medicine, must inevitably have terminated either in partial mortification, or the entire death of the patient.

The bark of the Spanish oak, *quercus rubra montana* of Marshall, *red-oak of the mountain*, is said by Dr. Barton, in his Collections for an Essay* towards a Materia Medica of the United States, to

* It may not be amiss here to inform the reader, that this short treatise is a valuable repository of facts respecting the medicinal products indigenous to our own soil; and as comprising *all, or nearly all*, at present known upon that interesting subject, it cannot be too highly recommended to his perusal.

have wrought a complete cure in a case of gangrene, which occurred within the sphere of his practice at Philadelphia. The following is his history of the case.

"In a case of gangrene of the foot, from a punc-
"ture of a nail, which came under my notice in the
"course of the last summer, I gave to the patient
"very large quantities of the decoction of this oak-
"bark; at the same time that the affected part was
"constantly kept wet with the same decoction, or
"with a poultice made of bread and milk with the
"bark. I cannot but ascribe the recovery of my
"patient entirely to the use of these means; and I
"am emboldened to recommend to my country-
"men the use of this cheap remedy, as one highly
"worthy of their attention in similar cases." Part 1st. p. 44. Col. for &c. &c.

The medical virtues of this, if not the same, are probably in no respect materially different from those of the bark of the common white-oak of New-England; as they both belong to the same family of plants, and both have been found beneficial in the cure of diseases, differing rather in degrees of force, than in their natures. White-oak bark exceeds in astringency the Peruvian, and falls but *little, if any*, short of it in its tonic powers.

A chemical analysis of the white-oak bark, as made by Mr. Davy, affords from one hundred and

eighty grains of the inner bark in substance seventy-two grains of pure tannin. In 128th page, vol. 8th. Fourcroy's Chemistry, William Nicholson, London, 1804, is the following description of tannin—"There is every reason to believe, that this "very remarkable vegetable principle," i. e. tannin, "is the common and general source of the astringent "property; that it is the principal seat of the vir- "tue, which the physicians call *antiseptic*, &c."

III. The diffusible stimuli are opium, brandy, and ardent spirits of all kinds, the volatile alkali, &c. Opium seems to be more peculiarly adapted to the cure of mortification originating in the toes, than any other remedy hitherto discovered, if we except blistering. So important are deemed the virtues of opium in the cure of this kind of mortification, that the highest eulogiums have been heaped upon Mr. Pott, who first applied the article to the cure of the disease in question.

That it produce the desired effect, it is necessary that it be administered in such doses, and those doses repeated at such intervals, as will constantly keep the system under the influence of its stimulus, and thereby take off that extreme sensibility, which renders the pain so excruciating. Brandy, rum, &c. should be used very freely by those, who have long been accustomed to the stimulus of those articles, or who have become so extremely debilitated

as to have lost their susceptibility to the influence of ordinary stimuli. In cases requiring the use of the diffusible stimuli, the dose and its repetition should be so regulated as to render the excitement of the system uniformly increased; otherwise the remedies may fail to afford the desired relief. The volatile alkaline salts should be administered, whenever the powers of the system shall be so exhausted, that less powerfully stimulating medicines cannot excite its actions.

The external remedies to be employed in the cure of mortification *from constitutional defect* attended with *decreased* arterial action, are the same as those, which were enumerated in treating upon the cure of mortification from constitutional defect attended with *increased* arterial action.

In this species of mortification, however, the steam to be applied to the seat of the disease should proceed from an elevated temperature of very powerfully stimulating articles. Heated vinegar or ardent spirits furnish steam powerfully stimulating, as do likewise the heated decoctions of many of the astringent barks, &c. The astringent principle may dispose the *fibre* to contract, while the flow of caloric from the steam to its corpuscles gives it the power of elongating. The fermenting poultice may sometimes be applied with advantage, but is generally too inefficacious an application to be employed, when

the powers of animation are so nearly exhausted. Blisters to extend around the living parts surrounding the mortified, the practice of Dr. Physick has proved very efficacious in the cure of this species of mortification. The application of the most powerfully stimulating steam should precede that of the blisters. If the parts be too inirritable to be acted upon by the conjoint forces of the steam and blisters, they should be washed with diluted sulphuric acid to facilitate the action of the flies.

Opium administered internally, and blisters externally applied around the parts surrounding the mortified, in the manner above specified, are undoubtedly the two most efficacious remedies hitherto discovered in the materia medica for stopping the progress of this kind of mortification. The bark and general tonic plan of treatment should by no means be omitted, while the system is under the influence of these other remedies. If the mortification extend so deep as to render amputation necessary, the above remedies should be perseveringly used, until the deadened soft parts have sloughed off from the sound; after which the operation should immediately be performed.

The carbuncle, which often comes on without any apparent cause, undoubtedly belongs to the division of mortification, not preceded by, or accompanied with, increased arterial action. It most com-

monly makes its appearance upon the backs of people in advanced life, and when they are numerous and extensive, the disease is attended with extreme danger.

It commences its attack with a circular inflammation at first circumscribed to a point, from which it extends, putting on a paler hue, and is accompanied with very severe pain. The common remedies, employed in the cure of this species of mortification, are proper in the cure of carbuncle.

Among the notes I took while attending Lectures upon Surgery by Professor Physick, I find the following.

There is another kind of mortification, which comes on without inflammation, and which has something very peculiar in its nature. The disease first begins with a pain of the shooting kind in the part attacked, from which it extends itself in every direction. It soon becomes livid, and afterwards turns black. The disease is rare in this country, but is said to be common in Provence, France. It has been successfully treated by making a circular scarification in the sound parts surrounding the diseased. The adhesive inflammation excited by the scarification checks the progress of the mortification upon its arrival at the line scarified. A solitary case of this kind of mortification, which occurred at Phila-

delphia, was successfully treated by scarification made in the above manner. This remedy was used at the advice of Dr. Mongez, after the usual remedies had been applied without success.

In the London Medical Museum, vol. 1. p. 442, Dr. Wollaston gives a very extraordinary account of a mortification, which proceeded through a whole family at Wattisham. The case, as illustrating the importance of a wholesome diet to the general health of the system and the preservation of its various component organs, deserves transcribing.

In January 1762, John Downing together with his wife and six children, were successively attacked with mortification, which was supposed by the attending physician to have originated in the use of corrupted meal, which was made into bread for family consumption. P. 445, is subjoined the following account, taken from Memoires Hist. tom. 2nd. p. 16.

"Some years ago M. Perrault gave an account "to the accademy of Sciences in Paris, that in pass- "ing through the Sologne he heard from the physi- "cians and surgeons of the country that the rye was "corrupted in such a manner, that the use of the "bread into which much of that corrupted grain "had entered, caused one part to fall off mortified "from some, from others, another; and, that one, "for example, lost a finger, another his nose, &c.

" that this gangrene was not preceded either by fe-
" ver, inflammation, or considerable pain, and that
" the gangrened parts fell off of themselves, without
" any need of being separated by applications."

Although the most skilful surgeon will ever feel distrustful of any applications he can make in curing mortification, which proceeds from constitutional defect; still not only all *probable* but after their faithful trial and failure, all *possible* remedies are to be resorted to for restoring the patient, and to be perseveringly used so long as the least gleam of life remains.

II. Mortification produced by an *external cause* may be divided into three distinct kinds according to the efficient means concerned in its production.

1st. When it is preceded by the use, internal or external, of poison; 2nd. When it is preceded by exposure to scalding heat or freezing cold; and 3d. When it follows external violence, that immediately kills the part sustaining the injury, or so far lacerates it, or paralizes the contractile power of its vessels as to bring on inflammation of gangrenous termination. Although the medical management of these three kinds of mortification proceeding from an *external cause* may vary but little, still as the prophylactics in each are so very different, we shall be justified in adhering to this division of the second part of our subject.

1st. Respecting mortification produced by poison, it may be observed, that few hopes can be entertained of effecting a cure, after it has once really commenced. Alexipharmics, before the full operation of the poison, should be used freely as guardians against its deadly influence.

If the poison have been received into the stomach, emetics of sudden and powerful operation, as blue vitriol, &c. should be taken immediately to throw it up and counteract its influence. When it is impracticable to effect this by emetics, before the poison has partially operated, and, if it already has excited puking, copious draughts of demulcent drinks at a temperature lukewarm should be taken to dilute it, and prevent its corroding or paralizing the coats of the stomach by facilitating its ejection from that organ. Dr. Bancroft, of Middlesex county, communicated to me the following fact, which he witnessed within the circle of his own practice. A man through mistake had taken fifteen grains of corrosive sublimate at once, which excited the most violent puking and spasm. Large draughts of milk and water were drunken, which so far diluted this mineral poison and assisted its being thrown up from the stomach, that the patient in a few days was completely recovered from its operation. If the poison have commenced its action upon the intestines, enemas of castor oil, or of olive oil, should be administered repeatedly, and in quick succession to acceler-

ate the passage of the poison through the body. The same articles may also be administered internally in very large doses. If the poison have proceeded so far in the work of death before assistance is sought as to have destroyed consciousness and to have reduced the body to a palsied state, it is *possible* that the affusions of cold water upon its surface or the long continued application of powerful mechanical stimuli may rouse the system, while the requisite internal remedies are administered. The *poison of rum*, which has destroyed thousands, where *that* of *asps* has killed one, is defeated in its influence by the plentiful affusion of cold water upon the surface of the body. The drunkard in his fit of intoxication, upon having cold water pumped over his body, awakes from his apoplectic stupor, and rises from the ground to resume his usual occupations. Whytt relates a case in proof of the salutary influence of mechanical stimuli in rousing animals from the stupor induced by poisonous drugs taken into the stomach. A dog, which had swallowed a quantity of opium apparently sufficient to have killed him, was roused from a state of insensibility by a severe flagellation.

If the poison taken be of an alkaline nature, mineral and vegetable acids are the proper antidote; and, *vice versa*, if the poison be of an acid kind, the vegetable or mineral alkali in strong solution should

be taken to destroy its corroding powers by neutralizing the acid.

If an animal poison have been applied to the external surface of the body, any of the caustic applications to succeed scarification will corrode away the part poisoned, and destroy the effects of the poison, provided the lapse of time between the application of the poison and that of the caustic have not been too great. Calomel, as an internal remedy and mercurial unguents, applied externally, will sometimes secure the system against the action of the poison. A few instances in proof of the alexipharmic virtues of nitrate of silver externally applied, and mercury taken internally, have occurred within the limits of my personal acquaintance. In one case the scarification of the part bitten by the rabid animal, and the subsequent application of lunar caustic to it effectually prevented any alarming symptom from the operation of the poison. In another, the patient, from a slight cut of the finger in dissecting, was affected to that degree by the animal juices while undergoing the putrefactive fermentation, that he was afflicted with a severe pain through his whole arm and shoulder, and an inflammation that threatened immediate mortification and final death. Lunar caustic was applied directly to the place cut, and a mercurial unguent rubbed over the whole arm in the course of the pain and swelling. Calomel was taken internally, until the glands of the mouth and fauces

began to be affected. These remedies arrested the further progress of the pain and inflammation, and effected a cure of the disease.

Oils, if seasonably applied, are *said* to be sufficient prophylactics against the poison of serpents. Certain caustic applications, as concentrated sulphuric acid, &c. experiment has demonstrated to be such.

2nd. As mortification preceded by excess or defect of temperature requires medical treatment in no respect materially different from that preceded by external violence, it hardly merits separate attention. We shall only remark that it is rather produced by the *suddenness* than the *degree* of change as is proved in the trifling inconvenience, that commonly attends the *gradual* alteration from one to the other extreme. When there has been an exposure to one extreme, the object of the physician should be to restore the part thus exposed *gradually* to its *mean* temperature. Snow and cold spring-water are the proper applications to a part frozen, and spirits of turpentine and other warm irritating substances are most suitable to be applied to a part scalded or burnt. The part scalded or burnt should be exposed, naked, to the atmosphere, that the spirits of turpentine may undergo a rapid evaporation; and they should be poured as rapidly upon the diseased surface as they can be made to evaporate for several hours after the accident. Spirits of turpentine blended with the

yellow basilicon spread upon lint makes an exceedingly good application to succeed the use of the simple spirits of turpentine in the cure of burns. This remedy I have used with the most satisfactory success. It should not come in contact with any of the sound skin, as it is highly irritating to that, although it excites very little pain in the part diseased. This remedy is very highly recommended by Kentish on Burns.

3d. The third division of this second part of our subject embraces the diagnosticks and cure of mortification following external violence, that lacerates, bruises, or, in some manner so far deranges the structure of certain portions of the system, as either suddenly destroys the life of the part, or brings on inflammation of gangrenous tendency or termination.

In all kinds of mortification, *resisting* and *overcoming* this tendency in the system to putrefaction claim attention rather than the restoration to life of parts already mortified.

The principal *difference* between mortification from constitutional defect and that which proceeds from an external cause is to be found, as has already been remarked, in the previous state of the system before attacked by the disease. When any external cause, adequate to the production of mortification in a healthy constitution, shall have operated, violent

inflammation supervenes, which, if allowed to proceed, extends until the whole system is attacked by a fever, that eventually may destroy the patient, provided no remedies are used to procure its abatement. When some great violence has caused this sudden transition from full health to partial mortification and universal inflammation, the natural susceptibility of the system to the action of stimuli is so far increased as to require great reduction in the force of "the exciting powers," acting upon this morbidly increased susceptibility. Copious depletion, as most readily diminishing the force of these acting stimuli, is loudly called upon to afford the desired relief. Blood-letting, both general and topical, and active, cooling cathartics are the principal remedies to effect this reduction in the force of the *sthenic diathesis;* and these are to be repeated according to the prevalence of that diathesis. These violent reactions of the system excited to recover itself from the local injury (which reactions constitute the fever) may generate caloric in such quantities as so far to increase in size the caloric atmospheres surrounding the corpuscles of the fibres as to remove them beyond the sphere of each other's influence, when the fibres cease to vibrate, and animal decomposition begins to take place. Cool air and cold water reduce this excessive temperature, when applied to the surface heated above its standard temperature. Acetite of lead, or muriate of ammonia, dissolved in vinegar and water, makes a good local application for

the original seat of the inflammation in diminishing its excessive actions and conducting off the morbid excess of caloric. Abstinence, rest, the abstraction of light and of sound, and a free use of cooling diluent acid drinks should be rigidly enjoined to co-operate with the other remedies in regulating the reactions of the system, that the time, requisite to the completion of the sloughing process for casting off the mortified parts, may be allowed, before death can supervene. After the fever has abated, recourse must be had to a nutritious diet, to wine, to bark, and to other tonic remedies, to maintain the system at that standard of action required in the cure of the patient. Blisters around the parts mortified, or the fermenting poultice, should likewise be used according to the circumstances of the case. Should the mortification be so extensive as to render an amputation necessary, the operation should be delayed, until the tendency in the system to putrefaction be subdued, and there shall be formed a line of distinction between the dead and the living fibre. After these indications are accomplished, the operation should be no longer deferred.

A

DISSERTATION

ON

THE STRUCTURE AND PHYSIOLOGY OF THE SKIN, WITH A VIEW TO THE DIAGNOSTICKS AND CURE OF DISEASES USUALLY DENOMINATED CUTANEOUS.

MATTER is continually circulating. The hardest substance gradually becomes fluid or aeriform, and substances the most fluid or aeriform are gradually becoming solid or fluid. The machinery of the human body, which is a compound of solids and fluids, is one product of this circulation. In the history of man's uterine animation and growth, it is found that those parts are first developed, whose actions are most essential to the origination, extension and maintenance of those circulations, concerned in the arrangement, structure and increment of the various organs of his body. The uterine blood of the mother, which is the raw material to be wrought up in the animal factory, imparts its principles of nutrition as it passes, propelled by the salient vibrations of the heart, the more thoroughly elaborated particles only being carried to the surface. Hence the skin of the foetus exhibits the appearance of a very fine pellicle; but the skin has

few or comparatively unimportant functions to perform, while the body is enveloped in the membranes, and continues its attachment to the *parietes* of the uterus, where it has a uniform temperature, which nothing can destroy without producing its first impression upon the mother. When the foetus drops its maternal hold, the skin, as well as lungs, has functions entirely novel to perform. In the former situation, preserved in a temperature equable and invariable, protected from any foreign agent by a bland water, which surrounded it, the skin apparently had no other duty to discharge than remain in a quiescent state to be acted upon by an internal pressure from gradually distending parts, and an external one from the fibrous contractions of the uterus. In the latter situation it is exposed to variety of temperature almost invariably below the standard of animal heat, to the action of the atmosphere, with that of all the principles it may hold in solution, and indeed to the action of all external mechanical agents with which it is liable to come into contact. To accommodate itself to its new situation, the skin soon undergoes a considerable alteration. The action of the atmosphere upon it causes it to contract, hardens it, and roughens its exterior surface.

The skin is connected with the other soft parts by intervening cellular membrane. Its readiness to dilate and contract by the action of mechanical agents shows its great elasticity. Maceration proves it to be

composed of three distinct *laminæ*, which anatomists have called *cutis vera*, *rete mucosum*, and *cuticula*.

The *cutis vera* is formed of a very thoroughly elaborated portion of the blood, it having been submitted to more vascular action than that from which other parts nearer the heart are generated. Almost the whole strength of the skin is concentered in this *stratum*. It is the part, which receives the principle of tannin in making leather.

The *cutis vera*, notwithstanding its distance from the source of the circulations is extremely vascular. No part of it, in a living state, can be divided, without the effusion of blood. It is the strand, where the arterial flow terminates, and the venous ebb commences. It is the seat of exhalent arteries, which secrete and throw off perspirable matter, and is the expansive bed, upon which repose the sentient extremities of the whole nervous system. It likewise is the part, in which are imbedded all the cutaneous absorbents.(A) The seat of the sense of touch, it performs offices essentially important to the lives, health, and pleasure of animals. It is less exposed from its situation to the influence of external chemical or mechanical agents than the other laminæ.

The *rete muscosum* is the next *lamina* exterior to the *cutis vera*. It is extremely cellular in its struc-

ture, as its name implies. It is to the complexion, what the iris is to the colour of the eye.

It varies in colour and consistence according to climate, state of society, and its exposure to the combined influence of the sun and atmosphere. In civilized man of middle latitude, it exhibits, when viewed by the microscope, the appearance of a mucilaginous net-work, less delicate than that in the vitreous humour of the eye, though of a lighter colour by several shades. In colour it approaches almost to the whiteness of the *medulla oblongata*. In the torrid zone, the inhabitants have black or swarthy complexions, from the changes which a perpendicular sun and copious perspiration operate upon this singularly constructed portion of the skin.

In proof of the position respecting the skin's undergoing a change in function, and of course in structure, adapted to the discharge of that different function after birth, it will be sufficient to adduce the similarity of complexion in the children of the white woman and black, when they are first born, and the material difference, which discovers itself soon afterwards.(B) By microscopical examination in a black descended from parents Africanborn, it exhibited a sky-blue colour. The mucous meshes appeared somewhat larger, more corrugated, and much firmer in their consistence than those in the skin of the white man.

The *rete muscosum*, in colour and appearance, exhibits a variety equal to the diversity of climate from the line to the poles. It is but a change in this, which converts the white man into the black man; which, at the same time it fixes the indelible stamp of degradation, enables the constitution to resist the combined agency of a perpendicular sun and a damp atmosphere. A discussion of the opinions and arguments of all, who have written upon the causes of the variety in the human complexion, would swell these sheets to a full-sized octavo. Suffice it to say, we stand in no need of different originals for the different portions of the human family in accounting for their variety of complexion.(c)

The *cuticula*, called also *epidermis*, and *scarf skin*, is the external *lamina*, which comes in contact with the atmosphere. It is a fine membrane entirely devoid of sensibility; and its vascularity seems to be somewhat questionable; for while all anatomists agree in their inability to inject any vessels belonging to it, some think this negative argument against its vascularity insufficient to justify the assertion, that it has no vessels, while others as confidently maintain the opposite sentiment. Though devoid of sensibility, and *probably* of vascularity, it is the result of *organic* action, and not a mere mucus hardened by the action of the atmosphere as many of the ancients supposed. Chemistry can supply nothing analogous to it. Microscopically examined in a living state,

it apparently dives down into the *rete mucosum*, forming it into cells. In this respect it seems somewhat to resemble the *tunica arachnoides* in its invelopement of minute portions of the brain. The *cuticula* is susceptible of quite as great changes in structure and thickness from mechanical compression and the action of chemical agents as the *rete muscosum* is from the combined agency of the sun and atmosphere. This is evinced by its thickness in the palms of the hands and upon the soles of the feet of the labourer, and by the scaly appearances of the skins of those, who alternately expose their hands to the action of air and water. The physiological purpose subserved by the scarf skin seems to be the protection of the other *laminæ* from the chemical and mechanical irritations, the touch of which would otherwise be extremely painful.

The hypothesis of Malpighi respecting the original construction of the skin from the three invelopes of the brain by their extension and expansion, their order according to him having been inverted after passing through the *tela cellulosa*, that the *cutis vera* might correspond to the *dura mater*, must be substantially untrue, for according to this doctrine the nervous *papillæ* should have been exterior to the *cuticula*, whereas the fact is directly the reverse.

The skin is the product of vascular action upon circulating blood, being formed by a process *sui generis*, which is incapable of imitation.

It has already been stated, that the skin, while the child is yet in its mother's womb, is subjected to an external pressure from the contracting *parietes* of its *matrix*. After nature has destroyed its uterine attachments, it is exposed to a pressure from the atmosphere, which is equal to fifteen pounds, every square inch of superficies. It is not only exposed to such a pressure, but to a very material change in temperature. The tendency to equilibrium of temperature in all bodies, from the necessary flow of caloric from warm into the cool is evinced by the passage of a portion of the caloric from the animal into the surrounding air. Caloric is the principle of expansion in all bodies, and, upon the loss of any portion of this, contraction is the invariable result.

This accounts for the appearance of the *cutis anserina* upon the admission of cold air to the naked skin. Though the production of the *cutis anserina* be accounted for by the diminution of temperature, still there must be the principle of animation to favour the agency of cold in the production of this phenomanon.

The skin, when the foetus passes from its warm bed in *utero* into the atmosphere, suddenly contracts from the cold produced by the evaporation of the moisture, with which it is ever bedewed at the time of birth. The consent between the skin and intercostal muscles, together with that between the skin and diaphragm, causes their fibres to shorten—the ribs are now elevated, the diaphragm is drawn down

towards a plane, and the thorax is enlarged. The weight of the atmosphere forces it into the lungs through the glottis to fill this newly forming cavity. Cold is now produced upon the surface of the lungs from the evaporation of the moisture upon their exterior part coming in contract with the air; the contraction of the fibre is the conseqeuence. The consent between the membrane inveloping the air cells of the lungs and the muscles antagonizing with the intercostals, causes their quick contraction, and consequently an expiration; which is announced in the cries of the child.

Thus respiration is originated, organic motion maintained, (D) and the exercise of the vital functions preserved by the actions of the atmosphere.

The extreme sensibility of the skin makes it the ever vigilant sentinel to communicate alarm upon the attack of a *foreign* enemy, and thereby renders a service essential to the preservation of animal existence. The skin has other and equally important functions to perform. It is the grand transpiratory organ destined to conduct off no inconsiderable proportion of the aliments and drinks received into the stomach.

Sanctorius computed from actual experiment, that five eighths of every thing received into the stomach passed off from the body through the pores of

the skin; but in this he included exhalations from the lungs, and consequently his calculations must have considerably exceeded the truth.

The great quantity of perspirable matter continually going off from the surface of the body, passes from the minute cutaneous vessels filled with red blood through exhalent arteries, which Ruysch and Albinus are said successfully to have injected. In the healthy condition of the animal economy, the quantity thrown off in a given time by cutaneous exhalation depends upon the compound ratio of the temperature of the atmosphere, its motion and dryness, upon the force of arterial action, and upon the quantity and quality of the diluent drinks, which have been taken into the stomach. Were it practicable to assume numbers representative of each of the above principles, the product from their entire involution into each other would determine the precise quantity of matter perspired in a given time through the insensible pores of the skin.

In the fourth volume of Thompson's Chemistry, p. 734—5. are detailed the experiments made by Lavoisier and Seguin for ascertaining precisely the quantity of matter transpired in a given time by man. A bag of oiled silk was procured for this purpose, and it was made to inclose the whole body except the lips, for which it had a slit, and to which it was luted by pitch and turpentine. This bag retained

all the exhalations from the body except those from the lungs. From the experiments made with this by those gentlemen, they draw the following conclusions.

"1. That the *maximum* of matter perspired in a "minute amounted to 26, 25 grains Troy; the *mi-* "*nimum* to 9 grains Troy; which gives 17, 63 "grains in a minute at a medium, or 52, 89 ounces "in the twenty four hours. 2. The quantity per- "spired in a given time is increased by drink, and "not by solid food. 3d. Perspiration is at its *mi-* "*nimum* directly after a repast. It reaches its *maxi-* "*mum* during digestion."

This series of experiments, however ingenious, cannot be conclusive; for the air contained in the bag after it had become partially saturated with the matter of perspiration, would less readily absorb the succeeding portions. This must necessarily diminish the quantity thrown off by the exhalent arteries, for the load with which they are now oppressed from the bad state of the inclosed air, must check their actions, and their check of action cannot be immediately counteracted by a proportional reaction of those arteries, from which they derive their origin. An increased action of the secretory vessels of the kidneys and exhalents of the lungs is known to be produced by diminished perspiration, which would probably prevent the system from suffering during the time of the experiment.

"It has been ascertained," says Mr. Thompson, "that water, carbon, and an oily matter are emitted; "and that an acid supposed to be the phosphoric, "phosphate of lime, and even urea are sometimes "emitted through the skin." Whatever the constituent principles of the perspirable matter may be, it is certain, that by long retention upon the skin or upon clothing and exposure to a certain temperature, it may undergo the putrefactive fermentation, and thereby become a fruitful source of disease, constituting what Dr. Rush calls *idiomiasmatic* exhalations, the infection of typhus, camp, jail, or hospital fever. According to Dr. Mitchell it generates the *septic acid*, which he considered the principle of the contagion of yellow fever and of other epidemical diseases. But this doctrine respecting the generation of the *septic acid* by a putrefactive fermentation of the perspirable matter and the *alescent* destroyer of its contagion is discarded by all the learned in the science of chemistry.

It is probable that this putrid miasm differs very little from that generated by the common putrefaction of animal substance, upon which subject M. Fourcroy makes the following remarks.

"Frequently the putrid masmata of the gases, "which are exhaled" during the process of the putrefactive fermentation, "are so deleterious, that "men and animals are deprived of sense by their

"contact. When they do not produce this sudden "effect, they occasion putrid diseases in such as are "exposed to them. Some individuals contract ex- "ternal affections, carbuncles, malignant and gan- "grenous pustules by the corruptive action of these "vapours; others are influenced by them in a much "more dangerous manner, for besides a considerable "prostration of the powers of life, they become af- "fected with putrid fevers of the most malignant "character. It is not yet known what is the nature "of the putrid gas from which these terrible effects "arise: it is not the azotic gas, as some *modern phy-* "*sicians* have thought, who on that account have "given it the name of *septon* or rather *septic* gas."

The skin performs a vicarious office with many other excretory organs and secerning glands, for the moment the skin falters in the discharge of its duty, the lungs and kidneys increase their secerning, and consequently excretory actions to relieve the system of the burthen, which must otherwise greatly oppress it; and when the cutaneous excretions are copious, the urinary excretions and pulmonary exhalations are proportionally small.

The influence of temperature upon the transpiration of the perspirable matter through the pores of the skin will be readily understood by adverting to the comparative cutaneous excretions in summer and winter, and by comparing the reeking Ethiopian

with the panting Laplander. The vicarious functions which the skin performs in coparceny with the kidneys will be comprehended with equal facility by attending to the operation of those causes upon the kidneys, which obstruct cutaneous perspiration. The influence of the dryness and motion of the atmosphere upon the quantity of vapour perspired in a given time, is explicable upon the principles of solution, which must take place, that the matter of transpiration and of sweat may be conducted off from the body. The atmosphere absorbs the vapours coming into contact with it the more readily, the less the quantity it may already hold in solution. When the air becomes nearly saturated with exhalations of any kind, man feels a langour from the inability of the skin to rid itself of the perspirable matter and caloric, which it holds in excess. This continues until either the state of the atmosphere is altered by a precipitation or dispersion of the foreign materials it may hold in solution, or until the reactions of the arteries shall have become stronger in proportion to the increased load accumulated upon the skin from the bad state of the air. The feelings of man are a more correct standard for determining the state of the atmosphere, in relation to the morbid exhalations with which it may be combined, than all the eudiometers and hygrometers, which have ever yet been invented; and the skin is the seat in which is fixed this delicately constructed *aero-nosometer*.

The state of the atmosphere not only produces an alternation of function between the skin and kidneys, but likewise between the skin and bowels, for a cold damp atmosphere, which shall suddenly check perspiration, in feeble constitutions not unfrequently brings on colliquative diarrhoea.

The pressure of the atmosphere exerts no inconsiderable influence upon the skin. It is computed to be equal to fifteen pounds every square inch. Supposing the skin of a common-sized adult measure fifteen square feet, it must sustain a pressure equal to 32,400 lb. or 14 tons, 9 cwt. 1 qrs. 7 lb. gross. Were this pressure to be suddenly removed, while the pores were yet closed, man would burst like a cask of new wine from the violent effervescence of its contents. The operation of cupping and experiments by the air-pump, sufficiently evince the probability of this.

This pressure is counterbalanced by the elasticity of the internal soft parts, and that of their contained fluids. The greater this pressure the more vigorous the body, for increased pressure, from the increased weight of the atmosphere, causes a proportionally increased vigour of vibration among the fibres, as every one must have noticed, who has compared his own scale of health with the rise and fall of the mercury in the barometer. This atmospherical pressure likewise contributes very much to-

wards supporting the circulation of the blood in the veins, which, it is very well known, possess very little contractile power, that can render them susceptible to action from the stimulus of the blood. This deficiency of contractile power in the veins, which is so very necessary to alternate fibrous contraction and elongation, is supplied by external atmospherical pressure, and by the artificial cold produced by insensible perspiration. No fact relative to the animal economy is more obvious than the diminution in the size of the superficial veins, upon the hands and arms, upon exposure to a cold and clear atmosphere.

If the contracting agency of the cold from without be not counteracted by the expanding agency of caloric, generated from within, man falls palsied to the ground. If the caloric, which is generated by animal action, be not conducted off by evaporation, man glows with fever, pants for fresh supplies of cool air, and supplicates for the cooling draught to allay the burning flames within.

The skin, when physiologically considered as a whole and *unique*, as has already been noticed, is the organ, by which transpiration is carried on for the relief of the system, from the caloric accumulated in excess by the actions of the vessels. By transpiration through the insensible pores of the skin, the system is not only cooled down to, and maintained at, the standard temperature of health, but extrane-

ous portions of the fluids, after the purposes of nutrition and of absorption are subserved, are carried off from the body. The skin is the *middle wall of partition* between the internal circulating fluids and the external circulating atmosphere. The atmosphere is the condenser, which cools down this *choleric being*, *man*, to his *rational* temperature, and is the receiver for the free admission of all the vapours of transpiration, the exhalation of which is essential to the maintenance of the motions of life.

The influence of the element we breathe upon the skin, in relation to the exercise of its healthy functions, has now been noticed. The discharge of function, founded upon arterial agency, remains yet to be discussed. As the exhalent arteries, whose office is to separate from the rest of the blood and conduct off the matter of transpiration and of sweat, are continuous from those filled with red blood, their actions must in a great measure be regulated by the actions of the heart and arteries. The force of arterial action depends upon the irritability of the component arterial fibres, and the strength of the stimulus applied to them. The blood, which is the natural stimulus that makes the heart and arteries contract to originate and maintain the circulation of their contained fluids, is liable to variation both in quantity and quality; and, of course, to variation in the force of the stimulus it supplies to its containing vessels for the continuance of its own motion. The drinks

and aliments, taken into the stomach, which are the materials to be elaborated into blood, are capable of affecting the force of arterial action in two ways. 1st. By changing the irritability of the heart and arteries, and 2nd. By changing the quantity or quality of their circulating contents.

1st. If food, unwholesome in quality, or wholesome in quality, but excessive or deficient in quantity, be taken into the stomach, the stomach suffers a check in its healthy actions, which check of healthy action is propagated by sympathy to the rest of the system, either diminishing or increasing its irritability, according to the chemical nature of the aliment taken and the state of the organ, into which it is received.

2nd. This check of healthy action in the stomach, from the application of a stimulus not accommodated to its structure and sensibility, prevents the proper secretions of the gastric liquor for the solution of the aliments taken. Imperfect chymification from the wrong stimulus it supplies to the contractile fibre of the intestines, and to that of the patulous mouths of the lacteals every where spread upon their internal surface, must necessarily produce imperfect chylification, and imperfect chylification, for the same reason, imperfect sanguification, and imperfect sanguification imperfect assimilation, and imperfect assimilation imperfect excretion through the insen-

sible pores of the skin, a long train of *general* as well as of *cutaneous* diseases. Here is a chain of actions composed of several links, mutually influencing, and influenced, by each other. What, from the nature of its stimulus, originally commenced a wrong impetus upon the stomach, in consequence of the reactions excited in that and its continuous organs concerned in performing the animal functions, passes from one to the other, until it arrives at the skin, where it expends all its remaining force. These two modes of attack upon the health of the skin, through the medium of the stomach, are exemplified in the sometimes sudden appearance of maculæ after food, not accommodated to the sensibility of the organ, has been taken, and in the cutaneous eruptions, which not unfrequently appear among children from a too plentiful use of acid fruits. The influence of aliments upon the skin is likewise shewn in the rash, which almost invariably succeeds a change in diet from vegetable to animal food, and in a change from what is *feebly* to that which is *powerfully* stimulating. The reason why bad aliments should shew their influence in cutaneous rather than other diseases will be best understood by adverting to the mode of life, commonly pursued by those most subject to this kind of complaint. Unwholesome diet and drinks are usually taken by that class of people, who are as much distinguished for the filth allowed to accumulate upon their skins, as they are for their destitution of every principle of moral decorum, or their

disregard of external decency. So extremely sensible is the skin, such are its exposures to the attack of morbid agents, and so invariable are its sympathies with the whole body and its various component organs, that it becomes a matter of no small difficulty to determine the boundary line between *cutaneous* and *other* diseases. The skin, which is the frontier of the human body, is not unfrequently *first* attacked by those *morbid agents*, which, either directly or indirectly, assail the life or health of man.

Difficulties, little less perplexing, present themselves in drawing a *discriminating* line between the several forms of cutaneous disease. Those authors who treat exclusively upon cutaneous diseases cannot be pursued in their arrangements. Turner is not sufficiently comprehensive, and Willan, whose depth of research and accuracy of investigation, whose plain distinctions and successful application of common simple remedies to the cure of obstinate diseases do honour to the medical character of the country which gave him birth, is too diffuse, and too minute in his discriminations to be followed in a paper like this. Nosology presents no permanent land-marks for directing our course. Like the titles of a *knight-errant* it might inspire confidence by its sound, but could never relieve in the hour of distress.

Their division into *contagious* and *non-contagious* would be very unsatisfactory, such is the difficulty of determining definitively their dividing line. Here a wilderness presents, and the nature of the expedition forbids a circuitous march.

"Nunc quoquamq ; modo possim cognocere, dicam."

Cutaneous diseases may be referred up to two causes; the one internal, the other external. 1. The internal cause of cutaneous diseases embraces all those produced by what is taken into the stomach, whether bad aliments or drinks, medicine or poison. 2. The external cause of cutaneous diseases comprehends all those generated by the influence of a bad state of the atmosphere, by contact with the matter of contagion or poison, whether it be animal, vegetable, or mineral, by change of temperature much above or below the standard of health, from communicated or abstracted caloric, and by inattention to personal cleanliness.

So various are these causes of cutaneous diseases in their mode of operation, so intermingled and obscure are they in the effects they produce, and such is the *sameness of indication*, whether they are individual, compound, or collective in their operation, that they can furnish little or no assistance in framing divisional lines between the several parts of the pathology of our subject. The sameness of effect from the action of these multifarious causes will

be readily acceded to on considering that their operation is more or less dangerous according to the *degree* and *suddenness* of check they produce in the function of *perspiration*. As the restoration of this *function* to the skin should be the ultimate object to be accomplished, and as this cannot be effected where the parts upon whose actions its exercise depends have been deranged in *structure* before their healthy *re-organization*, we shall be justified in dividing cutaneous diseases into the two following classes. 1st. The first class comprises all those necessarily attended by *derangement in the structure of the skin*, or the destruction of one or more of its *strata*. 2nd. The second class comprises all those *necessarily* attended by *derangement in function* only.

Though *derangement in structure* may likewise attend the second class, still it is only an occasional circumstance, and by no means *necessary* to its production.

1st. That class of cutaneous diseases attended by derangement in the *structure* of the skin or by the destruction of one or more of its *strata*, admits of subdivision into two orders. 1. When they are accompanied by an excess of arterial action, and 2. When they are accompanied by a deficiency of arterial action. Although this distinction between the two first orders of our subject is apparently founded in the human constitution, still as the system is lia-

ble to such sudden and frequent transitions from the one state of arterial excitement to the other, the orders must be necessarily neglected in pursuing our inquiries into their *phenomena* and *cure*.

The nature of both these states of this class of cutaneous diseases points out the same indication of cure, viz. the restoration of the vessels leading to and from the skin to that standard of action favourable to the reproduction of destroyed parts, or to the removal of *morbid changes* in *structure*. In the regeneration of parts, which have been once destroyed, nature seems to imitate the process, originally pursued in the formation of the *foetus in utero*. Coagulable lymph is granted by all modern physiologists to be the material for fabricating new parts. Its readiness to separate from the other component parts of the blood Mr. Hewson proves to depend upon the *quantum* of arterial action. There is a certain medium state of vascular action, which is peculiarly suited to the regeneration of lost parts. It is what Mr. John Hunter calls the adhesive stage of inflammation. In this stage of inflammation, coagulable lymph, of proper quality and in proper quantity, is effused from the patulous mouths of the minute vessels for the renovation of destroyed organic fibre. The pus found upon the healing surface of a healthy granulating sore answers as nearly to the waters inclosed in the membranes, which surround the *foetus in utero*, as the circumstances attending the two

states of existence in relation to the different susceptibilities and exposures to the action of different stimuli will admit. It is one of the first maxims in the practice of surgery never to disturb the process of nature in her actions for the renovation of destroyed parts, whether superficial or deep-seated; but to remove every irritating cause by frequent ablution with soap and water, and the application of such soft dressings as absorb the pus as it is secreted, and prevent every kind of mechanical or chemical irritation: likewise in the cure of cutaneous diseases attended with death in one or more of the *strata* of the skin, perfect cleanliness by a free use of water accommodated in its temperature to the state of the system, and the removal of every kind of irritation, are essentially requisite. In the cure of sores, the accommodation of the aliments and drinks, both in quality and quantity to the irritable fibre of the stomach and bowels is deemed of the first importance; likewise in the cure of cutaneous diseases, where a part, that has been destroyed, is to be regenerated, great attention must be paid to accommodating the food to the powers of the digestive organs. In the healing of an ulcer, the temperature of the part affected, and the action of the arterial system are considered objects demanding vigilant attention; also in the regeneration of dead portions of skin and in obviating *morbid* changes in *structure*, the temperature of the skin and the action of the arterial system must be regulated by the most watchful observation. If

the heat be too great, cooling applications should be made to the seat of the disease, as cool air, cold water, lead water, &c. and if the arteries in their actions transcend the adhesive stage of inflammation, the force of the circulation should be diminished either by blood-letting, or by some other depletion according to the state of the system. If the arterial action fall below the inflammatory state, usually denominated the adhesive, bark, wine and nutritious diet should be given to raise it up to that state. All local applications should be accommodated as nearly as possible to the sensibility of the part. If from atony the secretory ducts called the exhalent arteries become too much dilated in their diameters, astringents should be applied to make them contract and recover their accustomed tone. If the skin have suffered a great accumulation of morbid sensibility some preparation of opium should be blended with the lotion to remove the *morbid* sensibility of the fibre, and prevent inflammation from the action of the other ingredients dissolved in the lotion. The stimuli to be applied to the skin in the cure of cutaneous diseases, as well as those to be taken internally, must exceed in force the irritation constituting it, or the cure is incomplete. As in the motion of inanimate matter when two bodies meet from counter directions, the one which has the greatest momentum, stops, or changes the motion of the one possessing the least, so when two impressions are made upon the same part of an animal at the same

time, the greater always destroys the less. This doctrine admits of extensive application to the cure of certain obstinate cutaneous diseases.

The force of the medicine should not only exceed the force of the irritating cause, which had produced the disease, but its exhibition should be continued, until the *morbid habit* of action, constituting the *inveteracy* of the disease, be completely destroyed.

E. F. a maiden lady between fifty and sixty years of age, of spare habit, was attacked over her whole body with scaly incrustations, attended with the effusion of a bloody ichor upon their abrasion. The skin exhibited as much the appearance of the leprosies of authors as almost any complaints which occur in this country. Ethiops mineral and antimony, combined with acid preparations of mercury, were first administered without success. Native oxide of arsenic, *the arsenious acid of the chemists*, was next resorted to, and taken in the dose of one twelfth of a grain once in one or more days according to the effects produced, and continued for three weeks, additional to a low diet and abstinence from animal food, cured the patient. Bark, wine, and a nutritious diet, after the disappearance of the disease, soon elevated the system to the standard of health.

If the remedy be not accommodated in its force to the force of the disease, it may induce a new

disease more malignant than the original one; or, in conformity to common language, aggravate the original disease.

S. A. a middle aged labouring man, of temperate habits and robust constitution, in the former part of the Spring of 1806, was affected with a troublesome eruption upon his legs and feet, arms and hands, which was accompanied with a constant oozing of a corrosive humour. Its cause could not be detected in diet, exercise, or in any previous exposure to cold. A wash of corrosive sublimate was first applied, but without affording him any relief: rigid injunctions were likewise made respecting his diet and the maintenance of his body at an equable temperature. Arsenic was afterwards administered internally, but its operation rather aggravated the complaint, after it had been taken between two and three weeks. The following remedies were at last administered which effected the cure.

R. Marine acid gt. x
Muriate of mercury grs. x
Antimonial wine ℥ i.
M.

The patient began the use of this remedy by taking fifteen drops twice a day, which were gradually increased to twenty-five. The following wash was at the same time, externally applied to the seat of the disease.

R. Muriate of mercury grs. xxx.
Spirits of wine, ℥ viii.
M.

These articles were mixed with tar-water, and used twice a day. The above remedies, both the internal and external, were used between two and three weeks before an entire cure was effected. The patient fed on a milk diet twice a day, and sparingly upon animal food once a day during the exhibition of the above medicines.

The introduction of laws respecting personal cleanliness into the religious rites of those nations, who inhabit those warm climates, where obstinate cutaneous diseases most abound, shows that the common sense and common experience of mankind in those places have decided, that the *cleanliness* of the skin is the surest preventive and most certain cure of its diseases. The Hindoo (E) cleans his skin in the Ganges under a *pious* delusion, that he is washing away his sins. *Wash and be clean* was the divine prescription to the ancient Jewish leper upon his release from confinement and readmission to the enjoyment of the rights of social intercourse with his brethren.

(F) *A rising, a scab, and a bright spot*, were the diagnosticks pointed out for the Jewish doctors to notice in their discriminations of the *plague of leprosy* from other diseases. The leprosies of Britain,

which Turner acknowledges he could not cure either by mercury or the mineral waters, Willan observes, are generally cured by a free use of warm bath, cold bath, (G) sea-bathing, gentle friction, and proper attention to diet and temperature. Cleanliness, the use of alkali as subservient to this, and friction, seem to have been known to the Arabs as remedies in the cure of cutaneous diseases in the days of Job. *And he took him a pot-sherd to scrape himself withal, and he sat down among the ashes.* In the Philadelphia Medical Museum mention is made of the African remedy used in the cure of yaws, *framboesia.* The patient is immersed in a stream of running water, in which he remains, until his whole skin has been faithfully and severely rubbed. (H) Willan lays great stress upon the use of warm bath and cold bath, and upon sea-bathing in the cure of a majority of his cutaneous diseases. Much attention is necessarily paid to the *state of the stomach and bowels*, to the *force of arterial action*, to the *temperature of the body*, (I) and to *cleanliness*, as has already been remarked, in the *cure of all forms of cutaneous disease*, whether originating from an internal or an external cause, independently of the local applications, which are to be made to the seat of the complaint.

The local applications to be made to the skin in the cure of this class of cutaneous diseases, are designed either to *diminish the temperature of the skin*, or *to remove every cause of irritation from its naked*

fibre, or *to produce some change of action in the minute cutaneous vessels.*

Cool air, cold water, and the various solutions of muriate of ammonia and of acetite of lead, fulfil the *first indication.*

Frequent ablution with tepid water, with alkaline water, the application of dry lint and of other absorbent articles to receive the ichor or matter, as they are thrown out, and the various bland unguents, used merely to guard the skin against the contact of the atmosphere, fulfil the *second indication.*

The various astringent and stimulating lotions and ointments fulfil the *third indication.*

All the external applications, necessary in the cure of the greater part of the cutaneous diseases, which occur in New-England, are comprised in the remedies which fulfil the two first indications. The third indication may sometimes require attention in the cure of some species of the *herpes* or *cutaneous ulcer* of Mr. Bell.

Muriate of mercury, sulphate of zinc, and acetite of lead are among the best *solvends* to enter into the composition of the various washes to be externally applied for changing the action of the minute cutaneous vessels, and thereby giving the ulcer the disposition to heal.

Tetter, ring-worm, and shingles, according to Mr. Bell, express the different species of *herpes* as they occur in England. Tetter in its milder form is attended by an itching upon the skin and desquamation of the cuticle. In its severe forms, it is accompanied by not only an abrasion of the cuticle but by scaly incrustations of the lymph and serum which are effused. Its most obstinate form Mr. Bell calls *herpes exedens*, or *phagadenic ulcer*.

Lead water combined with laudanum, and saturnine ointment medicated with an opiate preparation are valuable external applications in the cure of some species of tetter. They, at the same time, allay the heat, and diminish excessive sensibility.

Mrs. D—, of robust constitution, but addicted to the intemperate use of ardent spirits, between sixty and seventy years of age, was seized with many febrile symptoms, as loss of appetite, furred tongue, increased sensibility, and heat upon the skin, which were accompanied with a troublesome itching. Her illness commenced some time in the month of September, 1807. Pil. coc. and submuriate of mercury were first administered with a view to a thorough evacuation of her bowels. She was directed to apply lead-water mixed with laudanum to the parts most violently affected. She took a pill of calomel and opium at night. These remedies produced a temporary remission in the violence of the

symptoms, when they were first used, but soon lost their influence. Costiveness returning, she was directed to take a cathartic pill every other day to regulate the peristaltic motion of her bowels. The eruption at first was of the pustular kind. The pustule had an inflamed base, and rose up in a manner giving it the resemblance of the half of a common-sized field-pea. The eruption at length extended over the whole surface of her body. There was an exacerbation of all her painful symptoms, when day-light first appeared. She would then call upon her nurse to hunt up all the pustules upon her body for the purpose of their being pricked with a needle. They discharged a watery humour rather corrosive than otherwise. The water appeared to be deeper seated, than that contained in common vesicles, situated between the *cutis vera* and scarf-skin. At length the pustules increased in size about their bases, and apparently run into one another, making the skin exhibit the appearance of a uniform scab. These appearances took place between two and three weeks after her first attack. She was now ordered to use warm bath; and the first night after its use all her symptoms seemed to be rather mitigated in their violence. The saturnine lotion had been previously laid aside for the saturnine ointment, which was likewise medicated with an opiate. Under the influence of these various remedies, the skin at one time seemed to have been very nearly healed; but the disease again returned

with renewed violence. Previously to every re-application of the saturnine ointment, the parts were washed over with soap and water.

Her constitutional strength had now so much declined, that bark and wine were necessarily prescribed to maintain the proper excitement of the system. The old lady growing rather impatient under her increasing infirmities, and desirous of trying some *new* remedy, frequently solicited the trial of Glauber's salts instead of her usual cathartic pill. She was indulged; but reaped not the expected advantage from the operation of her favourite remedy. The *unguentum acetitis plumbi* was now laid aside, and the tar ointment substituted. In the course of a week the symptoms seemed somewhat to abate; but they disappeared only to return.

She was again ordered the use of warm bath, which was attended in its operation with many good effects. The tar ointment was in turn laid aside, and a sulphur unguent used in its stead. This seemed to be attended with more *decidedly good* effects, than any external application, which had previously been made, *warm bath excepted.* Her stomach all this while performed its offices tolerably well. The powers of her constitution were supported by a generous diet upon animal food, by wine, bark, and, towards the latter stage of her disorder, she was indulged in the moderate use of brandy.

The progress which her eruptions took, was from the head downward. Her legs and feet were the last that healed perfectly. The itching, heat, and restlessness kept her in constant torture. The interval between the first appearance of the disease and its final cure somewhat exceeded two months. Her sensations were most distressing, while the pustules were pushing out in the palms of her hands and upon the bottoms of her feet.

Sulphur furnishes a stimulus, which is peculiarly suited to the cure of many cutaneous diseases. Mr. B. Bell * has prescribed a lotion made by putting together lead water, rose water, and *lac sulphuris*, with very great success in the cure of certain species of tetter.

Tinea capitis, which Syndenham very appropriately denominates *scab of the head*, and which Mr. Bell places in the species of herpes, which he terms *pustulosus* is readily cured by shaving off the hair and applying the tar ointment. In the London Medical and Physical Journal, No. 14, p. 496, is a formula for a remedy, *said* to be very efficacious in the cure of *tinea capitis*.

R. Kali Sulphurat. (recens preparat) ʒiij.
Sap. Alb. Hisp. ʒiss.

* On Ulcers, p. 200.

Aq. calcis.	℥viiss.
Spts. vin. rectf.	ʒij.

m. f. lotion for washing the head morning and evening, suffering it to dry spontaneously. Previous shaving the head is unnecessary, when this remedy is used. In one case which came within the circle of my observation, the vaccine innoculation *nearly* cured the patient of a very violent *scab of the head.* The fact is noticed by the writers upon the Cow-Pock.

Shingles which is a troublesome eruption appearing upon the lower part of the body, sometimes encompassing it, are very easily cured by attending to the general remedies previously laid down.

Ring-worm is ordinarily very readily cured by the sulphur ointment, by mercurial unguents or lotions, &c.

Trichoma, or *plica Polonica*, furnishes an example of diseased structure in the hairy scalp. It is an endemic disease, peculiar to Poland, and the neighbouring countries. The causes, which produce it, have not yet been satisfactorily investigated. The disease is said to be both contagious and congenital. A detailed account of it is to be found in the first volume of Duncan's Annals of Medicine, to which the reader is referred for satisfactory information

respecting it: the rarity of the disease renders its discussion unnecessary in this place.

Elephantiasis presents the most horrid example of *diseased structure* of the skin of which the imagination of man can conceive. In Barbadoes, it is called the *glandular disease* from the circumstance of its exhibiting its first symptoms in an inflammation of the inguinal glands. It remains a question whether the disease *admit* of cure. The powers of the constitution by the aid of the most active articles in the *materia medica* have not hitherto been adequate to it. Although the disease does not occur in the United States, still as the history of its causes, progress, and termination evinces that its treatment, to be successful, involves a knowledge of principles of the *animal economy*, which have not been satisfactorily explained, I have transcribed, in the Appendix, the account of it given by Pinkerton in his notes on the West Indies.(J) It seems not improbable, that the disease originates in obstructions, which prevent the flow of lymph to the thoracic duct. This, it is natural to suppose, would cause an effusion of lymph through its delicately constructed vessels, which would probably coagulate, and thicken the skin. The pathology of the lymphatic glands and vessels, and the remedies, which from their accommodation to their structure and sensibility are adapted to the cure of their diseases, are yet involved in much obscurity. Even a wounded lymphatic of any consid-

erable size has hitherto baffled all the skill of the *faculty*.(K)

Warts and corns, *verrucæ and clavi*, belong to the class of cutaneous diseases attended by derangement in the structure of the skin. The former are cured by compression, by excision, and by cauteries, both *actual* and *potential;* the latter by excision and the subsequent application of an emollient oil for preserving a softness upon the part.

Scurvy, though a general disease, commonly makes its first appearance upon the skin, probably from the circumstance of its very delicate structure. Proceeding from an internal cause, i. e. from unwholesome diet or drinks, a general *laxity of fibre* takes place, which is to be *strung up* by a nourishing diet upon ascescent vegetable food, by *astringent* and *tonic* barks, by the mineral acids, by decoction of the root of the water-dock, spruce beer, &c.

II. The second class of *diseases, usually denominated cutaneous*, embraces all those *necessarily* attended by *derangement* in the *functions of the skin* simply. Here three questions naturally arise. 1st. What are the *functions* of the skin? 2nd. How are these functions deranged? and 3d. By what remedies is this derangement in the *functions* of the skin to be obviated.

1st. What are the *functions* of the skin? It has already been noticed, that the regulation of *animal temperature* is one of the most important functions of the skin. Animal temperature is prevented from transcending the standard temperature of health by spontaneous evaporation, or the insensible transpiration of the perspirable matter through the pores of the skin.

Another obviously important function of the skin is its being the seat of the sense of touch.

The health of the system, as connected with *cutaneous absorption*, must necessarily be passed by, so *very little* is known of the *cutaneous absorbents*.

2nd. How are these functions deranged? The functions of the living healthy skin become deranged in their exercise by all those agents, which either increase the actions of the skin above the standard action of health, or reduce them below such standard. If poison, contagion, or any miasm come in contact with the denuded fibre of the *true skin*, the fibre touched is checked in its actions, and a general contraction of the organ takes place. Perspiration becomes obstructed, and increased arterial action is excited to remove the obstructing cause.

When the powers of animation become nearly exhausted, perspiration is many times exceedingly

profuse, which profuse perspiration often terminates in the *cold sweat of death.*

Increased or *diminished sensibility* of the skin is likewise accompanied with an increase or diminution in the force of arterial action.

3d. By what remedies is this derangement in the functions of the skin to be obviated.

Increased sensibility of the organ is to be obviated by the subtraction of all irritants from it, while the necessary remedies are administered for regulating the general health of the system. *Diminished sensibility* is to be cured by friction, by warmth externally communicated, and by sundry irritating external applications as cantharides, &c.

In treating upon *derangement* in the *function* of perspiration, the class of remedies, which the writers upon the *materia medica* call *sudorifics*, is necessarily discussed.

In the healthy animal economy, the quantity perspired in a given time is regulated by the quantity of diluent drinks taken into the stomach, by the force of arterial action, and by the state of the atmosphere, which is to absorb whatever is transpired through the insensible pores of the skin. Variations in either of these produce corresponding variations in

the exercise of the function of perspiration. Variations in the non-conducting substances externally applied, usually denominated clothing, likewise produce variations in the quantity perspired in a given time. There is a certain degree in the scale of animal temperature, which may be called the perspirable point. If the actions of the system concerned in the generation of animal heat transcend this point, perspiration is obstructed. That this is the fact every one must have noticed in his daily attentions to the maintenance of the temperature of his body at the pleasurable degree. Too much clothing produces a febrile diathesis by diminishing perspiration. Upon laying aside the superfluous part of the clothing, the atmosphere receives and carries off from the body the matter of transpiration and of sweat, and thereby produces a refreshing coolness, which succeeds to the febrile diathesis, the surface being now slightly moistened. These phenomena are readily witnessed during the hours of repose. Throwing off a portion of the bed-clothes, when there is a fibrile diathesis, invariably produces the desired relief by restoring to the skin the function of perspiration, especially if the general health have not been previously impaired. On the other hand, when animal temperature is much reduced below the perspirable point, an increase of clothing by causing animal heat to accumulate, until it shall have attained that point, restores to the skin the exercise of this function, particularly when its derangement is slight, and is not associated with any general disease.

Diluent drinks exert a very evident influence upon the skin in maintaining the exercise of the function of perspiration. The temperature as well as the quantity and quality of these diluent drinks should be cautiously accommodated to the state of the system. Cold water, which readily excites perspiration or sweating when the system is elevated in temperature above the perspirable point, would check it, when the system is reduced in its excitement below that point. Blood letting and active cathartics in a system too much excited would do much towards obviating derangement in the important function of perspiration; but to a system already below the standard excitement of health they would prove extremely injurious in relation to perspiration. The stimulating diaphoretics, which are very efficacious in promoting the healthy exercise of this function in cases of obstructed perspiration attended with feeble arterial excitement, in cases of obstructed perspiration attended with increased arterial excitement, would defeat the very purpose, for which they had been administered. When the stimulating diaphoretics taken internally operate powerfully upon the kidneys, very much increasing the flow of urine, they make little or no impression upon the minute exhalent vessels of the skin; and, when they promote copious mucous discharges from the bowels, they are equally inoperative upon the skin. When all the internal remedies prove ineffectual from the circumstances above related, the wished-for diaphore-

sis may sometimes be produced by the external application of steam. Dr. Alexander, after an attempt to provoke sweating by a free use of warm and afterwards of cold drinks, which were ineffectual, because they produced *diuresis*, obtained his desired object at last by the application of flannels wrung out of boiling water to his legs and thighs.*

Those medicines endued with strong emetic powers produce a very evident operation upon the skin. The different preparations of mercury and of opium likewise act powerfully upon it: these several medicines combined produce a very evident operation upon the function of perspiration. Upon the authority of a learned medical professor† the assertion rests, that James' Powder is *one* of the most *certain* diaphoretics in the incipient stage of fever. Mr. Davy in his analysis of this powder has shewn it to be a calcareous phosphate of antimony. Long-continued sweating produces great prostration of strength, unless it be supported by the plentiful use of cordial diluent drinks.

The application of each of the diaphoretic remedies, above alluded to, to the cure of all diseases, where derangement in the exercise of the function

* Experimental Essays, p. 180.

† B. S. Barton, M. D. Professor of Materia Medica at Philadelphia.

of perspiration is a prominent symptom, would lead beyond the original limits, assigned to the discussion of the subject. It may, however, be proper to remark, that the diaphoretic medicines should be so regulated in their use, as never to excite copious sweating, but only to raise a moisture upon the skin, which generally should be kept uniform for a considerable length of time; otherwise the function of perspiration would be but partially restored to the skin.

The general principles regulating the exercise of the function of perspiration having been discussed, this class of cutaneous diseases requires a subdivision into two orders. 1st. When they are attended by *too much*, and, 2nd. When they are attended by *too little* arterial excitement.

1st. The first order embraces most of the *exanthemata* of authors in their usual phenomena, as *variola* or small pox, *varicella* or chicken pox, cow-pock, erysipelas as it appeared in the days of Sydenham, *rubeola* or measles, *milliaria* or miliary fever, &c. The propagation, progress, and termination of these fevers prove them to be cutaneous diseases.

The matter of contagion of the contagious portion of this class of cutaneous diseases, upon coming in contact with the naked fibre of the skin, pro-

duces a check of action in the fibre, or, in other words, a spasm, and this check of action or spasm gradually extends until the whole skin is drawn into a state of contraction. Perspiration is diminished, and heat consequently accumulates. The cutaneous arteries from their increased fulness and temperature increase their actions. This arterial reaction extends, until the whole arterial system and heart are made to co-operate in their efforts to force open the cutaneous exhalents, or overcome the spasm upon the skin. After this is effected, the heart and arteries return to their healthy standard of action, when nature discharges her patient *cured.* But this reaction is often so violent from increased irritability and additional force of stimuli, that the minute vessels become deranged in structure beyond the power of recovery, when the body passes suddenly from life to the putrefactive fermentation. Seasonable attention to the reactions of the system by maintaining the proper balance between "the exciting powers and excitabilty," may almost invariably prevent this rapid dissolution. Certain eruptive fevers of this order must run a certain determinate course, before the skin can possibly be made to resume the exercise of its usual healthy functions.

The object of the practitioner in such cases must be the prevention of those consequences to the system, which necessarily result from obstructed perspiration by artificial substitutes for conducting off

the heat from the body, by diminishing the excessive actions of the vessels, which generate it, and by increasing the actions of those parts, which alternate in their functions with the skin. Cool air, cold water, &c. are the best artificial substitutes for perspiration in the reduction of excessive temperature. Rest, abstinence, and blood-letting are the most certain remedies for the reduction of excessive arterial action. Emetics and cathartics, diuretics and diluents, increase with most certainty the actions of those parts, which alternate in their functions with the skin. The *limits* of a dissertation must form our apology for not discussing each of the above eruptive fevers in detail.

2nd. The second order of this class of cutaneous diseases comprises those attended with too little arterial excitement. The general remedies to be employ- in the cure of this order of cutaneous diseases, are tonics, generous diet upon easily-digested animal food, friction, exercise, cold-bath, warm-bath, sea-bathing, wine, alcohol, and stimulants for external application. Much caution should be used in maintaining the body at the standard temperature of health by warm clothing, and avoiding all sudden transitions from a *heated* to a *cold* atmosphere.

All the eruptive fevers, which have been noticed in the first order of this class of cutaneous diseases, are liable to degenerate into the second order of the

same class. When this *synocha* state of fever, which ordinarily accompanies the exanthemata, degenerates into *typhus*, the most approved remedies employed in the cure of typhus must be used, as emetics, calomel and opium, wine and bark, rubefacients and blisters, acid diluent drinks, frequent ablution of the skin with water accommodated in its temperature to the state of the system, &c. Erysipelas, as it commonly appears in the climate of New-England, assumes the type of typhus. Erysipelas, although not unfrequently attended by an abrasion of the cuticle and an effusion of a corrosive ichor, still as the disease may, and often does, exist without either of these, should be retained in this order of the second class of cutaneous diseases, which are necessarily attended by derangement in the functions of the skin *simply*.

One of the most valuable external applications I have ever used in the cure of erysipelas is wheat flour. This, at the same time it very gradually conducts off the heat from the part affected, absorbs the ichor as it is effused, and thereby preserves the surrounding parts from excoriation. The flour should be repeatedly applied, until the temperature of the part is reduced to the healthy degree.

Blisters applied to the seat of the inflammation are often attended with advantage. Much attention should be paid to the internal exhibition of stimulants, of tonics, of cooling diluent drinks, &c.

Itch is a contagious disease *sui generis*, which commences its attack upon those parts of the skin most exposed to the action of the matter of retained perspiration. The eruption appears first between the fingers, upon the arm-pits, in the hams, &c. When allowed to run on for a length of time, the eruption extends over the skin of the whole body. A small insect which insinuates itself into the skin, is sometimes the cause of the disease. It is called the Acarus Siro *(exulcerans of Linnæus)* by Dr. Adams, to whose treatise on Morbid Poisons, the reader is referred for its particular history.

An ointment of three parts of lard to one of tar, saturated with sulphur, by melting the ingredients together, is an application peculiarly suited to the cure of itch. The several mercurial washes and unguents are likewise effectual remedies, but are attended with more hazard to the general health of the patient in their operation, than the above sulphur ointment. The flowers of sulphur are said by Mr. Bell not to be so efficacious as crude brimstone, although Boerhaave* says, that sublimation produces not the least alteration in the properties of sulphur. The most common remedy in the cure of itch among the people in the interior is made by blending the bruised root of *yellow-dock* with cream.

* Boerhaaves's Chemistry, Vol. 2d. p. 265.

The violent itching, produced by *pediculi pubis*, *pediculi corporis*, or *pediculi capitis*, is cured by killing the vermin, whose bite caused and continues the irritation. Soap and water, alkaline water, the several mercurial washes and unguents, and a great variety of other applications to the seat of the irritation at once remove the complaint.

Petechiæ often appear upon the skin in the latter stages of typhus fever, but they are the result of general debility, and are to be cured by those remedies, that have been already enumerated, which remove this debility. Tincture of cantharides externally applied, additional to friction, commonly answers a very good purpose.

Petechiæ are likewise produced upon the skin by a diet, which is not accommodated to the sensibility of the stomach. In such cases emetics and cathartics afford the most speedy relief. (L)

The poisons, afforded by the three kingdoms of nature, when externally applied to the skin, produce a great variety of cutaneous eruptions. Washing the part, coming in contact with the matter of the poison, with soap and water, alkaline water, or with almost any caustic solution, directly after the exposure of the skin to the action of the poison, either prevents or cures the cutaneous diseases, *already* generated, *or to be* generated, by the action of the poison.

A physician of *high respectability* related to me a case, where the patient, a robust sailor, was bitten upon the finger by a rattle-snake. Violent symptoms, which threatened his immediate destruction, supervened. Destruction of the part bitten by sulphuric acid arrested the further progress of the disease and eventually effected a cure.

A question here very naturally occurs; viz. *what* cutaneous eruptions is it *unsafe* to cure, and why is their cure attended with hazard?

In certain diseases attended with great debility, local irritations upon the skin by caustic, setons, cantharides, &c. are excited to provoke the system to a more vigorous action. This is only imitative of a process, sometimes pursued by nature for relief in certain cases of great distress. Cutaneous eruptions of long standing are accompanied with an irritation, which from the influence of habit, has become a *necessary* stimulus in maintaining that degree of action which constitutes health. If this irritation be suddenly removed by the cure of the eruption, the patient falters like the palsied dram-drinker before he has taken his *morning sling*. This local irritation may however be removed with safety, if some corresponding irritation be excited upon the bowels by the occasional use of stimulating cathartics. Sudden transition from violent to feeble action produces as much derangement in the health of animals, as

would an accelerated march of the sun from Cancer to Capricorn in the health of plants. Remove from the Turk his opium and he languishes. Wine recovers him. After using the wine awhile, he feels sufficient vigour without either wine or opium. The following fact I have from a *respectable* source.

The late Dr. Fay, while a resident practitioner at Boston, was called to two African children, who were covered over their whole bodies with *body-lice*. He ordered them to be immediately washed all over with warm soap-suds, with a view to the destruction of the vermin. The *sudden* removal of the irritation by the *sudden* destruction of the vermin, additional to the *warmth* of the water, suddenly checked the motions of life, and the children dropped down, and expired immediately.

A

DISSERTATION

ON

THE CAUSES, DIAGNOSTICKS, AND CURE OF BILIARY CONCRETIONS.

ALL stimuli taken into the stomach, act primarily upon that organ, from which their influence is propagated to every portion of the system.

Those parts are most affected, which possess most irritability, associated with the least muscular contractility, and are situated nearest to that organ to be most influenced by what medical writers call contiguous sympathy. The liver is an organ, in which modern anatomists cannot detect a single muscular fibre; of course it can possess little contractility, or power of recovery, after its fibre has been once stretched beyond its mean state of action. Drunkards are observed to have disordered livers soon after the quantities of *liquid fire*, of which they are in the daily use, have impaired the tone of the stomach by over-stretching its fibres in their actions.(M) But other causes than dram-drinking contribute towards producing derangement in the functions of that important viscus. As deficient secretion or

excretion of bile brings on dyspepsia, so dyspepsia, from whatever cause originating, checks the liver in the performance of its functions, and renders deficient the secretion or excretion of bile.

The frequency of liver-complaints in low latitudes arises from the combined agency of a heated moist atmosphere, and certain destructive modes of diet and still more destructive habits of life upon the human constitution, particularly upon the stomach and alimentary canal. The liver, possessing comparatively little vital power, suffers most from the general attack of these agents.

The blood, which circulates to the liver to supply it with the materials for biliary secretion, comes principally from the chylo-poietic viscera. Additional to the contractions of the mesenteric arteries from the stimulus of the blood circulating through them, the peristaltic motion of the intestines must hasten its circulations both through them, and the mesenteric veins. With the greater impetus the blood in its reflux through the mesentertic veins strikes against the sides of the *vena porta ventralis* to mingle with the blood from the gastric and splenic veins, the more rapid must its circulation be in the *vena porta hepatica* through the substance of the liver, and the greater must be the quantity of bile secreted in a given time by that viscus. The greater the quantity of bile secreted in a given time, the

more watery and bland will it be. This we infer from the general properties of all secreted fluids, and from the analogy of the liver to other secerning glands. If a man be so affected with grief as to weep incessantly for a considerable length of time, after a while his tears cease to be acrid or corrosive. When a person takes large portions of diluent drinks his urine soon becomes limpid and tasteless. Slowness of circulation seems essential to the progress of absorption. By stagnation the thinner and more watery parts of all secretions are reabsorbed and carried back into the general circulation. This is proved by the urinous smell emitted from the perspirable matter of persons for a long time affected with strangury, and by the fæcal smell of the cutaneous excretions of those labouring under obstinate costiveness. We have the authorities of all modern physiologists and anatomists for the numerous absorbent vessels of the liver. The languid motions of that important viscus in a peculiar manner favour the absorption of the more watery parts of the bile. The remaining portion of blood, after the bile is secreted circulates through the hepatic veins to the *vena cava ascendens*. Thus it is proved that both the quantity and quality of the bile depend very much upon the tone and vigour with which the chylo-poietic viscera perform their functions, that the viscidity or tenacity of this substance arises from the absorption of its more watery parts, while it stagnates in the liver and gall-bladder.

The emptying of the bile after its secretion into the *intestinum duodenum* also partially depends upon the vermicular motion of the intestines, the *ductus communis choledochus* not possessing sufficient susceptibility to contraction from the stimulus of the bile to force it out without the co-operation of other causes. This may be inferred from the greater proportional excretion of bile in relation to the secretion, while emetics or cathartics are acting upon the stomach or bowels, and from the gall-duct and bladder being invariably found full of viscid bile, when the stomach and intestines have been torpid any considerable time before death. Surrounded on all sides by parts endued with great muscular contractility, the liver is much indebted for its motions to the vigorous impulse communicated by its neighbours. Not only the stomach and bowels, but the diaphragm, the lungs, the intercostal and abdominal muscles are continually pushing it on all sides.

Having traced out the connexion between the the liver and surrounding parts, and shewn its great dependence in the exercise of its functions upon the tone of the stomach and bowels, the way is now prepared for a more thorough investigation of the causes, *remote and proximate*, of biliary calculi.

After bile, unusually viscid from the torpid state of the liver and absorption of its thinner parts in consequence of its long stagnation in that viscus,

is poured from the *pori biliarii* into the hepatic duct, it passes through that to the common gall-duct, from which it regurgitates through the cystic duct to the gall-bladder. Here suffering another long stagnation from the torpid state of the stomach and bowels, the thinner aqueous parts of the bile exhale and are reabsorbed into the general circulation, while the thicker settle to the bottom of the *vesicula fellis*, there gradually harden from the loss of their principles of solution, until they eventually become the first layer or nucleus of the future gall-stone. Upon the influx of a fresh portion of bile into the gall-bladder, the thickest and saline particles attach themselves to the concretion already formed, and there chrystallize, forming another concentric *lamina*. In this manner one or more gall-stones are formed in the gall-bladder, where they may remain perfectly harmless for a series of years, provided they do not fall into the duct, nor become impacted in its mouth so as to obstruct the flow of cystic bile into the *ductus communis choledochus*.

I recollect having been present a few years ago at the examination of a man who had died hectical at the age of sixty-five or seventy from an inguinal abscess. He had been remarkably robust during his whole life until just before his decease, and when he died the cells of his adipose membrane were much distended with fat. Upon making an incision into the gall-bladder, seven chocolate-coloured gall-

stones of a prismatic form, perfectly smooth and polished, about the size of common beach-nuts, were discovered. He had never been troubled with any disease of the liver from that source. Authors are full of similar cases.

When the action of any cause has forced them into either of these ducts, and there they have become so impacted as to obstruct the flow of bile into the duodenum, they become the source of incalculable mischief to the constitution, bringing on jaundice with all its frightful train of symptoms, spasm, convulsion, and even death, if relief be not afforded, either by medicine, or the accidental removal of the cause.

As a description of the valuable purposes subserved by the bile in the process of digestion will reflect light upon the train of symptoms which proceed from its obstruction, it will be proper here to introduce the *chemical, chylo-poietic, and cathartical* history of that fluid. In the first lines of Haller's Physiology, p. 353, is the following account of the bile.

"It therefore is a soap; but of that sort which is composed of a volatile alkaline salt, mixed with oil, and retains its water. Therefore being intermixed with the aliment reduced to a pulp, and expressed from the stomach by the peristalic motion of the

duodenum and pressure of the abdominal muscles, it in great measure overcomes the acescent qualities of the food, it dissolves the coagulum of milk, and, disposes the aliment more to putrescency; it dissolves the oily matters, so that by freely incorporating with the watery parts, they may form chyle and the more readily enter the laeteals; it absterges, and attenuates the mucus; and lastly excites the peristaltic motion by its acrimony." Morgagni, Sabatier, and Monroe agree pretty exactly with the above writer in their descriptions of the physiological uses of the bile in promoting digestion.

Were all the symptoms from obstruction to the flow of bile from the presence of biliary concretions in the gall-ducts to be described by reasonings *a priori*, spasm from the irritation of the gall-stone being set aside, and Haller's history of the bile being the data, the most material symptoms would be as accurately described, as though they had been penned by one, who had watched the disease in its various stages.

The following are the most general phenomena of the disease, viz. languor, depression of spirits, yellowness of the adnata and afterwards of the whole skin, anxiety, respiration occasionally difficult, pain about the *scrobiculus cordis* and through the right shoulder, loss of appetite, costiveness alternating with a relaxed state of the bowels, clay-coloured

stools, and dyspepsia with all its attendant pains from an acid fermentation of the chyme and the consequent disengagement of elastic vapours, producing distention and eructations of wind, which are acid to the taste. The urine gives a yellow dye to linen. A low, quick, and somewhat tense pulse is likewise a symptom, which frequently accompanies the complaint. Dr. Saunders says it is sometimes slower during the passage of the gall-stone. False vision as it relates to the colour of objects is *said* to be an occasional symptom; as *are* likewise false taste as it relates to a sensible bitterness in all sapid bodies received into the mouth, and a febrile diathesis.

* "A very troublesome itching, but without any eruption, is often observed in jaundice. In a simple jaundice without any apparent disorder of the liver, or other viscera, a hiccup will now and then join itself to the other symptoms, but without denoting any present or future mischief. In other disorders of the bowels it is a very alarming symptom to have the patients subject to fits of shivering: but very strong ones now and then happen in the jaundice, and last an hour, and return every day for two or three times without being followed by any other complaint. It is difficult to guess satisfactorily at the cause of this; but whatever it be, I have suspected, that this symptom, happens at the time

* Heberden upon Jaundice. Lond. Med. Trans. vol. 2nd. p. 138. &c.

of the stones passing into the intestines. However neither suppuration, nor gangrene, nor any other mischief needs be apprehended from this shivering."

When the gall-stone has sharp angular edges, by pressure against the internal coat of the bile duct, it checks the vital action of the part thus irritated, and this check of action is first communicated to the duodenum and stomach, afterwards to the whole system.

In the reactions of the system or efforts made to recover their accustomed action, the stomach and intestines are spasmodically affected, and sometimes are inverted in their actions. There is no part of the living body, however feeble its powers of life or small its natural sensibility, which is not capable of acquiring a high degree of morbid sensibility; thus ligaments, tendons, and bone, which in their healthy state possess little or no sensibility, in a diseased one acquire a morbid sensibility so acute as to be pained by the action of the least irritating cause; likewise the liver, the sensibility of which in its healthy state is relatively small, can acquire a morbid sensibility, which will render a slight irritation excruciatingly painful. The pain attending the severest paroxysm of colic in the most irritable habits from the presence of sharp angular gall-stones in the

common biliary duct cannot be more forcibly expressed than in the following language of Virgil.

——— rostroque immanis vultur obunco
Immortale jecur tundens, fœcundaque pœnis
Viscera rimaturque epulis, habitatque sub alto
Pectore; nec fibris requies datur ulla,*

so long as the excessive irritation and spasm continue.

"Those who have once had this distemper, are very liable to returns of it, not only because other gall-stones are liable to be generated by the same causes which formed the first, but likewise because a fit of the jaundice is frequently terminated, not by the passing of the stone into the duodenum, but by its falling back into the cystis; at its passing out of which it occasions a fresh fit, and many may thus be caused by the same stone."

"I attended a woman, who for five years laboured several weeks every year under all the usual

* A ravenous vulture, in his opened side,
Her crooked beak and cruel talons try'd;
Still for the growing liver digged his breast;
The growing liver still supply'd the feast;
Still are his entrails fruitful to their pains;
The immortal hunger lasts, the immortal food remains.
Dryden's Translation of Virgil, Book vi. l. 808—13.

symptoms of the jaundice in the highest degree. In the sixth year she voided a gall-stone like a small olive in shape and size; since which time she has enjoyed good health for many years without any returns of the jaundice, or the appearance of a disorder which could be attributed to her once having had it."*

Obstruction to the flow of bile from biliary concretion is liable to be confounded with obstruction from spasm upon the orifice of the common gall-duct, with its obstruction from a paralysis of the liver and of its excretory ducts, with its obstruction from the obliteration of the common gall-duct, with its obstruction from the too great viscidity of the bile accompanied by a languid vermicular motion of the duodenum, and with its obstruction from schirrous tumours or scrophulous enlargements of some of the abdominal viscera pressing against the gall-duct, and thereby shutting up its passage. The diagnosticks by which the above various causes producing effects so very similar can be discriminated from each other are to be sought in the history of the state of the system, before and during the first stages of the complaint.

If spasm upon the orifice of the gall-duct terminating in the duodenum be the obstructing cause,

* Of the Diseases of the Liver, by William Heberden, M. D. London Medical Transactions, vol. 2nd, p. 123.

the symptoms must have been sudden in their appearance ; and antispadmodics afford immediate relief, *sublatâ causâ, effectus tollitur;* whereas when gall-stones fill up the cavity of the biliary duct, they must be forced out before a cure can be effected.

If schirrous tumours or scrophulous enlargements of some of the abdominal viscera be suspected as the cause of the difficulty, and they cannot be satisfactorily traced out by the sense of feeling, discrimination would be comparatively unimportant, for a course of calomel or the long and faithful use of the cicuta are equally proper in curing the symptoms proceeding from both sources. If the patient have a scrophulous habit of body, the cicuta should be administered ; otherwise the mercurial course would be most proper in removing the schirrous affection.

When an adhesive inflammation upon the internal coat of the *ductus communis choledochus* has obliterated the passage of that duct by converting it into a solid cord, the disease is absolutely irremediable ; but the rareness of obstructions to the flow of bile from this cause and the hopeless situation of the patient after it once exists, should induce the practitioner never to suspect its existence, before all possible remedies in all their various modes of being administered have been tried without success.

If a paralytic state of the liver or its excretory ducts be the origin of the difficulty, the pain is less

severe than when gall-stones stop up the passage of those ducts, and the disease readily yields upon the application of electricity to its seat, or to any other stimulus sufficiently powerful to rouse that sluggish organ into action.

The discrimination of obstruction to the flow of bile, proceeding from its too great viscidity accompanied by a feeble vermicular motion in the duodenum, from obstruction originating in the presence of gall-stones in the common or cystic duct cannot be very important, as they are only different degrees of the same disease, and can require for their cure only different forces of the same remedies.

As biliary concretion is by far the most frequent cause of obstruction to the flow of bile into the duodenum, a trifling suspicion of the existence of other causes should not influence the prescriptions of the practitioner in the least. Thus Haller in his Elementa * Physiologiæ, when speaking of biliary concretion, says, that the disease is common; much more frequent than stone in the urinary bladder, although it is for the most part concealed under the name of colic.

The following are his words—"Invenio eum morbum vulgarem esse, multo frequentiorem calculo

* Vol. vi. p. 564. § xii.

urinariæ vesicæ, esti plerumque sub colicæ nomen latet."

The remedies to be employed in the cure of this disease naturally present themselves for our consideration in two classes, 1. Those, which are only palliative of the pain during its almost insupportable severity, and 2. Those, which operate a permanent cure.

1. It has already been stated, that a check of action in the gall duct from the irritation of a sharp, angular gall-stone against its morbidly sensible internal coat, sometimes communicates its influence extensively to the rest of the system, exciting colicy pains in the stomach and bowels, and bringing on general spasm. The indication in this case is the use of such remedies as effect a relaxation of the fibre. These comprehend blood-letting, warm bath, opium, and the general list of antispasmodics. If the pulse be tense, blood must be drawn. The quantity should be regulated by the state of the system. Should blood-letting prove insufficient, or should not the pulse indicate it, warm-bath and opium must be immediately resorted to for taking off the spasm and removing the pain. The opiate may be administered, while the patient is in the bath. Its use should be pushed indefinitely, to be commenced in small doses and repeated at short intervals, until it has produced the desired effect.

Were it allowable to prescribe *a priori* without the aids of experience in relation to the operation of the remedy, I would suggest the propriety of passing repeated galvanic or electric shocks through the liver from right to left, in the direction of the cystic and common gall-ducts, and continuing them downwards through the duodenum, while the opium and warm bath are in full operation. It seems not improbable, that the galvanism or electricity would excite the cystic and common ducts to such powerful contractions, alternating with a proportional relaxation of the fibre and consequent expansion in the diameter of the tubes, as must propel the gall-stone, or stones into the duodenum.

II. The class of remedies, which operate a permanent cure, admit of subdivision into three orders. 1st. Those, which act mechanically; 2nd. Those, which act chemically, and 3d. Those which have an action compounded of the two, i. e. a chemico-mechanical action.

1st. By remedies which act mechanically, I would not be understood to mean those, which cure by any *deobstruent* power, derived from the *ponderosity*, or *spicular shape of the particles;* but such as either stimulate the fibre to contraction, or diffuse freedom of motion and its consequent vital warmth through every part of the system, by producing an equable and properly balanced action in every fibre.

I apply the epithet *mechanical* to this order of remedies, not from any partiality to the word, but because I can find none more appropriate in distinguishing it from that order, whose actions are decidedly chemical.

This order of remedies embraces, 1st. Emetics, 2d. Cathartics, 3d. Emetico-cathartics, 4th. Incitantia, or general stimulants, and 5th. Sedatives, or those remedies, which, though their first operation may be stimulant, eventually relax the fibre and allay spasm.

1st. If the gall-stones be small, emetics of tartarized antimony, or ipecacuanha, are fully sufficient to remove all the symptoms. Dr. Saunders, in his *valuable* treatise upon the Liver, under the article of Jaundice from Biliary *Calculi* impacted in the cystic or common gall-duct, advises to the use of ipecacuanha in preference to other emetics, to be administered however in such small divided doses as to excite considerable nausea before puking actually commences. Tartar Emetic I have seen successful in removing obstruction, after the ipecacuanha had failed.

Dr. Darwin recommends half a pint of olive-oil to be given as an emetic during the paroxysm of spasm, and to be repeated at proper intervals in the same dose until it operates.

2nd. Cathartics operate a cure by stimulating the duodenum to such a brisk vermicular motion, as is adequate to the propulsion of the gall-stone from its narrow bed in the bile duct into the cavity of that intestine. If the biliary concretion be small in relation to the diameter of the tube through which it must pass, cathartics of some kind possess a force best accommodated to the force of the disease, and of course are to be used in preference to the other remedies. Pil. coc. and calomel, or jalap and calomel, as possessing universal stimulant powers and being at the same time perfectly harmless in their operation, should be preferred to most other cathartics. Dr. Darwin says he has in repeated instances procured the evacuation of biliary calculi by administering calomel grs. vj. at night, and follow it in the morning with a dose of oil.

3d. Emetico-cathartics claim a decided preference to either emetics or cathartics alone, for they act with the joint force of both. Calomel and tartar emetic form a most valuable remedy in forcing open the bile ducts and procuring a free discharge of that fluid from the liver. This mixture acts, with great certainty and effect, both as emetic aud cathartic. If the irratability of the habit forbid the use of tartar-emetic, ipecacuanha may be substituted with nearly the same promise of success.

The following are common doses of these articles for an adult, to be administered however in divided portions.

℞. Tartarized Antimony. grs. ij.
Sub-muriate of Mercury. grs. viij.
M.

[or

℞. Pulv. Ipecac. ℈ i.
Calom. ppt. grs. viij.
M.

If one emetico-cathartic do not remove the obstruction, it may several times be repeated according to the symptoms of the complaint and the constitution of the patient.

4th. *Incitantia* or general stimulants comprehend mercury, galvanism, electricity, *cantharides*, &c.

Calomel combined with opium in such doses and repeated at such intervals as slightly to affect the glands of the mouth, succeeded by cathartics to prevent mercurial action proceeding to salivation and to excite an increased peristaltic motion in the intestines, experiment has proved to be a very efficacious remedy in removing obstructions to the flow of bile from the concretions of that fluid in the gall-duct.

In some cases it may undoubtedly be necessary to excite salivation, and to maintain it a considerable length of time. Dr. Gibbons * has given a report of thirteen cases of biliary obstruction from calculi, twelve of which were cured by salivation. Many of his patients were far advanced in life. One of his patients after a ptyalism of three weeks standing, excited by the internal use of calomel, voided three biliary calculi, each weighing ten grains. He remarks, "From this it seems to appear that the mercury did not act upon the calculi, but so relaxed the ducts as to facilitate the exit of the stones." He proceeds, "But let us review the first five cases, where every patient was cured, and no gall-stones found in the fæces. May we not reasonably suppose, as none of those patients had any return of the disorder, that the mercury in those cases acted as a *solvent?*"

This same gentlemen concludes the history of case xij with the following remarks. "There is great reason to suppose from the knotty state of the liver after the bile had got a free passage, and the tumour lessened, that not only the *ductus cysticus*, and *ductus hepatius*, but that the *pori biliarii* were likewise obstructed; for I do not think it possible for a human gall bladder, to contain a fourth part of the calculi she voided, not much larger than

* Duncan's Annals of Medicine, vol. I. p. 279, &c.

sand. Did the mercury in this case diminish the size of the calculi? The lady had resolution enough to persevere in the use of her medicines, and spitting to the end of the month or some time longer; and happily got rid of her disorder. There was one stone voided, the last that passed, about the size of a pea."

In cases where the mercury taken internally could not be made to act upon the glands of the mouth, from the relaxed state of the bowels, I have known mercurial inunction over the region of the liver attended with the happiest effects. It is the practice of the English physicians and surgeons in the East-Indies to cure jaundice from biliary concretion by the use of calomel, as the East-India* correspondent of Dr. Saunders clearly shews. It is recommended by some medical authors to alternate the use of calomel with emetics.

The torpid state of the stomach, bowels, and liver indicate the passage of frequent shocks of galvanism or electricity through the several regions of the abdomen. Tincture of cantharides may be rubbed over the abdomen with advantage. If the irritations of the gall-stones produce any degree of inflammation in the liver, which may threaten suppuration, large blisters should be successively applied over the right hypochondria, until the tumour is discussed.

* Saunders on The Liver, p. 172; vide note.

5th. Sedatives are comprehended in that list of remedies, which produce a universal relaxation of the fibre. These are blood-letting, and certain narcotic vegetable products, together with warm-bath. They are mostly contained in the class of *palliatives*, or those remedies employed only in procuring temporary ease during the paroxysms of severe convulsive pain.

Provided the patient be of a plethoric habit, and have a tense labouring pulse, blood-letting should be practised *pro re natâ*.

Of the narcotics, or antispasmodics, opium is the most powerful. The virtues of the common opium would be greatly enhanced in the cure of this complaint, provided it did not constipate the bowels at the same time it removes spasm, by diminishing the susceptibility of the fibre to contraction. Notwithstanding opium increases costiveness, it has been employed with very great success in the cure of biliary concretion. It not only diminishes pain, but produces great relaxation of the fibre to facilitate the passage of the gall-stone. In the Memoirs* of the Medical Society of London, Dr. Lettsom has reported a case of jaundice from biliary concretion, which was cured by Thebaic tincture, warm bath, and gentle laxatives, together with laxative anodyne

* Vol. i. p. 374.

injections. The pain had been severe at short intervals for a very considerable time. Three hundred drops of Thebaic tincture were administered daily, for two or three days in succession. Castor oil was taken into the stomach on the same day, as a purgative, and likewise mixed with anodyne injections to be administered *per anum*. At length a gall-stone of the following dimensions was voided—

Length—2,25 inches.
Circumference—3,25 inches.
Weight—℥i. ʒij. ℈i. grs. iij.

For the two or three days succeeding the passage of the above-described gall-stone, the patient took three hundred drops of laudanum; but afterwards was completely cured of the complaint.

It is said there are preparations of opium, which rather increase than diminish the alvine discharges. If this be true, they must form a valuable remedy for the removal of biliary concretion.

Conium maculatum, or *cicuta*, is a powerful relaxant of the fibre. The dilatation produced by it in the pupil of the eye, when administered in the full dose, demonstrates its efficacy in diminishing muscular contractility.

Dr. Fisher prescribed this remedy several times in cases of jaundice from biliary concretion with the

most perfect success. This *veteran in the healing art* explains the *modus operandi* of the cicuta, in removing obstruction to the flow of bile, from the presence of calculi in the gall-duct by its antispasmodic qualities. He administered it in small doses at first, increasing them however until he arrived at the extent the stomach could bear them. In the course of a very few days by this practice he procured a free discharge of bile into the duodenum.

Dr. Prescott of Groton, in a communication to the Massachusetts Medical Society, relates a case, where *chronic pain in* the region of *the stomach* proceeding from biliary concretion had been relieved *by smoking tobacco.* The patient called her complaint *colic.*(o) Upon dissecting her body after death, which was produced by a rupture of the uterus in parturition, *one hundred and fourteen gall-stones of various sizes were found in the gall-bladder.*

II. The second order of the second class in our division of remedies, which are to be used in the cure of biliary concretion, embraces all whose actions are decidedly chemical. Before proceeding however to the consideration of this order of remedies, it will be proper to investigate the chemical properties of gall-stones. In the history already given of their formation, the increased viscidity of the bile, from its long stagnation in the liver, originating in a feeble peristalic motion of the intestines

has already been noticed. Mention has already been made of the absorption of the more watery parts of the bile after its reception into the gall-bladder, where the thicker portions of it agglutinate, and in some instances undergo a kind of crystallization, as the fracture of some gall-stones clearly demonstrates.

M. Sabatier calls the process of concretion in the bile, *the thickening and drying up of the bile*, *l'épaississément & le dessechément de la bile* being his description of the formation of biliary concretion in the gall-bladder. Be this as it may, if accident, disease, or any cause whatever, produce any thing in the gall-bladder, which may serve as a nucleus, round which the grosser particles of the bile may collect, biliary concretions are the inevitable consequence.

Hence all the constituent principles of the gall-stone must have as much pre-existed, variously modified in the gall, as all the constituent principles in the crystals of nitre must have pre-existed in the nitrous solution, before the act of crystallization had taken place, notwithstanding the suggestions of even Dr. Saunders to the contrary.

It has likewise been stated, that all physiological and most chemical writers agree in calling the bile an animal soap, formed by the triple union of a

fine animal oil with a sub-alkaline water, holding certain other principles in solution, as mucilage, soda, &c. Monroe in the second volume of the Edinburgh system of Anatomy,* says the bile is a natural soap made from a *volatile saline lixivium, mixed with oil and water.* If this be a true description of that fluid, gall-stones are little else than a concrete animal oil, containing the water of crystallization, and slightly impregnated with ammonia. Much the greatest portion of the water must have been reabsorbed into the general circulation, and along with it must have escaped a part of the volatile alkali, the affinities between that article and oil being too small to be retained long even in volatile liniment, the temperature of which is much *below* animal heat. But deductions respecting the constituent principles of biliary concretion from the *known* constituent principles of bile concerned in forming the concretion we shall leave for the chemical history of Biliary Calculi founded upon actual experiment by M. Fourcroy.†

"I have been led to think, that the cause of the production of these calculi depended upon the circumstance, that this oily matter becoming too abundant by a particular disposition of the bile to remain in solution in it with the aid of the soda, and this hu-

* Saunders on the Liver, p. 101.

† Fourcroy's Chemistry, vol. x. p. 73, 81.

mour being by the same disposition thick, and tending to concretion, a crystallization of this substance took place, sometimes pure and insulated, sometimes mixed with a more or less considerable proportion of biliary matter, and that the different forms which it affected in its precipitation, depended upon the slowness or the rapidity with which it was deposited. As this matter proceeds manifestly from the concrescible oil of the bile, and as a vegetable resin never assumes a nature similar to that of adipocire, I have thence concluded that the oily matter of the human bile is not a resin, but a substance more or less analogous to spermaceti, a real adipocire, susceptible of assuming the concrete and crystalline form under certain circumstances.

"I now reckon six genera of biliary calculi: The first are the *bilious-hepatic*, composed almost solely of thickened bile, deposited in irregular clots in the texture of the liver itself: these are rare.

"The second are the *hepatic-adipocirous;* they are found sometimes in narrow laminæ, forming solid points in the parenchyma of this viscus; sometimes they are prominent upon its surface, exhibiting small white or yellowish tumours: they are very rare in this place; frequently, perhaps, very small ones of this kind are discharged, and run off with the bilous evacuations.

"The third I call *cystic bilious:* these are concrete balls, or flakes of thickened bile, granulated, irregular, very various in form and consistence, sometimes friable, brown, or reddish. The calculi of the gall-bladder of the bullock, which the painters use, are of this kind.

"The calculi of the fourth genus are the *cortical*, of the same nature with the preceding; they are only more dense and covered with a grey, or white smooth layer, well terminated with adipocire. They hold the second rank with respect to their frequency. They are frequently found in great numbers in the gall-bladder; sometimes even they exceed a hundred in number: they are then polygons, situated close to each other like pieces of mosaic work, and distend the bladder more or less.

"The fifth genus consists of the cystic adipocirous calculi; they are white or grey, opaque without, or semi-transparent, granulated or smooth, covered with a crust of short filaments, or without crust, formed of entire laminæ in their whole thickness, or of rays proceeding from the centre, and diverging to the circumference: very frequently they are single, and they have the size and form of pigeons' eggs. They are more rare than the preceding; they are mostly found in women. At the termination of bilious diseases, and almost always of chronic jaundice, irregular calculi of this sort, somewhat dry or solid,

rather granulated than crystalline, soft, similar to tallow, and yellowish, are discharged with the stools.

"This kind of adipocirous, or fatty evacuation, is much more frequent than has been believed, and may be observed in many subjects when their dejections are carefully examined at the termination of diseases.

"Finally, I refer to the sixth genus the *mixed cystic*, or *adipo-bilious* calculi, which are mixtures of adipocire and thickened bile in various proportions: these are most frequent of all, and like those of the fourth genus, they are numerous; they are frequently found mixed with them; sometimes brown, or of a deep green or olive colour, we see more or less easily in their interior, brilliant streaks or lamellæ, of a deep yellow colour, or only some micaceous points. When they are polyhedral, we observe upon their worn sides, edges of broken crystalline laminæ."

According to this history of bile and of biliary concretion, alkalis must make the best menstrua for the solution of the gall-stones. By combining a greater than ordinary portion of alkali with the blood, the newly secreted bile must of course become surcharged with that article. According to one of the laws of affinity of composition, the attraction of the particles of one body for those of another is in the inverse ratio to their saturation with each other. If

this law hold true when applied to the present case, the excess of alkali in the newly secreted bile, upon its arrival at the vesicula fellis, must immediately enter into chemical union with the animal oil, or *adipocire*, constituting the principal ingredient in the gall-stone, dissolve down its sharp angular edges, lubricate its whole surface by softening its external stratum, and thereby favour its expulsion through the common gall-duct into the duodenum by the vermicular motion of that intestine.

But the products afforded by the analysis of gall-stones have been different, when they have been analyzed by different phisiologists and chemists.

This is readily accredited, for additional to the new compounds which would be likely to be made in submitting gall-stones to the action of fire and of the different menstrua, into which they are immersed for solution, the varieties of bile, and of course, the varieties of concretion from that bile, must be as great as the constitutions of different people affected with biliary concretion are different.

Morgagni describes two kinds of biliary concretion. Though both possess in common the property of swimming upon the surface of water, they have different colours, and exhibit different phenomena, when exposed to the action of a burning taper.

While the one burns with a vivid flame until it is entirely consumed, the other puffs up, melts, and falls down in drops, being but partially consumed, and emitting an odour peculiarly fetid. It is a maxim, which obtains among all modern physiologists, that diseased fluids are almost invariably the result of diseased solids, the specific qualities of the fluids secreted depending upon the specific actions of their secerning solids. Any change of action, whether morbid or not, must produce a corresponding change in the fluid secreted by the action of its secerning solid. This accounts for the difference in the different conantric laminæ, which are sometimes discoverable in the *same* gall-stone, and for the great variety in different gall-stones.

When the bowels are constipated for a length of time, the mucilage, which forms a greater or less proportion of all the aliments used in diet, is probably absorbed by the lacteals in too great quantities. The blood, having a redundancy of that article, in its languid circulation through the liver, would probably supply the bile with a surplus.

The position respecting the *variety* of *biliary calculi* may be extended. The product, from the multiplication of the variety of animal action in the different people affected with biliary concretion, into the variety of aliments used by those people, and all the permutations and combinations of which

such product is capable, must furnish all possible varieties in the structure and composition of gall-stones.

If they are composed of earthy, resinous, and mucilaginous matters, combined with certain saline substances, in some cases, as Dr. Saunders thinks he has shewn them to be in the analysis he made of them, an alkaline solution, or, in other words, bile supersaturated with the article, upon coming in contact with the gall-stone, must act upon it, soften its hardened edges, and lubricate its surface generally. If the gall-stone be very hard, it may be necessary to persevere for a considerable length of time in the use of the remedy, before it will produce the desired effect.

Although Dr. Saunders acknowledges, that biliary calculi of the above description are soluble in alkaline menstrua out of the body, still he virtually denies the efficacy of alkaline remedies in procuring their solution in the body, when he says, *It remains yet to be proved that the proportion of alkali in the bile is increased by alkaline medicines. Many saline remedies*, continues our author, *pass into the urine unchanged, but we cannot detect the presence of alkaline or of other solvents in the bile: the analogy therefore between the action of solvents in biliary and urinary calculi will not obtain.* Here is a conclusion founded upon a broad assertion, which, in the lan-

guage of its author, *remains yet to be proved.* When he tells the reader, that *saline remedies pass into the urine unchanged*, he indirectly admits, that they have a previous circulation with the blood, for nothing can reach the kidneys without a previous circulation through the heart and arteries. That the Dr's position, relative to no increment in the alkalescency of the bile from alkaline remedies taken into the stomach, may be true, he must prove an *appetency (a non-descript of Darwinian discovery)* in the mouths of the renal arteries to receive the saline particles of the blood, which the mesenteric and splenic do not inherit in common with their neighbours; or he must prove, that the saline particles of the blood circulating through the chylo-poietic viscara are absorbed by the lymphatics and carried back into the general circulation without being presented to the patulous mouths of the minute veins, which unite to form the vena-porta ventralis. Neither of these hypotheses, which have been assumed to preserve the Dr's consistency with himself, can be substantially correct, for he informs us, that he found both soda and ammonia * in the gall stones he analyzed.

The suggestions, opinions, and theories of medical writers deserve a scrutiny, severe in proportion to the celebrity of those writers, and the relations

* Saunders On The Liver, p. 106.

those suggestions, opinions, or theories may bear to the practice of the healing art. The celebrity of Dr. Saunders, and, of course, the plausibility of every speculation stamped with the sanction of his name, must justify the above strictures upon the opinions advanced by that eminent physician. But with *mere reasoning* we will not oppose *so respectable an authority* as Dr. Saunders.

* "All these calculi, being soluble in the *caustic alkalies*, in the solution of *soap*, are made to yield and disappear, or soften, and even *dissolve* by the use of these medicines when they are able to reach them. They ought to be attacked with these remedies, administered in a judicious manner."

Of the alkalies, soda as being least caustic, and consequently least apt to corrode the internal coats of either the stomach, intestines, lymphatic or blood-vessels, through all which it must pass before arriving at the liver, is to be preferred. Notwithstanding soda forms a harder soap when combined with oil and water than potass, the aqueous portions of the bile at the temperature of animal heat must preserve a sufficient fluidity in the compound to favour the action of the mineral alkali upon the gall-stone.

* Fourcroy's Chemistry, vol. x. p. 82. W. Nicholson, London, 1804.

Both of the fixed alkalies have however been proved by the *touchstone* of *correct* practice, *experiment*, to be valuable remedies in curing jaundice from biliary concretion in the gall-duct. Among the labouring farmers in many parts of the interior of New-England, if any one feel the symptoms of an incipient jaundice at the commencement of the warm weather in the spring, the ley of wood-ashes steeped in his morning draught of cyder, is his first remedy, and that perseveringly used generally proves adequate to the removal of all his difficulties.

Alkaline remedies, in the cure of biliary concretion have other advantages than those derived from their passing into the general circulations. The stomachs of those affected with obstructions to the flow of bile into the duodenum, from torpor, secrete a gastric liquor insufficient for the entire solution of every thing received into them as articles of diet, and consequently their food must undergo more or less of an acetous fermentation. The acid thus generated is neutralized by the alkali, and the chylification of the food best promoted by this *artificial substitute* for bile.

It seems not improbable, that *bilious colic* is often the result of an acid fermentation in the chyme, which proceeds from deficient or obstructed excretion of bile. The spasm induced by the acid at such times and the painful distention by *flatus* are

almost immediately relieved by drinking an alkaline solution proportional in strength to the quantity of acid in the stomach and intestines. The severe colic often induced by having taken into the stomach too much acid fruit and its sudden disappearance upon administering an alkaline remedy, strongly corroborates the opinion just now advanced. At the same time the patient takes his alkaline remedies, he should make free use of cordial diluent drinks, for water is the bond of union between the alkali and the component principles of the gall-stone, and is the natural solvent for hardened soap. *Corpora non agunt, nisi soluta*, was the practical maxim ever kept in view by the ancient alchymist; and that *two bodies can have no chemical action upon each other, unless one of them be dissolved*, is a law, held equally sacred by the modern chemist.

Besides some biliary calculi are *said* to be soluble in water, while others are not. "Aliqui in aqua * solvuntur, non quidem omnes."(P)

The vegetable or mineral alkali should be administered in small doses at first, and increased as the stomach can bear them.

The soda is very conveniently administered and readily taken in the water of the supercarbonate of soda of the Dispensatory.

* Haller's Physiologia, vol. vi. p. 575.

In Townsend's Guide to Health, p. 469, mention is made of ammonia being given in the dose of one scruple in mint-water three times a day for the cure of jaundice from the presence of biliary calculi in one of the bile-ducts. The tartarized kali is likewise there highly recommended as a remedy for the same disease originating from the same source. It is recommended in the dose from a scruple to a drachm three times a day either alone or combined with rhubarb.

Dr. Darwin, from the circumstance of having dissolved a gall-stone in sulphuric ether, suggests the propriety of combining the ether and yolk of an egg, to be taken by the *jaundiced* from biliary calculi.

Ether combined with the white of an egg, says M. Fourcroy, at the same time it dissolves the calculi, is very useful in allaying the spasm and contraction, which they produce in the gall-bladder.

Though the above chemical remedies may be proper in the cure of biliary concretion in cases where all the symptoms are *moderate;* in cases where the symptoms are *severe*, they are too tardy in the operation to be employed with any sanguine hopes of affording immediate relief.

III. *Chemico-mechanical* remedies are formed by the union of those medicines which stimulate the

fibre to contraction and of those which act *chemically* from the established laws of affinity. The different indications to be answered in the cure of biliary concretion seem to point out this compound remedy. The gall-stone is not only to be dissolved, but the stomach and intestines are to be stimulated from their quiescent, torpid state to a more vigorous performance of their accustomed functions. To effect both of these indications, the alkali, whether vegetable or mineral, may be combined with some gently stimulating substance to increase the peristaltic motion of the intestines, and render their actions more equable and vigorous. Soda and the white-pine turpentine, soda and *rad. rhei*, or potass with either of the above articles, may answer a valuable purpose in procuring this compound effect.

In cases of dyspepsia attended with slight symptoms of jaundice, I have seen pills, a compound of equal parts of white-pine turpentine and soda, administered with the most satisfactory success. The number of pills taken at a time should be increased, until they render the bowels moderately relaxed. Other cathartics may answer equally well, provided they do not stimulate the bowels to such a degree as to cause the alkali to run off by stool before it can be absorbed by the lacteals, and provided no action take place between the alkali and the cathartic medicine used. The metalic salts would not answer, for the affinities between the acids and the al-

kalies are stronger than between the acids and the metals. After the chemical solution of the gall-stone, or its expulsion through the *ductus communis choledochus* into the duodenum *undissolved*, tonics and a rigid attention to the *non naturals* will generally restore the patient to his accustomed health and prevent a return of his disease.

In some rare instances, nature seeks relief from the irritations of gall-stones in quite a different way from those previously pointed out.

An adhesive inflammation is first excited, which attaches the gall-bladder to the parietes of the abdomen. Ulceration commences, and an hepatic abscess is formed. The ulcerative inflammation progresses, dissolving and absorbing the external surrounding soft parts, until an outlet is made for discharging the purulent matter and the gall-stones through the skin. As a more correct account of this mode, sometimes pursued by nature in the cure of biliary concretion, cannot be found, than that, which is contained in the * writings of the celebrated Albert Haller, the reader is presented with the following, which is a translation from the original Latin of that author.

Nor are the cases rare, where biliary calculi have been discharged with very considerable pain from

* Haller's Physiologia, vol. vi. p. 595—6.

an open ulcer in the side. These calculi have been voided from a tumour in the umbilicus. This is noticed by many writers. The gall-bladder has become, after adhering to the abdomen, a small fountain, from which has distilled a yellow lymph.

After the excretion of the bile, the gall-bladder has adhered, filled with calculi, which have remained without any bile. The gall-stones have burst through the teguments of the abdomen, and passed out at the side—Through a broken abscess of the abdomen angular gall-stones have passed out—There is first a scirrhus of the right side, and afterwards a spontaneous rupture of the gall-bladder. Bile then flows out. At intervals there are fistulous openings, which alternately close and open—There have been abscesses of the epigastrium, through which numerous biliary calculi have been seen to pass. Chesselden mentions calculi, which have spontaneously opened to themselves a passage, and others which have been cut out, where the patients have afterwards recovered. J. Lud. Petit, who *followed nature* in the practice of surgery, has merited much for curing a patient afflicted with this dreadful malady. From the site and fluctuation of the tumour, which was circumscribed and adhered to the teguments, he conceived the necessity of making an incision into the gall-bladder. Nor did he timorously desert his patient, without daring to test the correctness of this novel opinion. Afterwards he made a very

small opening into the gall-bladder, which he enlarged by introducing a style, and at length took out a gall-stone, which effected the cure. The operation has lately been performed by other eminent surgeons, particularly by J. Zacharias Vogel.

Heberden mentions a case, * which terminated favourably. The following is his account of it.

"A woman, fifty years of age, was for ten days severely afflicted with pain of the stomach, hiccough, purging, and faintings, and with difficulty struggled through it. A month after there arose a swelling near the navel, which was opened, and discharged a great quantity of yellow fluid for the space of four years; at length the pain increased, together with sickness and shivering, and after a few days there was discharged a gall-stone three inches long and as much in circumference, weighing 245 grains. During the two following weeks a thin liquor was poured out in great abundance; soon after the sore healed up and the woman recovered. It is evident the gall-bladder must in this case have inflamed and suppurated."

* Commentaries on the History and Cure of Diseases, p. 252

NOTES.

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NOTE (A)

THERE is no subject at present more interesting to the inquisitive physiologist, than *cutaneous absorption.* The Philadelphia Lyceum have felt such a concern in *ascertaining* the *fact*, that the society offered a reward last winter to any one who would demonstrate it. Lord Verulam's mode of investigating *physical science* by experiments has become so fashionable among the faculty, that the medical mind can now rest satisfied with nothing but *demonstration.* The whole evidence however in favour of cutaneous absorption, when embodied, amounts to probability. If the following, which are transcribed from the writings of Baron Haller, (Physiologia. vol. v. p. 90) can be admitted as *facts*, the principle contended for must be considered, as already settled upon the solid basis of *certainty.*

Ex Gatinaria puella quotidie per 60. dies pocula minxit 16. qualia tria biberat, ut in eo tempore, 1740. libris urina superaret, & super cibum potumque, amiserit libras 1740. felici tamen eventu. Many other similar instances are quoted by the same author, who thus comments upon his quotations.

In his exemplis, cum plus urinæ reddatur, quam cibus potusque possint reparare, & cum ipsum corpus paucos ad

dies tantæ jacturæ sufficeret, etiam si totum in aquas diffluere, creditum est, ab aere omnino humorem resorberi. Respiratione sola absorberi non posse tantum aquæ, calculis positis C. Taglini reperit.

NOTE (B)

The *rete mucosum* not unfrequently undergoes a material change of colour in the same individual, after he has attained to years of manhood. Every one must have noticed the great change of complexion, which takes place in the conversion of the "*sweet-scented beau*," into the *hardy tar*. Likewise the African complexion may be bleached by compression, or by any stimuli, which shall act powerfully upon the cutaneous absorbents: hence the negro is white in the palms of his hands and upon the soles of his feet, which are much exposed to mechanical compression. The vapours of the oxigenated muriatic acid likewise bleach his complexion.

In the American Philosophical Transactions (vol. iv. p. 295), Dr. Rush has communicated the following extraordinary physiological fact respecting a change in the colour of the *rete mucosum*.

"In a certain Henry Moss, who lately travelled to this city (Philadelphia), the change from a black to a natural white flesh colour began about five years ago at the ends of his fingers, and has extended gradually over the greatest part of his body. The wool, which formerly perforated the cuticle has been changed into hair. No change in the diet, drinks, dress, employment, or situation of this man had taken place previously to this change in the skin." Many other similar instances are upon record.

NOTE (C)

That the Jews and Christians are not the only people, into whose religious creeds has been introduced a belief in the *sameness of original*, among our species, is proved by the following, which is an extract from Asiatic Researches, vol. vi. p. 253.

"It being admitted, that all mankind are the offspring of "the same stock, namely, of the Biamma, who descended from "the abodes of Rupa; a certain *Burma* doctor asks, why there "is not the same language among all nations; and whence arises "that variety of manners, religions, *complexions*, and features "so observable among the inhabitants of this earth? This same "doctor thinks he answers the question by saying, that the "first inhabitants of the world after having greatly multiplied "by marriage were forced to emigrate into various parts of the "earth; and as in these the *climate*, *air*, water, natural pro-"ductions, and *temperature* are extremely different, such cir-"cumstances could not have failed to produce an effect on the "manners, religion, and *appearance* of those who were under "their influence. For if in one kingdom the inhabitants vary "in stature and colour, how much more evident must this dif-"ference be amongst the inhabitants of remote countries?"

All the varieties in the human complexion are readily accounted for by the varieties of climate and habits of life, which are the physical agents that diversify the colour of man. Change of feature as great may be produced by the absurd customs, which obtain among the human race. The Chinese damsel, whose pride is the smallness of her foot, and the Ethiopian, who glories in his bandy legs, thick lips, flat nose, arched forehead, and glossy, smooth and jet-black skin, in *some measure* regulate the operation of those physical causes, which are concerned in the production of these "*fancied beauties*." The depraved taste, upon which these singular

preferences are grounded, cannot be more unaccountable, than that which led the officers in the court of Alexander the Great, to wish they might each of them have *fistula in ano*, in humble imitation of the Great Emperor.

What was *originally* casual, *eventually* becomes constitutional; and what a series of centuries has been concerned in accomplishing, cannot be expected to be obviated within a period short of the original term, consumed in its accomplishment. In the island of Jamaica there is a law of enfranchisement, which invests the fifth in the order of descent from an African, with all the rights, immunities, and privileges of the native white.

In Edward's History of the West-Indies, vol. ii. p. 19. is the following account of the different gradations of people according to their complexion in Jamaica.

"Among the tribes which are derived from an intermixture "of the whites with the negroes, the first are the *mulattoes;* "next to these are the *tercerones*, with some approximation "to the former, but not so near as to obliterate their origin. "After these follow the *quarterones*, proceeding from a "white and a terceron. The last are the quinterons, who "owe their origin to a white and a quarteron. This is the last "gradation, there being no visible difference between them "and the whites, either in colour or features; nay, they are "often fairer than the Spaniards. The children of a white "and quinteron consider themselves as free from all taint of "the negro race."

The principle admitted that the refinements of civilization will obliterate *one sixteenth* of the African complexion in five generations, and the generation in a West-India climate being limited to fifteen years, seventy-five years would be consumed

in bleaching a sixteenth part of the African complexion. According to this calculation twelve centuries would elapse, before the habits of civilization would change the jet-black of the African to the dark brown of the native West-Indian, who could regularly trace out his descent from ancestors, European-born. It is probable, that a considerable longer term of time would be requisite to produce the desired change of features. Compression, which was the most *probable original cause* of the *flat nose*, could not be made to operate in restoring to it its original shape.

King Solomon's analogy between man and beast,* the story of Jacob's getting the ownership of all *the stronger of the cattle* in Laban's flocks,† and the account of the increased ratio of *black* lambs, when their *white* dams are put into new pastures, where they blacken their fleeces by rubbing against logs partially burned, might be here enlarged upon, to shew that casualty *may* sometimes be concerned in darkening even the human skin.

For the various arguments in favour and against the sameness of original among our species, the reader is referred to an *Essay on the Causes of the variety of complexion and figure in the human species, by Rev. Samuel Stanhope Smith, D. D. and to Lord Kaim on Man.*

NOTE (D)

No law of the animal economy is more familiar, than the sighing produced by the accidental plunge of the foot into cold water, or the sprinkling of that fluid at a reduced temperature upon any portion of theskin. The sympathies between the skin and the rest of the system render a knowledge

* Ecclesiastes, chap. iii. † Genesis, chap. xxx.

of its functions exceedingly important, not only in the treatment of disease, but also in restoring suspended animation. If animal temperature be at the proper standard, no remedy perhaps is so certain in its operation in restoring suspended respiration, or indeed, suspended animation, as the external application of cold to the naked skin. Of course, cool air, cold water, ice, snow, &c. are common external applications to the skin, not only in the restoration of suspended animation in newly born infants, but likewise in the resuscitation of those apparently destroyed by lightning or by respiring the carbonic acid gas. In re-exciting suspended animation, the cold acts the same part, which it performed at first in originating respiration. A distinction is however to be made between the different ways of producing cold in the two cases. In the first instance, the cold is produced by evaporation from the surface of the body, for the infant breathes whether it be immersed in an atmosphere at a reduced, or at a temperature elevated above that of the body. In the second instance, the substance to be applied to the skin must be at a temperature, reduced below that of the animal, because the functions of the skin are suspended in their exercise, and therefore cannot produce cold by evaporating the perspirable matter.

NOTE (E)

In Asiatic Researches, vol. v. p. 345 and following, are to be found very particular injunctions respecting personal cleanliness, interwoven among the religious rites of the Hindus.

"A Brahman, rising from sleep, is enjoined under the "penalty of losing the benefit of all rights enjoyed by him, to "rub his teeth with a proper withe, or a twig of the ramecife-"rous figtree, pronouncing to himself this prayer :

"Attend, lord of the forest; Soma, king of herbs and "plants, has approached thee; mayest thou and he cleanse "my mouth with glory and good auspices, that I may eat "abundant food, &c. The following prayer is also used up- "on this occasion: Lord of the forest! grant me life, "strength, glory, splendour, offspring, cattle, abundant "wealth, virtue, knowledge, and intelligence.

"But if a proper withe cannot be found, or on certain "days when its use is forbidden (that is on the day of the "conjunction; and on the first, sixth, and ninth days of each "lunar fortnight,) he must rinse his mouth twelve times with "water.

"Having carefully thrown away the twig, which has been "used in a place free from impurities, he should proceed to "bathe, standing in a river, or in other water. The duty of "bathing in the morning, and at noon if the man be a house- "holder, and in the evening also, if he belong to an order of "devotion, is inculcated by pronouncing the strict observance "of it as no less efficacious, than a rigid penance in expiating "sins, especially the early bath in the months of Magha, "Pholgima, and Cartica: and the bath being particularly "enjoined as a salutary ablution, he is permitted to bathe in "his own house, but without prayers, if the weather or his "own infirmities prevent his going forth; or he may abridge "the ceremonies and use fewer prayers, if a religious duty or "urgent business require his early attendance. The regular "bath consists of ablutions followed by worship, and by the "inaudible recitation of the Gayátri with the names of the "worlds. First sipping water, and sprinkling some before "him, the priest recites the three subjoined prayers, while he "performs an ablution by throwing water eight times on his "head, or towards the sky, and concludes it by casting water

"on the ground to destroy the demons, who wage war with "the gods.

"1st. O waters! since ye afford delight, grant us present "happiness, and the rapturous sight of the supreme God. "2nd. Like tender mothers make us here partakers of your "most auspicious essence. 3d. We became contented with "your essence, with which ye satisfy the universe. Waters! "grant it unto us. For, as otherwise expounded, the third "text may signify, Eagerly do we approach your essence, "which supports the universal abode. Waters! grant it "unto us."

In further proof of the importance of water and of ablutions, in the estimation of the Hindu, to his spiritual salvation, the following is quoted from the same volume, p. 354.

"I offer this water to the sun, whose light irradiates my "heart, who sprung from the immortal Essence. Be this ob- "lation efficacious—as he who bathes is cleansed from all "foulness—so may this water purify me from sin. The ab- "lution is finished by the following prayer.

"Water! thou dost penetrate all beings; thou dost reach "the deep recesses of the mountains; thou art the mouth of "the universe; thou art sacrifice; thou art the mystic word "*vasha;* thou art light, taste, and the immortal fluid.

"Preparatory to any act of religion, ablution must again "be performed in the form prescribed for the mid-day bath; "the practice of bathing at noon is likewise enjoined as requi- "site to cleanliness, conducive to health, and efficacious in re- "moving spiritual as well as corporeal defilements.

"If there be no impediment, he may bathe with water "drawn from a well, from a fountain, or from a bason of a

"cataract! but he should prefer water, which lies above "ground, choosing a stream rather than stagnant water; a "river in preference to a small brook; a *holy* stream before a "*vulgar* river, and above all the water of the Ganges—

"After bathing and cleaning his person, and pronounc- "ing as a vow, I will now perform ablutions, he who "bathes should invoke the holy river; O *Ganga*, *Yamuna*, "*Satadru*, Marudviáha, Jiyiciya! hear my prayers; for "my sake be included in this small quantity of water with "the holy streams of Parushti, Asieni, and Vitasta—what- "ever sin has been committed by me, do thou, who art up- "held by the hundred armed Crishna, ascend *my limbs*, and "remove *every sin*——"

The priest recites the following accompanied with many mystical flourishes.

"Waters! remove this sin, whatever it be, which is in me; "whether I have done any thing malicious towards others, or "cursed them in my heart, or spoken falsehoods. 2nd. Wa- "ters! mothers of worlds! purify us; cleanse us by the "sprinkled fluid, ye who purify through libations; for "ye, divine waters, *do purify every sin*.——

"May divine waters be auspicious to us for accumula- "tion, for gain, and for refreshing draughts: may they lis- "ten to us, that we may be associated with good auspices. "Next reciting the following prayer, the priest should thrice "plunge into water: O consummation of solemn of rites! "who dost purify, when performed by the most grievous of- "fenders; thou dostin vite the *basest* criminals" *(the most slovenly villains)* "to purification; thou dost expiate the "most heinous crimes.

"One who has drunken spirituous liquors, should traverse "water up to the throat, drink as much expressed juice of the "moon-plant, as he can take up in the hollow of both hands, "while he meditates the triliteral monosyllable, and then "plunge into water, reciting,

"*May the waters free me from every defilement, whatever "be my uncleanness*," &c. &c.

If the civilized christian, from the prudential considerations of *self-preservation*, would make the same liberal use of water by daily ablutions, as the half-savage pagan makes, from the religious considerations of washing away his own spiritual defilements, a great many of the obstinate *cutaneous* as well as *general* diseases, which now afflict mankind, might not only be prevented, but cured without the administration of any other remedy. Pinckard, in his Notes on the West Indies, (vol. ii. p. 149 and 150) gives an account of the practice of bathing among the negroes of Barbadoes, which is not *dissimilar* to the preceding accounts of the Hindu worship.

"A sense of cleanliness attaches to their love of the water, "for we not only see them often in the sea, but frequently "also washing themselves in rivulets. It seems to form one "of their favorite amusements to stand in the sea, or river, "and to take up water in both hands, and pour it over their "shoulders down their backs. This is practised both by the "men and the women, and is one of their most frequent methods "of bathing. Another mark of cleanliness also prevails "among them, which was less to be expected; viz. that of "paying great attention to their teeth. The chew-stick, "which is here employed for cleaning the teeth, is far more in "use among the negroes, than the tooth-brush among the "lower classes of people in England. Our adroit negro, "amidst his many gambols in the water, dived to the bottom

"of the sea, and brought up a handful of sand. With this "rough dentifrice he soundly scrubbed his teeth, and by way "of essence to wash it off, plunged down to the bottom for "another handful with his mouth wide open; thus alternately "repeating the rubbing and sea-water washing until he felt "his pearls were duly contrasted with his ebon countenance."

In further proof of the importance of perfect cleanliness of the skin in procuring its exemption from disease, the following is extracted from Jackson's Dermato-Pathologia, p. 152.

"When I minutely consider the uses and importance of "the *cutis vera*, and all its appendages in the animal economy, "and their connexion, directly or indirectly, with all the prin- "cipal functions of animal life, or the sensitive principle, I am "very much inclined to think with Mr. Howard, that the "want of necessary attention in parents and others, who have "the care of young children, to the outer surface of their ten- "der and growing frames, by *constant cleanliness* and *sufficient* "*ablution*, too certainly dries up, weakens, or impoverishes, "while they are in their infancy, that spring of health, a "sound and perfect skin, and which eventually deprives them "of the full strength of manhood, when they reach that period "of life, and to which they may have been hereditarily enti- "tled. I believe, that if such prophylactic means, as COLD "WASHING, and COLD BATHING, were from their birth uni- "versally attended to, in their full extent, we should soon "lessen the number of diseases."

NOTE (F)

The first appearances of the Jewish leprosy answer to those of the British, as described by the discriminating Willan, in his elaborate treatise On Cutaneous Diseases, p. 112.

"Lepra Vulgaris exhibits first small, distinct elevations of "cuticle" *(a rising,)* "which are reddish and shining, but "never contain any fluid. On their surface, when examined "through a magnifier, the cuticular lines are found obliterat- "ed: and within a few hours, a thin, white scale" *(a scab)* "is formed on the top of each of them. In three or four days "the small elevations appear flattened, and are at the same "time dilated by an extension of their bases to the size of a "silver penny. These patches continue to enlarge gradually, "till they nearly equal the dimensions of a crown piece. "They have always an orbicular or oval form; are covered "with dry scales, and surrounded by a red border," *a bright spot.*

The subsequent symptoms of the Jewish leprosy seem not very well to agree with those in the leprosy of Britain; for the leprosy here pointed out by the Jewish law-giver was spontaneously cured by the powers of the constitution; at least, no mention is made of the use of any remedies. Willan observes, that the modern leprosy of Britain is not cured without medical assistance.

Dr. Joseph Adams, On Morbid Poisons, p. 205, supposes this disease, which Moses has called *plague of leprosy*, to have been no other than yaws. The opinion seems not to be without foundation.

NOTE (G)

"A simple warm bath, along with moderate friction, like- "wise contributes to remove the scabs and to produce a soft "red skin, which, in time, regains the usual colour and "texture. This plan is sufficient in the slighter cases of lepra, "without the use of any internal remedies. If the disease

"affect the extremities only, bathing of the whole body is "not necessary; it may be enough to apply steam, or warm "water, frequently to the disordered parts."

P. 146. The following is copied from an Essay on Dulcamara, by Mos. Carrere, in the cure of Lepra.

"The true lepra is the only disease of the skin, in which "I would venture to assert the dulcamara will generally effect "a cure. Out of twenty-three cases of lepra Græcorum, in "which I have tried it, two only have resisted its action. "All the others were completely cured. I exhibit the dulcamara as follows:

"℞. Stipitum Dulcamaræ unciam i. Aquæ puræ libram "i. ss.: decoque ad libram i.; & liquorem frigefactum cola.

"Of this decoction I generally desire the patient to take "two ounces every morning, noon, and evening; but I afterwards increase the quantity until the pint is consumed every "day. At the same time I order the patient to wash the skin "with a stronger decoction, which greatly accelerates the "cure. The remedy seldom begins to exhibit any evident "good effects for the first eight days."

"None of the above remedies are applicable for the cure "of lepra nigricans. This form of the disease requires, in "the first place, a regular and nutritive plan of diet, with "moderate exercise: it may be afterwards wholly removed "by the use of bark, and the mineral acids, sea-bathing, &c."*

Having never seen any well marked cases of leprosy (they being exceedingly rare in this country) I wrote to Dr.

* Willan on Cutaneous Diseases, p. 147.

Haskell of Worcester county, a physician of much attentive observation and great experience, who very politely communicated to me the following, which is transcribed in his own words.

A CASE OF LEPROSY.

"*The state of the patient when I was first consulted, Dec. 6th,* 1782.

"Miss B. J. of L. aged 13, of a delicate constitution and "sprightly disposition, was completely covered from head to "foot with a dry, scaly or crusty eruption: except the middle "of her forehead, her nose, round her mouth to the end of her "chin, and the backs of her hands and feet, which were af- "fected in a less degree; except also the insides of her hands, "and the bottoms of her feet, which were not affected at all. "In the bend of her elbows and hams, the skin was so corru- "gated, that in attempting to extend them the skin was actu- "ally fissured with some affusion of blood. The crusts, which "were thick and prominent, were of a yellowish and brownish "cast, mixed with white; but the parts covered with thin "scales exhibited a whitish appearance. Between the scales or "crusts, and under them, when scratched off, the skin appeared "preternaturally red and inflamed. And the whole surface "of her body exhibited some degree of œdema or bloated ap- "pearance. And she experienced an uneasy sensation, which "she said was not like that of a common itching, but rather a "prickling, resembling that of being raked with a card; and "this was especially troublesome when warm in bed, inducing "at those times an almost constant scratching: hence she usu- "ally left a handful of scales in bed after her, every morning.

"Her general health did not appear to be very materially "affected; as her appetite for food and drink, and her excre- "tions by stool and urine, were nearly in their natural state. "In my notes I did not notice the state of her pulse. Her

" spirits were rather low and dejected, and there were marks
" of a considerable degree of general debility.

" *Preliminary information obtained from the patient and her mother.*

" About three years ago, (from the date above,) there
" came out a spot on each arm, which began like a tetter, in-
" creased to the size of a copper, was covered with white scales,
" continued a while, and then disappeared spontaneously,
" leaving the skin smooth and of a whitish cast, which appear-
" ance it retained, till the approach of her present disorder,
" which her mother dates about a year ago. At this last men-
" tioned time another spot appeared on her arm, resembling
" the sting of some poisonous insect, which itched to such a
" degree, that her mother suspected it to be the itch. It rose
" above the level of the skin, and upon being scratched, dis-
" charged a little watery fluid, felt hard under the skin, and
" soon became covered with a white scurf, which gradually
" increased in breadth and thickness to the size of a copper.
" About the same time similar appearances occurred in several
" places on her head. And from this time forth it went on
" increasing, by making its appearance in other new places,
" till it overspread the whole surface of her body, as above
" described, and became the most universal leprosy I ever
" witnessed.

" *Methodus Medendi, Dec. 6th*, 1782.

" She had hitherto been under the care of Dr. J. D. who
" prescribed many medicaments to me unknown, under whose
" operation she found no relief, but, on the contrary, her dis-
" order appeared to be gaining ground fast upon her. This
" information, however, respecting her treatment I received
" from her mother, that the only external application used was
" friction with a cloth fumigated over burning sulphur.

"℞ Sulphureti antimonii præcipitati drachmas duas ; Hy-
"drargyri drachmam unam : simul triturentur, & fiant Pulvis
"Æthiopicus. Hujus Pulveris capiat Ægra Grana tria omni
"Nocte, hora Decubitus.

"℞ Sulphatis sodæ drachmas sex (in aquæ callidæ unciis
"sex soluti) secundo quoque matutino, ad tres vices.

"December 16th. The symptoms nearly the same. The
"powders occasioned some nausea ; but the sulphate oper-
"ated well. The gums and glands of the throat a little swell-
"ed ; but no ptyalism.

"℞ Sulphuris sublimati, & super-tartritis potassæ sin-
"gulorum Unciam unam ; Nitratis Potassæ semunciam : fiant
"Pulvis, dequo capiat omni nocte Drachmam unam.

"Repetatur quoque sulphatis sodæ dosis eadem, bis in
"septimana. Partes affectæ etiam, mane & vesperi Panno sul-
"phure urente fumigato, fricentur.

"December 23d. The friction seems to produce a more
"agreeable sensation in the skin for a short space ; but the
"disorder appears in no degree mitigated.

"Continuenter Pulvis Æthiopicus & Pulvis Sulphureus,
"alternis vicibus omni nocte ; et Cathartićum ut antea repe-
"tatur. Totum corpus a capite ad pedem decocto callido
"e Lapatho, Verbasco, & Malva omni nocte lavetur.

"January 1st, 1783. The symptoms nearly the same.
"The lotion renders the skin more soft and pliant, than the
"dry friction, and in some degree diminishes the troublesome
"itching.

"Continuentur medicamenta ut antea. Sed post singulam "lotionem, partes circum articulors, genua & cubitos "præcipué, Unguento Resinæ Empyreumaticæ Pini sylvestris "illinentur.

"January 8th. The disorder on the decline; the skin "round her elbows and knees becoming much more pliant, "the crusts having fallen off.

"Continuentur medicamenta: sed applicetur Unguentum "omnibus Partibus maxime affectis.

"January 16th. The disorder gives way fast, the skin in "many places appearing natural and smooth.

"Medicamenta omnia continuentur.

"SEQUEL.

"By persevering in this course she soon became to appear- "ance perfectly well and sound. She has however since that "time had several slight attacks of the same affection; but "by having recourse to the above mentioned Æthiopic pow- "der, salts, and unguent, and several times by the use of the "unguent alone, it was soon removed, and indeed with very "little trouble.

"OBSERVATIONS.

"The above was the first case of the kind to any consider- "able degree that occurred in my practice. And it is easy to "be perceived, that I had not then shook off the trammels im- "posed by ancient maxims. The doctrine of a humoral pa- "thology pointing to a cachochymia as a cause, and the famous "Vis Medicatrix Naturæ, ever vigilant to guard the nobler "parts, and active in throwing the acrimony off from them to "the surface, where it could do the least mischief, seem to be

"among the leading doctrines of the ancients, respecting the "disease now under consideration. And these doctrines nat- "urally suggested the propriety of trusting the cure princi- "pally to internal remedies; and at the same time imposed "a strong caveat respecting external applications. And the "practice thus founded almost reduced leprosy to the class of "incurables; for instead of curing the patient, it proved a "lasting opprobrium to the medical art, and laid the foun- "dation for the introduction and increase of quackery. For "the unfortunate patient, tired out and disgusted by a long "continuance of swallowing nauseous doses, and dishearten- "ed and dejected by finding little or no relief from them, "as if in a fit of desperation, flies to some unprincipled "quack, who, equally regardless both of the principles of mo- "rality, and these erroneous maxims, draws a bow at a ven- "ture, and chances to hit upon something that cures his pa- "tient. This guess-work tears the laurel from the brow of "the noble profession, and fixes it upon that of ignorance "and quackery. For I am persuaded that it is owing to er- "rors like these, that quackery has maintained its sway over so "large a proportion of mankind to the present day. And so "long as such errors are retained and practised upon; so "long will every effort to expose the baseness and absurdity "of quackery be construed into selfishness and illiberality. "Ignorance will hold up its brazen head, and the presuming "pretender thus supported, will deride every attempt to ex- "pose his ignorance.

"In continuation of the ancient doctrine of assigning a "cachochymia for the remote or predisposing cause of leprosy, "a sedentary and inactive life, together with gross feeding, "especially living much upon swine's flesh and fish, have been "charged with being the cause of introducing that depraved "state of the humours. But these could not operate as a "cause of this patient's complaint; for her parents say, she

"was always sprightly, and lived an active life, and never craved "either flesh or fish, but always preferred a milk and vegetable "diet. On the whole I could assign no particular errors in "the non-naturals, as the cause of this patient's disorder. "Perhaps a peculiar state of the skin is the predisposing cause, "giving effect to the action of the air upon it, at certain sea- "sons, or in particular states of the atmosphere. For I have "observed leprous affections to rage most, and be most preva- "lent in the autumn and spring.

"Therefore however repugnant to the ancient doctrine, or "however singular or erroneous the sentiment may appear, I "am induced to believe, for many reasons founded on obser- "vation, that leprosy is a local affection, whose seat is the sub- "cutaneous glands and their excretory ducts. These being af- "fected by inflammation, are thrown into morbid action, and "consequently secrete and excrete an increased quantity of "vitiated fluid, which being too gross to escape through the "fine pores of the epidermis, raises the scarf skin in the "form of serpiginous eruptions; and being likewise too viscid "wholly to evaporate and fly off in the form of insensible "perspiration; but drying on the surface forms those white "scales or scurf, which are the distinguishing mark of leprous "affections. Whilst at the same time the inflammatory af- "fection of the cutaneous vessels raises the part affected a lit- "tle above the common level of the surface, and presents to "the touch the sensation of hardness in the prominent parts, "and which also, when the affection is general over the sur- "face, occasions some degree of bloated appearance.

"In regard to the cure of leprosy, I am constrained to "say, that I never knew a cure effected by internal remedies "alone, or where it could be fairly ascribed principally to "their use. In the case before us the patient had been long "subjected to a course of internal remedies before I saw her,

"but to no effect. And after she came under my care the in-
"fluence of the ancient doctrine induced me to push them
"to a much greater extent than I now deem necessary; not-
"withstanding which, I gained no ground of the disorder,
"till the warm ablution and unguent were made use of.

"I was lately called upon to visit a very respectable lady,
"who laboured under the severest crural elephantiasis* I
"ever saw, (and I have seen several), and who had been treat-
"ed by a course of mercurials, till her strength was greatly
"reduced, a copious ptyalism brought on, and a sore mouth,
"produced to a degree which totally disenabled her from tak-
"ing any kind of solid food for more than a month, though
"her appetite sufficiently craved it; yet under this severe
"treatment her disorder in no degree gave way, but rather in-
"creased. But being put upon a course of bark as a tonic,
"sublimed sulphur, and supertartrite of potass, with one or
"two of the gentlest cathartics, as antisialagogues, and slip-
"pery elm tea, as a demulcent; and at the same time wash-
"ing the part daily with warm milk and water, and some-
"times with hard-soap suds, and applying after each wash-
"ing an unguent composed of four parts of ung. resin. empy-
"reumat. pin. sylvestr. and one part of ung. nitrat. hydrarg-
"yr. her disorder gave way, and she gradually recovered.

"Instead of the above topics, I have frequently applied a
"weak solution of the muriate of quicksilver, and the simple
"tar ointment after it, and with equal success. Nor do I
"suppose these to possess any specific virtues, by which
"they effect a cure in some unaccountable manner. In ev-

* This elephantiasis must have been a disorder very different from the elephantiasis of warm climates. D. H's. account of it, by no means corresponds to that which in Barbadoes is called the "Glandular Disease." However this may be, it is of very little consequence; for *symptoms*, and not *names*, claim the attention of the philosophic physician.

"ery prescription of this kind the object is, I conceive, to "arrest the morbid action of the vessels, which pour out an "increased quantity of vitiated matter upon the surface, "where this same morbid secretion continues the tragic scene, "by raising the inflammation higher, and spreading it wider, "and thus producing and increasing the exulcerations; and "at the same time to restore the action of the absorbents, and "heal those exulcerations. And what is better calculated "to answer those intentions than remedies possessing in a cer- "tain degree an escharotic quality, (such as the oxides, the ni- "trate, and the muriate of quicksilver, the subacetite and the "sulphate of copper; and perhaps the *oxidum arsenici*, but "I have not used this last,) which may lay hold on and des- "troy those innumerable fungous excrescences, which grow "out of those diseased vessels? This seems to arrest the "morbid action at once, and thus prevent their further mor- "bid secretion. After which some unctuous application "calculated to restore the action of the absorbents, and keep "the skin soft and pliant, will heal the ulcerated parts and "complete the cure. On this ground the tar ointment was "preferred in the foregoing cases, to other unctuous sub- "stances. But every application for answering the above pur- "poses, *should be always preceded by ablution* to give the med- "icament a fair chance to take effect, and also for the pur- "pose of removing so hurtful an agent, as well as for other "good purposes.

"And as I would not trust the cure to internal remedies "alone; so neither would I wholly omit their use. And as "the action of mercurials and antimonials combined, when "given in small doses, is directed strongly to the surface; so "their use may, I think, contribute somewhat towards re- "storing the healthy action of the vessels of the skin, and "contribute something to the cure. And as the change in "the circulation, occasioned by the removal of an inflam-

"mation as extensive as the surface of the body; and as the "cessation of a discharge, though a morbid one, as copious as "this increased secretion from the surface, might materially "affect the system, I have thought it expedient, occasionally "to interpose gentle cathartics. In regard to any other med- "icines, the circumstances of the patient, as they may occa- "sionally present themselves, must alone instruct us, whether "to use or refuse them."

NOTE (H)

In the Philadelphia Medical Museum, p. 422, &c. is the following history of the case and of its cure:

"In the year 1770, about the month of June, I had a num- "ber of African slaves for sale, among them was a lad about "eighteen years of age, who was a miserable object from the "disorder called the yaws; he was vastly more afflicted with it "than any disorder I ever saw before or since; from his head "to his feet he was thick-set with all sorts of knots or ulcers, "which that disorder produces, when it is in its worst stages.

"Among the slaves there were a few, who had been living "for some time at one of the British factories in Africa, and "understood a little of the English language. Observing that "I was at a loss what to do with this diseased slave, they un- "dertook to cure him, to which I readily consented, but with "very little faith in their success.

"*The cure was as follows:*

"They took him to a running stream of water, laid him in "it, two confined his feet, two his arms, and one held up his "head to prevent drowning; two then operated in scrubbing "off the knots and ulcers in the running water. The opera-

"tion must have been dreadful, for they scrubbed him with "corn-husks, and even sand; the blood, and matter, and scabs "were constantly washed down the stream: when every ulcer "was thus smoothed away and cleansed by the running water, "they led him up naked to the house, and wiped him; then "they made an ointment of the juice of limes made boiling hot, "and mixed to a proper consistence with powdered iron-scales "taken from a blacksmith's anvil: with this ointment they "anointed every sore with a feather; the same operation was "continued for four weeks; every six or seven days, they gave "him frequently a decoction of some roots, which I believe "operated as a purgative: in about eight weeks they complet-"ed a cure; in three or four months, he became sleek, fat, "and a very likely fellow; all the sores skinned over, and no "scar remained. I sold him afterwards, and never heard that "the complaint returned.

"David Ross."

The report of this case of yaws agrees very well with the history of the disease, as given by Dr. Winterbotham and Dr. Joseph Adams, who observe that the powers of the constitution are *ultimately* adequate to its cure.

NOTE (I)

The only occasional causes that I am able to point out, with any certainty, as contributing to the production of lepra vulgaris, are exposure to cold and moisture, and the accumulation of *sordes* upon the skin. Hence persons engaged in some particular lines of business are more subject to this disease, and especially those who work among dry powdery substances (as brick-layers, labourers, coal heavers, laboratory men, &c.) as also many of the labouring poor, who are much exposed to cold, and almost constantly surrounded with dust or dirt,

without procuring even a temporary enjoyment of cleanliness.

Willan on Cutaneous Diseases, p. 126.

NOTE (J)

The following history of this loathsome complaint is transcribed from Pinkard's notes on the West-Indies. *

"The elephantiasis, called by some the "*glandular dis-*
"*ease,*" but, by the many, designated simply the "*Barba-*
"*does disease,*" commonly appears in the form of an enor-
"mous and frightful enlargement of one or both legs; but
"occasionally affects other parts, particularly the scrotum,
"which becomes increased to a surprising bulk. When once
"established, it is extremely difficult to remove, and for the
"most part proves to be incurable. It affects the general
"health less than might be expected, and frequently exists
"for many years without seeming materially to impair the
"constitution; often, indeed, the person attacked with it
"bears it about through the remainder of a long life. It is
"mostly seen among the negroes, but it is too common also
"among the creole whites, and even suffers not the Euro-
"peans to escape. Although so frequent in Barbadoes as to
"be held in a great degree peculiar or endemial, it is not wholly
"confined to this country: some instances of it being seen
"in the neighbouring islands.

"It would seem not to have been so prevalent as it now is
"for any very distant period of time; for about the year
"1760 died at Barbadoes a man named Francis Briggs, more
"commonly known by the fictitious appellation of Christo-

* Vol. ii. p. 119—130.

"pher Columbus, who, from the uncommon and monstrous "appearance of his legs, had been represented as the bug-bear "or object of terror for the purpose of frightening children.

"Male and female, young, middle-aged, and old, black "and white, are now all subject to its attack; and in walk- "ing the streets, the eye is distressed at almost every corner "with the appearance of this hideous deformity.

"The disease usually begins with an affection of the in- "guinal glands, from whence a red streak or line of inflamma- "tion extends down the limb, in the direction of the lymphatic "vessels; the part affected becoming tumefied, and taking "on an oedematous and shining appearance. The swelling "gradually occupies the whole of the leg, increasing until, in "many instances, the limb is more than double its ordinary "size. The skin assumes a morbid appearance, grows rough "and scaly, or is covered with irregular wart-like risings. "In some cases deep belts or indentations appear in various "parts of the tumour, as if formed by the pressure of liga- "tures: in others the swelling bulges out in a number of ir- "regular protusions: sometimes, from extreme distention, "the skin ruptures or breaks into cracks and fissures, and a "watery fluid oozes out, which on exposure to the air grows "gelatinous upon the surface. The foot frequently partakes "of the disease, but in many cases the immense tumour of "the leg terminates abruptly at the ancle, hanging over the "foot in knotty and scaly excrescences. The deformity thus "becomes diversified; the enormous bulk of leg appearing "under a variety of unseemly and disgusting forms. As the "enlargement increases, the whole extremity becomes hard "and scaly; and the distended skin, which at first indented, "grows thick and corneous, and wholly resists the pressure "of the finger.

"It has been found on dissection, that, from the effused "lymph which originally caused the tumour having become "coagulated and hardened, the substance of the enlarged "limb has assumed an appearance not unlike brawn; the "morbid skin and cellular membrane under it having grown "into a tough, horny, and almost cartilaginous consistence.

"From this unsightly malady being mostly accompanied "with fever of an intermittent type, we often hear it termed "the "fever and ague." Indeed from the periodical returns "of the paroxysms, and from the tumefaction succeeding to "them, the disease has very generally been considered only as "an effect resulting from an intermittent fever. The practice, "said to be successful in removing it, seems also to be found-"ed upon this view of it. Regard being had to the fever as "the original affection, the elephantiasis is considered only as "a sequel, and the curative means are directed solely to the "removal of the febrile symptoms: which being effected by "antimony and the bark, the patient is sent to some other "island by way of change of climate, in order to prevent a "relapse. No particular attention is paid to the tumour, "which on the fever being removed, is expected gradually to "subside. But sometimes, instead of receding, it remains "stationary, or is increased; or if it subside, is renewed on "any future recurrence of the fever.

"Often to return to Barbadoes brings a return of the inter-"mittent, and a consequent addition to the enlargement of the "already thickened extremity; and, from the attacks of the "disease recurring in frequent repetition, there remains no "way of preventing it from being established into an un-"seemly deformity, but by seeking the remedy of a more "temperate climate. Frequently the disorder seems to be "subdued entirely by a few years' residence in England, yet "again recurs on the patient returning to Barbadoes.

"Some regard the disease in a directly opposite point of "view, considering the glandular tumour, with its attendant "inflammation of the lymphatics as the primary affection, "and the fever merely as symptomatic. It is not consistent "with my present purpose, nor does experience warrant me to "enter more minutely into this question; but I may offer you "a few extracts of cases wherefrom you will be enabled to "collect a more just and accurate idea of the commencement "and the progress of this singular and distressing malady.

"Mr. Daniel Massiah, aged fifty-three, of the Jewish re- "ligion, was a very healthy boy till eighteen, when he was "attacked with a disease, which at that period was very "unusual indeed. Without any known cause he complained "of a soreness and swelling of the left groin. When he had "felt this about a quarter of an hour, he was seized with the "cold fit of fever; a burning hot fever succeeded, which was "followed by profuse sweating. The whole paroxysm was "accompanied with violent pains of the head and back, and "great sickness at the stomach, and reaching. This first at- "tack left very little swelling in the left ancle. From this "fit, for the four following years, he had this disease in the "same manner about once a month, with a gradual increase "of the left leg; so that it became eighteen or twenty inches "round the calf. After he was twenty-two years of age, the "attacks were five, six, seven or eight times each year. "From the year 1764, being then about thirty-six, he has "been irregularly attacked, sometimes in the right, and some- "times in the left leg; each time the legs were left larger and "larger. At the age of thirty-nine the right leg was consid- "erably increased in size. In the centre of the calf of this "leg there arose a lump as big as a goose's egg, which burst of "itself, and discharged a fluid as clear as water in large quan- "tity. The swelling abated, but each succeeding attack left "the leg so increased in bulk, that at this time it measures

"thirty-six inches in every part of the leg, from below the "knee to the ancle. The feet of both legs are of their natural "size. The left leg measures twenty-six inches. The swell- "ing is very smooth, except on the right heel, where there are "great excrescences, which have the appearance of large "corns or warts. The increase of the legs seems to have "been so gradual, that he has not been in the least sensible of "it; nor has he experienced any other inconvenience from "the disease, except when he has been weakened by sickness, "and then he feels his legs heavy.

"During the first sixteen years of his being subject to the "disease, the local affections were always evident. Since that "time, i. e. for about twenty years past, but more particu- "larly lately, he has scarcely been able to determine whether "the local symptoms or the cold fit came on first. He says, "that lately he finds the first local symptom to be a purple "hue on the finger nails, and a great coldness in the palms of "the hands. His appetite is very good, every function of "life is uninterrupted, and he has been free from every other "disease."

"Mr. P—, aged twenty-six, a native of Barbadoes, since "the age of eleven, has been subject to the glandular disease. "It first attacked him with a swelling of the leg and thigh, "which he perceived in the morning on rising from bed. The "swelling of the extremity was uniform, and except a little "pain which he felt in the groin, where on examination the "glands were found enlarged, was not attended with the least "mark of inflammation or fever. This enlargement continu- "ed for about fourteen days, when he was seized with a regu- "lar paroxism of fever; which however was preceded by a "red streak in the thigh, and a considerable affection of the "inguinal glands. A violent inflammation of the leg and "thigh immediately preceded the hot fit, and continued for

"seven or eight days. The disease left a great degree of "swelling, which has continued with little variation ever "since. About two years after, the attacks being frequent, "he was advised to change his climate, and accordingly went "to England, where his general health was much improved. "During his stay there, which was about eight months, he "had no fresh attack from the glandular disease; but the en- "largement continued nearly the same. Soon after his return "to Barbadoes, he had a regular attack of the glandular dis- "ease, which lasted as long, and was as severe as those he had "experienced before he went to England. These returns "continued for several years to be very frequent, but lately "have been much diminished, both in number and severity."

"The history of the patient's case, whose leg I dissected, "as far as I could inform myself, was as follows: she had "laboured under the glandular disease for ten years: the "first attack was at fifteen years of age, and was attended with "fever. At every return she found her leg much inflamed, "increased in size, stiff, contracted, and gradually enlarged, "till it became so enormous as to be extremely troublesome. "She then applied to me to perform amputation, of which "she recovered; but was soon after seized with the same dis- "ease in the other leg, and died in consequence of it."*

"Different opinions have been held respecting the origin "of this singular affection. From it being most frequent, or "first observed among the negroes, many have believed it to "be imported with them from the shores of Africa. But this "opinion is divested of probability, by the extraordinary "prevalence of the disease at Barbadoes. Were it brought "by the slaves from Africa, it would be equally common in "the other islands; and not being infectious, would not be

* Hendy on the Glandular Disease of Barbadoes.

"seen among the white creoles, or the Europeans. It is un-
"doubtedly the indigenous offspring of the island, and possi-
"bly is connected with a peculiarly arid state of the atmos-
"phere; for in the islands shadowed with thick forests and
"vegetation, it is still unknown, and has only grown common
"at Barbadoes, in proportion as its woods have been remov-
"ed, and the surface of the island left unsheltered.

"Except on its early attack, or at the periods of acute re-
"lapse, the disease is attended with little or no pain, and the en-
"largement sometimes proceeds so gradually, as for the person
"himself to be in a degree insensible of it. He walks about as
"usual, and appears to suffer but little inconvenience, either
"from the additional bulk, or the great increase of weight.
"Hence it is often less afflicting to the individual, than offen-
"sive to others. It is extremely repugnant to the sight, and
"as the negroes go about the streets with these diseased limbs
"exposed to every eye, Europeans but recently arrived, are
"extremely annoyed by their filthy and monstrous appearance.

"Perhaps nature has not formed, nor can the human
"mind conceive an object at once so disgusting, and so pitia-
"ble, as an old half famished negro woman—of withered
"frame—tottering and trembling about with her loose and
"naked skin hanging shriveled in deep furrowed wrinkles;
"and dragging after her one or both legs grown into an im-
"mense bulk of hideous disease—her feet only toes, protrud-
"ing from this huge mass of distempered leg."

NOTE (K)

A physician of great professional industry and of long experience informed me, that he once had a patient, a robust man of middle age, who, from a blow upon the interi-

or of his thigh, was affected with a soreness and tumour upon the part stricken, which gradually increased, until he was incapable of business. After trying *discutients* to no purpose, it was at length agreed upon in consultation, that an incision should be made into the tumour under an apprehension, that it contained coagulated blood, which it would be necessary to remove. After the tumour was laid open, effused lymph was found. The wound was cleansed with a sponge and warm water. No bleeding vessel was discovered. Afterwards upon dressing the wound, instead of finding forming granulations, the part had assumed a glassy appearance. The part was spunged out the second time with a view to detect the weeping orifice of the wounded lymphatic; but it was so minute as to elude discovery. The sore exhibited the same appearances from day to day without discovering any disposition to heal. The patient, being wearied out by its tardiness to heal under the treatment of *skilful physicians*, put himself under the care of a *quack*, and *died* soon afterwards. The case is here imperfectly reported from the *fancied resemblance* its cause bears to the *probable* cause of elephantiasis.

NOTE (L)

Lorry de Morbis Cutaneis, p. 132. Solis diluentibus sanatur malum, & si recrudescat, levi catharsi tollitur. Verum talis veneni summam efficaciam legere qui voluerit, legat ILL. de Sauvage dissertationem de imprudenti esu hepatitis illius piscis, qui Linnæo *squalus catulus* dicitur, Gallus vocatur *chat marin*, quod præter profundum sommum ruboremque omnium partium quem intulerat, tertio die epidermidem a cute subjectâ ita secedere coegit, ut vigessimo etiam die lamellas hujus quasi papyrum æger detraheret & illustrissimo de Sauvage dono daret.

NOTE (M)

Haller in his Elementa Physiologiæ, vol. vi, p. 578, remarks, it is *said*, that biliary calculi abound in certain places from the use of an acid wine, and among hard drinkers, but they are frequent in those places where beer is the principal drink and afflict females, who use water as their common drink.

The following are his words: *Ob vinum acidum certis locis abundare legi; et in bibacibus frequentes esse. Sed ostendi in regione cerevisia pena sola utente maxime frequentes esse, tum nostris in feminis*, quæ *tamen vulgo solam aquam bibunt.* P. 564, the same author, in speaking of those most subject to biliary concretion, *Junioris ei minus* obnoxiæ *sunt, senes magis, tum* feminæ.

Hoffman, in his Opuscula Pathologico-Practica, p. 196, while treating upon the same subject, has the following passage. Sæpissime *in hypochondiacis, in hystericis, colica atroci laborantibus, item ab iracundia graviori flavum colorem per totum corpus dispergi, &c.*

Dr. Heberden has the following upon the same subject.

"Men and women are equally liable to this malady: in a "continued succession of a hundred patients, I counted 52 "males and 48 females."

NOTE (N)

Fourcroy in his Chemistry, vol. x, p. 44, gives the following chemical history of the bile.

"All the known facts relative to the chemical properties "and the analysis of the bile, which I have collected in this

"article, show that this liquid is of a very compound nature, "and that it especially differs from most other animal sub- "stances that have hitherto been examined. It contains, as has "either been proved by the facts enunciated, or indicated ac- "cording to experiments more or less advanced.

"A. A large quantity of water.

"B. Soda.

"C. An oily matter united with the latter in the sapona- "ceous state.

"D. A colouring matter combined with the preceding "kind of soap.

"E. A bitter and odorous oily substance.

"F. A coagulable animal substance.

"G. A kind of saccharine substance analogous to the su- "gar of milk.

"H. Salts of several kinds.

"I. Lastly, oxide of iron."

NOTE (O)

Dr. Herberden concludes his observations upon jaundice in his Commentaries upon the History of Diseases, in the following words.

"Before I conclude, it may be of some use to observe, "that biliary concretions are probably one cause, amidst va- "rious others, of that commonest of all complaints, an *uneasi- "ness or pain of the stomach.* This I have been induced to "believe from finding that in many persons a pain of the "stomach, which had frequently afflicted them for months, "or years, has at last been joined by a jaundice. When a "pain therefore of this kind frequently returns without any "other manifest cause, especially if there be at the same time

"a sensation of fulness, a thickening of the bile may general-
"ly be suspected, &c."

Haller's Physiologia, vol. v, p. 575—6, contains the following:

"*Etiam in raphani rusticani succo, crusta exterior mol-*
"*lescit, & in succo* cochleariæ, *atque nasturcinarum planta-*
"*rum hi calculi solvuntur, ut arena sit in alvi excrementis.*

"*Etiam in universum succus vegetabilium recentium icte-*
"*rum sanat, & fecit, ut calculi fragmenta prodirent; & in*
"*Hungaricis bobus, adeo crustis biliariis infestatis, uti dici-*
"*mus, recens & vernale gramen ita solvit, ut* Viennæ *nullus*
"*calculus supersit, quo aguntur.*"

Many physicians of modern times seem to have embraced these opinions of Haller respecting the solubility of biliary concretions in the juices of recent vegetables, for in this vicinity they have been a common prescription for those affected with chronic jaundice.

THE END.

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153 SHATTUCK, Geo. Cheyne. Three dissertations on Boylston Prize Questions for the years 1806 and 1807. Boston, 1808. 8vo. Orig. calf. 192pp. Fine. (The subjects are: mortification; structure and physiology of the skin; biliary concretions.) 10.00