the *impelling movement* of the weights or spring, by which its wheels are kept in motion.

Oppression, then, may be compared to the *obstruction* of the *machinery* by some foreign body, or by some mechanical disarrangement among the wheels, which clogs their action until it is removed or corrected.

Exhaustion and *depression* have their chief seat in the nerve-central sources of dynamic force; *oppression*, in the circulation of the blood, or in some subordinate organs or functions.

This distinction, however recondite in *theory* it may seem to be, is of high **practical** importance. This will be seen on consideration of the remedies used and required in the different forms of debility.

Supporting measures may be classified as—

1. **Stimulant;**
2. **Analeptic** (recuperative, restorative).

Under the first head we rank the preparations of *ammonia* and *alcohol*, etc., as usually employed.

Under the second are included *generous diet*, *tonics*, *chalybeates*, *cod-liver oil*, *change of air*, etc.

Now the *first* of these (**stimulants**) are adapted especially to *acute prostration* or *depression;* the second class (**analeptics**), to *chronic prostration* or *exhaustion*. *Oppression* or *counterfeit* debility generally requires *neither*, being benefited by very different treatment. A *mingling* or *blending* of these states is of course possible; and then a union of measures is right, to meet the conjoined indications.

Oppression (simulating depression) is every day illustrated by the condition of a patient in the early stage of any of even the mildest acute disorders; as catarrh or bronchitis, indigestion, tonsillitis, measles, etc. In all of these cases, especially where *fever* is developing, the patient is very *weak;* not only as to his muscular apparatus, but in the performance of all the animal and organic functions. But *stimulation*, for such a condition, in persons of ordinary constitutional vigor and soundness, would be generally *inappropriate*, often injurious, sometimes dangerous.

A more serious degree of oppression occurs in some cases of visceral congestion, particularly of the lungs or brain; and in violent spasmodic affections of the alimentary canal, with constipation of the bowels. *Uræmia*, from inaction of the kidneys, presents another case of oppression, in which even a fatal result may occur.

Counterfeit debility or oppression, then, to recapitulate, may occur in—

The *first stage* of all acute diseases;
The *febrile state;*
Indigestion or *dyspepsia;*
Congestion of the brain, lungs, etc.;
Obstruction of the bowels;
Uræmia.

The *first* of these instances is to be treated usually by measures which promote reaction in the mildest manner. More doubt exists, however, if the *cold stage* itself be intense or profound—as in pernicious intermittent—constituting a *depression*, under **toxæmic** *influence*. Of this, a word or two presently.

The *febrile* oppression is to be managed simply by those palliative measures mentioned already under the head of *febrifuge treatment*.

That of *indigestion* is usually *temporary* or *occasional* only; and gives way under the use of antacids, carminatives, blue pill, etc.

Violent *congestion* of the *brain* or *lungs* occurring in a person of previously good constitutional strength (although it may produce the most absolute debility, which, especially in the case of *pulmonary* congestion, masks the cause of the disorder), calls, if the diagnosis be clear, for counter-irritation and the local or general abstraction of blood. In doubtful cases a **tentative** plan may be pursued; abstracting but a minimum quantity at first, being encouraged to repeat and enlarge the depletion only if the result be favorable.

Constipation, producing oppressive debility, is of course to be met by agents calculated to unload the bowels; antispasmodics, anodynes, etc., being also indicated, if colic exist, and be not relieved by laxatives alone. In absolute (mechanical) *obstruction* of the bowels, causing or endangering enteritis or strangulation, the treatment now generally adopted is, to depend upon *opium* and *rest*, *avoiding* purgatives.

Uræmia demands all the means within our power to restore the action of the kidneys; and to aid them in their eliminating duty by favoring the *cutaneous* transpiration and secretion.

I have already said that **mixed** cases of oppression and depression occur, in which the indications of treatment are, to a certain extent, obscure and doubtful. Such are, the cold stage of pernicious (congestive) intermittent, the incipiency of the algid or collapsed state of epidemic cholera, etc.

It is clear that **reaction** is here to be brought about, if possible; and that *external* stimulation, by powerful rubefacients, frictions, etc., is altogether appropriate; but, however authoritatively rules may have been laid down, it is not so certain, in *every* case, whether *alcoholic stimulation* or *venesection* would afford the better result, or whether some cases might not be benefited by *both combined*. The *incompatibility supposed* to exist between bloodletting and stimulation is in fact *not intrinsic* but *circumstantial*. Holding distinctly in our minds the principle that the object of bloodletting is to **balance** the quantity, consistency, and distribution of the blood, and *not* to reduce the strength of the patient, it is far from impossible that the balancive action especially of **local** bloodletting may be called for in a case in which the forces require to be sustained at the same time by "**supporting** treatment." To borrow an illustration (Billing), the one is like taking part of the load from the cart, the other, whipping the tired horse up the hill.

Personal experience, however, is indispensable to the application of these, or of any analogous principles, to cases, in regard to the management of which the profession has been, but we may hope will not be always, divided. The recent tendency of medical practice has been quite too much in the direction of *over-stimulation*.

Depression is exemplified in the state produced by—

Severe injuries; e. g., railroad accidents, extensive burns, etc.

Mental shocks; e. g., terror or great grief.

Withdrawal of accustomed stimulation; e. g., delirium cum tremore.[1]

Intense toxæmia; e. g., cholera collapse, etc. (see above).

Gouty spasm, of the heart or stomach, etc.

Stimulation by alcohol, ammonia, ether, opium, camphor, turpentine, capsicum, etc., is needed, with greater or less urgency, and in larger or smaller does, in all of these conditions; always bearing in mind the probability of *reaction*, and avoiding, as far as possible, the exaggeration of this reaction into fever.

Dr. Lidell[2] remarks that "the physician's success in saving or prolonging life in cases of pulmonary tuberculosis, chronic bronchitis, chronic pneumonia, chronic pleurisy, chronic abscess, vertebral caries, chlorosis, leukæmia, scrofulous adenitis,[3] ague cachexia, syphilitic cachexia, infantile marasmus, senile marasmus, and many other debilitating diseases, will largely depend upon his ability to prevent the occurrence of thrombosis[4] in some part of the venous system." Ammonia is urged as meeting this indication, as well as that of pure stimulation.

The prostration of *typhus fever*, in a *majority* of cases (*not in all*), and that of *typhoid* fever, in a *minority* of cases, requires, especially after the height of the fever has passed, alcoholic stimulation, as well as support by concentrated liquid nutriment (beef-tea, milk), at short intervals.

The instances of these fevers afford a sort of intermediate gradation between what I have called **acute** and **chronic** debility.

In regard to the *latter* (the debility of convalescence, chronic disease, etc.), certain principles are agreed upon by all physicians, on the ground of experience, confirmed by the deductions of physiological science. We shall first briefly consider some of these, and then one or two debatable points akin to those already alluded to.

The two most important and familiar results of clinical experience in the treatment of debility, are, the superiority of the pure vegetable **bitters** in **stomachic** and *digestive* weakness, and of **iron** in **anæmia** (spanæmia). The influence of **quinia** and cinchonia in **nervous** debility is equally assured. The confidence of many physicians is strong in the utility of the **mineral** tonics (zinc, copper, arsenic, and silver salts)[5] in debility with **nervous symptoms**; *e. g.*, chorea, hysteria, etc. I believe this confidence to be deserved, to a considerable extent; but, some of the diseases in which these medicines are given (*e. g.*, epilepsy) will, in many instances, baffle all treatment. The use of **strychnia** in certain cases of **paralysis** is also well established; although requiring much care and *discrimination*.

[1] It is not intended, of course, to indicate that *all* cases of delirium tremens are referable to this cause.
[2] Am. Journal of Med. Sciences, July, 1874.
[3] Glandular inflammation.
[4] Coagulation of blood in a vein.
[5] Salts of *manganese* (phosphate and sulphate) are valued by some physicians as very useful in anæmia and debility.

Cod-liver oil holds, at the present time, a very high place in the list of analeptics. All medical observers are not of one opinion in regard to its value; but most of them believe it (on the basis of experience in practice) to be the best and most reliable, where it is tolerated, of all recuperative medicines; not only in consumption, but in other wasting diseases.

The theory of the *mode of action* of cod-liver oil as an analeptic is an interesting subject. Dr. Bennett's view of phthisis is, that the error of hæmatosis, from which tubercle results, consists in an *excess* of **albumen** in the blood, with a *deficiency* of **oil**; so that, in the process of cell-formation, the first step of which is believed (Ascherson) to be the investment of *oil globules* in *albuminous envelopes*, an imperfection exists, fatal to the subsequent development of the cell and obliging it to abort. But, the debilitation of the *digestive and assimilative* functions in phthisis renders it impossible by ordinary food to supply the desiderated oleaginous matter to the blood. *Cod-liver oil* is fatty matter which, by the assimilating action of the liver, following the process of digestion, is **prepared** *for immediate absorption* and **appropriation** by the blood, for purposes of nutrition. This rationale of its influence is, although not demonstrable, much more probably correct than that which refers it to the presence of *iodine*, *phosphorus*, or any other special ingredients which it may contain. Allusion to the more newly introduced *dugong* oil (Holt), shark oil, etc., would be more proper in connection with the subject of *materia medica* than here.

The **phosphates and hypophosphites** have attracted a great deal of attention. I do not consider the question settled as yet, as to their value; and do not feel competent to pronounce a final opinion upon them. My impression, however, is, that the phosphate of *iron* is the best of them all, and that they will be found secondary and inferior to cod-liver oil.

Within a few years, renewed attention has been given (Gubler, Hammond, Baumetz, S. R. Percy,[1] Routh) to the effects of *phosphorus* (not in the state of phosphoric acid) in exhaustion of the brain and nervous system; as, *e. g.*, from over brain-work or worry, or from venereal excesses. Chemical analysis shows a diminished amount of phosphorus in the brains of aged people, and still more in those of idiots. There is reason to believe that it is also lessened especially in cases of *softening* of nerve centres. Phosphorus is safe in doses of $\frac{1}{50}$ grain, in oil or in powder with some farinaceous substance.[2] *Amorphous* phosphorus is the least irritating, and, therefore, most safe. *Phosphide of zinc* is often given, in pill, in gr. $\frac{1}{6}$ to gr. $\frac{1}{2}$ doses.

What is the proper place of **alcoholic** beverages or preparations in the treatment of **chronic** debility, such as that of phthisis, etc.? This important question opens a discussion, only the main elements of which can be noticed in this work.

In the first place, the theory of the action of agents called stimu-

[1] Prize Essay on Phosphorus, etc., Trans. Am. Med Assoc., 1872.
[2] See Routh on Over-work and Premature Decay, etc., 1873.

lants was formerly almost always mis-stated in authoritative treatises. It has been commonly laid down that "one of the laws of all stimulation, whatever may be its degree, is, that it is followed by a depression proportionate, at least approximately, to the previous exaltation of the function or functions excited."

The true law is this: that all stimulation which is **excessive** is followed by a depression *corresponding to the excess;* while all that merely excites any function *up to par* (to use a familiar expression), *i. e.*, to or toward its **normal** activity, does, so far, only good, with no *resulting* debilitation, however it may fail, from want of other conditions, to sustain the organ or system at the point desired. To deny this, would be to ignore some of the most obvious physiological facts. Heat is a stimulant to life force; oxygen to all the active functions; blood is an excitant as well as food to all the tissues it reaches; and all those impressions upon the exterior of the body which give rise to instinctive or automatic actions are stimulants, without any necessary ulterior depression. Nor do I see how the use of stimulants in any supposable case of disease could be rationally justified, if we *practically* admitted the force of the law as above stated; since if, after every dose of an excitant, the patient should sink as far *below* the condition for which he was treated, as the intended remedy raised him for the moment *above* it, of course a mere *oscillation*, and no advantage, must be the result.

This, however, is theory; which has not governed practice on this subject. Another interesting physiological question—"Does alcohol contribute to the **material**, or to the **force** of the economy, or only excite some of its organs to exhaustive **action**?"—has been the topic of able and learned disquisitions. I venture merely the opinion that it may do *either* of the three, or *neither*, according to the **circumstances** and the **quantity** of its administration. When there is *scarcity* of *food*, or *difficulty* of *digestion*, alcohol may contribute to the needed material; its carbon, hydrogen, and oxygen going to repair the *adipose* tissue at least, and to economize albuminous substances.[1] When there is *excessive exertion*, alcohol may sustain the flagging forces of the system. When given in *mere excess*, as with the intemperate, it excites to exhaustive action, organic if not motor; even when the bloated body shows increase in *quantity* of material, its *quality* being more or less degenerate.

Parkes, Richardson, and others have shown that alcohol, given during health, produces a wasteful consumption of force, by accelerating the heart's action.

In a word, then, the phrase "**accessory** food" is a happy one. When *unnecessary*, as in full health, alcohol is **injurious** precisely in proportion to the quantity used; and the same is true in disease, when the quantity given is **disproportionate**.

This is the important practical precept. Alcoholic stimulus should never be taken in quantities which produce circulatory or cerebro-nervous *disturbance* or *super*-excitation. If this rule be observed, not only will it be a valuable *supporting* agent in phthisis

[1] Dr. Wilks, of Guy's Hospital, London, has given some carefully obtained evidence that alcohol, under some circumstances, acts as food. See *Lancet*, Jan. 27, 1872.

and other complaints, but no *dipsomania* (methomania) or morbid thirst for it will arise; *that* terrible disease always growing out of **excess**. Upon this principle, in the use of alcoholic beverages in cases of ordinary debility, the common table doses are, medically speaking, *too large*.

Alcohol, in advanced or advancing consumption, in low fever, and in other analogous cases, when used in due proportion, is useful—

1. By its **direct** excitant supporting power.
2. By aiding the enfeebled **stomach** to digest a larger supply of food.
3. By tending to **retard tissue-metamorphosis**.

This last action is one which alcohol has been shown (Böcker, Hammond) to have, in common with other agents, used as medicines or luxuries; coffee, tea, morphia, quinia, etc. I have alluded to it in our classification of remedies, under the head "economic medicines."

It is not supposable, however, that the retardation of the change of tissue in the body is always beneficial. It may, especially in febrile disease, when accumulation of effete matter in the blood and organs is a present evil, be injurious.

It is probable, however, that in low fevers, when oxidation is going on excessively, alcohol *yields carbon and hydrogen* as *fuel* for the "combustion" which takes place under the depression[1] of life-force; thus economizing the materials of the blood and tissues. This may explain the entire absence of "toxic" effects of alcohol when given in typhus, in regulated, but often considerable quantities. *When more is given than can be consumed by oxidation*, then symptoms of alcoholism occur.

The lowering of temperature under the use of small or moderate doses of alcohol in low fevers, may be accounted for in two ways: 1, by its combustion generating less heat than that of other materials in the blood and tissues whose place, in oxidation, it may take; 2, by its *energizing* influence upon the ganglia, through which the vital control over excessive waste and combustion may be restored or promoted.

Admitting, then, the frequent utility of alcohol, we are prepared, most of all from clinical observation, to condemn without hesitation or qualification the practice introduced by the late Dr. Todd, of London (foreshadowed by that of the famous Dr. Brown of the last century), of giving alcohol as the remedy or proper medicine "for all acute diseases." Enough for our present purpose to cite some impartial testimonies as to the *results* of that practice.

1. The physician whom Dr. Todd intrusted with the task of analyzing his own records of hospital practice[2] asserts, that the mortality from fever in the hospital attended by Dr. Todd was in a marked degree greater than that of any other fever hospital in Great Britain.

[1] Lowering of *vital* energy being attended by increased activity of *ordinary chemical* change.

[2] British and Foreign Medico-Chirurg. Review, October, 1860, p. 331.

2. Statistics of the London Hospital[1] more recently published, show a large increase, since 1858, in the use of stimulants in that hospital, and, with it, a closely coincident ratio of increase in mortality.

3. Drs. Gairdner[2] and Russell have shown, in the Glasgow Fever Hospital, that even typhus may be treated, *with excellent results, almost entirely without alcohol.*

Stimulism, as we may call the theory and practice of Dr. Todd, since followed by many others, confounds three distinct propositions: 1. That all disease is debility; 2. That all debility should be treated by the use of stimulants; 3. That alcohol is always the best stimulant. Granting, with some qualification, the first of these, we emphatically deny the truth of the second and third. It is a practice which, like many other *specialisms*, will *have its day.*

The following classification of the "genuine effects of stimulation," when properly used as to time and *dosage* (remembering the *often opposite* effects of *small* and *large* doses), is from Anstie.[3]

"I. Relief of pain. II. Removal of muscular spasm, tremor, or convulsion. III. Reduction of undue frequency of the circulation. IV. Reduction of excessive secretion. V. Removal of general debility, or of special fatigue of muscles, brain, or digestive organs. VI. Removal of delirium or maniacal excitement, and production of healthy sleep. VII. Support of the organism in the absence of ordinary food. VIII. Local increase of nutrition where this is deficient."

From the same writer comes also the following terse summary of the stimulating agencies most available therapeutically.

"1. Quickly digested and nutritious *food.* 2. *Opium* in doses of one or two grains; or *morphia* (sulphate, etc.) a quarter to half a grain. 3. *Carbonate* and *chloride* of *ammonium* in doses of five and ten grains respectively. 4. *Alcohol*, in doses just too *small* to produce flushing of the face or sweating of the brow.[4] 5. Chloroform, inhaled (in the proportion of about two per cent. to the bulk of atmospheric air) for a short time; or taken internally, in doses of a few drops. 6. Certain fetid gum-resins. 7. Many aromatic volatile oils. 8. The bitters, pure and aromatic. 9. Counter-irritation, as it is called; stimulation, as it should be termed, through the skin."

Dr. Karel, of St. Petersburg, has within a few years obtained the attention of the profession to the treatment of dyspepsia, chronic nervous affections, etc., by an *exclusive diet of skimmed milk.* Dr. Donkin has followed him, giving in Bright's disease and other chronic diseases six or seven pints of skimmed milk daily, for weeks together, without any other food. Dr. S. Weir Mitchell[5] reports favorably of the alterative influence of this treatment in obstinate disorders of the stomach. He begins with one

[1] British Med. Journal, Dec. 9, 1865. [2] Ibid., Aug. 22, 1868.
[3] On Stimulants and Narcotics, pp. 112, 113.
[4] It is singular that Headland (On the Action of Medicines, last edition) does not include alcohol in his list of stimulants. It is, with him, an "inebriant narcotic."
[5] Phila. Medical Times, Oct. 15, 1870, *et seq.*

or two tablespoonfuls of the milk on rising, and every two hours through the day. Increasing the quantity in a few days, the maximum amount of two quarts daily is mostly attained without great inconvenience, although some long constantly for other food. I cannot see anything in this practice but a purely empirical *dernier ressort* in troublesome cases of chronic disease. As such, however, it is now on trial by many physicians.

The subject of the treatment of debility, acute and chronic, must not be dismissed without one further remark, upon the importance of *rest* in cases of exhaustion from over-exertion. The popular truism, that *exercise is beneficial to health*, has been often *abused* by applying it almost *universally* to invalids or valetudinarians.

The one remedy for the immediate effects of **over-exertion** *is absolute and prolonged* **repose.**

The time required for recuperation, after *cerebral* over-fatigue, may be counted rather by *months* than weeks or days; and it is quite possible for *irreparable* mischief to be done to the brain or spinal marrow by neglecting too long the demand of nature for rest. With many others, the author must acknowledge indebtedness to Prof. Jackson, of the University of Pennsylvania, for the judicious emphasis of his teaching upon this point.

It is an important hygienic and therapeutic law, that exercise, to be beneficial, must be proportionate to the strength of the individual; and must never be carried to the extent of great fatigue or temporary exhaustion.

Calmative treatment has always been regarded as of importance in affections of the nervous system; not only for the relief of suffering, but to arrest the waste of irritation. *Opium*, *camphor*, *valerian*, and *assafœtida* are the oldest and most universally appreciated medicines of this class. *Warm* and *tepid baths* and *ablutions*, simple or medicated (especially with salt or alcohol), have always been favorite adjuvants.

Bromide of potassium has come largely into use within a few years (Locock, 1852), as a *sedative to reflex excitability* of all the surfaces, or rather of the centres, of the body. In *sleeplessness*, *epilepsy*, *hysteria*, and *spermatorrhœa*, it has seemed to be particularly valuable. I have always found it to act mildly and safely in twenty-grain doses. Thirty or forty grains at a single dose may be safe in an adult generally. Dr. Da Costa has pointed out that the bromide adds to the beneficial effects of opiates, given with or after it. Bromide of *calcium* does not generally agree so well with the stomach. *Bromo-camphor* (Schwartz) is said to act as a useful calmative in 2 to 5 grain doses. It must be remembered, however, that the *continuance* of any of the bromides in *large* doses may cause *bromism;* a condition of general debility, with abdominal pain, fetid breath, salivation, nausea, vomiting, or purging, an eruption like acne, anæsthesia of the skin, dilated pupils, dimness of sight, unsteadiness in walking, drowsiness and lowness of spirits. Organic disease of the kidneys is considered to contraindicate the use of the bromides.

Hydrate of chloral has lately, since its introduction by Liebreich,

of Berlin, taken almost the foremost place among hypnotic or sleep-producing medicines. It appears to be as certain in its action as opium, with less unpleasant after effects; but to be not so powerful in the relief of pain. As an *antispasmodic*, under various circumstances, it has proved efficacious.[1]

Croton-chloral hydrate is now asserted to have advantages in some cases. Its dose is smaller than that of chloral hydrate.

Antidotal treatment is a topic of great interest. Its *idea* is probably the oldest in medicine. *Specifics* always have been looked upon as the *magna bona* of therapeutical science. Unfortunately, however, their number, instead of increasing, has *diminished* under the inexorable scrutiny of modern investigation. Yet, there is room for hope that they may again *positively* increase, with the diligent application of the same means of observation and discovery.

In the largest extension of the term, antidotive remedies may be classified thus :—

Positive antidotes ;

Chemical palliatives;	*Chemical antidotes;*
Antacids ;	Antitoxics ;
Antilithics.	Parasiticides.

Constructive antidotes ;

Antiperiodics ;	*Antiscorbutics.*
Antisyphilitics ;	

Tentative antidotal remedies ;

Antiarthritics ;	*Antiseptics ;*
Antirheumatics ;	*Antidiphtheritics ;*
Antizymotics.	

The familiar use of **antacids** as palliatives in dyspepsia, etc., needs no remark.

Nor have we occasion to dwell, here, upon **antilithics**; *i. e.*, solvents for urinary solids, prescribed on chemical principles; as alkalies for excess of uric acid or the urates, mineral acids for excess of phosphates or oxalates.

The subject of **chemical** *antidotes* for poisons belongs to *Toxicology*. (See Part II.)

Anthelmintics are best treated of in the department of *Practice of Medicine*. (Part II.)

Antipsorics, or specific remedies for scabies (itch), are represented generally by sulphur; which, although not at all the *only* agent capable of destroying the morbific *acarus*, is the most convenient. Other cutaneous parasites (nosophyta) are also destroyed, but with less certainty, by preparations of mercury, etc., called **parasiticides**.

[1] Hydrate of chloral, made by the action of chlorine on alcohol, is a snow-white crystalline powder, without odor at ordinary temperatures. It boils at 145° Fahr.; it is soluble in water, alcohol, ether, chloroform, and fatty substances. Its aqueous solution should be neutral to test-paper, and, if pure, ought not to be made turbid by solution of nitrate of silver, nor brown by solution of potassa. Dose, 15 to 30 grains. Much larger doses are given, but are not unattended by danger. Chloral hydrate, being pungent and acrid, should be considerably diluted when taken; but the solution should always be freshly prepared, as it does not keep well. Alkalies are incompatible with it. Dr. Kidd has reported its acting well *by enema* when, given by the mouth, it disturbs the feeble stomach.

Of "**constructive** antidotes," the most important are the alkaloids of **cinchona**, applied to the treatment of **malarious** affections (antiperiodics). Medical men are divided upon the question whether quinia arrests intermittent fever, etc., by antagonizing (chemically) the organic poison itself in the system,[1] or (physiologically) by causing such an opposite impression upon the nervous centres as is capable of subverting the condition on which the periodical or paroxysmal affection depends. The last is the prevailing view. But, in either aspect, the cure of autumnal fevers and allied affections occurring under malarial influence (neuralgias, etc.), by *cinchonization*, is properly called **specific** treatment; as—

1. No other remedies (yet discovered) have the same power.
2. These remedies have no such control over any *other* diseases (*e. g.*, typhus and typhoid fever, yellow fever).

The second proposition is asserted with positiveness, notwithstanding the experimental use of quinine in full doses, by a few practitioners (Dundas), in typhus and typhoid fever, and its frequent administration in yellow fever.

Dr. E. B. Baxter, of London (*Practitioner*, Nov. 1873), reports a series of experiments showing the *antiseptic* power of quinia, quinoidine, cinchonidine, and cinchonia: the comparative action of these alkaloids in this respect (and their control over the migratory movements of the colorless blood-corpuscles), being relatively proportionate to their antiperiodic and curative power. The power of quinine to destroy minute fungoid vegetative organisms has been asserted by several observers. So has that of the active principle of eucalyptus globulus. This accords especially with the "fungous" or "disease germ" theory of malarious causation.

In stating that no other medicines, yet discovered, have the *same* power, I mean, to a degree or with a certainty at all comparable to that of the cinchonic alkaloids. The nearest approach to this is afforded by *arsenic* and the *sulphites*.

It is, however, a remarkable and important fact, that, when the recurrence of the paroxysms of intermittent fever has been allowed for a long period (**chronic** intermittent), and the system of the patient has become debilitated and **anæmic**, quinine will only **interrupt**, but *will not cure* the disease. **Iron** *is, then, the remedy.*

Opinion is divided as to the value or necessity of **mercury** as an **antisyphilitic**. In the primary disease I am a full believer in its importance; against which its frequent *abuse* furnishes no argument. In secondary syphilitic affections, *especially* syphilitic **rheumatism, iodide of potassium** also exhibits decidedly specific powers.

[1] Bence Jones found in human blood a fluorescent material, in small amount, not improbably supposed to be identical with quinia; Drs. E. Rhoads and W. Pepper ascertained a deficiency of "animal quinoidine" to exist in patients suffering under malarial disease.—See *Penna. Hospital Reports*, 1868, p. 269.

Antiscorbutics are most valuable as *preventives* of scurvy; but will promptly relieve it, also, when it has occurred. All **fresh vegetables** belong prominently to this class; certain plants not so used, as the cactus opuntia, are included in it; the juice of **lemons**, limes, etc., is of service for the same end, and the neutral salts of potassa have been largely employed, with variable results.

Tentative antidotal treatment—for diseases in which there is evidently (as a *part*, at least, if not the primary part of the malady) *humoral* disorder, such as gout, rheumatism, the exanthemata, etc.—affords a large field for study and ratiocination. The positive *facts*, so far, are few; the *hypotheses*, legion.

In **gout, colchicum** has long held, deservedly, a high place, as either an *eliminative* or an *antidotal* remedy. Most observers have given it the first title;[1] Dr. Garrod's experiments induce him to prefer the *idea*, if not the phrase of the latter. **Alkaline salts** *of organic acids*, as bicarbonate of potassium, sodium, or lithium, (Garrod), or tartrate of potassium and sodium, and the *alkaline earth*, *magnesia*, have also a large share of confidence in the treatment of gout. Experience satisfies me that this confidence is well founded. After all, however, so incomplete is any curative plan as yet devised, that a large margin is left for patience and opium.

The same is true of **rheumatism**; especially in its distinctive form, of *acute articular rheumatism*, or **rheumatic fever**. Colchicum is here also much given; but *in the absence of the gouty diathesis*,[2] hereditary or acquired, it will often, if not *generally*, *disappoint*. **Alkaline salts** are, at the present moment, the favorite tentative anti-rheumatics. Lemon-juice has been freely employed by many practitioners. Phosphate of ammonium was for a brief time in vogue. Calomel and opium are still the reliance of a few. Certain enfeebled cases, with free perspiration, will recover speedily under *quininization*. But in all these modes of treatment there is no *specific* **certainty**. The attack will last from one or two to six or eight weeks with all. In **chronic** rheumatism we resort, with the same *hope*, to guaiacum, spirits of turpentine, *oil of cajuput*, iodide of potassium, cod-liver oil; but often our hope is much lengthened out. Of *propylamin*, a remedy for rheumatism imported not long since, I have had some experience, and have found no basis for a favorable opinion. First employed by Awenarius, of St. Petersburg, Drs. Gaston, Dujardin Beaumetz, and Besnier have reported favorably of this remedy. Dr. Da Costa[3] has obtained quite good results with *bromide of ammonium*. The search for and trial of such remedies is certainly altogether legitimate.

[1] Colchicum has been shown, by Krahmer and Hammond (*Proceedings of Biological Department of Acad. of Nat. Sciences of Philadelphia*, Nov. 1st, 1857), to *increase the amount of the solids* of the urine more decidedly than any other vegetable diuretic.

[2] Garrod insists on the diagnostic importance of the *uric acid test* for gout. It is easily applied, as follows: Take about f℥ss of the serum from a blister, or from the blood drawn by venesection or cupping, and place it on a flat dish or watch-glass. Add to this fifteen drops of acetic acid, and place in it two or three threads of cotton. Allow the glass to stand in a warm room for one or two days, to evaporate. If the cotton fibres be then removed and examined microscopically with an inch object-glass, they will be found, if the serum contained uric acid, to be covered with its crystals, arranged somewhat as the crystals of sugar candy form on a string.

[3] Pennsylvania Hospital Reports, 1869.

In the management of the **zymotic** affections, the only great triumph of medical art has been one of **prevention. Vaccination** affords an instance of control over one of the most destructive and loathsome of pestilences, by the interference of the physician. As to the **treatment**, even of smallpox[1] itself, when it has occurred, and of scarlet fever, measles, chicken-pox, hooping-cough, and mumps, we are forced to confess our powerlessness, except to conduct the case, by the aid of **palliative** measures, to its natural and spontaneous termination.

This is equally true of **yellow fever.** There is **no specific** yet known for this terrible disease. Quinine, mercury, etc., have failed in the hour of need too often to be relied upon. It is to be **palliated**, as it *cannot be cut short*.

Nor have we any specific for epidemic **cholera.** Antispasmodics, at very short intervals of administration, and ice, with free external stimulation, will conduct many cases to a successful close; but this is not **antidotal** treatment. I am fully satisfied that *calomel*, in true epidemic cholera, is altogether *useless*.

In the medication of zymotic affections having, as a local symptom, inflammation of the mucous membranes, with unusual tendency to (septic) decomposition or **disorganization**—*e. g.*, *scarlatina* and *diphtheria*—**chlorate of potassium** and other preparations of chlorine, as tincture of **chloride of iron,** have achieved a very widespread reputation.

The last-named of these medicines, the tincture of the chloride of iron, appears also to have an excellent effect (although we can hardly call it antidotal) in *asthenic* **erysipelas.**

Antidiphtheritic power has of late been strongly asserted of *lime-water*, locally applied, and of *lactic acid*.

Professor Polli, of Milan, in 1864 (following Chaussier and Bielt of Paris), proposed the internal use of the *sulphites* of sodium, calcium, and magnesium, in toxæmic diseases, as antizymotics or antiseptics. The chemical rationale of their action is very plausible. Success has been asserted[2] for them in pyæmia, scarlet fever, diphtheria, intermittent fever, cattle-plague, etc., and in glanders in the horse. As a tentative practice these remedies have seemed worthy of careful trial; although, especially in the U. S. army during the late war, the amount of positive evidence in their favor has not been very large.

Science should *suggest* remedies for experience to *prove;* empiricism may thus be made rational, and rationalism in medicine may become practical. Even if disappointment attend a certain set of experiments, such a trial is fully justifiable in its principle.

The sulphites appear in the urine about twenty minutes after they are taken; also in the sputa and saliva; but they are gradually changed in the system into sulphates. M. Carey Lea, of Philadelphia, in a paper published in 1865,[3] reports a series of careful experiments, in which he found evidence that when a small

[1] *Sarracenia* has proved valueless upon fair trial.

[2] See Amer. Journal of Med. Sciences, Oct. 1863; and later numbers of the same Journal.

[3] Am. Journ. Med. Sciences, Jan. 1865, p. 84.

quantity of sulphite or bisulphite of sodium is taken, less than a hundred grains, it disappears by oxidation in the system ; but if large amounts be ingested, a considerable portion passes unchanged in the urine, and sulphurous acid may even be detected in the breath.

Polli asserts that the sulphites are not usually decomposed in the stomach. If they are, sulphurous acid gas is evolved. A little magnesia should then be added to each dose to correct this effect. The tolerance of the sulphites and hyposulphites is greatest when they are freely diluted. They are decomposed by all vegetable acids. Lemonade, for instance, should not be given to a patient using them.

Hyposulphite of sodium is much more purgative than sulphite of sodium or magnesium ; those salts are commonly rather diuretic. If cathartic, it is without pain. The stools are without fetid odor under the use of these remedies. Dr. Polli recommends especially the sulphite of magnesium as the most active and having the least taste. The dose is, according to him, fifteen to thirty grains, in powder, dissolved in water or an aromatic vehicle, or in troches. He advises *saturating* the system with the medicine ; four or five drachms daily for an adult as a minimum. Five to seven drachms of the sulphite of sodium are borne well. Polli prefers the sulphites for rapid curative action in acute diseases ; the hyposulphites for prophylaxis. Their long-continued use may bring on œdema and diseases of debility ; otherwise, they show no special influence on the system.

Externally, solutions of the sulphites, especially when mixed with a portion of glycerin, are recommended as applications to suppurating surfaces, to sloughing and ulcerated parts, and in erysipelas. Sulphites of calcium and magnesium are somewhat caustic. In septæmia from wounds, etc., Polli administers thirty grains of the sulphite of magnesium, every two hours, internally.

H. R. De Ricci, on the ground of experience, insists upon the use of the sulphite of magnesium, in scruple doses, *early* in the cases treated.

To show the presence of sulphurous acid in the urine, Dr. Davy half fills a test-tube with the urine, slightly acidulated with muriatic acid, and suspends in the tube, above the urine, a piece of starched paper stained blue with a weak solution of tincture of iodine. If sulphurous acid be present, its evolution will decolorize the paper.

Carbolic acid has lately come under trial, as a promising antizymotic, both externally and internally used. Dr. Shoemaker, of Ohio, amongst others, reports excellent success with it, given internally in small doses, in *scarlet fever*. Dr. Ernest Sansom[1] uses, in scarlet fever and other allied diseases, the *sulpho-carbolates* of sodium, potassium, and other bases ; especially sulpho-carbolate of sodium, five or ten grains every four hours.

Silicate of sodium is asserted by Dubreuil[2] and Champouillon[3] to have powerful antiseptic properties, especially available locally, in

[1] Lancet, Jan. 15, 1870. [2] Gaz. Médicale de Paris, No. 49, 1872.
[3] Gaz. Hebdomadaire, No. 8, 1873.

ozœna, catarrhal bronchitis (by atomization of its solution), and cystitis with accumulation of decomposing secretion.

En résumé we may say that all endemic, epidemic, infectious, and contagious diseases are naturally **self-limited** ; and that, so far, we have only reached a certainly *curative* treatment for one class—viz., intermittent, remittent, and pernicious (classed together as **malarial**) fevers ; and a **preventive** treatment for another, smallpox.

While, therefore, for yellow fever, scarlatina, pertussis, etc., we are without the possession of any *specific* or *antidotal* treatment, the **palliative** plan is the one for us to pursue. All attempts, by violent measures, to cut short either of these diseases, while they fail to attain that object, will endanger the patient, by lowering his forces, and thus promoting the victory of the depressive toxæmic cause.

Yet, I repeat, we are not to abandon or reject the hope that observation and cautious experiment, guided by the lights of advancing science, may enable us hereafter to discover remedies as potent in the management and control of scarlet fever, yellow fever, and cholera, as quinine is in that of ague, or vaccination in the prevention or salutary modification of smallpox.

Alterative treatment is distinguished, in our classification, it may seem arbitrarily, from the *antidotive*. All antidotes may be said to be alterative, but all alterative medicines are not antidotal ; as the latter expression implies at least the *probable*, if not the known existence of a **material cause**, against which the antidote is to act. Yet the distinction is not one upon which we can *insist*, although it appears convenient

The term *alterative* is by no means a mere apology for ignorance ; it involves an important therapeutical principle, viz., the **supplanting** or displacing of a morbid impression, condition, or process in the body, by the **safer** impression and **counteraction** of a medicinal agent. The influence of the latter, physiologically speaking, may be, *per se*, abnormal ; yet, having a sanative purpose, it is therapeutic.

This principle may be sufficiently illustrated by allusion to two or three examples. In the peculiar and often violent inflammation of the throat in scarlatina, the free application of a *strong solution of nitrate of silver* to the part will almost invariably arrest (if used *early*) the morbid local process ; converting it, at all events, from a *specific* and *dangerous* into a *simple* and *mild* phlogosis.

So will the powerful impression of the solid nitrate of silver, or other caustic, upon the surface of the penis affected with *chancre*, *supplant* the *venereal* process, and leave in its place a benignant ulcer.

When erysipelatous inflammation is spreading like a conflagration from part to part, a blister, or tincture of iodine, etc., will form a *cordon sanitaire*, by inducing its own milder irritation in advance of the disease.

The most essential part of the treatment of chronic *diseases of the skin*, is either **alterative** or **antidotal.** *Parasitic* affections,