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## FALLACIES OF THE FACULTY.

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BY S. DIXON, M. D.

## LECTURE, X.

### PRINCIPAL CHRONO-THERMAL REMEDIES.

*Summary of the Chrono-Thermal Doctrine of Disease.*

GENTLEMEN,

We now come to consider the mode of action of the Chrono-Thermal agents—or those substances so generally effectual in prolonging that remission of symptom which we have proved, beyond question, is a law of all disease. Whatever be the nosological name of a distemper—Ague, Epilepsy, or Eruption—the physician will more surely accomplish his purpose of cure by taking advantage of this period of immunity than by any measures to which he may resort during the paroxysm. The more perfectly periodic the paroxysmal return, the more amenable will the disease for the most part be to the chrono-thermal medicines; but however imperfect, irregular, or brief the remissions, there is no case of disorder that may not be beneficially influenced by these remedies—whether they be alternated with baths and emetics, or be perscribed in combination with such symptomatic medicines and local measures as the features of the case, from place or prominence, may appear to demand. Let us commence the consideration of the Chrono-Thermal agents with a few observations on

**THE PERUVIAN BARK.**—To the value of this Bark as a remedy for many diseases, the celebrated Cullen, among others, bears his unequivocal testimony: what does he say

are the ailments in which he found it most useful? Rheumatism, Gout, Scrofula, Scurvy, Smallpox, Dysentery, Gangrene, Diseases of the Bones, Convulsions, Hysteria, Hypochondria, Hæmorrhages. Is not this a pretty comprehensive association of apparently different diseases, all cured or relieved by a single substance! And yet never seemed to enter the head of any previous medical writer, that these diseases have each something in common—each some principal of continuity which, amid all their apparent variety establishes their Unity of type. One remedy alleviates or cures them all—and yet physicians either cannot or will not see that the action of that remedy is one and one only, viz., motive power. What better evidence of the absurdity of Cullen's own Nosological System—a system that so far from explaining the perfect continuity that prevades the chain of all morbid motion, separated the links so widely asunder that the student could not for the life of him believe them to be any thing else but so many distinct and unlike disorders, each of which, forsooth, required a separate treatise to understand it! What a beautiful piece of work for the quacks! what an admirable method of darkening the world, that bad men might the better pursue their game of imposture!

An accomplished French physician, Baron Alibert, speaks thus of the Bark and its influence in disease,—“I have been able to pursue and appreciate the salutary results of the employment of this substance in Cancerous affections, in Scrofulous tumours of the Glands, according to the recommendation of Fordyce in many Cutaneous diseases, and principally in Lepra, Elephantiasis, and in certain cases of Jaundice, arising from diminished tone in the secretory organs of the bile—in the alterations effecting the Osseous system, such as Ricketts, Spina Bifida, &c., With the Bark we may also advantageously combat certain disorders of the Nervous sys-

tem, such as Epilepsy, Hypochondria, Hysteria, &c. Many authors recommend it in Hooping-Cough, and the various convulsive coughs. No remedy, according to them, is so efficacious in strengthening the organs of respiration, and in preventing the state of debility induced in the animal economy by the contractile and reiterated movement of the lungs. The most part of those who employ it in like cases, are nevertheless, of opinion, that the administration of it is imprudent without some previous preparation, according to the particular stage of disease. These practitioners (influenced, doubtless by their hypothesis of a humour in the blood) would in some sort mitigate the ferocity of the paroxysms by sweeteners and temperants—often even by evacuants, such as emetics and bleedings. To prevent irritation, they wait until the strength has been absolutely struck down. But upon this point, the celebrated Murray differs from these practitioners *in toto*. The Peruvian Bark according to that physician, is equally adapted to the cure of Convulsive and Periodic Coughs as to the cure of Intermittent Fevers. He witnessed an Epidemic in which these maladies were efficaciously met by this powerful remedy from the commencement. He has therefore proved that there is no advantage in retarding its administration; and that to permit, in the first place, so great a waste of the vital powers, only renders the symptoms more rebellious, and their consequences MORE FATAL!"

Gentlemen, I am not now giving you opinions,—I am not now dealing in hypothetic disquisitions—I state facts simply, facts powerfully attested; for Murray in his day was celebrated over all Europe, and Alibert only a few years ago, was second to no physician in France. Both have now passed from the scene of life; but their writings may be still read with advantage by every one who takes any interest in medicine.—The value of the Bark in all diseases, both authors distinctly state. You have also heard what they say of the sanguinary practice. Nothing can be stronger than the expression of their united evidence against that practice; yet in the teeth of that evidence—in the teeth of common sense even, which says that whatever reduces the vitality of the whole, must more surely confirm the hereditary or other weakness of a part,—the medical herd of this country still go on like their ignorant fathers before them, bleeding, leeching, and purging to death, or all but death, every unfortunate creature who falls into their hands. Did the disciples of Malthus only know how admirably their master's system has been carried out by the

great body of English practitioners, what encomiums would they not heap upon the schools to whose regiments of lancers and leechers the world is so indebted for keeping down a surplus population! But let not people suppose that possessed of a remedy so powerful, and, so far as nomenclature is concerned, one so almost universally applicable as the Bark, the physician has an infallible elixir—a remedy adapted to all constitutions. The most perfect *ague-fit* within my own remembrance, appeared to me to be the effect of two grains of quinine, prescribed for an asthmatic patient. Dr. Thompson mentions the case of a patient of his, in whom this medicine brought on an attack of asthma: "When he was getting well, after seven or eight days, I again," he says "began the sulphate of quinine, and the same attack was the result." A lady, after taking it, became subject to intermittent fainting-fits. Now some would be glad to lay hold of this as a reason why you should never use quinine.—But the smell of the rose has produced fainting fits—the smell of ipecacuan asthma—must we, therefore, never smell a rose, or keep ipecacuan in our houses? What agent in nature is absolutely innocuous?—*Rhubarb* in a very minute dose, has produced convulsions with some people—but, according to some people, should we never prescribe *rhubarb*? When quinine disagrees, the common complaints are tremor, faintness, headache, vertigo, nervousness, cramps, and "all-overishness." *Ratier*, in his Hospital Reports, among its deleterious effects mentions, "nervous agitations," which, I fancy, might be as well translated, "shivering-fits," or, what say you to "*ague*," Gentlemen, Oh! you may depend upon it whatever can correct a morbid motion, may cause it!

Like many other medicines, the Peruvian Bark is termed by writers on *Materia Medica*, a tonic. All medicines are tonics, when they improve the health of the patient; but when on the contrary, weakness or nervousness is the result of using them, who will say, that in that case they are anything but debilitating? Bark, like an emetic, or a purge, may cause both one and the other. To go on, then, day after day, prescribing this substance, and what are termed "*strengtheners*," without manifest amelioration, or with positive retrogression, is not giving a course of "*tonics*," but a succession of exhausting or debilitating agents;—it is to prescribe a name for a name.

What then, is the mode of operation of the Peruvian Bark when its action proves salutary? This I conceive to be the true explanation. Whether it be administered during the Remission or Paroxysm, the bark,

like every other medicinal agent capable of influencing the corporeal *totality*, must, if it act at all, do one of two things, namely,—Being a superadded, *power*, it must either, with more or less force, *CONTINUE*, or with more or less force *REVERSE* the direction of the existing order of corporeal movement, according to the *attractive* or *repulsive* manner in which it may exercise its motive influence. Now, as this difference of result depends upon whether the patient's brain be *negatively* or *positively* electric, a thing which can only be known by trial, it must be clear to every reflecting person, that where the chances are equal in favour of the presence of either electrical state, it is better to prescribe the medicine during the remissional movement of body, when so far as continuance goes, it must act to a certain extent at an obvious advantage. In common with every material agent capable of influencing matter in motion, the power of the bark, under ordinary circumstances, must be more effective in continuing than in reversing existing motion. To *reverse* generally suggests opposition, difficulty, disadvantage. To *continue* what is already begun as generally implies a course of action that can be advantageously undertaken. The chances, then, being so much in *favor of continuance*, it no longer remains a question, which, state of body should be selected for the exhibition of the bark,—the Paroxysm or the Remission. Which of these two periods has most resemblance to Health? The term Remission at once suggests the answer; that then is the proper period for the administration of this particular remedy. And experience has confirmed what exact reasoning might have anticipated; for when exhibited to the patient during the Paroxysmal movement, the bark, for the most part, not only renders that movement more intense, but prolongs with equal frequency the duration of its period. A like effect follows its administration during the movement of Remission, for not only in most instances does it prolong this period, but adding force to the existing order of movement, it brings it at last to that desirable standard which it only previously approached, namely, the standard of Health. Numerous instances, of course, have occurred where a contrary effect has followed the exhibition of the bark, both in the case of the paroxysm and remission. But the general result of its employment determines us in the line of practice we should, under ordinary circumstances, pursue. So long, then, as we can, by the bark or any other agency keep up the movement of remission in as great, or even greater force than before, so long do we secure our patient from a recurrence

of the previous paroxysmal movement, involving, as the latter must do, the identical corporeal matter of the movement of remission. Whatever be the name or nature of the disease, the remissional movement, in most instances, though a shade or two beneath that of health, may, as we have already said, by the increase of force effected by the bark, be brought at last to the healthy standard; nay, in some cases, by a too long continuance or an excess of the medicinal force applied, it has itself been actually converted into a new febrile paroxysm of more or less intensity. But in that case the paroxysm of the old disease has, with equal certainty, been prevented from recurring. Still, however mild and subdued the movement kept up by the bark may appear, in comparison with that of the previous paroxysm, if it only be continued for a sufficient time, it generally becomes at last so habitual as entirely to supersede the original disease, and to destroy, as a matter of course, the constitutional memory upon which the recurrence of the old paroxysm depended. Such constitutional memory French writers term "*memoire machinale*." It is by this that all the motions of health are periodically reproduced—and by the same law, all morbid motions take on a habit of return. Whatever will put the brain on a new course of thought or action, will confuse this memory. Hope, joy, faith, and enthusiasm act in that manner. What are these—what are all passions but mild fevers?—and, as no two fevers can affect the body at one and the same time, inasmuch as no given coporeal atom can move in opposite directions at the same moment—these fevers, however mild in themselves, are sufficiently powerful, in many cases, to avert the return of the more dangerous morbid motions. Like the fevers of pregnancy, puberty, &c., they may cure or arrest every kind of disease you can name, from toothache to pulmonary consumption; like the same fevers, they have produced all! according to constitutional predisposition.

The Chrono-thermal medicine next in value to the Bark, is

#### PRUSSIC ACID.

The College of Physicians have given a formula for the preparation of this acid for medicinal purposes; but I prefer that of Scheele, and I believe most other practitioners do the same. The concentrated acid cannot be prescribed in practice. It must, then, be given in a diluted state. "*Diluted prussic acid*," says Magendie, "*is employed with success, in all cases of morbid irritability (weakness?) of the pulmonary organs.*"

It may be advantageously used in the treatment of nervous and chronic coughs, Asthma, and Hooping cough; and in the palliative treatment of Pulmonary Consumption; indeed, a great number of observations induce the belief, that it may effect a cure in the early stage of the latter disease. In England it has been administered with success in Dyspepsia, and also in Hectic cough sympathetic of some other affection. [Why sympathetic of another affection? When a man's health is wrong throughout, some prominent symptom is seized upon, and considered to be the cause of all the others!] [Dr. Elliotson, both in hospital and private practice, has frequently employed medicinal prussic acid, prepared after the manner of Vauquelin. He has recorded more than forty cases of Dyspepsia, with or without vomiting, and accompanied with considerable pain, in the epigastric region, and with pyrosis, (water-brash,) which were cured by this acid. The same physician quotes a case of colica pictonum (spasm of the colon) in which Dr. Prout gave the acid, and procured instantaneous relief. Dr. Elliotson also administered hydrocyanic acid, in a great number of Pectoral affections; and has almost invariably succeeded in allaying the troublesome cough. [Why will people use this word "invariably?"—what agent in the *Materia Medica* acts invariably in the same manner? such medicine would be, indeed, a specific! but that we shall never discover!] Applied externally in lotions, in different diseases of the skin, it has not, in Dr. Elliotson's practice, produced any decided effect. Dr. Thomson, however, asserts, that he has employed it in lotions with constant success [here again, "constant success!"] in diminishing the itching and the heat so annoying in cutaneous diseases, and has cured several species of herpes.]

"M. J. Bouchenel has published an interesting memoir on the employment of prussic acid in the treatment of chronic Pulmonary Catarrh. He mentions four cases in which this remedy proved effectual. He concludes by urging that prussic acid, when given in a small dose, is not more inconvenient than an ordinary cough mixture. M. Bouchenel has also employed prussic acid in a case of consumption, but he only succeeded in allaying the cough for a time, which leads him to doubt the fact of its having really effected the cure of confirmed consumption. I do, however, assert and maintain," says Magendie, "that with prussic acid I have cured individuals, having all the symptoms of incipient PHTHISIS; and even those in a more advanced stage.

"In Italy, the medicinal hydrocyanic acid

has been used to allay excessive irritability of the womb, even in cases of Cancer." "Professor Brera extols its happy effects in pneumonia: he recommends it also in Rheumatic cases, and as a worm-medicine. Since this professor has employed it in diseases of the Heart, Dr. Macleod has administered it in the same diseases. He has found it allay nervous Palpitations, especially those which seemed to depend on derangement of the digestive organs. [How common this error of accusing one symptom of being the cause of another!] He has also employed it in some cases of Aneurism of the Heart. Dr. Frisch, of Nybourg, in Denmark, has allayed the intolerable pain caused by Cancer of the Breast, which had resisted all the antispasmodics, by washing the ulcerated surface with diluted prussic acid. He has also successfully employed the remedy in several cases of Phthisis. Dr. Guerin, of Marnes, has obtained beneficial results from its employment in two cases of Brain Fever."

Thus far I have given you the experience of others, with this acid as detailed in MAGENDIE'S FORMULARY;—let me now add a few observations of my own in its favor.—Combined with the tincture of lobelia inflata, I have found it one of the most generally effectual remedies for Asthma, with which I am acquainted. The same combination has enabled me to cure Spasmodic Stricture of the urethra; and, generally, speaking, I have obtained successful results from the administration of prussic acid in cramp and spasms wherever developed. In the low, habitual Fever, whether misnamed dyspepsia, dysuria, or hypochondria, I have found it particularly valuable. I have also experienced its curative influence in the treatment of Dropsy; more especially when complicated with difficult breathing.

In Palsy, I have found prussic acid more generally successful than strychnia. I may here again, however, mention that it is my custom, in the treatment of disorder generally, to combine one or more chrono-thermal powers—quinine, hydrocyanic acid or arsenic—with one or more symptomatic medicines, possessing marked local influence.—Thus, one or more of the chrono-thermal agents may be advantageously combined with iodine, in glandular and skin affections, with colchicum or guaiac in rheumatism—squill or digitalis in dropsy—cantharides or copaiba in leucorrhœa and gleet—with squill in catarrh—with purgatives where costiveness is a symptom; and so in like manner, according to the most prominent feature of a case. Combined in this way with tincture of ginger, cardamoms, &c., I have found prussic acid extremely valuable in the treat-



ment of flatulency and acidity of the stomach. In all these disorders, however, this, and all other remedies will be found to be advantageous only in so far as they contribute to improve the temperature, and, consequently, the circulation of the subjects of them. Your patients, when obtaining their beneficial effects, will tell you, "I have not had those heats and chills which used to trouble me,"—or, "my hands and feet are not so cold or so burning as formerly." If you poison a certain number of rabbits with prussic acid—say a dozen, and pour cold water in a stream over six of them, these six will recover, while all the others will die. This has been done over and over again with the same result. You see, then, how clearly the influence of this agent depends upon its power of controlling temperature.

We have seen that prussic acid may be successfully employed in the most obstinate agues; yet I remember the case of an Irish barrister, who, from the same medicine, experienced severe shivering and chilliness, with cramp, pain of the stomach, and slight difficulty of breathing; the very symptoms, you will remark, Gentlemen, for which it is so often available in practice. The electric condition of the cerebral part influenced, determines whether a given remedy shall produce attractive or repulsive motions; and this, we have repeatedly stated, can only be known by trial. From such trial, no greater harm than a little temporary inconvenience can take place, when prussic acid disagrees, if prescribed and watched by a judicious physician. Rhubarb or magnesia may do the same, for, like prussic acid, both act electrically.

From Prussic acid, I now pass to

**OPIUM, AND ITS SALTS OF MORPHIA.**—These, like the Bark, may be advantageously employed, as we have already stated, in prolonging the interval of remission in every form of disease. Opium, indeed, like every other remedy, possesses more or less influence over the whole system, but its more obvious effect is the control which it exercises over the nerves of sense. With these we associate Memory—and as every part of the body has, through the brain, a power of remembrance, whatever will confuse or suspend the action of the senses, will often equally suspend and confuse memory, and consequently conduce to the suspension or interruption of any habitual or periodic action of any part of the body. A minute dose of opium generally heightens the perceptive powers, while a large dose as generally diminishes them. But a large dose, after all, is only a relative term—for the quantity that

would poison a horse, may be a moderate dose to the habitual opium eater!

I do not know a disease in which I have not found opium useful. In dropsical cases, when administered at that particular period of the day when the patients have confessed to amelioration of their feelings generally, it has, in my experience, been frequently followed by a copious flow of urine after every diuretic had completely failed. By giving it in a large dose during the remission, I have kept several consumptive patients alive for months, and some for years even, whose existence must assuredly have been shortened but for the beneficial influence of this drug. There are persons, however, whom

Not poppy, nor mandagora,  
Nor all the drowsy syrups of the world

would medicine into slumber—but upon whom the cold affusion would instantly produce that effect. Behold again, how much all things depend on temperature! With some people opium, as I have already mentioned, acts like ipecacuan—who can tell what may be the effect of any remedy till it be tried? It is only impostors who *never fail*! As a proof of the influence of opium as a preventive against disease, we are informed by Dr. McPherson, of the Madras army, in his book on China, that "the peculiar active principle in opium, the narcotic, has of late been employed with considerable success in Bengal, as a substitute for Quinine. It may also be mentioned, that at the time fevers prevailed so extensively among our troops at Hong-Kong, but comparatively few of the Chinese suffered, though exposed throughout to the same exciting causes." And this Dr. McPherson attributes to their habit of opium smoking. Travellers, who have witnessed the effect of this drug in the East, mention tremor, fever, dropsy, delirium, and restlessness, as the consequences of the habitual use of opium. It has, nevertheless, contributed to the cure of all these symptoms when produced by other causes. In practice, we find it gives repose in one case and preclude all sleep in another. It has caused mania, and cured it.

Very analogous to opium in their mode of action are

**ALCOHOL, WINE, AND MALT LIQUORS;** but like every other medicinal agent, they act upon the body, beneficially or the reverse, in no other manner than by changing the existing temperature of the brain. If a glass of brandy has arrested the ague-fit and its shudder, the army surgeon will bear testimony to the "horrors" and tremblings which the abuse of strong liquors too frequently induces in the previously healthy. Are not the

chill, the shiver, the fever-fit, the epileptic, asthmatic, icteric, stricture, and other spasmodic paroxysms daily produced by potation? How often have we known dropsy brought on by gin-drinking:—yet is not gin daily prescribed with the best effect for the dropsical? See how differently alcohol affects different men! One it renders joyful or gentle—another sullen and morose—in a third, it gives rise to wit, while a fourth, under its influence, loses the wit he previously possessed. I remember the case of a man of the 1st Regiment of Foot, who grew mighty religious and took to psalm-singing every time he got drunk. But this spurious kind of godliness, as you might have expected, generally evaporated with the fumes of his liquor. That excess of religious feeling or veneration (as the Phrenologists call it) does, however, depend upon the temperature or motive condition of some cerebral part, there cannot be a doubt; and that it takes place by fits or periods, Shakespeare well knew, for he makes one of Clarence's murderers say: "I hope this holy humour of mine will change; it was wont to hold but *while* one would tell (count) *twenty*."

Wine will make the brave man timid and lachrymose—the coward capable of actions, the mere thought of which, in his sober moments, would have inspired him with terror. One man will first show the effects of drunkenness in his speech—another in his diminished powers of prehension—some individuals will not betray the influence it has obtained over them until they try to walk; their limbs may then fail them, though neither hand nor tongue show any signs of inebriety. Now all this is done by the change of temperature which wine induces on various parts of the cerebrum of particular individuals. It throws them into a state of fever; and the same phenomena may be witnessed in the course of fevers produced by cold or a blow. Dr. Jenner, in describing the effects of excessive cold on himself, says, "I had the same sensations as if I had drunk a considerable quantity of wine or brandy, and my spirits rose in proportion to this sensation. I felt, as if it were, like one intoxicated, and could not forbear singing," &c.—[*Baron's Life of Jenner*.] Take the converse of this—A man shall get as "drunk as a lord," and immediately become sober under the influence of a cold shower, or plunge bath. Does not this unity of result argue unity of mode of action? We prove, then, by every possible manner, that the effect of wine, whether for good or evil, like that of every other power in nature, relates to the influence it exerts over the temperature of *one or more* portions of the Brain.

MUSK, VALERIAN, CAMPHOR, ASSAFOETIDA, have each and all of them cured the ague. Were it not for its expense, Musk would, doubtless, be more extensively used in the practice of medicine. For myself, I place it in the same rank with quinine and arsenic in the treatment of what are termed the purely nervous affections. It is generally recommended in books to begin with ten grains;—in my hands a much smaller dose has been attended with the best effects in numerous cases. But a great deal depends upon the purity of the drug. I lately succeeded with musk in a case of intermittent squint, which successively resisted quinine, arsenic, prussic acid, and iron.

A married lady, who always when pregnant became the subject of epilepsy, but had no fits under other circumstances, consulted me in her case: I tried every remedy I could think of without any advantage whatever; I then gave her musk, which at once stopped the fits. The dose in this case was four grains.

We have constant disputes whether a particular remedy be stimulant or sedative. Opium, musk, and prussic acid, have by turns become the subject of discussion. One theorist will take one side, another another, and each will bring you facts of equal cogency. Both are right, and both are wrong. To reconcile this seeming paradox, we have only to observe that all remedies are either stimulant or sedative according to the dose and the constitution of the patient.

STRYCHNIA can both interrupt and produce fever. In an experiment upon a horse suffering from "lockjaw," a watery solution of nux vomica—the well-known source of the strychnia—produced, when injected into the veins, a shivering fit of some duration. I have, nevertheless, found the sulphate of strychnia of great service in obstinate agues, and in many chronic diseases in which chilliness, vertigo, and hallucination or phantasy were symptoms. In the case of a female affected with nervous blindness, for whom I successfully prescribed sulphate of strychnia, the remedy deprived her, for about an hour, of the use of her limbs. The recovery of her sight, under its exhibition, amply compensated for this temporary accident. I have found it confuse the vision in a similar manner when prescribed for muscular palsies. In the treatment of epilepsy and many other spasmodic affections, this substance may be advantageously combined with the sulphate of quinine. I have, notwithstanding this, on several occasions, been obliged to intermit its use, from the pains of which the patients complained while taking it;—and this led me to make trial of the remedy in rheu-

matism, which, in some instances, it cured.

**SILVER.**—A consideration of the occasional beneficial influence of Nitrate of Silver in epilepsy, led me to try its effects in other disorders of the spasmodic kind, such as asthma, cramp, &c., and I am glad to have it in my power to bear testimony to its very great value in all of these affections. It is a powerful Chrono-thermal medicine—and like every medicine of this class, it can produce the diseases it can cure.

We have seen that tremor, spasm, palsy, differ but in degree. In all these disorders, silver may be advantageously substituted for bark, prussic acid, &c. While engaged in prosecuting my researches upon the merits and demerits of silver, I found it to be one of the most powerful diuretics in the *Materia Medica*; a circumstance not altogether unobserved by the older authors, particularly Boerhaave, who was accustomed to prescribe it with nitre in dropsy. It has, nevertheless, the power to suspend the urinary secretion. There is an affection to which young women are remarkably subject—a periodic pain of the side—or *stitch*. This disorder has been maltreated under a variety of names, according to the notions entertained by attending practitioners, as to its origin and nature. If practitioners would only take the trouble to ask the patient whether the affected side be colder or hotter than natural, I do not think they would be so forward, as they usually are, to order leeches and cupping-glasses. In ninety cases out of a hundred, the sufferer will tell you that that side is always chilly! This at least might convince them Inflammation is not the “head and front of offending.” Such pain is the result of spasm of one or more of the intercostal muscles—which pain, when the patient is told to inspire, will assuredly increase. Beware of adding to it by blood-letting! In numerous cases, it will yield to half-grain doses of nitrate of silver—failing which, prussic acid, quinine, or arsenic, may be successively tried; and to one or other of these, it will prove, for the most part, amenable. In pain of stomach after eating—also a disease of the spasmodic kind—I have found silver particularly valuable. In all varieties of cough and catarrh, I have derived advantage from its employment; and I am sure it has, in my hands, contributed to the cure of indubitable phthisis. Let it be at the same time remembered that I do not exclusively rely upon this medicine in any one form of disease;—for, unless it be sulphur for *psora*, I do not know a specific in physic!

There is a disorder to which aged individuals and persons who have suffered much from mental anxiety are liable—a disposition to faint and fall—often mistaken, and fatally

mistreated, under the name of “tendency to apoplexy.” The employment of silver in this affection has, in my practice, been very generally successful. I have found it also decidedly advantageous in vertigo, and in many cases of mental confusion.

Nitrate of silver has a great influence over the spine and spinal nerves; for patients sometimes complain of pains like lumbago, sciatica, and rheumatism while taking it. I have occasionally known it produce shivering and fainty sensations, but these inconveniences were merely temporary, going off upon the discontinuance of the medicine. It has cured them all when procured by other causes. You are aware that blueness of skin is an occasional effect of nitrate of silver; and I must here explain to you the reason. Many of you have seen, doubtless, the pictures produced by light on paper saturated with nitrate of silver. Before the nitrate of silver could turn the human face blue, the skin, as in the case of the paper employed in that process, must be completely saturated with the preparation—for how otherwise could the light affect the face in that manner. Though I have myself prescribed nitrate of silver thousands of times, I never witnessed the slightest tinge from its use—nor would any other practitioner have to complain of it in this respect, but such as had employed it in too large doses, or too continuously. Who, then, would reject a valuable remedy, because its abuse has produced, in rare instances, a peculiar color of skin—seeing that every remedy, if improperly applied, may occasion the far greater calamity of death itself?

**COPPER**, like silver, is now seldom used but in epilepsy. Fordyce, nevertheless, thought so highly of it as a remedy for ague, that he ranked it with the Peruvian bark. Boerhaave, Brown, and others, esteemed it for its diuretic power; and accordingly they prescribed it in dropsy. In the same disease, and in asthma, I have had reason to speak well of it, and I can also bear testimony to its salutary influence in chronic dysentery—a form of disease so frequent in the East Indies, that while serving there, I had many opportunities of testing Dr. Elliotson's favorable opinion of its value. That it can produce all these disorders is equally true: for where it has been taken in poisonous doses, “it excites,” according to Parr, “a pain in the stomach, and griping in the bowels, tenesmus, ulceration, bloody stools, difficult breathing, and contraction of the limbs.” A universal or partial shiver will be found to precede or accompany all these symptoms. Copper was a favorite *febrifuge* with the older practitioners.

IRON is a very old remedy for ague—perhaps the oldest. Stahl particularly dilates upon its virtues in this affection. Much of the efficacy of a medicine depends upon the constitution of the season and climate—much upon the constitution of the patient. This metal, like every other remedy, has consequently had its supporters and detractors in every form of disease. It is at present, one of the principal remedies for Hysteria, and other female disorders—disorders which we have already shown are mere variations of remittent fever. The water in which hot iron had been quenched used to be prescribed by the ancient physicians as a bath for gout and palsy. In skin diseases and cancer, ricketts, epilepsy, urethral stricture, &c., iron has been vaunted by numerous modern practitioners. The ancients recommended it in diarrhoea, dysentery, dropsy, hectic, vertigo, and headache. Now, in all these affections, it has served me much like other powers—ameliorating or aggravating the condition of the patient, according to peculiarity of constitution. Some pseudo-scientific physicians have amused themselves with witticisms at my expense, on the subject of iron. Finding it in some of my prescriptions for Phthisis, they have accused me of mistaking this disease for dyspepsia. How long will men deceive themselves with such puerile absurdity? When will they learn that the human body, in disease, as well as in health, is a *TOTALITY*,—not a thing to be mapped into parts and portions, like a field of rice or corn! Let them take a lesson from St. Paul, who, in his first epistle to the Corinthians, has these remarkable words:—“And whether one member suffer, all the members suffer with it: or one member be honored, all the members rejoice with it.” With

**ZINC** and **BISMUTH** I have occasionally succeeded in prolonging the remission in many cases of disease, where the other principal chrono-thermal medicines had been ineffectually tried. Generally speaking, however, they are less to be relied upon for this purpose, than those I have had so frequent occasion to mention in the course of these lectures. The successful employment of

**ARSENIC** by the natives of India, first, I believe, induced European practitioners to try its effects in ague, and also in diseases of the skin. The happy effects of this medicine were found not to be confined to these disorders. Not only has its judicious administration been attended with success in epilepsy, and numerous other forms of convulsive disorder, but it has been advantageously employed in the treatment of structural change. Like every other remedy, arsenic has its advantages and disadvantages. Enquire of miners, exposed to

the fumes of this metal, and you will find that fever, tremor, spasm, palsy and sores, compose almost the sum-total of their sufferings. In the Edinburgh Medical and Surgical Journal there is a relation of five cases of poisoning by arsenic. Among the symptoms mentioned by the narrator, Mr. Marshall, were vomiting, pain, and burning of the stomach, thirst, crural and abdominal spasms, purgings, headache, dimness of sight, intolerance of light, palpitation, chills and flushes, epilepsy; all of which proceeding from other causes, I have successfully treated by arsenic. The first case of epilepsy in which I ever derived benefit from any remedy, was cured by this metal; the disease was principally brought on by hard drinking, and the fit came on at a particular hour, every alternate night. Now it is worthy of remark, that after an attempt at suicide by arsenic, detailed by Dr. Roget, periodic epilepsy was among the effects produced. The subject of it, a girl of nineteen, had also chills and heats, which if you please, you may call *Intermittent* or *Remittent* Fever, or any thing else you can fancy—for it is not my custom to quarrel about names!

As a remedy for skin disease, I have every reason to speak highly of arsenic, even when complicated with much structural change. Some cases in which it had very great effect, I will detail to you. The subjects of them were sepoys, or Indian soldiers who had suffered in the Rangoon war, from climate, defective food, and the usual privations of men in the field. These patients were under my care for a fortnight only; and to that period the treatment refers. All of them, be it remembered, had had the Fever.

Case 1.—Jan Khan, havildar, (Native Sergeant,) had diseased thickening of the skin of the legs and arms. His nose was enormously enlarged, and his whole appearance unhealthy. He ate and slept badly, and his tongue was foul and clouded. After the operation of an emetic, the liquor arsenicalis was administered in six drops thrice a-day. At the end of a fortnight, the alteration in his general appearance was wonderful. The nose had then become nearly of the natural size, and the disease of the skin had gradually lessened. He then slept and ate well, and expressed himself much pleased with the improvement he had received from his medicine.

Case 2.—Daud Khan, sepoy, had pains of the bones and joints, white patches all over his skin, and an irritable sore of the scrotum, from which a fungus, about the size of a chestnut, sprung up. He complained also of a burning sensation in his feet. When I

first saw him, he was so weak he could not rise from the floor without assistance, and his countenance indicated extreme wretchedness and debility. Having detached the fungus with a pair of scissors, the lunar caustic was applied, and arsenic administered, as in the previous case. In a week, there was great amendment of the sore. The patient since then, rapidly gained ground; of the pains of the bones he no longer complained, and the eruptions on the skin gradually disappeared; the ulcer at the same time closed, and I expected he would soon be fit for duty.

Case 3.—Setarrum, sepoy, had large sores of the leg, sloughy, ill conditioned, and spreading in different directions. He had also cuticular eruptions, like the last mentioned patient; and his appearance and strength, though not so wretched, were yet sufficiently miserable. Pure nitric acid was applied to the whole surface of the sores, and a poultice ordered. The arsenic was given as above. On the separation of the dead matter, the leg was supported by Baynton's bandage. The sore gradually healed—the eruptions disappeared—and the patient regained complete health and strength.

Case 4.—Subryah, sepoy, had had his leg thrice amputated, the last time in the middle of the thigh, but the bone had been left with only a covering of skin. The stump was in an ulcerated state when I first saw him—and the probe, upon being passed through one of the sores, found the bone carious, (abraded) and denuded as far as it could reach. The patient's health was altogether wrong, not one function being properly performed. It was proposed to amputate at the hip joint, as it was not believed that any other treatment could do good. To this step, however, he would not submit. A trial was given to arsenic, and the sores, beyond expectation, at the end of a fortnight had nearly healed. The patient then slept and ate well, and looked comparatively strong and healthy.

Case 5.—Vencatasawmy, sepoy, had disease of the skin, and an ill-looking sore over the sternum, (breast bone,) which bone was perfectly carious,—the probe could be passed through it to the depth of three inches in the direction of the mediastinum. The patient was weak and irritable, and could neither eat nor sleep; his pulse was rapid and small, and his appearance altogether miserable. Arsenic was resorted to as before. The ring worm, under its use, disappeared—the sore began to look clean—the probe, when he went from my hands, only passed to the depth of an inch, and the patient's health was rapidly improving.

These cases were intrusted to my care by

Dr. Gibb, of the Madras Medical Staff, while he himself was on "sick leave," and were afterwards reported by him to the Medical Board of that Presidency.

Do I now require to tell you the principle upon which arsenic proved so efficacious in the treatment of these various structural changes? It acted simply by its power of controlling Remittent Fever, under a chronic form, of which these unfortunate sepoys were all suffering—the structural changes being mere features or developements of the general derangement.

Gentlemen, we have now established—in disputably established—even by the cases of the schoolmen themselves, that Fear, or any other given passion,—Bark, or any other given chrono-thermal medicine, has each cured a host of maladies, which the authors of nosological systems not only put down as separate and distinct disorders, but to which the profession usually ascribe a difference of cause and nature;—some, according to their views, being diseases of debility,—some, nervous—some, inflammatory. Now, connecting this with the fact, that the subjects of all these apparently different ailments have Fits and Intermissions, and have each a greater or less number of the symptoms or shades of symptom constituting the particular type of disorder, so well known to the vulgar by the term Ague; for which the same vulgar are aware, there are no powers so generally applicable, as Bark and the passion Fear; to what other conclusion can an unprejudiced person come, than that all disorders are variations of this one type—that, abstractedly speaking, there is but One Disease! If this then be true—and its truth may be easily tested in every hospital in Europe—am I not justified in believing that the notions (for I will not call them principles) which have hitherto guided or rather misguided physicians in their treatment of disease, are a mere romance of the schools; that their views of its causes have, for the most part, been as erroneous as their modes of cure are defective; and their nomenclature and narrations throughout, little better than an unmeaning jargon!

Gentlemen, I shall conclude these Lectures with a brief summary of the doctrines which have occupied us during the course. Their importance to the human race, if true, cannot for a moment be doubted;—if proved to be false, I shall be the first to acknowledge my error; but, as I said in the outset, I will only appeal to results—to nature. I have proved, however, I hope to the satisfaction of most of you, that

1. The phenomena of perfect health consist in a regular series of alternate motions

or events, each embracing a special period of time.

2. Disease, under all its modifications, is in the first place a simple exaggeration or diminution of the amount of the same motions or events, and being universally alternative with a period of comparative health, strictly speaking, resolves itself into Fever, —remittent or intermittent, chronic or acute. Every kind of structural disorganization, from Tooth Decay, to Pulmonary Consumption, and that decomposition of the knee-joint, familiarly known as White Swelling, being merely "developments" in its course; —Tooth Consumption, —Lung Consumption, —Knee Consumption

3. The tendency to disorganization usually denominated acute or inflammatory, differs from the chronic or scrofulous in the mere amount of motion and temperature; — the former being more remarkably characterized by excess of both, consequently exhibits a more rapid progress to decomposition or cure; while the latter approaches its respective terminations by more subdued, and therefore slower and less obvious alternations of the same action and temperature. In what does consumption of a tooth differ from consumption of the lungs, except in the difference of tissue involved, and the degree of danger to life, arising out of the nature of the respective offices of each.

Disease, thus simplified, will be found to be amenable to a principle of treatment equally simple. Partaking, throughout all its modifications, of the nature of Ague, it will be best met by a practice in accordance with the proper principle of treatment of that distemper. When the doctrine of the Concoction of Humours held its baneful sway over the mind of the physician, it was considered the greatest of medical errors to repel paroxysm—each fit being supposed to be a friendly effort of nature, for the expulsion of a peccant or morbid humor from the body. Like the popular error of our own day, so prevalent in regard to "the Gout," it was deemed to be a salutary trial of the constitution. An ague in spring was said to be good for a king! That monarchs occasionally became its victims at this season, had no particular share in the revolution which has since taken place in medical opinion. So late as the time of Boerhave, a physician asserted, that if he could produce a fever as easily as he could cure it, he should be well satisfied with his own skill! The consequence of such notions was, that the practitioner exerted his utmost to increase the heat of the body during the paroxysm, — but the fearful mortality attending the practice had no other effect upon the mass of the

profession, than to make them redouble their exertions in the discovery of means of increasing this heat, that they might thereby assist the unknown process which morbid matter was supposed to undergo! One hundred years have scarcely elapsed since the fever patient was wrapped in blankets, his chamber heated by large fires, and door, window, and bed-curtain closed upon him with the most scrupulous attention. The few that escaped this terrible ordeal, were said to be cured—and these cures, like *ignes fatui*, only served to delude and blind the practitioner to the awful mortality which followed the practice.

Like the present treatment of the symptoms still absurdly called Syphilis, the practice proved infinitely more destructive to life than the disease itself—but, so far from opening men's eyes, the seniors of the profession, when the invaluable Bark was first introduced to their notice, opposed it with a violence and a virulence only since paralleled by the resistance offered to the introduction of the variolous and vaccine inoculations. To bring forward any sweeping or useful measure in Medicine, requires a moral courage and perseverance that fall to the lot of few. The man who wishes to gain a ready notoriety, has only to puff off some inert or mystical mode of treatment, and his success is certain. He must beware of coming before the public with a remedy to which the stigma of poison can be attached. Does not the quack constantly boast of the absolute safety of his remedy!—see with what pertinacity he contrasts his vegetable medicine with the words mineral poison, which last he uses for a bugbear, as if the vegetable world was all for a blessing, and the mineral all for a bane; and the wonderful part of this is, that it answers admirably, even with what are termed the educated public—if those can be really educated who would swallow opium and hemlock in any quantity because they are vegetables, and who appear not to know that table-salt is a mineral—that coal or carbon is a mineral—that iron and lime are minerals, and that all of these mineral substances actually enter more or less largely into the economy of their own living frames! To sum up the whole, every vegetable substance is the product of the earth; and if there be truth in scripture—if there be a statement in the sacred writings more deserving of the attention of the physician than another, it is that contained in the 38th chapter of the Book of Ecclesiasticus, namely, that "The Lord hath created medicines out of the earth, and he that is wise will not abhor them!"—Can the man be a Christian



who, after this, would dare to rave against mineral medicines?

As now practised in England, Medicine is little better than a copy of the exploded navigation of the ancients. Taking his bearings, less by the observations of the fixed stars, than by every little eminence and prominent locality, the ancient mariner, cautiously if not timidly, crept along shore. With the unerring compass for his guide, the seaman now steers his bark boldly upon the boundless ocean. Despising the localism that formerly guided his sail, he now completes his voyage to the distant port, in as many days as it formerly occupied him weeks or months. Keeping in view the principles here laid down, the physician, may in like manner, with a few rare exceptions, entirely dispense with the common anatomical landmarks of his art—if he be not startled with the novelty of the light by which we have endeavored to dispel the darkness that has hitherto clouded the field of medicine. Taking corporeal unity and totality for his rudder and compass—the brain and nerves for the ocean and seas on which he is to act—temperature and remittency for his tide and season; constitution and habit for the rule by which he must occasionally change his tack; he may now rapidly accomplish ends which, by groping among the intricacies of nomenclature or by a vulgar attention to mere localities, he can only imperfectly attain by the reiteration of long and painful processes; he may thus, with ease, obviate difficulties which he previously believed to be insurmountable. Let him not question whether or not the adoption of this will best serve his own interest. As physic is for the public, not the public for physic, he may rely with certainty that notwithstanding the present over-crowded state of the profession, the supply of medical aid will sooner or later, adjust itself to its own, as well as to the general weal.

It was one of the boasts of the eccentric Radcliffe, that he could write the practice of physic on half a sheet of paper: the whole might be comprised in half a line—attention to temperature! This, you may be sure, was Radcliffe's chief secret—for he was one of the earliest physicians who first introduced what is called the cooling system in fever. When the Duke of Beaufort was taken ill of the small-pox, "the doctor," says Pottis, "was sent for, and found his grace's windows shut up in such a manner, by the old lady duchess, his grandmother's order, that not a breath of air could come into the room, which almost deprived the duke of the very means of respiration. This method had been observed by the physicians (!) in her grace's youthful days, and this she was

resolved to abide by, as the most proper in this conjuncture, being fearful that her grandson might otherwise catch cold, and, by means of it, lose a life that was so precious to her and the whole nation. She had also taken a resolution to give her attendance upon the duke in person during his sickness, and was in the most violent consternation when Radcliffe at his first visit ordered the curtains of the bed to be drawn open, and the light to be let in, as usual, into his bedroom. "How," said the duchess, "have you a mind to kill my grandson?—Is this the tenderness and affection you have always expressed for his person?—'tis most certain his grandfather and I were used after another manner, nor shall he be treated otherwise than we were, since we recovered, [escaped, truly!] and lived to a great age without any such dangerous experiments." "All this may be," replied the doctor, with his wonted plainness and sincerity, "but I must be free with your grace, and tell you, that unless you will give me your word that you'll instantly go home to Chelsea, and leave the duke wholly to my care, I shall not stir one foot for him: which, if you will do, without intermeddling with your unnecessary advice, my life for his, that he never miscarries, but will be at liberty to pay you a visit in a month's time." When at last, with abundance of difficulty, that great lady was persuaded to acquiesce and give way to the entreaties of the duke and other noble relations, and had the satisfaction to see her grandson, in the time limited, restored to perfect health, she had such an implicit belief of the doctor's skill afterwards, that though she was in the eighty-fifth year of her age at that very time, she declared it was her opinion that she should never die while he lived, it being in his power to give length to her days by his never-failing medicines."

Well, Gentlemen, the proper medical treatment of all diseases comes, at last, to attention to temperature, and to nothing more. What is the proper practice in Intermittent Fever? To apply warmth, or administer cordials in the cold stage; in the hot to reduce the amount of temperature by cold affusion and fresh air; or, for the same purpose, to exhibit according to circumstances, an emetic, a purgative, or both in combination. With quinine, arsenic, opium, &c., the interval of comparative health—the period of medium temperature, may be prolonged to an indefinite period, and in that manner may health become established in all diseases—whether, from some special local development, the disorder be denominated mania, epilepsy, croup, cynanche, the

gout, the influenza! In the early stages of disease, to arrest the fever is, in most instances, sufficient for the reduction of every kind of local development. A few rare cases excepted, it is only when the disorder has been of long standing and habitual, that the physician will be compelled to call to his aid the various local measures, which have a relation to the greater or less amount of the temperature of particular parts.

The Unity of Disease was first promulgated by Hippocrates, and for centuries it was the ancient belief. In modern times it found an advocate in the American physician Rush—but except in this instance of unity, betwixt the respective doctrines of both authors and my doctrine of disease there is not a single feature in common. For while the first, from his observation of the resemblance of disorders one to another, inferred that one imaginary humour must be the cause of all complaints—the doctrine of the second was that all disorders consisted in one kind of excitement. The principle of Hippocrates led him to purge and sweat;—that of Rush to bleed, leech, and starve. In practice and in theory I am equally opposed to both. Other physicians doubtless have held the idea of a unity of disease, but neither in the true theory of the nature of morbid action, nor in the principle of the practical application of medical resources have I as yet found the chronothermal system anticipated. The opponents of my doctrines, and those who embrace them by stealth, have alike searched the writings of the ancients in vain to discover a similarity to them in either respect. If it be urged against the author of the chronothermal system of medicine, that he has availed himself of facts collected by others—and that therefore, all is not his, which his system contains—I answer, Facts when disjointed are the mere bricks or materials with which the builders of all systems must work. And to deny to any man the merit of being the architect of a great Edifice of Truth on that account, would be just as reasonable as to ascribe the merit of St. Paul's Cathedral to the donkeys and other beasts of burden Sir Christopher Wren necessarily employed in fetching the marble and mortar composing it. "Merely to collect facts is an easy and mindless task, that any common being can perform; it requires eyes and hands, and almost dispenses with a brain; it is the work of a toiling wretch, who, like the miser, is incapable of using what he possesses. Mere facts lie around even the savage, but he knows not what he sees—and such, precisely such, is the case with the mere learners of the names of

things, the collectors of little facts, the undiscriminating triflers, who think they are cultivating the sciences."—[*Alexander Walker*] It is of these, nevertheless, that our medical clubs and coteries, are chiefly composed, and it is with the conglomerating effusions of these that the editors of the medical press chiefly contrive to keep the daylight of medical truth from the eyes of the student. "Microscopical observations,"—straw splittings, and other little facts you have from their hands in abundance—but facts properly arranged and systemized into a whole or great fact; not only do you never find in their writings—but when you present such great facts to their eyes, they either comprehend them not, or if they do so, they immediately endeavor to steal or stifle the discovery. Out upon such contemptible creatures, fit only to

Suckle fools, and chronicle small beer!

What was the first reception of the chronothermal system by medical men? I do not speak of its reception by the *craie* of the profession—the twaddling intriguing sycophants of country towns—I mean its reception by the medical *aristocracy*, as the Court doctors call themselves. Immediately after its publication, one of these court gentry (James Johnson) misrepresented, ridiculed, and denied it—three years after that another court physician (Holland) attempted, as you have seen, by a side-wind to steal it—three years more passed away and a third court doctor (Forbes) by those meanest arts, misstatement and misquotation, did his little endeavor to stifle it. If such was the candid and gentleman-like conduct of the *town* doctors, what had the chronothermal system of medicine to expect at the hands of the physic-selling profession in the country? What could these intriguing little gossips do but follow in the wake of their town masters, the court physicians? Now they ridiculed it—now they denied it—but all the while they had no hesitation to practice it by stealth, some in one, some in another of its fragments. This moment it was partially true, but not new;—the next, the newness was admitted, the truth denied. But, Gentlemen, up to 1836, when I first published the heads of that system, the profession to a man were utterly ignorant of the very nature of disease. Its periodicity in the case of ague, and in a few other disorders, they knew—the periodicity of all animal movement, whether in health or disease, they knew nothing at all about—and of the mode in which remedies act they were just as ignorant. As to blood-letting, which the great majority of them now admit they did carry too far, the



exclusion of it from the chrono-thermal system, so far from being its principal feature, as some of them pretend, is only a fragmental part that of necessity followed its discovery. I have never taken credit for being the first opponent of the lancet. But one thing in regard to this matter I do claim credit for—I claim credit for being the first man who, by a strong array of facts, and some force of reasoning, produced an impression on the public that all the facts and all the arguments of former opponents of the lancet never before produced on the Profession; namely, an impression of the dangerous nature of the remedy; and whether they like to be told of it or not, I claim to have either convinced or compelled the profession materially to alter their practice.\* In all the late medical reviews of my writings, the subject of blood-letting, which afforded so much mirth to my early critics, has either been kept entirely in the back-ground, or, if noticed at all, my strictures on it are declared to be a mere echo of the present opinions of the profession!—but whether they be so or not, the astute editors of these publications determine that no merit attaches to me for my endeavors to put it down, inasmuch as it had been equally opposed and decryed by somebody of some place or another in Greece, who lived before the time of the Messiah! Gentlemen, to say blood-letting is a bad remedy is one thing; to *prove* it to be bad is another; of force the world to believe and act upon your arguments against it, in the teeth of the opinion of the world, is a still greater achievement. That merit I distinctly claim. The silence and admissions of the medical press on that head equally attest the fact; while the recent bare-faced attempt of Dr. Laycock, under the disguised (?) name of “Vital Periodicity,” to purloin my doctrine of the *Periodic* movement of all *Vitality*, whether in health or disease, is as much a compliment to the genius of its real discoverer as it is a proof of the worth of the discovery. On that

discovery is based the whole chrono-thermal system of medicine.

Before concluding, I will just make a remark upon the subject of the doses of all medicines. Perceiving, as you must have done by this time, the utter impossibility of fretting, in many cases, especially of chronic disease, the particular agent by which you are to obtain amelioration or cure,—and as in almost every case where an agent does not act favorably, it does the reverse—you must see the necessity of commencing your treatment with the smallest available doses of the more potent remedies; of feeling your way, in short, before you venture upon the doses prescribed by the schools. Let me not, for a moment, be supposed to countenance the homœopathic nonsense.—The 12th part of a grain of calomel, for example, is a proper medicine to give to an infant; but such dose has no more relation to the millionth or decillionth part of a grain of the same substance, than the twelfth part of a bottle of wine—one glass—has to a drop of that liquid. The one has power to influence the whole body;—the other is utterly inappreciable beyond the taste it may impart to the tongue, the only organ it can, by any possibility, even momentarily influence.—Gentlemen, pity the Homœopaths!—shun the Pathologists and Bloodsuckers—and follow only that best guide of the physician—Nature! not in the confined sense of our mortal economy, but in every department of her works.—One great principle binds them together—God, in his UNITY, prevades them all!

(For the Director.)

# TRACTS ON CONSUMPTION.

## NUMBER THREE.

On the Cause and Prevention of Tubercular Phthisis.

By J— G—, M D.

\* Even upon the subject of *Apoplexy*, it is amusing to see the manner in which those who formerly advocated the lancet in that disease now end avor to get out of their difficulty. Sir C. Bell, Dr. Clutterbuck, Dr. Marshall Hall, Mr. Wardrop, &c., in recent remarks upon the treatment of apoplexy give so many doubts, *cautions*, and *reservations* as all but to amount to a complete prohibition of the lancet in this disease—not one of them, however, having the boldness to oppose it entirely in direct words, or virtue enough to acknowledge to whom he owes the new light that has so lately come upon him in this matter.—“Awful is the duel between MAN and the Ape in which he lives!”—*Bulwer*.

The term Phthisis, being that of Hippocrates, imports the high antiquity of a certain disease, and the interpretation given of it by Aretæus shows that it is the same which is so alarmingly frequent and fatal at the present day, and characterised as Consumption. The aid which the study of the origin and cause obviously contributes to the accurate knowledge of all the departments of disease must have made an enquiry into this subject coeval with the first observations of Consumption. Moral and physical evils coexist with and exert an agency in producing, per-

haps, every form of disease, and this connexion being obvious to the senses and the understanding they early formed a branch of Medical Science, that includes many of its essential principles. The importance of this connexion is perceived to be such that it may be said, in proportion as the medical practitioner is acquainted with the just relations between its various parts, so will he be enabled to prevent the existence, or to treat with success the diseases which may come under his care. The species into which Hippocrates divided Consumption, embracing as they do the varieties of good classifications of the present day, show that he had diligently endeavored to investigate it; and his book *De Acribus* affords evidence that the physical evil whence it springs had engaged his serious attention. Apparent as it then is, that the cause of consumption did not escape the enquiries of the earliest cultivator of medicine, it still does not appear that he, any more than the countless devotees to medical science who have followed in his steps, discovered any thing in relation to its true nature.

Investigations into the origin and nature of Phthisis Pulmonalis have given authority to the opinion that two things are necessary to its production—a cause which acts on the lungs, and a disposition in the lungs to be acted upon; or in the language of medical men, a predisposing and an exciting cause. The first of these may be regarded as the cause which induces the morbid state of the constitution, giving the name and character of tubercular diathesis; and the second that which determines the local deposition of tuberculous matter. The difference in the operation of the two causes may be illustrated by considering that a person little exposed to the exciting cause may have the constitutional affection long before any local disease becomes manifest; while no degree of exposure to exciting causes will determine the local disease when the constitutional affection does not exist. Of the predisposing causes the most prominent is considered a certain feebleness of constitution, the result of hereditary predisposition to tuberculous formations. Indeed, the great importance given to hereditary influences in the causation of the disease, and the small share which it is believed external agents possess, when hereditary taint is not also present, is the striking peculiarity, in the views of consumption entertained by medical men of the present day.\* Besides this cause, several others

are added, as interference with the nutrition of the body, from deficient or improper diet, absence of sufficient exercise to insure the proper growth and development of the body, or its check from the exhausting and debilitating effects of excessive labor; an imperfectly protected state of the body from inadequate clothing; inattention to cleanliness; gluttony and the abuse of spirituous liquors; and intense affections of the mind. Viewed as predisposing causes, this enumeration of evils is as applicable to any other disease as consumption; and, at any rate, they have been fully and elaborately treated of, and with all the importance due to them, in monograph treatises on the disease. As my object is not to repeat what has been said on Consumption, but to endeavor to find out what ought to be said, I shall dismiss this subject with the remarks, that the terms predisposing and exciting have been found useful in facilitating an understanding of the disease; but if we can determine the true cause of the effect—discover that efficient source of the disease which, when present may be and is followed by it, and which being absent it cannot exist—these terms may, without disadvantage, be banished from medicine.

shows that while no temperament, complexion, or frame of body confers immunity from Consumption; and it is frequently observed to originate in the healthy offspring of healthy parents, the infancy and youth of the children of tuberculous parents are very often characterized by as full a development of the organs and general system, and as active a state of the functions, as in those who are considered free from the supposed taint; while, equally with them, they may die in old age without the supervention of the disease. It must be admitted that the impure nutriment which the foetus derives from the abnormal state of the blood, and the infant, from the milk of a tuberculous mother, may reasonably be regarded as the sources of the disease when it exists at these early periods of life. But as tubercular consumption is far the most frequently developed after puberty, and after the changes of constitution have shown that the effects of diseased fetal or infantile nutriment have for a long time ceased to act, and been superseded, we must look for its cause in some more general, constant and independent source. It is possible to conceive that an impulse to the disease may be present in the materials furnished by one or both parents at a fecundating copulation; but it is impossible to understand how it can remain latent for an indefinite number of years, or, as believed, for one or more generations. The discovery and application of a *causa vera* will obviate the necessity of solving these difficulties.

\* On this subject, so painful to the feelings of parents, it is highly probable physicians have generalized too largely. Observation

This grand cause of Consumption is to be looked for in a vitiation of the atmosphere. The sensible effects produced by this element show that it has a powerful and enduring influence over the terrestrial creation. It is recognised as the chief agent in producing; and as the grand recipient of a large proportion of nature's operations. It is the perpetually working laboratory, in which spontaneous distillation, sublimation, composition and decomposition pursue their eternally recurring revolutions. In addition to the well known chemical elements of its composition, its contents are the mineral vapors from the earth, the products of combustion and respiration and of the volatile exuvia—whether gaseous or fluid—of animal and vegetable decomposition. Besides these vaporous and gaseous productions, we now know that the atmosphere is freighted with countless multitudes of insect ovula and vegetable semina, which, on meeting with a proper nidus, are hatched and developed into organised matter. This is clear to the naturalist, when he observes that stagnant water, though purified by distillation and confined in a marble basin, will, in a short time, become loaded on its surface or about its sides with various species of confervas, while the interior will be peopled with microscopic animalcules. To this thickly inhabited state of the atmosphere has been satisfactorily traced the cause of the rapid and wonderful effects of what, in common language, is called a blight upon plantations and gardens; and of the appearance of lichens and mosses which, in a single night, will line the surface of floors and brick walls.\*

Importance has been given to this subject by many physicians, and particularly the disciples of the Linnean School, having considered organic matters floating in the air, as the direct cause of nearly all the diseases to which both animals and vegetables are subject. More recently Hahnemann, in his *organon*, tells us that almost all chronic diseases are the result of a morbid animal miasm which he calls the *psori* or itch principle. According to Dr. Baron all tubercular disease, originates from vesicular worms, generated in minute serous cysts. This opinion has received a degree of support from the researches and assertions of Dupuy; who states that he has traced the conversion of the Cysts, containing these animals into collections of tuberculous matters. It is some further corroboration of these views, as applicable to consumption to find that animalcules can always be discerned in the Sputa of its victims, while vegetable organizations have

been found connected with the matter effused into the textures in tuberculous constitutions.

Although the atmosphere acts with great energy upon the inorganic materials, and the microscopic productions of our planet, its influence over the two great visible classes of animal and vegetable life is more conspicuously discerned. To animal life it is observed to be more particularly indispensable; without it, respiration is impossible; all its other functions must cease, and death be inevitable. But this fluid so essential to vitality, "this most excellent canopy, this brave overhanging firmament, this majestic roof, fretted with golden fire," is the direct source of the greater position of "the ills that flesh is heir to." Whether organic or inorganic matters be this source of deterioration we may be unable to determine; but enlightened observation, in various parts of the earth, shows that human health cannot be maintained, without a certain degree of chemical purity in the elements of the atmosphere. From the reasons already mentioned, it is evident, the portion of its constituents essential to this purity rarely exists; and, though we do not well understand in what the impurities consist, or the principles on which they act, yet their influence in inducing, at least, those general diseases termed endemic and epidemical, is generally acknowledged.

Uncertain as we are as to the precise nature of the morbid changes of the respirable medium which induce disease, yet they have been always supposed to arise from one of two causes: "either some temporary peculiarity in the constitution of the atmosphere itself, or a mixture of adventitious deleterious matters with it." Illusive as the difference between these two causes has been to the researches of philosophers, it is of unquestionably great importance, as well as to the determination as to which is the true one, because it involves the dearest interests of the human family. If diseases are dependent on the former, it is scarcely possible to conceive that they admit of control, while, if they are generated by the latter, they may be prevented by a simple application of human agency. But the subject in all its bearings is one of the most difficult to elucidate that can be presented by any science, not only on account of the impassable nature, or apparent variety of the causes themselves, but, also, because of the mysterious action which they exert on the living system. Its obscurity gives importance to the investigation, and, while it justifies the labor, requires that it should be examined in detail.

In the early ages of medicine, and before

\* Good's Study of Medicine, vol. i., p. 197.

chemistry existed as a science, the general suffrage of physicians seemed to be in favor of the opinion that some undefined change in the properties of the air, independent of the mixture with any accidental impurities, gave rise to all endemical and epidemical diseases. And it is the general opinion, at this day, that certain states or vicissitudes of the atmosphere, particularly in its temperature or hydrometric condition, may produce sporadic ailments, if not some of general prevalence. Consumption in particular, has been considered not only dependent for its predisposition on a cold, damp and variable climate; but as in an especial manner determined by this cause to its local manifestation in the lungs. The direct and constant exposure of the lungs to this element, would naturally suggest it as the probable source of all their ailments. In corroboration of the apparent truth of this opinion, we find removal from such a climate, as above mentioned, to one which is warm, dry and more equable is well known to be productive of the most beneficial effects to phthisical invalids, where other therapeutic agents are of little avail. "If we take into account also the effect of the continual action a bland atmosphere on the extensive surface of the respiratory organs both as abating irritation of the lungs, and enabling them more effectually to produce those changes in the blood that are essential to health, we have an apparently satisfactory explanation of the results observed." And when, on the other hand, we observe a change from the latter to the former climate, is as frequently attended by a contrary state of the functions and of the circulation, with a deterioration of health, we can scarcely avoid attributing the evil consequences of consumption, to these states of the atmosphere. But it may be said, in modification of these views, that there is reason for believing that consumption is limited to no climate, and scarcely to any country. It is particularly prevalent over the temperate regions of Europe and Northern America, it extends over the isles of the oceans; pervades the northern tropics; and according to recent statistical reports exerts its most destructive influence in the West Indies. If there is any portion of our earth exempt from the direful effects of this terrible disorder, it is the southern hemisphere; and certain facts render it very doubtful whether it prevails endemically, or in that common form of our division that affects the serous tissue, in any part of that region. The different magnetical or electrical condition of that hemisphere justifies the inference that a disease, which we shall show has a direct relation to this state of the earth cannot probably originate in it. This conjecture is sus-

tained by reference to the medical reports of the British army, which show that at the cape of Good Hope, and in Australia, the mortality from this disease is smaller than in any part of the northern hemisphere, in which the subject has been examined with a view to determine this fact. In regard to this proof of the existence of the disease in the southern portion of the world, it must be considered that the estimate is taken from accounts illustrating its prevalence among strangers, and who, in all probability, brought with them the disposition to it. Other medical statistics assert that the disease does not originate in Peru, Quito, or Buenos Ayres. Our information respecting the influence which the different electrical states of the hemispheres exerts over tuberculous disease is too limited and imperfect to enable us to decide how far they are causes of, or furnish exemption from the disease. But the freedom of intercourse, which a long peace and the extension of commerce have been the means of producing, throughout the different parts of the world, has subjected all regions and climates to the acquaintance of accurate and intelligent observers; and it may be reasonably calculated that the data will soon be multiplied from which, upon comparison of one country with another, the real causes of disease may be ascertained. No subject is more worthy of full examination, or would, in all probability, be attended with more important results.

But since the discoveries of chemistry, and more particularly of hydrogen, and the other gases by Cavendish and his followers, the opinion is more probable that atmospheric heat, or moisture, acting alone or together, and even though alternating with cold, is not capable of producing an epidemic, an endemic, or, perhaps, any one of those forms of disease which are commonly ascribed to these causes. To effect such a result something must be superadded to the ordinary constitution of the atmosphere—it is necessary that there should be a morbid condition of the air we breathe, independent of either mere temperature or moisture. That alterations or fluctuations in these phenomena exercise a great influence in the development of diseases admits of no doubt; but alone they can only act as predisposing causes. Besides, observation and research as well as reasoning assure us that during the prevalence of both endemics and epidemics the atmosphere always receives some extraneous accessions, other than either heat or moisture. By taking this comprehensive view of the causes of disease, we act more in harmony with the true system of philosophizing, inasmuch as it refers to a distinct

and palpable relation between the effect and a cause, and by directing our attention to, enables us to approach nearer to the discovery of the nature of atmospheric deterioration.

Though no doubt can be entertained of the agency of atmospherical influences in the production of many diseases and particularly Consumption; yet the manner in which it acts is not easily proved. Whether the deteriorations act directly on the nervous system, or, as I have found reasons for supposing,\* produce their effect primarily on the blood, and through it on the solids of the body, or whether they are all acted upon together and simultaneously, remains for further consideration and research. It is certain that chemical analyses of the atmosphere, rarely, or never present it to our senses as formed simply of those gaseous elements considered essential to its composition. Acting upon every species of mineral, upon every kind and state of animal and vegetable bodies,—the receptacle of myriads of organized substances;—the air we breathe, comes to us loaded with various heterogeneous matters, which, though imperceptible to the analytic chemist, may be supposed to include every form and species of gaseous combination known to us, and others which have yet eluded the researches of the most patient investigators. These extraneous substances so far as known, are most generally compounds of carbon and hydrogen, sulphur and hydrogen, probably all the compounds of metals with hydrogen, selenium and hydrogen, cyanogen, or other compounds of carbon and nitrogen, ammonia, animalcules and microscopic vegetation. Some specific combination of these gaseous and organic products, possessing peculiar qualities, and imparting a peculiar vitiation to the air, is undoubtedly the cause of both endemical and epidemical diseases. The evidence of this appears in the similarity of soil, and general elements of climate necessary to the production of diseases, as well as in the analogy, or identity, all over the earth, of the several forms of disease referred to vitiation of the atmosphere for their origin. But as these combinations undergo constant decomposition, and form new compounds as soon as dissolved, even under the process of analization, it is impossible with our present knowledge, and may always be so to define the kinds or quantities of matters necessary to produce the variety of ailments dependent upon vitiation of the atmosphere. Unsatisfactory as have been antecedent discoveries, or future may continue to be, it is

still useful to be able to establish the position, that, from the contemporaneous existence of most diseases, with peculiar conditions of the atmosphere, they are undoubtedly connected with extraneous aerial absorptions.

But though atmospherical impurities are a very great, and the chief source of the diseases to which the human frame is liable; yet it is not by their direct action on any part of the system, that they produce their deleterious operation. No one of these gases, nor any combination of them administered artificially will produce an intermittent fever, the influenza, or consumption. It is true that effects somewhat similar have been observed to arise from the respiration of particular gases; but however analogous in appearance they cannot be considered identical; resembling diseases of particular names in many of their phenomena, but still so different as to be unlike both in nature and consequences. It is by the electrical states induced in the atmosphere by combination of gases, vapors and organized substances, too complex for human ingenuity to imitate; that the respiratory organs, and through them the blood, and through that fluid the energy of all parts of the system is affected, and the phenomena of disease become apparent. If we consider that the facts connected with animal life, accumulated by modern physiologists, point to and authorise the opinion that vitality is but an exalted electrical state, in which electricity as known to the experimental philosopher, galvanism, magnetism, chemistry, and the common physical laws of matter are subordinate and contributory, we shall not hesitate to recognize the probability, that the presence of an agent, partaking of the same character, and existing in undue quantities, must modify its action, and thus form the true and ultimate source of diseases.

The energy of electricity and its known influence over organized matter, whether animal or vegetable, must convince us that any deficiency or redundancy of it in the air we breathe cannot be long endured, especially by the feeble, without the most injurious consequences. When the constitution is enervated and possesses that character which is denominated the tubercular diathesis, all the parts of the economy partake of the debility, and any defect in what is essential to the due elaboration and perfection of the animal fluids, and to the energy of the nervous power, as of electricity, is felt with greater force, and is productive of much more injury than in sound health. A redundancy of the vivifying influence of electricity must favor the formation and development of morbid accumulations, like tuber-

\* See Number 2, Page 22 of this Volume.

cles in the system; for it is rendered almost certain by a variety of facts that the proper performance of the functions in the human body requires a fixed quantity of this fluid. This has been proved by Dr. Wilson Philip and others in numerous experiments on animals, though it must be admitted, not so clearly, or to the same extent, as in its well marked effects on the growth and properties of plants. It has been distinctly observed that under its action the animal functions are discharged with increased vigor, particularly the circulation of the blood, and the cutaneous secretion. Observations such as these and many others of a similar description, which might be quoted, demonstrate very completely that the animal machine is sensibly affected by electricity; and there is nothing improbable in the conjecture that its varying states in the atmosphere is the cause of the salubrity or insalubrity of particular districts and seasons, the existence and character of epidemic and endemic diseases, and hence may be inferred, is the cause of all diseases.

Recent researches into the laws of electricity show that it is developed, and its quantity modified by every change in the form and composition of substances. The combustion of charcoal, hydrogen, alcohol, oil and other inflammables imparts positive electricity in abundance to the portion of air with which its products is mixed. The volatilization of metals, and even the evaporation of water, at least from substances susceptible of chemical change, are sources from which the atmosphere becomes charged with an excess of electricity. Indeed, the researches of Becquerel and others authorize the conclusion that electricity is evolved in all cases of chemical solution whether by liquids or acriform fluids; and it is even contended that variations of atmospheric temperature, and barometrical pressure develop it. When these are the ascertained facts arising from means so simple on a scale so limited, we may reasonably suppose that the changes of form and chemical composition which take place from the decomposition and volatilization of the immense variety of substances on which the atmosphere acts, or is the receptacle, must be productive of much more energetically electrical effects. In the northern hemisphere, and with an hydro-metrical state of the atmosphere admitting of the use of our instruments, it always indicates positive electricity, and Mr. Daniel states that it has been ascertained its intensity is subject to regular variations. These variations, it is believed, are found to correspond with those periods of the day in which, from the action of the sun, the eman-

ations from the earth arrive at their maximum and minimum at the atmospheric elevation in which the experiment is made. Experiments on this interesting branch of science must be multiplied before we can acquire data on which we can reason with absolute precision; and certainly no subject holds out a prospect of results that would be more gratifying to the physician, or more beneficial to mankind.

The fluctuations in intensity of this positive electrical state of the atmosphere, by acting on and modifying the vital electricity of the animal system, produce corresponding changes in it, and thus induce the immense variety and modification in individuals of those diseases which are considered dependent for their existence on atmospheric influence. Its long continued action must sooner or later affect the whole mass of the blood, and thus cause that cachectic state constituting the tubercular diathesis, from which springs the positive and expanded condition of the capillaries in the lungs or other weakened organs, and which, it has been shown is the proximate cause of tubercles. As different elements of soil, plants and animals exist in different climates and different parts of the world, so, no doubt, their decomposition and volatilization generate different electrical states of the atmosphere, but always maintaining a greater or less conformity with the local circumstances. Consumption is one of the most prominent of the diseases originating in and influenced by the atmosphere, is connected with and dependent upon an electro-positive state of that element.

This view of the cause of Consumption is strengthened by the known electrical condition of the atmosphere in some countries—as in England—in which it is peculiarly prevalent; by a rational consideration of many of its characteristics; and as has been referred to before, by the effects of remedies in subduing it.\* To the comparatively negative, or at least, different electrical state of the air over marshy parts of a country, where intermittent and remittent fevers are frequent, we may reasonably attribute the less liability of their inhabitants to Consumption, as well as the advantages such situations possess over the air of mountains for consumptive invalids. And to some such operation we must look for an explanation of the singular and salutary effect excited by a hurricane at Barbadoes, in 1780, which produced such a change upon the air that (according to Sir Gilbert Blane) some who were laboring under incipient consumption were cured by it, while others, who had reached a more advanced stage, were deci-

daily relieved, and freed from many of their symptoms.

The view of the cause of consumption we have adopted, has before come within the scope of medical surmise; but the subject has been considered so intangible that however interesting as a scientific fact its existence may be, it has been deemed insusceptible of practical application. Though, in truth, no discovery in medicine, nor in nature could be of more value to the interests of humanity than to be able to identify the cause of consumption with a certain electrical state of the atmosphere, the suggestion of the possibility of such a connection has been dismissed as a fruitless conjecture. Opinions in this respect have, however, recently undergone a change. Improvements in the construction of electrical apparatus have furnished us with means of research sufficiently delicate to enable us to observe the variations in the electrical state of the atmosphere with as much accuracy as those which occur to its temperature and pressure; and they will no doubt, henceforth, be registered with as much diligence as those phenomena have heretofore been. But in examining the cause with a view to the prevention of consumption, it is fortunately of comparatively little importance for practical purposes, whether it consists in the forces of matter, or in matter itself—organic or inorganic—because, in the present state of our knowledge, we can only act upon matter. The removal of the cause of consumption, and consequently the means of preventing it are dependent upon our ability to render the air we breathe respirably pure; this condition being alike incompatible with the existence in it of noxious exhalations, and that electrical state which acts injuriously on the vital powers.

A review of the history of consumption induces, irresistibly, the mortifying conclusion that there is no disease over which medical art has exercised less power, than in fact all medical treatment, if not positively injurious, has been of no avail—and that all its reputed salutary effects have been imaginary or deceptive. Experience, the great test of the useful, has rendered the opinion general, that any control over it, exercised by the physician, has consisted more in abolishing pernicious practices than in ascertaining any positive methods of lessening its fatality. If there is an exception to this sweeping charge of the inutility of the physician, it consists in his power to correct that derangement of the digestive functions which sensibly modifies and perhaps is modified by the disease, and which, being the result of an undue indulgence of the appetites and passions, like the agency employed, is artificial, and the

proper subject for human control. But though the beneficial effects of treatment on this principle, in lessening suffering, is undeniable, it has no tendency to cure the disease. If it is necessary that we should be able clearly to discern and to understand what it is, in every malady that must be removed or changed in order to restore health, how can we justly pretend to remedy consumption when its pathology is so unsatisfactory and unsettled that nothing can be conceived more contradictory than the various views that have been given to the world? Instead of an undoubted, well regulated, or even plausible theory of the true state of the body, on which we have been attempting to operate with our remedies, we have been left to the fallacious guidance of a multitude of unconvincing conjectures. Justly confident of the utility of their profession, as physicians generally are, and proud as many of them may be of their individual skill, all must acknowledge, that consumption has hitherto, mocked alike the scientific efforts of the enlightened physician, and the presumptuous labors of the empiric. The unmanageable symptoms of this disease, plunge the most learned and experienced physician, called upon to treat them, into doubt and despondency; while its universal termination in death, has, in this enquiring age, created in both the medical and non-medical public, a demand for some mode of managing it, radically different from those in practice.

This urgent want of a means by which the mortality from this dreadful malady may be diminished, has incited physicians to look to prevention as the most probable agent by which they can attain this object. Prevention of disease is, indeed, independent of relief from the suffering, which in a greater or less degree, accompanies every malady, of greater consequence to society than its cure. "That must be a decided improvement in the art of medicine which provides the means of preventing diseases;" and, we trust, the time will soon arrive when the attention of medical men will be turned as much to the former, as in all past time it has been directed to the latter. On the progress which may yet be expected in this, in connexion with the former line of enquiry comprised in this article, in both of which our success has been hitherto very limited, depend our chief hopes of the increasing usefulness and efficacy of the medical art in the treatment of consumption. The investigation and discovery of its cause will teach us the nature of the influence under which the vital properties of the fluids, and the vital actions of the solids of the body become liable to deviations from their natural and healthy state, and will suggest

the only principles on which a hope of cure can be based; while the application of the means of prevention may be made to intercept the diseased actions of which the body is susceptible in this disease.

Under the head of prevention, in systematic treatises on Consumption, arresting the causes of the disease is the avowed principle of action; but, in defining them, we find that the predisposing have been confounded with the *causa vera*, and even with exciting causes. Influenced by this error, writers have been profuse in their directions regarding the means and importance of securing athletic health to parents; of maintaining the health of the mother during pregnancy; of a proper regulation of the food, clothing and residence of infants; of suitable dress, exercise and education of youth, &c. All the minute attention and advice which have been directed to this subject, are not only useful to those predisposed to consumption, but acting upon them would undoubtedly produce a beneficial effect upon society at large. They are, however, better calculated to make a book than to prevent a single case of consumption. But we contend that as it may be considered an ascertained fact that consumption is directly dependent on a vitiated state of the atmosphere, therefore, it must be equally maintained, that by changing this state, *sublata causa tollitur effectus*. in that portion of atmosphere employed in supplying the respiratory necessities of man we must prevent its existence. Vast as the evil is, and wholly as it has heretofore been beyond the control of man there is, in this principle, an undoubted means of preventing consumption, the truth and practicability of which it will be the object of this portion of our communication to demonstrate.

As the only rational means of preventing maladies must be founded on some plan for preventing the generation of their cause, or of turning it aside, we propose to show how the cause of consumption may be rendered innocuous, and consequently how the disease itself may be anticipated and superceded. The discovery of the precise nature of this cause is essential to a perfect knowledge of the subject, though, perhaps, not indispensable to the successful application of our principle for obviating the disease. Although the process we propose to use for preventing consumption is also better adapted than any previous devise for enabling us to ascertain all the chemical properties of the atmosphere and through them its electrical state, and thence its cause, we have already shown that we cannot pretend to have determined them. Even if our invention be fully adequate to solve the subtle and recondite ques-

tion, we have not yet had time or conveniences for making the requisite experiments. All the circumstances, at present known, connected with consumption, concur in establishing, while no one can be said to be in opposition to the view we have taken, that it is dependent upon an electro-positive state of the atmosphere; and thus it fulfils the fundamental condition of a theory, or in other words of a truth. But whether this electrical state is induced by one or more vaporous or gaseous solutions in the atmosphere, by organized substances floating in it or by the assemblage and mutual action of the whole, must still be classed among those arcana of nature, which will only reveal themselves to time and an adequate means of investigation. We know the terrible effects of this cause, and we know that, as in all similar phenomena, an accurate acuity of these effects must precede any safe reasoning or useful experiments on its nature.

To subvert the original cause of consumption it is only necessary to put forth an amount of industry and ingenuity in the construction of our habitations, and their adaptation to domestic comfort equal to that employed for the simple but indispensable purpose of warming them in cold climates. But instead of building for the purpose of counteracting the cold of winter almost exclusively in view, we must pay equal attention to our comfort in summer, and, by providing an adequate supply of pure air, make all subservient to the security of health. The ends to be attained by these great objects are embraced in our remedy. Let our houses, in every climate, be built with a thorough regard to insulation, and an exclusion of the external impure atmosphere with its excesses of temperature, and let a labor and expense like that for elevating the internal temperature, be incurred in lowering temperature, and freeing air from excessive moisture and extraneous exhalations, and thus rendering it respirably pure, and the occupants would incur little or no risk of consumption. By applying a process, which will be explained as we advance in our labors, an abundant supply of pure air, combined with the means of moderating temperature in summer and aiding in exalting it in winter, may be obtained—a process which, if at present overlooked, or from its simplicity deemed inadequate to effect the objects in view, will, we feel confident, sooner or later receive the suffrages of mankind.

The testimony in regard to Consumption abundantly shows that atmospheric contamination arising from extraneous impurities is the original, or at least, an indispensable, co-operating cause of the disease; and it



must be equally obvious that its purification is sufficient to prevent or put an end to the production of this cause, and it follows of course to the disease itself.

The means by which we propose to counteract the evils of an impure atmosphere, so as to prevent, or at least moderate, the liability to so terrible a disease as Consumption, consists essentially in subjecting the portion of atmosphere employed in respiration to mechanical condensation. Physical science teaches us that mechanical pressure is one of the best means of divesting air of condensable vapors. It is well known that equal volumes of air, whatever may be their respective densities, the temperature being the same, have equal capacities for vapor; so that a cubic yard of air, under a pressure of four, eight, or any number of atmospheres, will, *cæteris paribus*, hold no more watery vapor in solution than one under the ordinary pressure of a single atmosphere. By condensing four cubic yards of air into the space of one, its capacity for retaining water in solution, the temperature remaining the same, must be diminished to one fourth its previous power, and, consequently, if before saturated, it must precipitate three fourths of the water it contains. The same law undoubtedly holds with regard to all other vaporous solutions, and it is probable has a similar operation upon solid matters, in the air, retained in suspension.

The atmosphere, in its ordinary condition, always contains aqueous moisture, and a variety of other impurities, which have already been mentioned. It would seem to be a provision of nature that all the exhalations from the earth, capable of acting injuriously on the human system, should be condensable by pressure; and therefore removable from the mass of respirable air by human agency. If we force into a reservoir a large quantity of highly condensed atmospheric air, and then drain from the bottom the moisture that has been precipitated by the condensation, it is evident that by this process air may be as thoroughly depurated of vaporous solutions, as water of solid matters, by filtering or by distillation. Even that adventitious, though constant, and for the purpose of respiration, probably deleterious component of the atmosphere, carbonic acid gas, may be condensed into a liquid, by a very high degree of pressure, and withdrawn from a mass of air employed in respiration. Air thus freed from injurious admixtures may, in order to impart to it a proper degree of hygeometric moisture, be exposed to pure in the place of the impure water previously held in solution—the quantity of which it is capable of absorbing must be equal to that it lost in its condensation.

Extraneous matters in the atmosphere are not in any circumstances essential to its healthful composition. On the contrary, they impart to it properties resembling their own, which, in proportion to the quantities in which they exist in it, are injurious to the animal system. None of these extraneous substances, so far as known or suspected, require so great a mechanical pressure for its condensation as carbonic acid, and therefore, if this gas can be separated from atmospheric air by mechanical agency, we can have no difficulty in rendering adequate quantities of it respirably pure. The separation of the liquid, or perhaps solid and organic substances that are diffused through the atmosphere, and the knowledge of their properties that may thereby be obtained, will afford just ground for determining the minute constituents of the air, the quantities and nature of its deteriorations, the mode by which they operate in the production of diseases, and hence the certain means of preventing them. Heretofore, the physician, in seeking for the cause of distempers, could argue only from effects, but with the means of divesting thousands or hundreds of thousands of cubic yards of air of its impurities, in his possession, he may compel the cause of disease to put on a tangible shape, and by developing its secret power, teach us to demonstrate and neutralize its effects on the animal economy.

To determine the value of any scheme, we must ascertain the full extent of the means that are required to effect its objects, and whether it is within our power to reach the end to be attained. It would be useless to devise a process for even preventing a mortal disease, if it could not be acted upon without an expense which would render the plan unattainable, and it would be of diminished practical utility in proportion as it did not admit of being applied to general use. In a plan for preventing a disease arising from the respiration of impure air, we must take into consideration the quantity of cause necessary to produce the effect, or, in other words, the amount of pure air that must be substituted to prevent it. All are aware that the respiration of pure air is essential to the preservation of good health, and that its purity and salubrity depend, in a great measure, upon its freedom from foreign matters, and a due proportion of oxygen gas. We know, too, that air may be more suddenly and destructively contaminated, where the processes of respiration and combustion are going on, than by the most abundant production of animal and vegetable decomposition. To maintain it in its purity, under any of these circumstances, frequent change is necessary. This change, it is true, may be

caused to a further extent than is necessary, or even salutary; it may be administered, like any other medicament, too copiously; and as we propose to effect purification as well as change of air, which cannot be done but at some cost, we have no desire of carrying them beyond the point of utility. To make our meaning more evident, it is necessary to recapitulate some facts that, though they may appear to have but an indirect, have an important connexion with the principles on which the proposed means of preventing Consumption are founded. They are all necessarily based upon the quantity of atmospheric air used in human respiration.

The quantity of pure air requisite for the respiration of an individual cannot be accurately determined, since it varies according to his constitution, the temperature of the air, the condition of his stomach as regards fulness or depletion, and numerous other extraneous circumstances that must always regulate the quantity which it is desirable to supply. In systematic works on ventilation, the estimates greatly exceed the amount that it would be necessary or even desirable to provide for the respiration of invalids, or healthy persons not in exercise. Contrary to the representations that have been uniformly made on this subject, it is possible as already intimated, to carry ventilation to an injurious extreme, and to shorten rather than prolong life by too much fresh, and even pure air. Startling and paradoxical as this position may seem, it is borne out by many analogies in nature. The composition of the atmosphere, as well as the whole process of respiration, shows that but a limited quantity of oxygen is necessary for the healthy exercise of that function. Oxygen exists in the atmosphere in the proportion of but one to four of all the gases; and the quantity of nitrogen and carbonic acid, which remain in the lungs after each expiration, show that these gases are not absolutely injurious, while they authorise the inference that air may be too pure as well as too impure for respiration. Dr. Liebig, in his animal chemistry, demonstrates that oxygen exerts such an affinity for all parts of the animal frame, that it would inevitably consume it, unless its utmost demands were supplied by food; and as there is a limit to the power of assimilating food, it is clear, on this view of the subject, that the admission of oxygen into the lungs may be carried to an injurious excess. As a candle in the ordinary and quiet state of the atmosphere, burns with a mild and sufficient light, giving to it the duration called for by the demands of economy, while if immersed in oxygen gas, it is rapidly consumed in surpassing splendor, and even in frequent

change of the air surrounding it ~~flashes away~~; so the human frame in this gas, or in too great supply of fresh air, must have its energies more actively exerted, but the more rapidly exhausted. There is a proper medium between the lurid flame and the splendid light—the feeble change of the system from an insufficiency of respiration, and its rapid consumption from excess—which, if attainable, would give the proper supply of air; but as the requisite quantity is ever varying, even in the same individuals, with changing circumstances, it is hopeless to expect that any fixed standard can be attained.

It is ordinarily calculated that a human adult employs in respiration an average of about four hundred cubic inches of air a minute, and consequently nearly fourteen cubic feet in an hour, or about twelve cubic yards a day. This, then, is the minimum quantity of pure air that ought to be furnished to him daily. But he also saturates a certain quantity with moisture, and renders it unfit for absorbing more, and as a necessary deduction, for one of the purposes of respiration. Therefore, in addition to the amount each adult requires for daily consumption, it is desirable to change as much of the air in his residence, as the moisture given off by the lungs and by cutaneous transpiration, would saturate in the same time. If we consider that as soon as the air we respire becomes diffused through and attains the same temperature as the atmosphere, a portion of its vapor becomes redundant, and must be precipitated or otherwise discharged, we shall probably find, difficult as the accurate determination of the fact may be, that the moisture given off in this way does not require, at the most, more than half a cubic foot of dry air a minute to absorb it. Hence it may be calculated that not more than seven hundred and twenty cubic feet, or twenty-six cubic yards of pure and dry air can be required, daily, for all the purposes of respiration by each adult that may be in a habitation. Now the power of ventilating a house or room should be proportioned to the number of persons that occupy it; but it is obvious that a calculation which supposes the average number of adult inhabitants that remain in a habitation continuously, throughout the twenty-four hours, to be ten, and allows twenty-six cubic yards of pure air for the respiration of each individual, must be amply sufficient. It will be shown hereafter that by our means there will be no difficulty in producing this quantity, or, if desirable and not injurious, two, four, eight, or more times that much to every person that usually inhabits a house.

Besides the purification of air which is

ness from its compression and draining off its deposits, there are the accompanying advantages of an evolution of heat from the compression, and a generation of cold from its subsequent expansion, both of which, and particularly the latter, may be applied to moderate the temperature of a dwelling. The elements of physics teach us that condensation is an invariable source of heat, and every student of the science knows that the compression of the gases furnishes it in considerable quantity. It is evident, then, that there is in the principle of mechanical condensation a means by which heat may be obtained without fuel from air; and, by increasing the pressure and quantity, to any extent we may please. Little important as this fact is in a practical point of view, from the cheapness of fuel all over the world, we shall hereafter show that the result can be obtained by a comparatively small consumption of mechanical power, and, as a consequence, of expense.

Whenever, or wherever, air which has been condensed is allowed to escape, it will expand into the volume it occupied previous to its condensation, and, in the process, the quantity of heat which was previously extracted from it, will be absorbed from all surrounding substances and rendered latent. It is a matter of indifference whether the expansion take place rapidly or slowly, at one temperature or another, the amount of heat absorbed by equal expansions of equal volumes, is a constant quantity, the only difference being that the amount absorbed is taken up in unequal times. The importance to invalids, of a diminished summer heat is not less than an increase of winter temperature; and we propose to obtain the former of these ends by the rarefaction and distribution of air throughout the rooms of a house, asylum, &c., of atmospheric air, previously subjected to mechanical condensation.

High atmospheric air is acknowledged to have a powerful effect in predisposing to consumption. This condition of the atmosphere with its invariable accompaniment—a diminished supply of oxygen, and an increased quantity of moisture in the volume of air used in respiration, act injuriously upon the constitution of the Caucasian race, and, if long continued, induce that feebleness which subjects the human system to the liability of falling an easy prey to the cause of consumption. Upon the inhabitants of very hot countries, as the Malays and Negroes, this effect is more marked. In confirmation of this opinion, it may be cited that both these races are well known to be much more subject to tuberculous disease than Europeans,

when exposed to the same causes.\* The languor and debility which invariably affect all the varieties of the human race, subjected to the over-stimulation of long-continued high states of the thermometer, deranges sooner or later, all the functions; and if they are not restored to their healthy action by a remission of heat, or the withdrawing of an equivalent stimulus of other kind, they will be liable to be destroyed by the slightest external influence. The value, then, of a principle which, besides rendering air respirably pure, proposes to modify temperature to our comfort as well as security, can, if physical effects are invariably dependent on physical causes, be readily appreciated.

The quantity of caloric evolved by the condensation of a column of air, and consequently the quantity absorbed by its expansion, is the next subject to which we must give consideration, in order to determine the value of our scheme both as a prophylactic and as a source of refrigeration. A variety of experiments, conducted by the most eminent philosophers, have been made with a view to resolve these questions in physical science. For the purpose before us, these investigations are of much importance, because upon their result depends the value of our researches into the means of rendering a sufficient portion of the atmosphere for practical purposes, respirably pure. We confess that to solve these and their consequent problems with accuracy, is exceedingly difficult, and, on this account, the various experiments undertaken with the view are by no means found uniform in their results. Air may be condensed and dilated an indefinite number of times, and there will be a simultaneous and proportional diffusion or absorption of its heat; and in a quantity as well as intensity, which probably admits of being equal in both instances, certainly in the production of cold, to the greatest degree that they are capable of being generated by art. But though the heat evolved by condensation and absorbed by the rarefaction of air is equal and invariable, the experiments to demonstrate these facts require a particular manner of performance to make the results apparent and uniform. In consequence of this difficulty (of which it does not belong to this Journal to treat) the quantity of caloric assigned to the condensation of air, or the quantity absorbed by its rarefaction, has not yet been ascertained with any results approaching to undoubted certainty. The deductions from such experiments as have been made, show a variance so large as in the proportion of one to five or upwards. It is

\* Clarke on Consumption, p. 157.

true the mode of experimenting or of reasoning has not been uniform. Different philosophers have employed different means of investigation; but this affords only additional evidence of the uncertainty that must attach to the apparent results. The instrument which we have devised for purifying and refrigerating the air we breathe, has a peculiar fitness for aiding us in determining this question with great accuracy; and, at some future day, we intend to institute a series of experiments necessary for the attainment of this desirable object, the result of which, we shall give to the public through the columns of this journal. A powerful one, well planned for illustrating the principle has already been made, but owing to errors and defects in its construction incidental, perhaps, to every new engine, and to a novitiate intercourse with working mechanics, it requires alterations to enable it to be used with all the advantages it is capable of affording. The result of a number of experiments that have been made with it accords with the testimony furnished by other experiments that air gains and loses, at least  $180^{\circ}$  F, for every time its volume is reduced to one half or rarefied into two volumes; while it is probable that the large amount of  $280^{\circ}$ , for the same changes, assigned to it by Guy Lussac, does not exceed the reality. The smaller of these amounts would be sufficient to establish the utility of employing condensed air for cooling, and ventilating houses.

This engine is simple in its construction, requires but a small expense of power, admits of being complete in its operation, and its parts, if well made, are not liable to get out of order, or to be injured by wear. It consists, essentially, of two double acting force pumps—one for condensing, and the other for rarefying air—both connected with a common beam or axle—and an air magazine or receptacle for condensed air. By this principle of construction, the pressures on the pistons in the cylinders, when the machine is in operation, are made to oppose each other, and the power consumed in the former is reclaimed in the latter, and made, as far as possible, to reproduce the original effect. This method of working the machine is important for the production of refrigeration; by no other known means than such as admit of the mechanical effect of expanding air being obtained, can the cooling power of dilatation be made apparent under all circumstances. The machine may be placed in any part of a house; but it is obvious that for supplying it with cooled air, the nearer the roof the better. By such an arrangement the heat squeezed out of the condensed air, would unite with the air round it, and, from

its levity, ascend in the atmosphere above the height to affect human comfort; while the heat absorbed by the expanding air, as it descended by its gravity, must be derived from the objects which it is desirous to cool.

To put the apparatus in operation, it will be necessary to pump air into the reservoir to the pressure at which it is intended to be worked, say two, four, eight or sixteen atmospheres. When this point is attained, the condensing pump is made to force another of its measures of air into the reservoir. As this latter vessel is constructed with a balance valve, at a point where it communicates with the expanding pump accurately loaded with a weight equal to the pressure of air within it, or, what is much better, furnished with an accurately adjusted cut off, it allows as much air to escape into the expanding pump, as the reservoir receives from the condensing cylinder. In the expanding cylinder the air received will tend to dilate into the volume it occupied under the atmospheric pressure, and, according to the law discovered by Boyle, will, in the act, exert the same mechanical force that was required to condense it. With every succeeding motion of the piston in the condensing pump, its measure of air must be found in the reservoir, and, at the same time, an equal quantity must flow through the balance valve with or by means of the cut off, with a repetition of its mechanical effect on the piston, into the expanding pump.

The quantity of air condensed and expanded and consequently the extent of refrigeration, produced by an engine of this description, depends upon the area of the cylinders, the length of the stroke, and the number of strokes in a given time and the tension at which it is worked. As the size of the pumps can be proportioned to any demand for air, a due consideration of the circumstance may enable us to adapt the engine not only to dwelling houses, but also to hospitals, asylums for the predisposed, schools, large manufactories, churches, prisons, or fortresses. The dimensions deemed fully sufficient for a house of an ordinary size are as follows:—The diameter of the cylinders should be four inches, and the length of the stroke about two feet. Pumps of this size will have a capacity of about three hundred cubic inches; and if we consider them as making sixty double strokes a minute, they will condense and expand about twenty cubic feet of air a minute, forty-five cubic yards an hour, and upwards of a thousand cubic yards a day. Working at a tension of two atmospheres they would, theoretically, furnish one thousand cubic yards of air a day cooled at least  $180$  degrees F below the

natural temperature, or would produce a quantity of cold equivalent to the production of about six hundred and forty pounds of ice. Practically they have been found, working at the above tension, and with a mechanical force equivalent to that of two men, with the atmosphere temperature at 80 degrees F, to pour out air, at the rate of a thousand cubic yards a day, cooled down to 10 degrees F below zero. According to either the theoretical or practical datum, and after making large allowances for the conducting power of the walls of a house, for the animal heat generated by the inhabitants, and for every other usual source of heat, it must be evident that there is in this principle of refrigeration and ventilation, the means of commanding under Summer, even if tropical heat, the most desirable mean temperature. It is proper to remark that though the process of reasoning, by which the best plan for constructing the machine was arrived at was simple, yet the effects were not obtained without repeated trials and failures; while there are many appliances besides the essential principles already mentioned, requisite to give complete efficiency to it, which it is not necessary at this time to describe.

Such are the only measures which, in the opinion of the writer, are calculated to prevent that particular morbid state of the constitution on which the terrible disease characterized as tubercular phthisis depends. Regarding this constitutional state as originating in an electrical condition of the atmosphere, dependent upon the presence of extraneous impurities, it is obvious that if this be true, and we can subvert this condition, we must be able effectually to prevent the disease. Our plan provides the means by which atmospheric air may be divested of aqueous moisture, and all condensible gases, while the process may be made to aid in elevating the natural temperature of winter, or of moderating that of summer in a limited space like that of a dwelling house, a hospital, or a public school. It will possess to the invalid more than the advantages of migration to a climate reported to be most favorable to his condition, while it may be made to enable the native of either the tropical or frigid zones to breathe in any climate, an atmosphere having an approximation to the temperature of his own. And all these effects, except the elevation of temperature, can be made to comport with the measure of our wants as easily and at as moderate expense, as the natural temperature of cold climates can be raised to an equal degree in similar spaces.

The machine we have alluded to, may be worked by manual, horse, water, or steam

power; but in order that its effects may be obtained at the least possible expense, the preferable power would be the wind. Horizontal sails capable of receiving from the wind a mean force equivalent to the power of two men and applied to the engine, would be adequate to condense with all the attendant frictions and losses of power, a thousand cubic yards of air a day, under a tension of two atmospheres; nor on the principle of construction adopted would an increase of tension materially increase the demand for power. Such sails would be so small, and could, by a slight modification of the present means of constructing roofs, be so easily screened from view, that they would present no unsightly object. In regard to the expense attending its operation, if we consider that the materials employed are simply air, or air and water, and that the mechanical agent is the wind, the only cost will be that of the machine and the oil and labor it will take to lubricate it. The cost of the engine and the appliances for making the necessary distribution of air, would not be greater than for fire places, grates, and chimneys of a well-built modern dwelling. As an enterprize of benevolence, or as a pecuniary speculation, constructing an asylum for the reception of consumptive invalids, or the predisposed to that disease, might in this age of difficult investment of capital, be an object of consideration. The natural laws on which this scheme for preventing Consumption is based, certainly exist, and therefore if we can at this small expense obtain a rational hope of modifying or subverting them, so as to render them innocuous, it is worthy of the assent and practical adoption of mankind, or at least its careful examination. If it shall have the effect of superseding the cruel, absurd and homicidal practice of sending pulmonary invalids to a foreign land and a hurried grave, it will have conferred incalculable benefits on mankind.

#### MAGNETISING MEDICINE, TRIUMPH OF SCIENCE.

The following article is extracted from a London publication entitled "The Popular Record of Modern Science." The book from which the extracts are taken is written by Professor Gregory, of Edinburgh, a gentleman held in high estimation for his scientific acquirements, and a son of the celebrated Dr. Gregory.

#### RESEARCHES ON MAGNETISM.

A contribution to science of far more than ordinary interest, has this week been furnished by Professor Gregory, of the univer-

sity of Edinburgh, in a comprehensive statement of the researches of Baron Von Reichenbach on "Magnetism and certain allied subjects." It appears that, while travelling on the continent last summer. Dr. Gregory's attention was directed to a detail of Baron Von Reichenbach's experiments, just published in the "Annalen der Chemie und Pharmacie," a periodical of the highest rank, conducted by Baron Liebig and Professor Wohler.—The conclusions to be derived from these experiments were of the most startling character; but Dr. Gregory being aware of Reichenbach's character for minute accuracy and untiring perseverance, and of his reputation among chemists, in consequence of his laborious and successful researches on the tar of wood and of coal, which made us acquainted with creosote and many other new compounds, could not for one moment hesitate to receive the facts on which they rested. He felt anxious, therefore, on his return to Scotland in October last, that these experiments should be made known, and while preparing a translation of Reichenbach's statements, he took the opportunity of describing, in two lectures to a numerous audience, a considerable part of the results obtained. The fame of these lectures spread to London, and coming as it did at a time when discoveries by Faraday and Hunt had already excited the public mind upon the subject, the greatest interest was felt for further information. This information is now supplied, and it is of a character to awaken the liveliest gratification, as opening up a new and inexhaustible field for philosophical inquiry.

Baron Von Reichenbach's experiments originated in his having the opportunity of studying a patient, Madlle. Nowotny, aged 25, subject for eight years to increasing headaches, and latterly affected with cataleptic fits, accompanied with spasms. She possessed a remarkable acuteness of the senses, could not endure the daylight, and in a dark night perceived her room as well lighted as it appeared to others in the twilight, so that she could even distinguish colors. She was also very sensitive in various ways to the influence of the magnet. Struck with these things, and remembering that the aurora borealis appears to be a phenomena connected with terrestrial magnetism, or electro-

magnetism, it occurred to him that possibly a patient of such acuteness of vision might see some luminous phenomenon about the magnet. Dr. Von Eisenstein, (the physician in attendance?) afforded every facility, and experiments were accordingly commenced.

"The first trial was made by the patient's father. In profound darkness, a horse-shoe magnet of nine elements, capable of carrying eighty pounds, was presented to the patient, the armature being removed; she saw a distinct and continued luminous appearance, which uniformly disappeared when the armature was applied.

"The second experiment was made as follows, on her recovery from a cataleptic attack, when the excitability of her senses was greatest. The room being artificially darkened, and the candles extinguished before the fit was ended, the magnet was placed on a table, ten feet from the patient, with the poles upwards, and the armature removed. None of the bystanders could see anything whatever, but the patient saw two luminous objects, one at each pole, which disappeared on joining the poles, and reappeared on removing the armature. At the moment of breaking contact, the light was somewhat stronger. The appearance was the same at both poles, without any apparent tendency to unite. Next to the metal she described a luminous vapor, surrounded by rays, which rays were in constant shooting motion, lengthening and shortening themselves incessantly, and presenting, as she said, a singularly beautiful appearance. There was no resemblance to an ordinary fire; the color of the light was nearly pure white, sometimes mixed with iridescent colors, the whole more like the light of the sun than that of a fire. The light was dense and brighter towards the middle of the edges of the ends of the magnet, than towards the corners, where the rays formed bundles, longer than the rest. I showed the patient a small electric spark; this, she said, was more blue, and left on the eye a painful and lasting sensation, like that caused by looking at the sun, when the image of the sun is afterwards seen on every object."

These experiments were repeated, and sometimes with a weaker magnet, nothing being said to the patient, who then saw only two luminous threads; the first appearances, however, always returning when the original magnet was substituted. As she regained strength, her impressibility diminished. After some time she saw nothing more than a kind of flash when the armature was removed, and eventually her recovery put an end to further experiments.

Dr. Lippich, clinical professor, now ob-

\* Abstract of "Researches on Magnetism and on certain allied subjects," including a supposed new imponderable. By Baron Von Reichenbach. Translated and abridged from the German, by William Gregory, M. D., F. R. S. E., M. R. I. A., Professor of Chemistry. Edinburgh. 1846.

tained for the Baron the means of experimenting with Madlle. Sturman, a patient aged 19, suffering from consumption, and subject to the lower stages of somnambulism, with attacks of spasms and catalepsy, and she proved still more sensitive than Madlle. Nowotny.

"When the magnet (capable of supporting eighty pounds) was placed six paces from the feet of the patient, (then in bed,) in the darkened ward and the armature removed; the patient, then quite conscious, gave no answer, having instantly fallen into a state of spasm and unconsciousness. After an interval, she came to herself, and declared that the moment when the armature was withdrawn, she had seen fire rise from the magnet, which fire was the height of a small hand, white, but mixed with red and blue. She wished to examine it more closely, but the action of the magnet (the circuit being then not closed) instantly deprived her of consciousness. On account of her health, the experiment was not repeated."

A lad, subject to frequent convulsions, was the person next experimented upon, and with somewhat similar results. The next was Madlle. Mair, aged 25, suffering from paralysis of the lower extremities, with occasional spasms, but exhibiting no other derangement of the nervous functions. As often as the armature was removed from a large magnet in the dark, she instantly saw the luminous appearance above the poles, about a hand's breadth in height.—Her sensitiveness increased when she was affected with spasms, and she then not only saw the light at the poles much larger than before, but she also perceived currents of light proceeding from the whole external surface of the magnet, weaker than at the poles, but leaving in her eyes a dazzling impression which did not for a long time disappear. This was the fourth confirmation of the existence of the magnetic light. The sensibility of the next patient was still more remarkable and distinct

"This was Madlle. Barbara Reichel, aged twenty-nine, of stout build. At the age of seven, she had fallen out of a window two stories high, and since that time she had suffered nervous attacks, passing partly into lunacy, partly into somnambulism, and speaking in her sleep. Her disease was intermittent, often with very long intervals of health. At this time she had just passed through severe spasmodic attacks, and retained the entire sensitiveness of her vision, the acuteness of which was singularly exalted during her attacks. She was at the same time in full vigor, perfectly conscious, looked well externally, and went alone through the

crowded streets of Vienna to visit her relations in their houses. The author invited her to his house, and she came as often as he wished it, so that he was enabled to employ her extraordinary sensitiveness to the magnetic influence, in researches with such apparatus as could not conveniently be brought into other houses.

"This person, although strong and healthy, saw the magnetic light as strong as any sick individual; she could move about freely, and was very intelligent, and in addition to these rare advantages, although highly sensitive, she could bear the approach of magnets, and experimenting with them, far better than sensitive persons generally do."

"This patient saw the magnetic light, not only in the dark, but also in such a twilight as permitted the author to distinguish objects and to arrange and alter the experiments. The more intense the darkness, the brighter and larger she saw the flaming emanations, the more sharp and defined was their outline, and the more distinct the play of colors."

"When the magnet was laid before her in the dark, she saw it giving out light, not only when open, but also when the poles were joined by the armatures; but the luminous appearance was different in the two cases. With the closed magnets, there were no points where the light appeared concentrated, as was the case when the magnet was open; but all the edges, joinings, and corners of the magnet gave out short flame-like lights, uniform in size, and in a constant undulatory motion. In the case of the magnet of nine elements, capable of carrying eighty pounds, these were about as long as the thickness of a little finger."

"When the armature was removed, it presented a most beautiful appearance. Each arm of the magnet was about eight and a half inches long, and the light rose almost to an equal height above the magnet, being rather broader than the bar. At each depression, where two plates of the magnet are laid together, there appeared smaller flames ending in points like sparks, on the edges and corners. These small flames appear blue; the chief light was white below, yellow higher up, then red, and green at top. It was not motionless, but flickered, undulated, or contracted by starts, continually, with an appearance as of rays shooting forth. But here, as in the case of Madlle. Nowotny, there was no appearance of mutual attraction or mutual tendency towards each other of the flames, or from one pole to the other; and, as in that case, both poles presented the same appearance."

"Experiments performed on a sixth patient, Madlle. Maria Atzmansdorfer, aged twenty, who had headaches and spasms, and walked in her sleep, led to results confirmatory of the preceding. The light dazzled her eyes by its brilliancy."

"From the above facts it appears, that the foregoing six sensitive individuals, each according to the degree of sensitiveness or to the diseased state of the body, saw, more or less vividly, a luminous appearance like a moving flame, at the poles of powerful magnets. These individuals were highly sensitive, although of unequal sensitiveness; and, although unacquainted with each other, and with each other's observations, their accounts agree in all essential points, and were in each case, uniformly consistent, not only with themselves, but with the known laws of electricity and magnetism. The author, having no reason to doubt the perfect honesty of those persons, and feeling, at all events, confident of his own caution, accuracy and bona fides, had no hesitation in admitting the reality of the phenomenon, although invisible to ordinary men; and he considers the fact of the existence of such luminous appearances at the poles of powerful magnets as fully established as the researches of one man can establish a fact. He confidently anticipates confirmation from other observers, since sensitive persons, although not numerous, are readily found in small towns, and quite easily obtained in large cities."

But in order to prove that the impressions upon these persons were the result of actual light, Baron Von Reichenbach instituted the following experiment:—

"A very sensitive Daguerreotype plate, being prepared, was placed opposite to a magnet, the armature of which was removed, in a closed box, surrounded with thick bed-clothes, so that no ordinary light could enter. After sixty-four hours' exposure, the plate, when held over mercurial vapor, was found fully affected, as by light, on the whole surface. In a parallel experiment, made without a magnet, the plate was found entirely unaffected. This proves that, unless other imponderables, such as magnetism, act on the prepared plates as light does, the emanation from the magnet is of the nature of light, however feeble and slow in its action on the Daguerreotype."

This beautiful and satisfactory experiment

\* Dr. Gregory's pamphlet contains well executed lithographic representations of the appearance of the various flames and streams of light, from drawings made by the patients.

was followed by another equally remarkable. By means of a lens, the magnet was made to produce a focal image on the wall, and whenever the experimenter moved the lens, Madlle. Reichel was able to point to the situation of the light.

Thus much with regard to the luminous appearances. We now come to the mechanical force exerted by the magnet on the human frame. Dr. Patelin, of Lyons, and other observers, having formerly stated instances of the attraction of the human hand by a magnet, and of the power of some patients to distinguish water, along which a magnet had been drawn, resolved to institute experiments in this direction.

"The adhesion of a living hand to a magnet is a fact unknown in physiology as in physics, and few have seen it: it, therefore, requires explanation. Madlle. N. being in catalepsy, insensible and motionless, but free from spasms, a horse-shoe magnet of twenty pounds power was brought near to her hand, when the hand attached itself so to the magnet, that whichever way the magnet was moved, the hand followed it as if it had been a bit of iron adhering to it. She remained insensible; but the attraction was so powerful, that when the magnet was removed, in the direction of the feet, further than the arm could reach, she, still insensible, raised herself in bed, and with the hand followed the magnet as far as she possibly could, so that it looked as if she had been seized by the hand, and that member dragged towards the feet. If the magnet was still further removed, she let it go unwillingly, but remained fixed in her actual position. This was daily seen by the author between six and eight P. M., when her attacks came on, in the presence of eight or ten persons, medical and scientific men." At other periods of the day, when she was quite conscious the phenomena were the same. She described the sensation as an irresistible attraction, which she felt compelled against her will, to obey. The sensation was agreeable, accompanied with a gentle cooling aura, streaming or flowing down from the magnet to the hand, which felt as if tied and drawn with a thousand fine threads to the magnet. She was not acquainted with any similar sensation in ordinary life; it was indescribable, and included an infinitely refreshing and pleasurable sensation when the magnet was not too strong."

Similar results were obtained with Made-moiselle and Madlle. Sturman, and the statement of the various modes in which the veracity of the patients and the accuracy of the experiments were tested, is such as to inspire the most unreserved confidence



in the experimenter. Mr. Baumgartner, the distinguished natural philosopher, was one of those who, amongst others, tested in a very ingenious way the above phenomena.

With regard to magnetised water, Baron Von Reichenbach, although strongly prejudiced against this "mesmeric idea," was compelled to admit that a palpable effect was produced.

"He saw daily that his patient could easily distinguish a glass of water, along which a magnet, unknown to her, had been drawn, from any others; and this without failure or hesitation. He found it impossible to oppose a fact like this by arguments; but when he saw the same result in many other patients, he ceased to struggle against that which, whether he understood it or not, was obviously a fact. He then perceived that it was more rational to admit the fact, and to wait with patience for the explanation."

The experimenter then determined to see whether bodies besides water could be magnetized, so as to produce similar effects. He passed the magnet not only over all sorts of minerals and drugs, but over indiscriminate objects, and they all affected the patient more or less powerfully. But although all were equally magnetised, the results were different, some substances producing a strong and others only a slight impression. It was therefore clear, that the different results must have been caused by an inherent difference of power in the various kinds of matter, and he resolved to test if this difference would manifest itself, when the substances were applied in their natural condition. To his astonishment they still acted on the patient, and with a power often little inferior to that which they had when magnetised.

Amongst the various substances tried, (of which a well arranged list is given) distinct solitary crystals were found to act in the strongest manner.

"In trying the effect of drawing the point of rock crystal, 7 inches long, and 1 3-4 thick, from the wrist to the points of the fingers, and back, as in magnetising, the author found that the sensation experienced by the patient, was the same as with a magnetic needle or bar, nearly five inches long, one-sixth inch broad, and one-thirtieth inch thick, weighing nearly 180 grains, and supporting about 8-4 oz. The patient felt an agreeable cool aura in both cases, when the crystal or magnet was drawn from the wrist to the point of the middle finger; if drawn in the opposite direction, the sensation was disagreeable and appeared warm. A crystal thrice the size of the first, produced, when drawn downwards, the same effect as a mag-

net, supporting two pounds of iron; and when drawn the opposite way, a spasmodic condition of the whole arm, lasting several minutes, and so violent that the experiment could not well be repeated."

It was found that this peculiar force residing in crystals was analogous to electricity and magnetism, inasmuch as it was capable of acting through opaque bodies, and admitted also of being transferred to other substances. A large rock crystal, placed so that its point rested on a glass of water, produced water as strongly magnetised as a horse-shoe magnet. It was further ascertained that the power thus transferred, was capable of being retained for a short time (in no case, however, longer than for ten minutes.)

In Madlle. Nowotny, the hand was attracted by a large crystal, exactly as by a magnet of middling size. Crystals also gave forth the same luminous appearance as the magnet, only more singularly beautiful in color and form.

Still proceeding steadily in his researches, and calling to mind the many effects analogous to those of the magnet, alleged to have been produced on sick persons by the human hand, Reichenbach, while he avoided all study of the literature of animal magnetism, in order to retain an unfettered judgment, resolved to ascertain "whether animal magnetism, like the crystalline force, might not be subject to physical laws? As crystallization seems to mark the transition from organic to inorganic nature, he ventured to hope, that by experiment, he might discover a point of connection between animal magnetism and physics, or perhaps even obtain, for animal magnetism, that firm foundation in physics, which had so long been sought for in vain."

And here the philosophical caution of the practised observer is strikingly displayed.

In order that his experiments might be free from every disturbing cause, he felt it essential, previously, to ascertain the part which terrestrial magnetism plays in relation to human sensations. If a magnet or crystal produces marked effects, it is certain that the magnetism of the earth must exert a powerful action, and, therefore, it became necessary for him to ascertain the conditions of this action, to enable him to estimate the degree in which the results of the new experiments might be modified by its influence.

The inquiries instituted with this view, led to the discovery of a singular fact, namely, that persons sensitive to the magnetic influence (at least, in the northern hemisphere,) find, when in a recumbent state, every other position except that from north to south highly disagreeable; that

from west to east being in particular almost intolerable.

"On examining the position of Madlle. Nowotny, she was found lying almost exactly on the magnetic meridian, her head towards the north. She had instinctively chosen this direction; and it had been necessary to take down a stove to allow her bed to be placed as she desired it to be. She was requested, as an experiment, to lie down with her head to the south. It took several days to persuade her to do so, and she only consented in consideration of the weight which the author attached to the experiment. At last, one morning, he found her in the desired position, which she had assumed very shortly before. She very soon began to complain of discomfort, she became restless, flushed, her pulse became more frequent and fuller, a rush of blood to the head increased the head-ache, and a sensation of nausea soon attacked the stomach. The bed with the patient was now turned, but was stopped half-way, when she lay in a magnetic parallel, with the head to the west. This position was far more disagreeable than the former, indeed, absolutely intolerable. This was at half past eleven, A. M. She felt as if she would soon faint, and begged to be removed out of this position. This was done; and as soon as she was restored to the original position, with the head to the north, all disagreeable sensations diminished, and in a few minutes were so completely gone, that she was again cheerful."

Further singular corroborations are quoted in confirmation of this view; and Reichenbach thinks it sufficient to account for many of the errors and contradictions which have occurred in animal magnetism from the time of Theophrastus and Mesmer to our own day. "For if the same disease were treated magnetically, in Vienna, in the position north to south; in Berlin, in that of east to west; and in Stuttgart, in that of south to north; totally different results would be obtained in the three cases, and no agreement in the experience of the different physicians could be obtained."

"Nay, if the same physician, at different times, or even at the same time in different places, were to treat the same disease with the same magnetic means, while accidentally the beds of his patients were placed in different positions, he must necessarily see quite different results, so as to be entirely puzzled with magnetism and with himself. He must conclude it to be full of caprice and change; and finding it impossible to foresee and regulate its action, reject magnetism altogether as an unmanageable instrument. Such has been, in fact, the sad history of

magnetism. From the earliest times, often taken up, and as often cast aside, it now lies almost unemployed, and yet is so distinguished, so penetrating, nay, we may say, so incomparable a means of relief in cases where man has hitherto been unable to afford any benefit. Nervous diseases are still the *scandala medicorum*. It may be confidently expected, that ere long an improvement will be effected. The all-powerful influence of terrestrial magnetism will be measured and calculated, and the whole subject of magnetism will now admit of being regularly studied in reference to medicine. Progress will be made; experimenters will mutually understand each other; and the world at length hope to derive some actual benefit from those extraordinary things which have so long excited expectation without satisfying it. Having thus established the existence of a powerful influence exerted by the earth's magnetism on the magnetic phenomena in sensitive persons, all subsequent magnetic experiments were made with the patients in the position from north to south, which is considered by the author as the normal position for the living body, sensitive or affected with nervous maladies."

The experiments then instituted resulted in convincing Reichenbach that a similar force to that which he had detected in the magnet, and other bodies, resides in the human hand.

The most singular experiment is that with a glass of water.

"If it be grasped from below by the fingers of one hand, and from above by those of the other, during a few minutes, it has now acquired to the sensitive, the taste, smell, and all other singular and surprising properties of the so-called magnetised water. 'Against this statement,' says the author, 'all those may cry out who have never investigated the matter, and to the number of whom I formerly belonged; but of the fact, all those who have submitted to the labor of investigation, and have seen the effects I allude to, can only speak with amazement.' This water, which is quite identical with that treated with the magnet or with the crystal, in all its essential properties, has, therefore, received from the fingers and hand an abundant charge of the peculiar force residing in them, and retains this charge for some time, and with some force. It was found that all substances whatever were capable of receiving this charge, which the sensitive patients invariably detected. The inevitable conclusion is, that the influence residing in the human hand may be collected in other bodies, in

the same way, and the same extent, as the influence residing in crystals."

But in ascertaining thus much we have not arrived at all the sources of this force. Some of Reichenbach's most interesting and striking researches go to establish, in the most unquestionable manner, that it resides also in the rays of the sun, and the moon, and the stars; that it is developed likewise in chemical action, (especially in the processes of digestion and respiration,) and again by electricity. These are its ascertained and peculiar sources; but it seems, from the experiments subsequently detailed by Reichenbach, that there is scarcely an object in the collective material world through which it may not be manifested in relation to peculiar idiosyncrasies.

Towards the conclusion of his remarks, the author gave some very interesting statements of the relative development of the magnetic force in individuals, at specified periods of four and twenty hours, and he suggests many applications of these facts of great practical value in the preservation of health. He promises also, within two months, to publish the results of extended inquiries.

On the whole, it is scarcely too much to assert, that a more interesting series of observations in relation to physical science has rarely been presented to the world. Those who will take the trouble to enter into the statements, of which little more than an outline has here been presented, will meet suggestions sufficient to give direction to a whole life-time of thought and observation. The phenomena observed and narrated bear with almost equal force upon every branch of inquiry—crystallography, mineralogy, geology, botany, anatomy, physiology, medicine, astronomy; in short, the whole circle of the sciences. It opens up a field of inquiry, to which every student of Nature must direct his steps, and to which all, no matter how varied their pursuits, may bring their labor with a certainty of reward.

In conclusion, it is proper to mention that one very gratifying circumstance, in connection with the publication of these researches, consists in their having drawn forth the admirable remarks of Professor Gregory, by which the publication of them is accompanied. It is also a matter of congratulation, that, in a letter dated from Vienna the 7th of the present month, published in the appendix and addressed by Baron Von Reichenbach to Professor Gregory, the following paragraph is to be found:

"Berzelius has expressed himself in the same way as you have done; and carries on with me a friendly and brisk correspondence on the subject of my researches, on which we may shortly expect a report from him, to be laid before the Swedish Academy of Sciences."

#### CURATIVE EFFECTS OF MESMERISM.

A young lady of Ohio, about 18 years of age, who has been for some time at school at Hartford, Conn., received an injury in the lower part of her spine in November last, from a fall which rendered her unable to bear even the slightest elevation toward an erect position, and kept her in continual pain. She was attended by the most skillful physicians without benefit, but at length, under the advice of a physician of this city, she was placed on a bed constructed for the purpose, and brought here by railroad and steamboat, with the view of trying the effects of mesmeric treatment under his direction. She arrived here on the 3d inst. (April, 1846) accompanied by her brother-in-law and sister, and put up at Judson's Hotel, Broadway. The following evening the physician introduced Mr. Oltz, a distinguished magnetizer, and recommended him to make the proper mesmeric passes along the spine for the purpose of allaying the high nervous excitement under which she was laboring, and which had continued without intermission, from the time of the accident. The passes were quite effectual, and that night she enjoyed sound and refreshing sleep which she had not obtained for the previous five months.

The next morning, the magnetizer, by means of the mesmeric passes alone, gradually raised her to an erect position, in which she remained about a minute. In the evening he operated again, and she was again enabled to sit erect. The doctor then directed him to raise her upon her feet, which he did with a few passes; and supported by the magnetizer and the physician, she found herself able to walk several times across the room. After resting about fifteen minutes, in an easy chair, where her expressions of wonder and gratitude were deeply fervent and affecting, she repeated her walk around and across the room, and retiring full of joy and hope, again passed the night in tranquil sleep.

On the following morning, the mesmeric passes proved so effectual that she was considered sufficiently restored to undertake a

journey to Philadelphia, that afternoon, on her way to her family in Ohio. Mr. Oltz accompanied her to the depot in Jersey City, and having seated her comfortably in the car, and stowed away her previous traveling coach upon the top, transferred his mesmeric power over her to her brother-in-law and saw her start on her unexpected journey. The following are extracts of a letter from the sister who accompanied her, to her physician in this city, dated Harrisburgh, Penn., April 13th, 1846 :

"I fear our neglecting to write from Philadelphia will lead you to think we do not appreciate the kind interest you took in sister's case. Be assured we do and ever shall remember you with gratitude. \* \* Our kind friend Mr. Oltz, (to whom you will please remember us) doubtless told you how well we succeeded in getting to the cars. Mr. B was able to continue the influence to such a degree as to keep her very easy for about two hours, when, owing to some relaxation of effort, she became sick at the stomach. We gave her the globules [*Ipecacuanha*] which soon relieved that, and then, notwithstanding the noise and motion of the cars, Mr. B—succeeded in putting her into a sounder sleep than ever she had been in before, and she awoke from it quite refreshed. For two days after our arrival in Philadelphia she felt too weary for exertion; but on the third night, after being magnetized, she sat up for more than two hours and walked about the room for nearly an hour; she slept well for that night, and was next day quite comfortable. We left Philadelphia at half-past seven in the morning, and rode nine hours over the roughest rail-road in the country, but under the magic influence she was kept quietly asleep most of the time. She feels much fatigued and sore to-day, but is in good spirits at the idea of starting and the comparative ease with which the rest of the journey will be performed."—*New York Tribune*.

Besides the ordinary effects of an injury from a fall in this case, there was great derangement in her magnetic organization which required the power of the magnetizer to restore to its proper condition and normal action, and hence our confidence in the success of the experiment and the rationale of its results.

#### Tubercular Disease of the Organs and Muscles.

Miss M. S. of Providence, R. I., aged 25 years. This young lady had been out of health about seven years, when she was

placed under my care in May, 1845. She presented the external appearance of the most robust health; yet this was one of the worst cases of tubercular disease I ever saw; for on an examination, I found all of her organs, including the cerebrum, cerebellum and uterus, as well as all the muscles, in a very advanced stage of tubercular disease; accompanied often on retiring to bed with the most violent and prolonged spasms, terminating in insensibility and coma or sleep. The muscles of the body and limbs presented everywhere the same elastic and puffy state seen in the common white swellings of the joints and limbs. There was also great sensibility to pressure the whole length of the spine.

A clairvoyant examination of this case, confirmed the above diagnosis, and besides located the disease in the cerebrum in the organs of imitation, marvellousness, hope, and conscientiousness of the left hemisphere; a matter of great importance in directing the passes in mesmerising and in the application of the buttons in magnetising.—Prescribed the magnetised gold pills and plaster, mesmerism and the action of the magnetic machine.

The following letter from this talented young lady will show the result of this practice:

*Providence, March 9th, 1846.*

DR. SHERWOOD, Sir:

I feel it a duty devolving upon me, to write you at this time. As regards my present state of health, I can say, I am well. During the past winter my constitution seems to have undergone a change; which change cannot be attributed to any other source than strictly adhering to your practice. I consider it a case worthy of note; for after having spent my "living upon physicians, and was nothing bettered, but rather grew worse," and all that were ever employed gave me no encouragement of ever fully recovering, after having experimented upon me until my patience was worn out.

Under my present state of health the whole creation seems created anew. I now begin to realize how many years I have spent in a disordered state of health, enjoying naught of life or its charms. I am now able to attend any public assembly without apparent inconvenience; my head feeling as clear the next day as before. The privilege I think I know how to prize. My sleep is sweet and refreshing; none of those long, dreaded nights, and anxious watchings and fears. My gratitude I can never express, in being led to persist in your method of treatment.

I will endeavor to state as high as I can the origin and progress of the disease. In the spring of 1838, my health began to give out, a general weakness seemed to pervade my frame, and in the month of May was quite reduced with distressing pains in the lower part of my back, accompanied with spasmodic affections; employed a physician who immediately pronounced it a severe case of spinal irritation, and was put upon a mode of treatment general to their clique; no relief was gained excepting short periods of repose when the disease seemed to be preparing to break out anew, until it seemed to extend to all parts of my system, and for seven years I have been going on in this way, employing other physicians, but all to no purpose. When I recall the nights and days of suffering with my head, it is more a wonder that mind has kept her throne. I say not that my mind has not suffered from the shock, but enough of reason is left to know from what source I at last found relief.

I have stated what was then considered the source of so much trouble, but since applying to you, find that an organic affection in the lower part of my body must have been the primary cause of so much pain in my back and head.

I commenced the use of your remedies the early part of May, 1845, and used two boxes of pills, and the magnetic machine and plaster, and am now enjoying more of life and better health than I had previously, for eight years; this is not only my testimony, but of friends who have seen me most, and it is a wonder to them that I am where I am. I am now 26 years of age, and feel younger than I did at 18. I know my recovery is attributable to the thorough use of your remedies; and if my recovery can be of any assistance to others similarly affected, use it as far as you think proper.

#### Baron Reichenbach's Experiments.

We were made aware, some time ago, that a German periodical, devoted to chemistry, had presented last summer, a long and carefully prepared paper, detailing certain experiments of the Baron Reichenbach of Vienna, respecting hitherto undescribed phenomena connected with magnetism. We were informed that, conducted as they had been by a rigidly scientific investigator, and one whose writings were usually but statements of dry facts, they might be considered as entitled to respectful notice; and yet they were of such a nature as we have been accustomed to regard with the greatest suspicion. They appeared, in short, as tending

towards the domain of animal magnetism, and yet as promising to bring that theme of marvels within the scope of exact science. This is a subject of course, on which curiosity will be greatly excited; and we are therefore glad to obtain an opportunity of conveying some account of it to our readers in consequence of a very readable abstract of Reichenbach's papers in the "Dublin Quarterly Journal of Medical Science."

The writer sets out as follows, strictly following, we believe, the statements of the Viennese chemist, but condensing his language: "If the poles of a strong magnet capable of supporting the weight of about ten pounds, be passed over the bodies of fifteen or twenty persons, there will always be found some individuals among them who are affected by it in a very peculiar way. The number of such persons is much greater than is generally supposed. Of the above number, there will be three or four at least. The nature of this impression on sensitive persons, who, in other respects, may be looked upon as perfectly healthy, is not easily described, being rather disagreeable than pleasant, joined with a slight sensation, now of cold, now of heat, as if the person were blown upon by a cold or lukewarm current of air. Sometimes they feel contractions in the muscles, and a prickly sensation, as if ants crawled over the body; and many persons even complain of sudden headaches. Not only women, but even young men, are sensible to this influence, and in young children the sensation is very strong." Susceptibility, however, amongst the healthy, is strongest in sedentary persons, and those suffering from secret grief and deranged digestive organs. Persons affected by nervous complaints, as epilepsy, catalepsy, hysteria and paralysis, are peculiarly sensitive; and still more so are lunatics and somnambulists.

To pursue the abstract of our Dublin contemporary—"Actually or apparently healthy sensitive individuals discover, in their relation to the magnet, nothing besides the sensation just described. But the case is very different with the sick sensitive. Its action on them is sometimes agreeable, sometimes unpleasant—often disagreeably painful to such a degree, that fainting, cataleptic fits, and spasms, at times violent, and sometimes dangerous, ensue, according to the nature and degree of their disease. In this latter class, to which the somnambulists also belong, an extraordinary increase takes place in the sensitiveness of the senses. The patient sees, tastes, and feels better than others and often hears what is said in the next

room. This is, however, a fact well known and is not by any means unnatural."

"The hypothesis that the aurora borealis is an electrical phenomenon, produced by the magnetism of the earth, the real nature of which is at present unknown, owing to our not having been as yet able to detect an emanation of light from the magnet, led Reichenbach to try whether persons, in a state in which the senses were thus sharpened, could detect such an emanation from the poles of a magnet. He was enabled to make trial on a young woman named Vowotny, aged twenty-five, who suffered from continued headache, accompanied by catalepsy and spasms. So sensitive was she, that she could distinguish all the things in her room, and even the color of objects, on a dark night. The magnet acted on her with extraordinary force; and though by no means a somnambulist, she was equally sensitive with one."

"The experiment was made in a perfectly dark room. At the distance of about ten feet from the patient was placed a horse-shoe magnet of nine plates [a magnet of nine plates of alternate metals, bent into a horse-shoe form, so as to make the ends or poles approach,] and weighing about eighty pounds, with its poles directed towards the ceiling. Whenever the armature of this magnet [a piece of iron clapped upon the poles of the magnet] was removed, the girl saw both poles of the magnet surrounded by a luminosity, which disappeared whenever the armature was connected with the poles. The light was equally large on both poles, and without any apparent tendency to combine. The magnet appeared to be immediately encircled by a fiery vapor, which was again surrounded by a brilliant radiant light. The rays were not still, but continually flickered, producing a scintillating appearance of extreme beauty."

"The entire phenomenon contained nothing which could be compared to a common fire; the color was much purer, almost white, sometimes mixed with iridescent colors, and the whole being more similar to the light of the sun than to that of a common fire. The rays were not uniformly bright; in the middle of the edges of the horse-shoe they were more crowded and brilliant than at the angles, where they were collected into tufts, which extended further out than the other rays. The light of the electric spark she considered much bluer. It left an impression on the eye similar to, but much weaker than that left by the sun, and which did not disappear for several

hours, and was transferred to all substances upon which she looked for some time in a painful manner."

Reichenbach endeavored to verify these results by trials upon other persons, particularly upon a woman named Reichel, who was rendered sensitive in consequence of an accidental hurt but was nevertheless healthy.

In her case, "the appearance of the light along the four longitudinal edges of each plate composing the magnet was extremely curious, even where the edges of two contiguous plates fitted one another exactly; and where one would think rays of light given off from each plate must necessarily merge into one another at their basis, they could be distinguished with great accuracy." Reichenbach, "in order to be certain that there was actual light given off in these cases, made some very careful experiments with the daguerreotype; the result of which was, that an iodized plate was acted upon when placed opposite the poles of a magnet. He was also able to concentrate it with a lens; but the focal length was found to be fifty-four inches, while for a candle, it was only twelve inches. He could discover no action of heat with the most delicate thermoscope. In some cases the patients declared they could see the surrounding objects by means of this light, and that any substance stopped its passage, as it would ordinary light: thus, for example, when the hand was laid before the poles, it streamed through the fingers. From the similarity of this light in many respects, to the aurora borealis, Reichenbach considers them identical." We may here add, from another source, that the Baron contrived to subject his patients to an effectual test in these lens experiments; for he caused the lens to be shifted about, and the theoretically proper place for the focus on the opposite wall was invariably and at once pointed out."

Continuing his abstract, the Dublin journalist says: "From the observations of Peltin, made at Lyons in 1788, and which were afterwards verified by many others, we know that, in catalepsy, the hand is capable of being attracted by a powerful magnet, just like a piece of iron; and as Mesmer observed that water over which a magnet has been several times passed, can be distinguished from ordinary water by sensitive patients. Reichenbach has fully verified these facts in a large number of persons. He found that this effect took place not only during perfect catalepsy, but even afterwards, when the persons were in full possession of their senses. Miss Vowotny described the sensation to him as an irresistible attraction

which she felt obliged to obey, though against her will; that it was a pleasant feeling combined with a cool, gentle aura, which flowed over the hand from the magnet, the former feeling as if tied and drawn to the latter by a thousand fine threads; and that she knew nothing similar to it in ordinary life, it being a peculiar indescribable feeling of refreshing and extraordinary pleasure, particularly if the magnet attracted the right hand, and was not too strong.

"He did not, however, verify Thilorier's observation, that nervous patients can convert needles into magnets; and he considers in fact, the attraction of the hand by the magnet to be of a totally different nature from that between iron and the magnet. This opinion we shall see verified further on.

"We have had no instance hitherto of the form or arrangement of the molecules of a body rendering it capable of exerting force on other bodies at a distance; but Reichenbach, by a series of experiments on magnetic water—that is, water over which a magnet had been several times passed—was led to suppose that other bodies could, in all probability, be also rendered magnetic. This he soon found to be the case in a greater or less degree; but he also observed that many substances, which were never in contact with a magnet, affected the nerves; and by extending his experiments, he arrived at the law that amorphous bodies possess no power similar to that possessed by the magnet, but that crystals are capable of producing all the phenomena resulting from the action of a magnet on cataleptic patients. This is true, however, only of single perfect crystals, and not of an agglomeration of crystals such as lump sugar. Thus, for instance, a large prism of rock crystal, placed in the hand of a nervous patient, affects the fingers so as to make them grasp the crystal involuntarily, and shut the fist.

"The power is not equally distributed over every part of the surface of the crystal, but is found to concentrate itself in two points or poles corresponding to the principal axes of the crystal. Both poles were found to act similarly; but one was generally somewhat stronger than the other, with the exception that one gave out a cool, and the other a luke-warm gentle aura."

Notwithstanding the apparent resemblance of the magnetic power in crystals to ordinary magnetism, Reichenbach satisfied himself that there is a difference; because he found that crystals do not attract iron filings or affect the compass or needle. It appears that the ordinary magnetic power is of two kinds; one of which is this peculiar power

resident in crystals, and in the living body. The learned chemist also found that a charge of this power can be communicated to bodies, as is the case with a charge of electricity. "The readiness with which the situation of the poles could be detected by those sensible to their influence, was striking. Many of the patients could detect all the ores, even in the most complicated crystalline forms, with unerring accuracy, by their effects on them; as of course it is unnecessary to observe they could have no knowledge of crystallography. By extending his experiment, he soon found that the poles of a crystal gave out light exactly as the magnet does. Miss Sturman described it as a tulip formed flame, blue at the base, passing into perfect white at the top, with scattered rays, or stripes of a reddish color, passing upwards from the blue towards the white. The flame scintillated and flickered, and threw on the support on which the crystal rested, for a space of about eighteen inches all around, a certain degree of brightness. Miss Reichel describes the flame similarly; but, in addition, she saw a peculiar star-like light in the interior of the crystal; which evidently resulted from reflection, produced by the structure of the mineral.

It may be necessary to remark, that, in order to observe these phenomena, the room must be perfectly dark, and the crystal very large; not less at least than eight inches thick, and proportionately long. Smaller crystals will, however, answer with exceedingly sensitive persons.

"The curious results produced on cataleptic patients, which we have already mentioned, excited some attention in the last century, and it was soon found that similar results could be produced without a magnet, by the hand alone. It was impossible from the then state of physical science to show the connection between these phenomena and the ordinary physical ones of the magnet; and the subject was therefore passed over by philosophers, and gradually grew into disrepute, principally from the use made of it by mountebanks, and from the unsuitable name—animal magnetism—which it received. From the similarity of some of the phenomena observed by Reichenbach with those described by the elder magnetisers, he was led to think they might be the result of the same cause.

"As a magnet affects the human body he thought that the magnetism of the earth cannot be without some influence of a similar kind; and in this he was not mistaken; for he found that, of all positions in which a nervous invalid can lie or sit, the best is in the magnetic meridian, with the head towards, the north; the opposite direction is

not quite so good; but the worst possible is at right angles to the magnetic meridian, with the head towards the west. He found that patients placed in the same position slept better at night, suffered less from headaches, and in general found themselves much better; while, with the head towards the west, the same patients suffered greatly; their pulse increased in frequency, hectic fever often resulted, and catalepsy was sometimes occasioned; but the moment the patient was restored to the first position, all these symptoms ceased, and were in general replaced by an agreeable feeling of well-being. In some of the cases which were tried, the most extraordinary effects were produced on the patient by this change of position; and he hence concluded that the various and contradictory effects which have been attributed to the application of electricity and magnetism to the cure of diseases, have arisen from the neglect of the influence exerted by the magnetism of the earth on the patients; and to the same cause he also attributes the little success which has hitherto attended the treatment of nervous diseases.

"In extending his experiments, he found that soft iron, which loses its magnetism when removed from the inductive power of a magnet, does not lose the power of acting on the nerves; and he hence concludes that magnetism, properly so called, is perfectly distinct from this new power, as we have already seen in other instances, when speaking of the crystal. We have already mentioned that bodies placed in contact with a crystal or magnet, such as water, &c., became possessed of the same power of affecting the nerves as those bodies, and could be distinguished from portions of the same substances not magnetised. But we have now to learn that the same properties can be communicated to the human body; or, in other words, that a man rubbed, or in mere contact with a magnet or crystal, is capable of producing the same effect on the nerves as those bodies: nay, more, that a man has these properties even when he has not touched a magnet or crystal; in fact, that we are a source of this peculiar power ourselves. It is unnecessary to give here the mode in which he arrived at this remarkable conclusion, as the experiments are all similar to those made with the magnet and crystal—a man being merely substituted for these latter. Like them, the hand produces an aura, attracts the limbs of cataleptic patients, and communicates a charge to other bodies which, as in the case of magnet and crystal, disappears again in a short time, and is capable of passing through all bodies, is little influenced by the magnetism of the earth, and like

them, is polar, the principal axis being across the body, the ends of the fingers being the poles. The head and genitals very likely form secondary poles.

But the most extraordinary part of the whole investigation is, that the top of the fingers of healthy men give off tufts of light, just as the pole of crystals, while those of women give off none, or at most merely appear slightly luminous. The patients who were able to observe these phenomena, described the flame as being from one to four inches long, according as they were more or less sensitive, and of an extremely beautiful appearance.

Baron Reichenbach has also attained what he considers as conclusive evidence, that magnetism exists in the sun's light. All bodies exposed for a time to sunlight, retain a magnetic light for some time after. One of his experiments is so curious that we shall give it here: To a piece of thick copper wire, about thirty feet long, he fastened a piece of sheet copper about nine inches square. The end of this wire was placed in the patient's hand, and the plate exposed to the direct rays of the sun outside the window; this was scarcely done when an exclamation of intense pleasure was heard from the patient; she instantly felt the peculiar sensation of warmth, which gradually spread from her arm to her head. But, in addition to this, she described another and hitherto totally unknown sensation, namely, a feeling of extreme well being, as the patient said, similar to the sensation produced by a gentle May breeze. It flowed from the end of the wire to the arm, and spread itself over the whole body, producing a sensation of coolness, the patient feeling at the same time strengthened and refreshed. In some of his experiments Reichenbach substituted various bodies, and among them a man, for the plate of copper, and still obtained the same results. What is extremely curious, the yellow part of the ray of light produces the agreeable and refreshing feeling, while the violet part causes the disagreeable feeling sometimes experienced from the action of the magnet; and this violent part we know to be that in which the greatest chemical action takes place. In heat, friction and artificial light, the Baron found various modifications of the same surprising effects.

It equally appears that "in every case of chemical action, even where it consists in nothing more than the combination of water of crystallization, with a salt or mere solution of a body in some solvent, this power is set free." "If we recollect," says our journalists, "how manifold are the circumstances under which chemical action takes



place on the earth, we will be able to see what an inexhaustible source of this power there must be. In the animal body there is a series of such change continually going on; we eat food, it is digested in the stomach, and converted into blood, which is again further changed into muscle, fat, &c., and these in turn are again decomposed to yield fuel for animal heat and motive power. The continued chemical action is, therefore the generator of the peculiar force which we find developed in man, as in the magnet and crystal. But not only does the chemical action going on in the living body generate this power, but the decomposition which ensues immediately after death is also an abundant source of it. Reichenbach, on going into church-yards on dark nights with some of his patients, discovered that graves were always covered with a lurid phosphorescent glow, about six or eight inches high; and in one case Miss Reichel saw it four feet in height in a grave yard in Vienna, where a large number of persons were daily buried. When she walked through this grave-yard, the light reached up to her neck, and the whole place appeared covered with dense, misty, luminous fog. This the baron conceives, explains in a very satisfactory manner the appearance of light and ghosts, &c., which have been from time to time observed over graves."

After thus discovering several sources of the power, Reichenbach was led to the detection of it, in a certain measure, in all bodies whatever. From this flowed some observations, the curious nature of which must be our apology for borrowing so largely from our contemporary. "Every one," said he, "is aware that there is a large number of persons upon whom certain substances have a certain peculiar effect, generally of a disagreeable kind, which sometimes appears to be absurd and ridiculous, and is often attributed to eccentricity; thus there are some who cannot bear to touch fur, others who do not like to see feathers; nay, some who cannot bear the look of butter. The invariable nature of this feeling, and the similarity of circumstances attending its existence among the most different races, and in the most distant countries, led Reichenbach to examine it closer; and he found that these antipathies occurred, for the most part, among persons apparently healthy, but more or less sensitive, and that they increase in degree according as persons suffer from nervousness, &c., and that, hence, there was evidently some connection between these sensations and the effects which he had in so many instances found to attend the action of magnetic crystals and on similar persons."

"We have already seen that in certain cases, the action of the crystal was attended by a disagreeable feeling, which sometimes produced painful spasmodic affections of the limbs; and that this property could be communicated to various bodies, though in different degrees; and that it is never totally absent from bodies which form perfect crystals. On this subject we have, however, already said enough; and it only remains to say a few words on the sensations of apparent difference of temperature, the disagreeable feeling, as it were of disgust, and the apparent mechanical agitation of darting pains through the body, sometimes produced by most dissimilar substances."

"Some of these sensations were felt by healthy persons, but highly sensitive individuals felt them all more or less strongly, according to the nature and extent of their disease."

"On making a number of experiments on the most different substances, he arrived at the conclusion that all amorphous bodies which do not possess the peculiar power resident in crystals, possess, in different degrees, according to the nature of the body and with a great degree of constancy, the property of giving rise to disagreeable sensations, sometimes accompanied by heat, and sometimes by a feeling of coolness. In the crystal, we had a power depending on the state of aggregation or form, while in the case before us, the nature of the substance is the determining cause of some dynamical effect of another kind."

Many curious observations remain, but our space is exhausted. Most readers will, we think, join us in wishing that the experiments of the Viennese philosophers should be repeated, and subjected to every imaginable test; as, in the first place, they seem worthy of this pains; and in the second, it is impossible to receive such extraordinary matters into the book of science without the strongest of attainable proofs. It would now, we think, be wrong to treat such things with the indifference of mere incredulity. It is far from likely that so many persons as have testified to peculiar effects of a zoo-magnetic nature, should have been entirely mistaken, or altogether possessed by a spirit of deception."

Nor is there any improbability that we are tending towards the discovery of some new form of the imponderables, in which the human organization is strangely concerned, and which therefore promises to possess medicative power. Where a prospect, however shadowy, holds out so much temptation, men will venture to follow it, and surely it were well for a few genuine men of science

to go into inquiry, if only to prevent the multitudes of the unlearned from breaking their heads upon it. It sometimes appears to us as if the spirit of incredulity overreached itself; and perhaps there is an instance here. Forty-six years ago, many cures by magnets, called "metallic tractors" were announced. They were suddenly quashed by two physicians, who stimulated the applications by using bits of wood and iron, disguised as tractors instead. What, however, if it should prove that the cures were real cures in both cases, only produced by a cause different from the tractors, and which resided in the bodies of the operators, and connected with an earnest exertion of the will in both cases? Things as strange have happened.

#### REMARKS BY THE AUTHOR.

An attentive perusal of the preceding articles will naturally induce the reader to revert, with an additional degree of curiosity at least, if not of confidence, to what has been said in the successive chapters, and various appended articles of this work, on the subject of Magnetism, as the motive power of the human system, and also the curative power of the author's peculiar remedies. Even the routine practitioner of the schools, hedged in, as he may be, by habitual prejudices, and by an equally habitual deference to stationary medical authorities, not a whit more advanced in science than himself, may be led to suspect the possibility of magnetizing other substances besides iron, to which his knowledge may hitherto have been limited, and he may, if not altogether invincible to the approaches of modern science, even exert his mental courage so far as to speculate upon the possible magnetization of substances adopted in the practice of medicine. We do not expect, of course, that he will permit his speculations to become so daring as to take even a glimpse at the idea that all medicines, of every kind whether having their natural properties enhanced by artificial magnetism or not, operate, either for good or evil, by the magnetic forces alone, for this would be akin to the grand conclusion that all the forces of nature in all substances whatever, are identical with those of magnetism. But when he

reads the conclusion of the inquisitive, cautious, and philosophical Reichenbach, republished and respected as it is by the learned and eminent Professor Gregory, of Edinburgh, that not only water, but all sorts of minerals and drugs, were not only susceptible of being magnetized, but also capable of imparting to his patients the magnetism they had acquired; when he further reads, on the same authority, that Reichenbach found that all substances whatever were capable of receiving a magnetic charge from the human hand, and that sensitive patients "invariably detected" the magnetism thus imparted, he may be led to think that there are greater absurdities in the world than the doctrine of magnetised medicines, and that even "Sherwood's Magnetic Remedies," after astonishing and confounding the medical faculty of the United States for more than thirty years, may admit of an explanation in perfect consistency with the demonstrable principles of magnetism. It must be a rather disagreeable transition of feeling, we dare say, for the too confident and arrogant sneer of derision to subside and change into the involuntary assent of grave and respectful conviction; but thousands have been compelled to experience this queer sensation, and every day is rapidly increasing the number.

It is difficult for the author of this work to advert to the preceding notices of the recent work of Reichenbach, without exposing himself to the charge of egotism, while merely sustaining his just and honest pretensions to precedence in this field of magnetical enquiry. In a matter, however, which may hereafter affect the claims of his country to a just position in the history of the science of the present age, all considerations relative to himself, whether of honor or of reproach, are, with him, of inferior moment. On this account, therefore, he will cheerfully incur the risk of the imputation of personal vanity, by claiming that it was an American physician who first not only asserted and demonstrated the practicability of magnetising medicines, but established, in the course of a long practice, their paramount, indeed *exclusive efficacy*, in an exten-

sive range and heretofore supposed wide diversity of human maladies, for which science had previously discovered no appropriate nor reliable cure. He fearlessly asserted that his remedies were *magnetic*, not upon the general principle that all remedies act magnetically, but upon particular and strictly chemical principles, at a period when he well knew that his supercilious brethren in the profession would ridicule the idea, and even before magnetism was distinctly recognised as a chemical agent at all. He thus, for the sake of holding forth a humane and guiding light of truth in advance of the age, and when his country, young even in national existence, had but comparatively few pretensions to the honor of original discoveries in science, voluntarily and deliberately incurred the envious hostility of a profession, jealous and implacable to a proverb, towards any of its members who shall dare to step beyond the hard, conventional limits, prescribed by previous authorities.

He not only adopted magnetic medicines, but he magnetised them himself, in a chemical process necessarily and unavoidably too elaborate to be entrusted to the unprincipled recklessness of quacks on the one hand, or to the illiterate mass of the profession (in this respect but little higher than quacks) on the other; and thus had to encounter another and more plausible source of reproach, sustained only by sound convictions of prudential necessity. He has truly informed many members of the profession concerning the composition of his medicines, and has concealed from none, that their basis is a perchloride of gold, exalted, by a process of magnetic chemistry, above any other chloride that can be produced either in this country or in Europe; and he has frankly imparted even this process, so far as it can be made without actual observation and explanation of every detail in the laboratory itself; and it has been as frankly conceded by all who are capable of forming a sound judgment upon the subject, that it could not with safety be entrusted in any written formulæ, either to the profession in general, or even to the best pharmaceutical chemists, ignorant of

the peculiarly critical operations upon which a valid result depends. To do so, would not only be to risk, but to inevitably ensure in a great majority of cases, the manufacture of a spurious production, and thus eventually consign to neglect and disrepute a remedy now, and, we trust, hereafter, a rescue to thousands from hopeless and fatal disease.

In this Journal, the author has advanced and defused the opinion that the great secret of Homeopathy, or of the extraordinary efficacy of infinitesimal quantities of medicinal substances, consists in their being actually magnetised by the triturating and other attenuating processes by which they are prepared. In other words, that the homeopathic medicines are magnetic, and that this is the sole explanation of effects at once undeniable and hitherto ridiculed, only because they appeared inexplicable. In his little work, "A Manual for Magnetising with the Rotary and Vibratory Magnetic Machines," the author has given Hahnemann's directions for magnetising medicines, by trituration and shaking. On page 166 of the *Motive Power of the Human System*, he has given extracts from Hahnemann on the subject of certain preparations of gold, as possessing "great remedial virtues, which cannot be replaced." This explanation of homeopathy was received with little favor at first, by some of its professors in this country, although fully and decisively sustained by Hahnemann's own language as quoted, notwithstanding his somewhat mystical dialect. Many of the objectors, however, upon more mature reflection, have assented to the force of the evidence adduced, and we think that the experiments of Reichenbach will now leave but little doubt upon the matter, in the minds of any who carefully investigate it.

On the subject, too, of the magnetic organization of the human system, first advanced by the author of this work, and for some time regarded as a mere imaginative vision of real or pretended clairvoyance, Reichenbach will be found to have elicited

strongly confirmatory evidence and elucidation, although as yet his experiments have left this exceedingly curious and important branch of science in a cruder condition than he might have found it in this and other works long since published by the author in this country. Thus he appears to have supposed that the major magnetic axis of the human body is across it, and that the principal poles are in the hands at the ends of the fingers; whereas the author has clearly determined, by experiments equally legitimate, and much longer repeated, that the major axis is a longitudinal one, and the principal poles are in the brain, the solar plexus and the genitals; those in the fingers, although as luminous and emissive as he describes them, being merely among the great number of minor or secondary poles. The author, nevertheless, cannot but congratulate himself and his readers upon this substantially conclusive corroboration or a discovery which, when first advanced, was deemed, even by many of his friends, as too bold and startling to be prudently offered to the public. Scientific caution, however, has been, and may be carried to the excess of frivolous fastidiousness and timidity; and moral courage in discovery, when properly sustained by evidence satisfactory to all reasonable minds, is a quality much more useful to the cause of truth and the advancement of science.

93- While Mr. Sunderland was giving lectures last February in the Tremont Temple in this city, he was applied to by Capt. W— of the U. S. A., to magnetise his daughter for the purpose of rendering her insensible while a cancer tumor should be cut from her left breast. The lady was 23 years of age and weighed about 180 pounds. The tumor had been examined some eighteen months before, by a number of our first physicians, who all agreed that it should be taken out with the knife. One of them pronounced it fibrous, and another cancerous. It caused her much pain, and about three months before she came to Mr. S., her attending physician put a diachylon plaster upon it; but took it off again in twenty-four hours, as he said it "only made it worse." In about 17 days Mr. Sunderland succeeded in securing the *spell* upon her system, so

that she was utterly unconscious. During this time she was visited by her surgeon, but the tumor was not particularly examined. Feb. 22, at 10 A. M. was the hour fixed upon for the surgical operation to be performed.

The night previous was spent almost without sleep by the anxious husband and parents. The patient herself had not been made acquainted with the design, and at the appointed moment she was *spell-bound* in a state of utter unconsciousness, with her left arm stretched over her head in a state of rigidity resembling death. The operating surgeon came precisely at 10, accompanied with three other surgeons; and, after arranging his instruments, waxing his thread, &c., he, with the attending surgeons, examined the breast for the space of half an hour, and,—finally decided that there was no tumor there! During the time she had been magnetised, the pain and tumor had disappeared as by magic!—*Boston Paper.*

#### On Nature's Temporary Hemostatics.

BY C. H. HALLET, ESQ.,

Assistant Demonstrator of Anatomy in University College, Edinburgh.

PHYSIOLOGISTS and surgeons have long been agreed about Nature's hemostatics, in the case of lesions of the external parts of the body. They have described two classes of these, the temporary and the permanent, and four conditions combining to the production of the former—namely, retraction and contraction of the coats of the injured vessels, the formation of coagula, and a tendency to syncope. The two first—the effects of the action of the vital properties of the vascular texture—act by diminishing the rapidity of the flow of blood through the orifices, and thus favor the supervention of the third—the formation of coagula. The fourth, or tendency to syncope, contributes materially to these results. "These important changes," says Professor Miller, "are contributed to by the natural result of loss of blood in considerable quantity; a growing faintness and tendency to syncope. The heart's action abating, and the general circulation becoming more and more feeble, the contraction of the arterial orifice is favoured as also the formation of coagula." Although coinciding fully in the opinions which are universally held respecting the extent to which these several conditions act in arresting, or conducting to the arrest of, hemorrhage, I believe we must take into considera-

\* Principles of Surgery.

tion a fifth and most important element—the relatively increased amount of fibrin in the blood following on its loss.

We have been for some time aware that the loss of blood causes a change in the relative amount of its principal constituents; a diminution of red corpuscles, and increase of fibrin. Now, as the coagulation of the blood depends on the fibrin, we should naturally be led to expect the accession of that phenomenon to be accelerated by the abstraction of the vital fluid. Such is really the case. "Thus, if a large quantity of blood be withdrawn from the vessels of an animal at one time, or within short intervals, the portions that last now coagulate much more rapidly, but much less firmly, than those first obtained." A familiar example will suffice to illustrate this. A medical practitioner determines to phlebotomize a patient, and desirous of observing the state of the blood, causes it to flow into a number of small receptacles—say teacups—successively. On arresting the flow of blood, he proceeds to examine that which he has designedly abstracted from the patient's system, and observes that the last cupful has coagulated as soon as the first; in fact, has solidified immediately on removal from the vessels.

Such an important change in the constitution of the blood, and such an augmentation of one of its most remarkable properties, cannot but be of great service as a hæmostatic. The phenomenon is so striking as to be worthy the attention of the profession. In fact, the advantage to be derived in one form of hæmorrhage—that accompanied and complicated by the hæmorrhagic diathesis—from an increased fibrinous state, and consequent heightened coagulability of the blood, has been brought prominently before the profession by Professor Miller. He writes, (*op. cit.*, p. 513,) "We shall endeavor to increase the blood's power of coagulation, more especially its power of forming a dense coagulum. If possible, we would increase the proportion of fibrin." But the fact of hæmorrhage inducing not only a direct effect on the powers of the system, but also a change in the blood favourable to its own arrestment, seems not to have attracted that attention which I am led to believe it deserves. The formation of coagula curing syncope, or a state approaching it, is well known. Thus *Druitt* ("Surgeon's Vade-Mecum," p. 280) says: "Now if a very large artery, such as the femoral or subclavian, is wounded, and if the aperture in it is large, and if the flow of blood is in no manner opposed, the loss of blood will be so rapid as to occasion death almost instantaneously. But if the wound in

the artery is very small, it may be closed firmly by coagulated blood during syncope, and the patient may survive." He does not give any explanation why the coagulum forms during syncope, but appears to ascribe it to the occurrence of syncope, not to the change in the blood, as the following sentence will show. "Fourthly, the faintness induced by hæmorrhage both checks the current of the blood from the heart, and gives it an increased disposition to coagulate." A statement opposed to all we know on the subject.

When a vessel has been divided, I consider Nature's proceedings towards the salutary results of occlusion of its orifice, and arrest of hæmorrhage, to be as follow:—On the immediate occurrence of the injury, the coats of the vessel retract and contract, an effect which lessens the diameter of the arterial orifice, retards the current of blood through it, leaves a space between the vessel and sheath, in which they stagnate, and exposes a rough surface on which the blood may be entangled as it flows past, and nuclei formed around which the blood may coagulate; a result to which these various states tend. The wound being small, or other conditions being favourable, these may be adequate to the purpose; but if they should fail, the hæmorrhage will, of course, continue, and another series of actions will be brought into force. Nature's local powers having proved insufficient, she calls the whole system, to her aid. A faintness or tendency to syncope—syncope itself in extreme cases—is induced; and the blood is become more fibrinous. Both these conditions operate essentially in the same manner as retraction and contraction of the vessel, that is, retard the current of blood through the arterial orifice, and favour by this, and by increased coagulability of the blood—the result of the latter condition—the formation of occluding coagula, although these would be less firm, and therefore more liable to be broken up by the returning force of the circulation than those formed by the first set of conditions. In the more severe cases, as hæmorrhage from wounds of vessels of the first or second magnitude, even these may prove insufficient, and the issue, unless the surgeon is opportunely able to prevent further loss by the exercise of his art, must necessarily prove fatal.

The chief elements, it will be observed, in Nature's temporary hæmostatics, is the presence of coagula within the sheath and open extremity of the vessel. To procure these, I conclude, from the foregoing observations, that two consecutive series of auxiliaries are brought into play by Nature: these I shall name, for the sake of distinc-

tion, the primary and secondary series. Each series will be found to have the same action, at least, tend to the same results,

To retard the current of blood, we have the retraction and contraction of the vessel in the primary series, the sedative result on the heart's action from the loss of its wonted stimulus in the secondary. To assist these in the formation of coagula, we have the rough surface of the sheath to entangle the blood, and the space between the sheath and the vessel in which the blood may be at rest in the primary; the change in the relative amount of the constituents of the blood, caused by the previous excessive depletion, and causing an increased amount of fibrin, and hence, increased tendency to coagulation of the blood in the secondary. The only distinction which seems capable of being drawn between the two is, that the primary series depends on local, the secondary, on constitutional changes.

In ordinary slight cases of hæmorrhage, the primary is always the principal agent in causing occlusion of the injured vessel. In more severe cases, the secondary is indubitably the more efficient, since the primary has failed in its attempts to achieve a salutary effect. Still, it must be remembered, that the action of the latter cannot possibly exist without the former, except where the hæmorrhagic diathesis is present; for here the primary is almost, if not wholly, in abeyance, whilst the secondary is Nature's chief reliance in the hour of need. With this exception, therefore, we observe that Nature has both series in action when the secondary has been induced at one and the same time.

This would appear to lead to the conclusion that the secondary was only accessory to the primary series. But the phenomena are so striking, the relation, as pointed out between the two, so close, their order of occurrence so natural and so regular, their results so similar, that I am led to place the secondary on the same footing with the primary, even higher in the scale of importance, in severe cases, and to consider it as Nature's greatest safeguard in those severe cases where the primary has failed.—*London Lancet.*

A few Observations on the Use of  
**PROF. SEUTIN'S STARCH BANDAGE,**  
In the Treatment of Fractures.

BY ALFRED MAREWICK, SURGEON, LONDON.

In the treatment of fractures, any apparatus capable of fulfilling the chief indication—namely, that of maintaining the extremi-

ties of the fractured bones in exact apposition, and which at the same time permits of progression—must undoubtedly be a very valuable one to the surgeon. Numerous apparatus have been invented for this purpose, since the time of Hippocrates; the principal ones now had recourse to are, the common apparatus, with splints; Desault's long splint, with Boyer's modification of it; for fractures of the thigh; the double inclined planes of Mac Intyre, Liston and Amesbury; Greenhow's apparatus; the fracture box; the *appareils inamovibles* of Larry and Emile Lacroix, the former consisting of—1stly, a linen cloth several times double; 2ndly, two cylinders or junks formed of straw, bound tightly together with twine, each an inch and a half in diameter, and rather shorter than the cloth; 3rdly, one or two bags or cushions, stuffed with chaff, of sufficient thickness, and of the same length as the junks; 4thly, a conical pad, stuffed with tow, six inches long, three wide, and two thick at its base; 5thly, three six-tailed compresses; 6thly, a long compress, called the stirrup; 7thly, the "tibiale", a large piece of linen cut to the shape of the apparatus; 8thly, ligatures five or six in number; 9thly, the resolvent liquid, a mixture of camphorated spirit, Goulard water, and white of egg, beaten together in water; and the latter, which is frequently employed by Dieffenbach, of a solid case of plaster of Paris, procured by pouring into a convenient sized wooden box, containing the fractured limb covered with oil or cerate, a sufficient quantity of semi-fluid gypsum; the *appareil hyponarthrecique*, or "a suspension," proposed by Sauter, of Constance, in 1812, and adopted with certain modifications, by Mayor, of Lausanne, and Chelius, of Heidelberg. It consists of a flat piece of board, a chaff cushion, and ligatures for fixing the limb; the whole is suspended by attaching a cord, passed through a hole in each corner of the board, to a pulley, fixed either to the ceiling or the top of the bed; the moulding tablets of Mr Smee, prepared by copiously brushing over one side of a piece of coarse sheeting with a thick solution of gum, and afterwards covering it with a composition made by rubbing whiting with mucilage, continually adding the powder, until the whole is of the consistence of thick paste; a second piece of sheeting is then rubbed over on one side with the solution of gum, and the moistened side applied upon the composition with which the piece of sheeting has been covered; the apparatus invented by Jobert, of the Hospital St. Louis, Paris, which consists of a leather sock or bracelet fastened to the foot of the bed, for making extension, a long

cloth folded and passed over the opposite side of the body, and fixed to the head of the bed, for producing counter-extension, and another, if required, placed across the limb, for counteracting the action of the muscles, on the upper extremity of the fractured bone; and lastly, the *appareil amidoné*, or starch bandage, which forms the subject of the present paper.

The principal advantages of this bandage, which—from the facility with which it is split, thus constituting, at will, a moveable and immoveable apparatus—has been termed also by its inventor, the *appareil amovoinamovible*, are, 1st, that of effectually preventing any motion between the fractured extremities of the bones; this is evidently of the utmost importance in the treatment of all solutions of continuity in the osseous tissue, as, unless coaptation be maintained, not only will irritation and inflammation be excited, and the pain and suffering of the patient greatly prolonged, but also the formation of the callus considerably retarded, if not entirely prevented; for children and infants, also, whose restless nature is a source of considerable anxiety to the surgeon, in consequence of the difficulty thereby experienced in maintaining perfect immobility of the fractured bones, the starch bandage is an invaluable apparatus. All others, independent of their total inability to maintain perfect coaptation, become, in cases of fracture of the lower extremity, constantly saturated by the alvine and urinary excretions. They therefore require to be frequently changed, in order to prevent the irritation, excoriation, and fætor, which would otherwise be occasioned. But this frequent changing must evidently cause considerable pain to the patient, as well as greatly retard the formation of the callus, by allowing the fractured ends of the bones to rub against each other. Thus, it will be perceived, that by remedying one evil the surgeon creates another. In the delirium occurring in cases of compound fracture from extensive laceration of the soft parts, injury of the nervous filaments, &c., no apparatus will so effectually prevent the fragments producing that disturbance upon which the delirium in many cases depends. It forms, with the fractured limb a whole, which cannot move without the concurrence of its constituent parts. Hence the impossibility of any partial movement taking place, or the occurrence of any displacement of the broken bones, the whole limb being obliged to move in the direction of any impulse given. “Neither can there be free motion in any articulation; for supposing a bone was solicited to move on another, it will be prevented from doing so by two dia-

metrically opposite surfaces of the bandage; hence it is easy to conclude that the muscular contractions themselves will be unable to produce any change in the relation between the fractured surfaces, since, on the one hand, the contraction, requiring a certain lateral space for the development of the fibres, can but imperfectly take place, and on the other, although it might be freely effected, the displacement would be rendered impossible by the contentive means.” The compression also which the bandage exercises, considerably suppresses the suppuration occurring in compound fractures which, from its frequently being very excessive, greatly reduces the strength of the patient and consequently protracts his recovery. It likewise secludes the purulent matter from the free contact of air, and thus renders its absorption much less dangerous. In gun-shot fractures of the articulating extremities of bones, in which, when amputation has not been immediately performed, a cure can only be obtained by ankylosis, the starch bandage affords an excellent means for securing this desirable termination, by preventing all motion of the joint; 2ndly, that of adapting itself when properly applied to all elevations and depressions, consequently it exercises an equal degree of pressure on all parts, and is therefore not liable to produce congestion or mortification; on the contrary, it acts antiphlogistically by giving tone to the vessels, relieving the inflammation, and by preventing any unnecessary afflux of the fluids towards the fractured limb, allows this to receive only sufficient for the repair of the solution of continuity; 3rdly, that it does not become deranged, but remains in the same position as when applied; 4thly, that it admits of progression and enables the patient to be removed to any part without danger; thus the adult patient who has been accustomed to a life of activity, is no longer under the necessity of remaining in bed during the formation and consolidation of the callus, there to become exhausted and cachectic by a long-continued decubitus, and a prey to his bitter reflections, but is able to change his position, get up, and even walk about on crutches, and by this means recruit his strength, relieve his mind, and facilitate and hasten his recovery. Those severe and distressing cases of ulceration and gangrene which are so commonly met with, especially in old people, and which are consequent on remaining long in the recumbent posture, are of very rare occurrence, if not entirely unknown to those who employ the “*appareil amovo-inamovible*,” 5thly, that of the

material of which it is composed being economical and easily procured; 6thly, that it is equally applicable to all kinds of fractures; 7thly, that it admits of the limb being placed either in a state of flexion or extension, of pronation or supination; or of abduction or adduction; 8thly, that it is more easily removed and more speedily applied than any other apparatus; 9thly, that from the facility with which it may be divided, it forms, as its name implies, a movable and immovable appaerail, at will. These advantages are certainly not trivial, and when they are considered together with the success with which it has been attended in the hands of several distinguished surgeons, in the treatment, not only of both simple and compound fractures, but also of dislocations, ruptured tendons, caries, and other affections of the joints, &c., &c., it is a matter of surprise that this bandage has not been more favorably received and more generally adopted by the profession in this country.

*On the mode of application.*—The necessary requisites are one of Scultetus's bandages or a common roller, two or three old linen bandages, of convenient length and breadth for the fractured limb, some paste-board, of sufficient stiffness and firmness, from which splints are to be torn rather than cut of the proper size, in order that their edges may be so levelled off as to lie evenly on the limb, instead of being sharp and angular, and thus produce an injurious pressure on certain parts, and some fresh well-made starch. These things having been previously prepared, the surgeon immediately proceeds to reduce the fracture. When this is accomplished, and while the bones are being maintained in apposition by an assistant, a bandage is to be applied first round the toes,—for instance, supposing it to be a fracture of the leg, taking care, however, to keep their extremities free, as an index to the condition of the remainder of the limb. Those parts which, from their prominence, are likely to receive too great a degree of pressure, and by this means become inflamed and gangrenous, such as the ankles, the tendon of the tibialis antices, the spine and tuberosities of the tibia, the head of the fibula, and the condyles of the femur, are then to be guarded with wadding or amadou, previous to the application of the first roller. This is then to be passed round the foot and leg, as high as the knee or to a short distance above it, according to the situation of the fracture, and afterwards slightly starched for the purpose of fixing its edges; if more be applied, it will penetrate through to the internal surface of the roller, which will in consequence be rendered harsh and irritating

to the skin. The posterior splint, from which a semicircular piece has been torn to allow of a space for the heel, having been softened in water, starched and padded, is now to be applied and secured with the second roller, which must be well starched by means of a brush, or the palm of the hand. The lateral splints, prepared as the posterior one, are next applied, and over them the third bandage, which should receive a good coating of starch. If preferred, the lateral splints may be applied at the same time as the posterior one. However, I think more firmness is obtained by applying them as I have stated. If more solidity should be required, a fourth, and even a fifth bandage may be applied. It is advisable, previous to the application of the bandages, the first, however, excepted, to dip their extremities into the starch; by this means the edges become fixed as the bandage is unrolled. The end of the last bandage should also be folded in and placed in a conspicuous place. In cases of compound fractures, the apparatus must be so applied as to allow a free exit to the secreted fluids; thus, the edges of the rollers must either be turned back from the solutions of continuity, or holes cut in those situations corresponding to them, and the splints either notched or perforated. A communication can then, if necessary, be established between two openings, and a free discharge promoted. The wounds can also, by this contrivance, be dressed according to circumstances. Metal splints are sometimes requisite to give support to the fractured limb when the apparatus becomes softened by an abundant suppuration. Extension and counter-extension should be kept up until the bandage is perfectly dry. An old shape, resulting from a previously treated fracture, is an excellent addition to secure coaptation during its desiccation, which may, in some cases, be promoted by hot bricks, bottles of hot water, bags of heated sand, or by exposing the limb to a fire or the sun's rays. In fractures of the lower extremity in children, the bandage should be covered over, when dry, with white of egg or some kind of varnish, or enveloped in a piece of oiled skin, in order to prevent its being soiled and softened by the excretions.

The period at which the bandage should be applied has been and still is a point of much controversy. Professor Scultetus is in favor of its immediate application, whether tumefaction be present or not, and states that, instead of its being followed by any ill effects, it lessens the traumatic inflammation by diminishing the afflux of blood, promotes the absorption of that already effused, and



favours the circulation by its compression, which should be gentle and equal.

Others argue that if the bandage is applied where there is much tumefaction, and before this has arrived at its height, either strangulation will be the consequence, or else the swelling will decrease and leave a vacuum between the surface of the member and the bandage, the result of which would be a want of proper support to the fractured bones. These are certainly objections, but objections of little weight. It is true, strangulation would be occasioned if the swelling should increase after the application of the bandage, but this would not be the case provided the apparatus were properly applied. I believe the following remark of M. Velpeau to be perfectly just, and founded on clinical observation—that “if there is no tumefaction, the bandage will prevent its recurrence; and if there is, and the pressure be well made, it will disappear.” Whenever the swelling is considerable, I should recommend the first roller to be wetted in simple or Goulard water previous to its being applied. This would tend to reduce the tumefaction; but should such not be the case, space would however be given for its increase by the expansion of the bandage in drying. It is true, also, that the bandage no longer affords the necessary support to the fractured limb when an empty space becomes formed between it and the latter, in consequence of the subsidence of the swelling. But this will be of but short duration, as it is sufficient when the vacuum is but trifling, to soften it with water, then mould it to the shape of the fractured member, and finally to secure it by a starched roller; or if the vacuum is considerable, to split up the bandage with the scissors which Mr. Seutin has invented for that purpose, and remove a slip, if necessary, of the requisite width, and then bring it together again with a starched roller. The section of the apparatus is of the utmost importance; it enables the surgeon to make a careful examination of the limb, to remedy any improper pressure or defect, and to ascertain the position of the fractured bones. It should always be done on the following day or the day after. It causes no pain or displacement, and may be repeated as often as required without any danger of retarding the formation of the callus, as the posterior surface of the bandage gives the necessary support. It is a good plan, when applying the “bandage amilonne,” to place a piece of tape in the situation where the section will have to be made, so as to serve as a guide to the scissors. —*London Lancet*.

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A Sketch of the Relation of the Spinal

Marrow to

PARTURITION AND PRACTICAL MIDWIFERY.

BY W. TYLER SMITH, M. D. LOND.

Lecturer on Midwifery at the Charlotte-street School of Medicine.

The Uterus is a muscle,—the largest and most important muscle of the animal economy. It supports the race in the same way that the stomach and the heart support the individual. It is the organ of nutrition and circulation to the species. Parturition, the chief function of the uterus, is performed like the functions of other muscles, under the direction of the nerves by which it is supplied. These nerves have been beautifully made out by Dr. Robert Lee; and are derived chiefly from the third and fourth sacral nerves, and hypogastric ganglia. Through its nervous endowments the uterus has the power of associating with itself other muscles, in a certain definite order, for the safe and efficient performance of parturition. But the act of parturition never had been, and never could be, studied properly, as a motor function, until the discovery of the physiology of the spinal marrow by Dr. Marshall Hall.

The Spinal Marrow is the central organ presiding over the motor actions of the uterus.

All the chief physiological uterine motor actions are reflex in their nature.

Other causes of uterine contraction are, direct or central spinal action, the influence of emotion, and muscular irritability.

Contraction of the uterus from irritation of mammary excitator nerves, as in the sucking of a child, or from irritation of the cutaneous nerves of the abdomen, as by the aspersion of cold water, are pure instances of reflex spinal action. In either case the direction of the motor influences is from the extremities of the incident excitator nerves through the spinal marrow, and then to the motor organ.

Contraction of the uterus from fear is an instance of the influence of emotion. Emotion may be induced by external objects, as from the sight of instruments; or it may arise within the mind, as from the remembrance of former suffering. In these respects there is some analogy between reflex action and the action of emotion or volition; but emotion and volition are psychological, excitomotion is physical. This constitutes such immense difference, a difference so preponderating over the analogies referred to, that there is danger of great confusion in physiology, if the term reflex cerebral action

(proposed by Dr. Laycock) should come to be generally applied to motions dependent either on emotion or volition.

The seat of emotion is not yet ascertained, but it acts *through* the spinal marrow and the spinal motor nerves, as would appear from the facts that emotional movements remain in parts entirely paralyzed to cerebral voluntary motion.

Contraction of the uterus from the application of galvanism is an instance of uterine action from *vascular irritability*. Here, the stimulus directly affects the muscular fibres of the uterus.

*Volition* may increase the actions of the expiratory muscles after the dilatation of the os uteri, or it may bring into action before this part of labor is completed; but the motor forces, dependent on the will, are *accessory*, and *essential* to the process of parturition; delivery may take place in cerebral paralysis with total loss of voluntary motion, the actions dependent on *reflex action*, or *emotion*, and on *muscular irritability*, all remaining perfect.

Delivery may take place in profound coma—many such cases are on record; or in paraplegia from disease in the middle portions of the spinal marrow, as in a case related by Ollivier, when both volitional and emotional action are subtracted, but labour proceeds by virtue of the reflex action and the muscular irritability which remain. It should be mentioned, that in simple coma, only emotion and volition are withdrawn; but in paraplegia from disease in the middle of the spinal marrow, there is also the absence of the expiratory reflex action, the abdominal muscles are now inactive.

In paraplegia from disease involving the whole lower portion of the spinal marrow, labour either does not take place, or proceeds with extreme inertia, as in a case related by M. Brachet; here volition, emotion, and all the reflex actions, are absent, and *muscular irritability* alone remains. Patients in this state have nevertheless been delivered by the stimulus of galvanism applied to the uterus itself.

Thus the motor actions concerned in natural parturition admit of an interesting synthesis and analysis; obstetrician should be as familiar with the simple and compound forms of muscular action as the chemist with elementary bodies and their combinations.

The *type* of uterine action is rhythmic; the pains succeeding each other at regular intervals. The *rhythm* is probably dependent on the spinal marrow, being synchronous with

the action of the expiratory muscles, which is undoubtedly reflex in its nature.

The *mode* of uterine action is probably peristaltic; peristaltic action has been observed by Muller in the uterus of the rat, and in the oviduct of the turtle; In the human female, the contractions appear, according to Michaelis and Wigand, to commence at the cervix, to extend from thence to the fundus, and then to pass downwards again towards the os uteri. This is analogous to what takes place in other organs possessing peristaltic action; the heart begins to contract at the auricle, the contraction traverses to the apex, and then returns; in the stomach also, on the authority of Magendie, contraction begins at the pylorus, proceeds to the cardia, and then sweeps back from left to right. The objects to be obtained by this double action in the uterus would seem to be the prevention of the descent of the umbilical cord, the ascent of the arms of the child at the commencement of the pain, in cases when they hang down, and in this way to prevent arm or shoulder presentation, and the prevention of inversion of the uterus. Intussusception of the upper part of the organ, and complete inversion, would probably be frequent if contraction uniformly commenced at the fundus.

The peristaltic *mode* of action appears to depend on the ganglionic nerves. The question may be asked, is peristaltic action anything more than the muscular irritability of parts supplied by the ganglionic system? The uterus contracts so as to expel its contents after death. In the œsophagus, which, like the uterus, is endowed both with *peristaltic* action and *reflex* spinal motion, Dr. Marshall Hall has observed distinct contraction after death; I have also observed the same phenomenon.

The exciters of the reflex spinal action in the uterus are numerous.

First in importance are the incident nerves of the whole length of the parturient canal, from the fundus uteri to the constrictor vaginae.

Irritation of the incident nerves of the ovaria and of the mammae, the cutaneous nerves of the abdomen and general surface, the nerves of the stomach, bladder, and rectum, all excite reflex uterine action during labour.

A definite order is observed in the phenomena of labour.

With respect to that great problem in physiology and obstetrics—namely, the cause of the coming on of labour at the end of the tenth lunar month of gestation, nothing definite has hitherto been said. In the earliest part of the parturient process,

which in my lectures I have been accustomed to call the *premonitory stage* there is an equable, continuous contraction of the uterus, which exists for some time before the appearance of the periodical contractions. This equable contraction urges the head of the child firmly against the os uteri. What is the cause of this equable contraction? We must look beyond the uterus for the answer; for the uterus attempts to act in extra-uterine pregnancy. I believe the ovaria are the exciters of the first motor action of the uterus. It is well known that the majority of cases of abortion occur at what would have been menstrual periods, and it is equally well known that the entirety of the phenomena of menstruation depend upon the ovaria as their cause. In the human female, labour comes on at the tenth menstrual period from the time of conception; in animals also, as far as my observations have extended, the term of gestation is some multiple of an æstrual period. Now the menstrual periods of the human female and the æstrual periods of animals are alike in this, that in the one case ova are chiefly prepared at these epochs, in the other solely. Further than this the analogy cannot fairly be pressed. It is too much to speak of any moral similarity between the human female and the lower animals in this respect. I consider, then, that parturition in the human female is essentially a menstrual period; but that instead of an ovule being thrown off from the ovary, an ovum is expelled from the uterus, and I compare the lochial to the menstrual discharge. In animals, the phenomena of parturition are more strikingly similar to those of æstruation; there is evidence that a similar state of the ovaria obtains. For instance, the guinea pig and the rabbit will admit the male immediately after delivery, and conception will follow the congress. In the mare also, a few days after foaling is the time chosen for the admission of the male. On these and other grounds I believe the ovaria to be the exciters of the first contraction of the uterus in parturition, but I am engaged in testing the matter experimentally. I shall excise the ovaria in animals which have conceived, and note the results.

The effect of the equable contraction of the uterus first induced, is, as I have said, to urge the head of the child against the os uteri. This is the most excitable part of the uterus, and after a time, irritation of the os and cervix call forth the pains which constitute the commencement of actual labour. The effects of irritation of the os uteri are shown in cases of premature labour induced by irritation in this situation, as by the introduction of a plug, and by certain cases

where, from the pendulous state of the uterus, the head cannot be brought in apposition with the os uteri, and labour, in consequence, is put off until this cause of inertia is removed by an abdominal bandage, or the prone position. Irritation, then, of the os uteri must be looked on as a cause, though, in ordinary cases, a secondary cause, of the coming on of labour. I believe the ovarian nerves and the nerves of the os uteri, are as much the exciters of the motor actions of parturition, as the pneumogastric and the trifurcate are the exciters of the motor part of respiration.

After the persistence of the premonitory stage of labour for a certain time, actual labour pains commence. The object now to be attained is the dilatation of the os uteri, and I therefore propose to call this the *stage of dilatation*. Throughout this stage, the body and fundus contract periodically. The contractions of the uterus in this stage are not so violent as they subsequently become. This is owing to the contact of the membranes and the amniotic fluid with the os uteri. At the same time the os uteri and the vagina dilate. This dilatation is effected partly by the mechanical pressure of the membranes and the advancing head of the fœtus, but the os uteri possesses a *positive* as well as a *passive* power of dilatation—a dilatation similar to the dilatation of the cardia in vomiting or deglutition. This *positive dilatation* is shown by the extreme suddenness with which it takes place after the existence of previous contraction, and by the sudden contraction which sometimes occurs immediately after the birth of the child, as encysted pæcenta. The perinæum, in the dilatation of which is *passive*, never contracts in this way. It is also shown by the form of the hæmorrhage in placenta prævia; after the separation of a portion of the placenta, hæmorrhage is increased during the pains; if the dilatation were from mere pressure, the hæmorrhage ought to cease during the pains, and come on in the intervals. The direction in which the motor force is exerted in the stage of dilatation is *downwards and backwards*, in the direction of the axis of the pelvic inlet. In this stage of labour the motor actions are purely of a reflex kind, the excitor being the internal surface of the uterus, and particularly the os uteri. The centre of the nervous arcs involved in the uterine actions is in the lower part of the spinal marrow. In natural cases, emotion does not at all influence this stage physiologically.

During the *stage of dilatation*, various extra uterine reflex actions occur. The actions of the bowels and of the bladder are excited, and in many cases vomiting takes place. At

the time of the completion of the dilatation of the os uteri, several rigors affecting the whole muscular system are frequently experienced. Defecation and micturition have evidently a beneficial purpose in enlarging the capacity of the pelvis; the nausea and vomiting promotes the dilatation of the os uteri, and is a preparation for the expiratory action of the next stage.

In the next stage of labour, the head of the child advances through the vagina to the os externum; this I propose to call the *stage of propulsion*. In this stage, the whole of the uterus contracts upon the child, but new motor powers are now brought into play. Irritation of the os uteri only excited reflex motor action in the uterus itself, but irritation of the vagina excites both the uterus and the respiratory muscles. The contractions are also more violent, because the liquor amnii has now escaped, and the hard head and body of the child are in direct contact with the excitor surfaces. At the coming on of each pain, a deep inspiration is taken, and during the pain, expiration is protracted as much as possible where the pains are long. They consist, as far as the respiratory system is concerned, of several sudden and deep inspirations, followed by prolonged expirations. At the height of a pain in this stage, the glottis and cardia are closed, the abdominal and other expiratory muscles contracted, and the diaphragm inert, as in vomiting. All obstetric writers have taught the contraction of the diaphragm during the pains of this stage; but if it be considered for a moment that the diaphragm is a muscle of *inspiration*, while the parturient action is expiratory, the fallacy of such a view will be evident. It is true that the floor of the diaphragm remains plain during the effort at expiration, with the glottis partially or entirely closed, but this is from the mechanical distension of the chest by the contained air, not from active contraction of the muscle itself.

It will be seen, that in the stage of propulsion the direction in which the motor force is exerted, is different from what it was in the stage of dilatation. The direction the head of the child has now to take is *downwards* and *forwards*, instead of backwards. It has to pass through the lower half of the pelvic segment of the circle of Carus, in the direction of the axis of the pelvic outlet. Obviously, a new direction of the motor force was necessary to effect this, and it is supplied by the addition of the expiratory action at this time. The action of the abdominal muscles urges the fundus uteri backwards against the spinal column, and assists in giving the head the

proper direction while emerging through the pelvis. The mechanical adaptation of the foetal head to this progress has often been dwelt upon. Another object effected by the expiratory action is the compression of the uterus, which is thereby excited to additional contraction.

In this stage of labour, the nervous arcs concerned have their centres partly in the lower nodules of the spinal marrow, and partly in the medulla oblongata. There is this analogy between the medulla oblongata and the lower spinal marrow, that in the one are congregated the keys of the motor arcs of respiration, deglutition, and their various morbid actions; in the other, the centres of the motor arcs of parturition, defecation, micturition, ejaculation, and conception, as far as the pelvic viscera are concerned. It cannot but be considered wonderful that the dilatation of the os uteri should only excite the nervous arcs concerned in vomiting, while the dilatation of the vagina should only excite the respiratory arcs. In the stage of dilatation the motor actions are chiefly reflex; but both volition and emotion intervene in the stage of propulsion. The patient desires to press her feet against some fixed body, and to grasp with the hands, so as to increase the power of the expiratory efforts. When the pains are moderate, the woman utters only a prolonged and intermittent groan, owing to the contracted state of the glottis; but when the suffering, produced from the distention of the vagina, is excessive and unbearable, she utters a loud cry. This cry is a motor action, a powerful expiration, excited by the emotion of intense suffering; it opens the glottis widely, and immediately takes off from the uterine system all the extra-uterine pressure. Thus, the glottis may be compared to a safety-valve which is opened by emotion whenever the pressure becomes too powerful to be borne with safety.

In the next stage the child is born, and I have called this the *stage of expulsion*. The birth of the child is effected by the powerful action of the expiratory muscles, with the glottis and cardia closed, and by simultaneous contraction of the uterus and the whole parturient canal. At the moment of birth, the vagina is retracted over the head of the child by the action of the levatores ani, and positive dilatation of the sphincter ani and sphincter vesicæ occurs. The dilatation of these sphincters is partly produced by emotion, and partly by reflex action. It forms a most important provision for the safety of the perineum. At the moment when this part is subject to the greatest amount of distention, these two sphincters suddenly relax

before and behind it. We may thus see a reason for the situation of the vagina between the orifices of the rectum and bladder. Laceration occurs generally in first labours, and at this point primiparous women often suffer from feelings of delicacy. They should always be prepared beforehand for involuntary action of the bowels at this juncture, and impressed with the propriety of not preventing it by volition which otherwise they are, from motives of delicacy, prone to exert at this time. A napkin should be placed to receive any fecal matter that may be discharged. The regulation of the glottis by emotion is another provision for the defence of the mother from laceration at this period. At the moment of birth, the woman, affected with uncontrollable agony, gives a loud cry, which by opening the glottis widely, releases the uterus from all expiratory pressure.

This completes the process of actual labour. The phenomena which follow are so far different, that I propose to treat of them as a supplemental stage.

When the body of the child is born, the contracting uterus follows it in its descent, and the action of the uterus, produced by the great excitation of the vagina, is such, that in many cases it at once throws off the placenta, and lodges it in the upper part of the vagina. When this is the case, the presence of the placenta in the vagina, and the irritation of the surface, from which the placenta has been torn, are generally sufficient to ensure, by reflex action, the contraction of the uterus, and to prevent hæmorrhage. Thematernal emotions also tend to accomplish this end. The sound of the child's voice affects the action of the uterus. If the placenta does not separate immediately, slight irritation through the loose abdominal walls, or gentle traction of the cord, is sufficient to cause its expulsion. Denman recommended that the placental mass should be allowed to remain a considerable time in the vagina. He supposed that coagulation of the blood, poured out at the moment of the separation of the placenta, was thus favored, and after-pains diminished as a consequence. But this plan would also act by exciting reflex action, and the permanent contraction of the uterus. At this time a bandage is applied to the abdomen, and furnishes another guarantee against hæmorrhage.

The uterus has now lost its great excitor, by the delivery of the fœtus, but it is necessary that the uterus should be stimulated for a considerable time in order to promote its return as nearly as possible to its pre-impregnated state. This is provided for in nature. The stomach has an intimate reflex connexion with the uterus at all times, but

immediately after delivery this is very much increased; every thing the patient drinks now excites uterine contractions. The reflex connection between the mamma and uterus is increased to a still greater degree. The mere sight of the child will sometimes suffice to create the sensation of "the draught" in the breasts, and this re-acts upon the uterus. Drinking fluids also excites the draught, and thus the stomach exerts an indirect action on the uterus besides its proper reflex action. Still more powerful is the act of suckling the child; distinct uterine action is excited on each occasion, and when after-pains are present, a distinct pain is regularly produced every time the infant is applied to the breast. These different sources of excitation continue for some time after delivery, and are sufficient to restore the uterus to the size natural to the unimpregnated state in women who have borne children.

No one can refrain from admiring the successive order in which various excitor powers come into operation during the progress of labour. First, according to my belief, the ovaria excite the uterus, while this organ is defended from the irritation of the fœtus by the liquor amnii, a fluid of its own temperature, a medium least of all capable of exciting that reflex action of which the uterus is so susceptible. Next, the head of the child is brought in apposition with the os uteri, shielded, however, in some measure, by the liquor amnii, until the os is sufficiently dilated to permit it to pass; then, the naked head and body of the child come in contact with the highly excitor surface of the vagina and the os externum successively. After the fœtus has been expelled, the placenta takes up the train of excitation, and this is followed by the gastric and mammary succession of stimulus and action. Not less extraordinary is the gradual augmentation of motor action, from the simple equable contraction of the uterus the day or two before labour, to the grand combination of muscular actions, which marks the final throes that expel the child.

The motor power of the uterus itself, the number of motor organs involved as auxiliaries, and the different forms of muscular action brought into action during its progress, mark the act of parturition as the most comprehensive of all the motor functions of the animal economy. Taking muscular irritability as the basis, we have reflex action, emotion and volition, every power, in fact, which exists, whether for the execution of contraction or dilatation, all extensively and simultaneously engaged; the end of ail being the safe accomplishment of delivery.

Well might the philosophic Demman exclaim—"Instead, therefore, of despairing, and thinking they are abandoned in the hour of their distress, all women should believe and find comfort in the reflection, that they are at those times under the peculiar care of Providence, and that their safety in childbirth is ensured by more numerous and powerful resources than under any other circumstances, though to appearance less dangerous."

## THE DISSECTOR.

JULY 1, 1846.

### Lateral Curvatures of the Spine.

Miss E. L. H., aged 19 years called upon us on the 15th of March, 1846, with a lateral curvature of the spine. The posterior part of the upper and principal curve in the the spine, lay under the right scapula, and its deviation there from the median line was an inch and a half. It was about eight years since the curve commenced, which was now imbedded in a veritable white swelling of the scapula, and which, by the expansion of the muscles gradually drew the spine from the median line to its present position. We prescribed the magnetized gold pills and plaster to reduce the white swelling, and directed her to go home and use these remedies, and return here on the first of June, when I would commence magnetizing the spine.

On an examination at the end of this time, we found the white swelling greatly lessened and the curve reduced one half. We now commenced magnetizing the spine once a day, and on the third day brought it up to its place, and on the fourth it passed the centre under the action of the machine, and began to curve to the left side.

We magnetized this case twelve times only when the curve being reduced to one-fourth of an inch, we directed the young lady to go home and resume the use of the pills and plaster, and to continue their use until the white swelling was entirely reduced, when the spine would resume its

natural position and would be maintained there under the healthy and natural action of the muscles.

We have had more than a hundred cases of lateral curvature of the spine during the last three years, every one of which was connected with a white swelling on the posterior side of the curve, and produce the deviations of the vertebra. The obvious treatment, therefore, is first to reduce the tuberculations, when the vertebra will return to their proper place of their own accord, and the muscles thus relieved and restored will retain them in their true position. Yet the regular quacks of our profession continue to recommend that such patients be harnessed with cushions and splints; but regarding them as worse than useless, we always remove them.

The true cause of lateral curvatures of the spine is not understood by the profession; they are *always* cases of tubercular disease of the muscles of the spine. The tuberculations or white swellings are always on the posterior side of the curve, and produce the deviations of the vertebra. The obvious treatment, therefore, is first to reduce the tuberculations, when the vertebra will return to their proper place of their own accord, and the muscles thus relieved and restored will retain them in their true position. Yet the regular quacks of our profession continue to recommend that such patients be harnessed with cushions and splints; but regarding them as worse than useless, we always remove them.

The importance of the use of the magnetized gold pills and plaster in these cases will be seen in the following case which we treated and published before we introduced the use of the magnetic machine as auxiliary to the cure.

Miss E. B., of Stratford, Conn., aged twelve years. I called to see her in Dec. 1839, and on an examination found a lateral curvature of the dorsal vertebrae, a portion of which extended under and raised the right shoulder blade. The right hip was also raised above the left, and her health and strength much reduced.

Prescribed the magnetic remedies. The plaster to extend the whole length of the spine. The weight of her body was also directed to be suspended by her arms, with any simple contrivance, as by taking hold of a stick suspended from a ceiling, a few minutes, five or six times a day.

I called to see her again the last part of April, 1840, when, on examination of the

spine, it was found to have resumed its natural position, and her health and strength was perfectly restored.

#### Magnetic Machine--Pretended Improvements.

In answer to many correspondents who ask our opinion as to the reality and importance of the pretended improvements upon the vibratory magnetic machine, as set forth in the advertisements and puffs of certain parties, we beg to say that these alleged improvements, having no actual existence, are of importance only to the pretenders who get credulous victims to believe in them. There has been no improvement whatever made in magnetic machines, either at home or abroad, since we introduced the vibratory instead of the rotary movement in the one manufactured under our superintendence, and which maintains an undiminished reputation and unrivalled sale. If any real improvement should be discovered, our friends and patients may rest assured that we shall adopt it, at the earliest moment; but nothing of the kind has occurred or appears even in prospect. We have no doubt that our machine, which is always manufactured of superior materials, and in the best manner, conveys a greater amount of the magnetic forces into the system in better adjusted proportions, and with less inconvenience to the patient, than any other that has been ostentatiously fabricated to rival it; and the information which we are receiving, by almost every mail, of its almost miraculous effects, in a far greater variety of cases than it was originally supposed to be applicable to, fully convinces us that its sphere of usefulness is widening every day, and will extend in proportion as the instrument itself becomes known and experimentally tested.

Similar inquiries are frequently addressed to us concerning the rings, bands, and belts termed "Galvanic," and sold in connection with a bottle full of liquid called "The Magnetic Fluid!" We have already expressed our deliberate opinion of these nostrums, and now repeat that they have no other effect than that which they derive from the

genial imaginations of those who use them. These rings, bands, etc., are composed of small, thin pieces of zinc and copper, but it is well known that these metals evolve no forces until they are acted on by a corrosive acid, as in the galvanic battery. Rings of steel, permanently magnetized, and maintaining an action through the finger, arm or body, between the opposite poles, have a slight effect in highly susceptible subjects; and even copper and zinc, if connected at the same time with the two opposite surfaces of the body, namely, the mucous and serous, would also exert an action; but when both are applied to the same surface, as is the case with these rings, galvanism is evidently out of the question.

#### Consumption.

We would again direct the attention of the readers of this Journal to the importance of the use of the magnetic machine in the treatment of tubercular consumption, as our experience of its effects in more than 350 cases of this disease leaves no doubt but it greatly assists the action of other remedies in reducing tubercular disease of the lungs.

These cases were all distinguished by the magnetic symptoms, which *never* err; and the state of the tuberculations was often observed through clairvoyance during the progress of the treatment, as were the changes in the appearance of the tubercles from the action of the instrument.

Of 164 cases of ladies and gentlemen who visited our rooms in 1844, in all the different stages of the disease, we lost only eleven; and of 203 who visited our rooms in 1845, we have lost only nine. In two of these the tuberculations were reduced as shown by the magnetic symptoms and by clairvoyance, but both died of mucous disease, in the then feeble state of the lungs, in consequence of colds.

All the cases were from the commencement of the treatment, under the action of the magnetized gold pills in conjunction



with that of the machine, and a great majority of the cases the magnetized plaster was used at the same time. No other medicines were used in these cases except occasionally different articles to palliate the cough, and in a few cases the Hardwood Tar Syrup, or the pill composed of Hard. Bal. Copa. eubeds and Ext. Hyes, where the tuberculations were accompanied with much mucous disease, generally from colds after the tubercles had nearly disappeared.

**On some Electrical Effects Developed chiefly by the Galvanic Battery.**

BY GEORGE P. T. HILL, ESQ., F.R.S.

On sending a current of electricity, by means of the galvanic battery, through fine metallic wires, the most refractory metals are fused with facility, and become incandescent. If thin metallic leaves be employed, they burn with great brilliancy, being dissipated into vapor. Now, on the supposition that the space between the ultimate atoms of a body, independent of the several forces that may be arranged round them are entirely occupied by heat, I think the evolution of the latter substance, as exemplified in the above cases, may be satisfactorily accounted for. As a consequence of the law, that no two bodies can occupy the same space at the same time, we may suppose that the addition of electricity to a substance causes its heat of combination to be evolved, and thus to become sensible. Otherwise, whence arises this great increase of temperature? The caloric must obviously be supplied through the medium of one or other of the bodies employed; and if we grant this, the inquiry naturally presents itself as to what causes its evolution. Suppose M to represent a body, and B the heat of combination arranged all around it. Now, if we add to this a portion of electricity, C, on the supposition that this is materia, a displacement of part of the specific heat, B, must take place or the body be considerably enlarged. We find that heat is evolved, and must, I conceive, consider the specific heat of the body to have been lessened, for any other source from which this rise of temperature could have been derived is unknown. The form of the body remains unchanged, for, as the specific heat is replaced, atom for atom, or rather volume for volume, by the electricity, no condensation can possibly

take place. The evolved heat now asserts its action upon the body, which, as in ordinary circumstances, assumes the liquid form, and becomes incandescent.

In these experiments we find quantity of electricity to be the sole requisite. The large battery of Children, though capable of fusing several feet of platinum wire, had an intensity so feeble as not sensibly to cause a divergence of the gold leaves of the electrometer. This is perfectly in accordance with the above theory, for it is clear that the larger the addition of electricity, the greater the diminution of specific heat, whether the tension be high or low. Did the evolved heat proceed from the electric fluid itself, we should of course expect that intensity as well as quantity would be required for the production of these effects. This we know not to be the case. I do not consider the circumstance stated by Dalton, that the specific heats of bodies are greater at high than low temperatures, to be any obstacle to the reception of the above, for, to use an expression of the late Dr. Turner, these phenomena "have been investigated only for matter when in its ordinary state, and probably do not apply in cases of electric excitement." On the other hand, increase of specific heat causes an evolution of electricity. Harris detected electricity, though in exceedingly minute quantity, in the evaporation of distilled water from platinum vessels, when the presence of any chemical action was out of the question. In these we have phenomena directly opposed, to be former, but I think they may be considered as more anomalous than the fact, that when vapor should be decomposed by electric iron, heated to redness; and that the caloric thus generated should in its turn, be decomposable by a stream of hydrogen gas. I apprehend, then that there are other causes in operation which modify the effects of these most subtle and diffusive bodies, heat and electricity. In the condensation of aqueous vapor, the objects in contact with it likewise show signs of electric excitement. For a portion of vapor contains more specific heat and less specific electricity, than the same when liquid, and, therefore, before it can assume this form, it must receive electricity from surrounding objects, which thus exhibit signs of its emission.

No heat is evolved when a current of positive or negative electricity only is passed along a body, for in this case the repulsion of the particles confines the fluid to the surface alone, where it cannot influence the internal arrangements of the conductor. — *Lancet.*



On the Successful Treatment of Ovarian  
Dropsy,

BY WILLIAM HOOLES, ESQ.,

SURGEON TO THE ROYAL FREE HOSPITAL, LONDON.

I have lately had a patient who had been subjected to Mr. Brown's treatment,\* and, in justice to that gentleman, I must say that I believe he has been successful in curing her. I mention it, briefly, at this time, because public clamour appears to be directed against his doctrines; and, moreover, in common fairness he ought himself to have the opportunity of stating the case, as doubtless he will, in detail.

The patient was a married lady, about thirty years of age, who had had two children and one miscarriage. She first consulted me in the spring of last year, having previously been under the judicious care of Mr. Knaggs, of Camden Town. When she presented herself to me she had considerable abdominal enlargement, general emaciation, and great depression of spirits. An alterative course of treatment was suggested and adopted, but without any beneficial effect. Dr. Blundell was consulted, as also, subsequently, was Dr. Henry Davies. The opinion of both these gentlemen was, that the disease was ovarian dropsy; but no special treatment was recommended. In the beginning of December last I was requested to meet Mr. Brown. His opinion was, that it was a case in which his mode of treatment would be successful. I confess I was somewhat sceptical upon this point; but in the absence of all experience of his plan, I could not so much as venture an opinion respecting it. The treatment, however, was forthwith commenced; mercurial frictions, diuretics, and tight bandaging of the abdomen with a flannel roller, were the means applied. In ten days pyalism was produced, and the size of the abdomen was reduced from thirty-four and a half to thirty-two inches. I am not satisfied, in my own mind, that this reduction in size resulted from diminution of the cyst as Mr. Brown believes. I would rather attribute it to the absorption of the tissues caused by the salivation, and consequent loss of nutriment; these, however, are matters which may be passed over. Tapping was now performed, and nine pints and a half of fluid were drawn off; the abdomen was again very tightly bandaged, and the diuretic medicines continued.

The case, at this time, seems to be perfectly cured. The lady pronounces herself to be in better health than she has been in for years; she is, consequently, in high

spirits, can walk about with ease, and is daily gaining flesh. I have said, the case seems to be perfectly cured; but I am not insensible that there are early days to arrive at such a conclusion. What I mean is, that at present there is not the slightest appearance of the re-accumulation of fluid. I shall watch the case narrowly, and if, at the end of six or twelve months, there should be any indication of a return of the disease, I will, if you will allow me, publish the fact in the pages of *THE LANCET*. I would beg leave, in conclusion, to recommend to my professional brethren the adoption of this mode of treating ovarian dropsy, so that the merits of the plan may be fairly tested. In any cases that may occur in my own practice, I shall most assuredly have recourse to it, and I will trouble you with a faithful record of the results, feeling certain that your pages will always be open to the discussion of matters of so practical a nature.—*Id.*

Diseases of Children.

In the January number of the *Clinique des Hopitaux des Enfants*, we find various interesting articles, of which the following is the analysis:—

M. Guersant on the Influence of Rachitis on Fractures in Children.

From statistical researches founded on a medium of eighty cases of fracture, yearly, we have remarked that about a third of the fractures which we observe, occur in rachitic children. The circumstances which predispose them to fractures are two-fold; the anatomical structure of the rachitic bones, and the great weakness of rachitic children, which exposes them to frequent falls. The structure of rachitic bones varies according to the period of the disease. In the first period the spongy tissue is gorged with blood, more especially in the extremities of the long bones. In the second stage, the vascular system is still more developed, the compact tissue softens, the medullary canal becomes larger, and the bones bend in various directions. In the third period the disease remains stationary, and improves, the cellular structure becoming less vascular, and the bones regaining a certain degree of hardness. The predominant feature in these various states is extreme fragility of the bones. This fragility however, is fortunately compensated by the thickness of the periosteum in children generally, and more especially in rachitic children.

The symptoms of fracture in rachitic children are very different from those which are met with under other circumstances. There

\*Vide Case, ante.

is no crepitation, owing to the softness of the bones; often no deformity, on account of the periosteal covering; and when deformity exists there is no means of distinguishing it from the curvatures that are so frequent in rachitic children. These are the only symptoms which enable us to recognise the fracture:—1st. Abnormal mobility of the bones modified by the resistance of the periosteum; 2nd. Flexibility of the limb at the seat of fracture. If the existence of fracture is not recognised, or if a lengthened period elapses before the surgeon is called in, the periosteum may be ruptured, and then the signs of fracture become more apparent. There is then deformity riding of the fragments, and even crepitation, when the general rachitic affection is not too advanced.

The symptoms of fracture persist a long while after the accident, even when it is treated properly. Fifteen days afterwards, the fragments are generally still found moveable, whereas in a healthy child at that time, consolidation has always taken place. Consolidation is thus always tardy, and the more so the more severe the general disease. In addition to the direct unfavorable influence of rickets, there are other morbid influences to which the patients are often exposed. Thus, they are frequently attacked with pneumonia, bronchial catarrh, and eruptive fevers, to which ricketty children are extremely predisposed, these diseases always lengthening the treatment of the fracture.

M. Guersant reduces the treatment of these fractures to the mere application of a roller-bandage applied to the limb, and three or four small splints placed at the seat of the fracture, the whole being again kept in place by another circular bandage. The splints must not be allowed to rest on the osseous protuberances, lest excoriations should follow; this is the more important, as the extremities of the long bones are morbidly swollen. The entire apparatus must be surrounded with a piece of oil-skin, if it is one of the inferior limbs that is fractured, owing to the circumstance of very young children often wetting their bed. M. Guersant does not approve of any other forms of apparatus, all kinds of padding or cushions being soon destroyed, and the starch bandage being softened, by the contact of the urine.

The general treatment ought to consist principally, as in simple rachitis, in a good and tonic alimentation. Some writers have latterly asserted that a substantial diet is not beneficial in rachitis; but this is an error which may be explained by the circumstance

of substantial food being sometimes given too suddenly to children who have previously been living on very low diet. The change should be gradual, so as to allow the stomach to become accustomed to the difference in the food.

#### M. Bricheateau on the Antagonism of Ague and of Pulmonary Consumption.

This question has been much discussed of late by French medical practitioners, as our readers are well aware. M. Bricheateau, physician to the "Hospital Necker," analyzes the various communications that have appeared on the subject, including documents from different parts of Algeria, from Bourdeaux, Strashbourg, Lyons, the department of the Ain, Rochefort, Rome, &c.—all localities in which intermittent fever is rife, —and appears to come to the conclusion that there cannot be said to be antagonism between the two diseases—that is, exclusion of the one by the other; although the circumstances which favor the development of intermittents may be, and in all probability are, unfavorable to the development of phthisis. M. Bricheateau thus concludes his remarks:—

"Although, on examining the etiology of these diseases, we do not find incompatibility between the causes of phthisis and intermittent fevers, it is impossible not to recognise, either in the climate of marshy districts or in the influence of marshy miasma over the economy, conditions favorable to tubercular patients. Our knowledge of this fact is to be referred to the authors of the labors which we have enumerated. But instead of calling to our assistance some obscure antagonizing tendencies, would it not be possible to account for this kind of prophylaxy, by attributing it to the moist uniform heat which reigns in some marshy districts, and which, by favoring the development of fever, may impede that of pulmonary tuberculization. Does not this appear proved by what takes place at Strashbourg, where the climate being both damp and cold, the town is ravaged by intermittent fever and by phthisis; whereas the more southern departments of L'Ain, La Nièvre, Le Var, &c., are decimated by intermittent fevers, but offer very few phthisical patients? We may also add that it is impossible to deny that in all countries intermittent fevers preserve from other affections. The Dutch appear to be aware of this fact, as Boerhaave informs us, that they are in the habit of congratulating themselves on the return of their fevers. The same Boerhaave, along with Hoffmann, Lancisi, and Sydenham,

thought that intermittent fevers freed us from various diseases, and even predisposed to longevity: 'Febres intermittentes, nisi malignæ, ad longevitatem disponunt, et depurant ab inveteratis malis.' Some recent writers think that typhus fever is rarely met with in countries ravaged by endemic intermittents."

**Abscesses in the Liver; Ulceration of the Intestines.**

Mr. R. W. Smith presented a specimen of abscesses of the liver, which were not indicated by symptoms during life, at least so far as the history of the case was known. The subject was a man who had been a patient in the Talbot Dispensary, was afterwards in the Jervis-street Hospital, and lastly in the Whitworth Hospital. During the last three months he was constantly suffering from gastritis and gastro-enteritis. He had uncontrollable dysentery, but voided no blood; frequent vomiting, pain in the epigastrium, but never complained of pain in the hypochondrium, nor in the shoulder; had no jaundice, no rigors, nothing which could lead to the belief that hepatic disease had existed. The dysentery resisted all remedial means. He gradually became worse; singultus came on, and death took place. On examining the abdominal viscera it was found that the great intestine was ulcerated extensively. The ulcers were of various sizes, and occupied the mucous coat in the whole extent of the periphery of the canal. Some had an erysipelatous aspect, some an ash-colored surface. In the stomach there were signs of chronic gastritis. The mucous membrane was vascular and softened. The liver was full of abscesses; a very large one was on the right lobe. This was lined with a strong dense membrane, forming the sac of the abscess. In the left lobe were three abscesses. The first of these that was cut into had no sac, but was surrounded by the substance of the liver with which the purulent matter was in contact. The second also was without a distinct sac. The third, which might be termed a dissecting abscess, was bounded by the diaphragm anteriorly, and by the stomach posteriorly, and had separated the peritoneal from the other coats of the stomach. The formation of abscesses in the liver, without symptoms of hepatic disease, has been lately noticed in cases of dysentery."—*Dublin Pathological Society, April, 1844.*

**Sub-Cutaneous Division of the Sphincter in Anal Fissure.**

M. Blandin has lately operated in fissure of the anus by the sub-cutaneous section of

the sphincter. In two cases in which he recently adopted this treatment, the operation was followed by a prompt cure.

M. Marchal (de Calvi) has lately performed the same operations on a man laboring under cancer of the rectum. His patient suffered intense agony at the time of defecation, which M. Marchal attributed as much to spasmodic structure of the anus as to the presence of the cancerous mass. The operation was followed by great relief. —*Gazette des Hôpitaux.*

**M. Valleix on the Treatment of Difficult Dentition.**

M. Valleix relates a case in which a young girl died after suffering during three weeks from symptoms which could only be referred to difficult dentition. Her constitution was strong and her health had previously been very good, but the four molar teeth which complete the second dentition developed themselves simultaneously, giving rise to intense inflammation of the gum at the angle of each jaw. M. Valleix excised the gum which covered the teeth, but only when convulsions had already appeared, and without any beneficial effect. He thinks that the operation ought to have been performed sooner, and that whenever there are many teeth forcing their way through the gums, and the general reaction is severe, it ought to be resorted to at once, without waiting for the appearance of serious symptoms, such as obstinate vomiting, abundant diarrhoea, or high fever. The pain of the operation is trifling compared to that occasioned by the teeth themselves, and when performed early it will often disperse a host of alarming symptoms. In the above case, obstinate bilious vomiting existed, and the state of the stomach soon became such that the smallest quantity of fluid was rejected. This symptom, when carried to such an extent, is always serious, and is generally followed by convulsions. The appearance of convulsion was preceded during several days by general agitation, strabismus, swelling of the right eye, dilatation and immobility of the pupils. The convulsions lasted three days and ended in death, notwithstanding the most energetic treatment. —*Lancet.*

**M. Ricord's Treatment of Indurated Lymphatic Ganglions.**

All surgeons know how difficult it is, generally speaking, to bring about the resolution of lymphatic ganglions in the treatment of syphilitic diseases; the measures usually adopted—leeches, blisters, and resolution ointments, often failing. M. Ricord employs at the hospital a much mor-

energetic treatment, destroying progressively the ganglionic mass by the Vienna paste, (potassa fusa and quick lime.)

A layer of the caustic paste is first applied to the tumor. When the eschar falls another layer is applied, and so on until the basis of the tumor is approximated. The thickness of the layer must then be diminished, in order that it may not attack the subjacent parts; at the groin, for instance, a careless operator might open the crural artery. There are always patients in M. Ricord's wards undergoing this treatment. The caustic appears to act in two ways; it destroys a part of the ganglionic mass, and promotes the resolution of the rest by elevating its vitality.

M. Marchal (de Calvi) has adopted this mode of treatment at the Val de Grace, in a considerable number of cases, and with great success. When it does not appear to him applicable, he combines with the ordinary treatment by leeches, blisters, and resolutive frictions, the daily administration of from twelve to twenty-five drops of the tincture of iodine. He does not find that the iodine of potassium produces any perceptible influence on these ganglionic indurations.—*Gazette des Hôpitaux*.

#### On the Contagious Nature of Puerperal Fever, and its Connection with other Diseases.

Under this title, Dr. Peddie details in the *Edinburgh Medical and Surgical Journal*, several cases which occurred in his practice, and which, illustrating the highly contagious character of puerperal fever, show how unwittingly the physician may be made to scatter, in his progress, the seeds of destruction and death. Independently of the facts which are by all admitted, Dr. Peddie's cases confirm the experience of a more limited number, which shows that puerperal fever may originate from the contagion of a different disease,—in this instance, erysipelas,—and they moreover show that the contagion of puerperal fever may give rise to a different disease, in this instance, also, erysipelas. Mr. Storr, of Doncaster, illustrated this subject in the *Provincial Journal*, (No. 166,) and adduced a host of evidence from his own painful experience, and that of several other practitioners. The following are Dr. Peddie's conclusions. One in reference to treatment is omitted. The observations are not judicious.

"1, That a specific virus, of an animal nature, is produced under certain circumstances, and in turn generates a peculiar form of fever in the puerperal state.

"2. That that virus frequently originates from erysipelatous inflammation.

"3. That, when once generated, it may be communicated from one lying-in patient to another with extraordinary virulence, quite independently of locality, either by direct intercourse, or through the medium of a third person; and that this is more likely to happen when the predispositions of a weak body and a depressed mind exist.

"4. That it may produce disease of various kinds in non-puerperal individuals, more especially of an erysipelatous and phlebotic character.

"5. That the principal concern of a medical man, seeing that a cure is so difficult and so very rare, should be to adopt every conceivable precaution against the occurrence of a single case of it, or to lessen the risk of its propagation, when once established. And to attain these ends, patients in child bed should either not be attended at the same period with cases of malignant or severe erysipelas, or that proper caution should be observed as to ablutions, &c., more especially after contact with any discharge from them; and that when a puerperal fever case does occur, lest it should be something more than sporadic, chlorinated ablutions and change of garments are first required; and then, should a second case occur, it would be the safest plan for the practitioner to abandon the practice of midwifery for a time—two or three weeks, if possible—and in the interim attempt by removal into the country, warm baths, and other alternative and purifying means, and by the exposure of the clothes to a free atmosphere or to a high temperature, (150° dry heat,) as Dr. Henry recommends, to rid himself of the subtle virus which adheres to him occasionally."

#### HOMŒOPATHY.

Testimony of Dr. E. Humphrys, Ureæ.

"After practising for more than 30 years upon the Allopathic system, and during the last 5 years having investigated and practised the New Homœopathic System, I do not hesitate to recommend it as a most safe, expeditious and certain method of curing disease. And I do farther assure the public that homœopathy is no "humbug," "quackery" or "emanation of a disordered brain," as alleged by its interested and unscrupulous opponents—but a true science based upon a principal or law of nature, a discovery not an invention, an immutable principle, coeval with magnetism, electricity, or the laws of vegetable life."

E. HUMPHRYS.