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PART FIRST.

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ARTICLE XI.

On the Vis Medicatrix Naturæ. By W. J. Summer, M. D., of Lexington, South Carolina.

Believing that it is both the right and the duty of the student of any science, to investigate, candidly, fully and fearlessly, any theory held forth by men or books, no matter how long or how generally received, and feeling that he upon whose shoulders is laid the responsibility of life or death, should, above all others, be willing to "prove all things," and hold fast only to "that which is good;" I have ventured to devote this article to an inquiry respecting that principle so frequently invoked by medical writers, and which is perhaps best known as the "vis medicatrix naturæ," or vital principle.

The existence of this principle, the medical man is too prone to admit upon mere authority. Few can say that they have investigated the truth of this subject, yet almost all are ready to defend the principle in question; and this fact is not without significance.

I shall endeavor to show that there need not be, and is not any such principle in living beings, as that styled vis medicatrix naturæ. If I fail in this, I hope at least to prove, that there are two sides to this, no less than to some other questions which not long since, it would have been considered heresy to call in doubt. I am aware that the attempt to disprove the existence of this almost axiomatic principle of ours, is novel and seemingly adventurous. I can only ask, that this subject be viewed in the light shed upon it by simple scientific truth.
Let us not forget, in the outset, that while there are many truths relative to the human body, which are beyond all doubt being attested by the evidence of our own senses, the idea of a *vital principle* is purely a theory, a supposition, which no man can say he knows to be true, but which we infer by the exercise of our reasoning powers. Thus, we have all seen many solid substances belonging to the human system, and, among them, such an one as phosphate of lime in the bones: and, consequently, we know that all these do exist. But, if an individual tells me he knows that there is such a thing as a *vis medicatrix naturae*, I may ask him how he knows?—has he ever seen it? No! Heard, smelled, tasted, or felt it? No! Then he does not know; he merely infers, theorizing from certain phenomena which he has witnessed in the system; and what he would call a fact, is only an inference—a theory. But being a theory, it may be erroneous; and hence, until established, must be received with due caution.

If now we look through the medical works of the past and present time, we are struck with the diversity of names and offices with which this supposititious principle has been honored. Thus, Hippocrates, who was the father of this medical monstrosity, and above whose level of vision, we, it seems, have not been able to raise ourselves after a lapse of two thousand years, christened his bantling *Physic*, i. e. *Nature*; and, subsequent to it, he had other principles, *Dynamics, or Powers*. Aristotle called it the *moving* or *generating* principle. Van Helmont named it *Archeus*. It was Stahl’s *anima*; Børhaave’s *imperium faciens*; Hunter’s and Hooper’s *vital principle*; Darwin’s *sensorial energy*: Rush’s *occult cause*. (occult to him, no doubt, not because different from ordinary physical causes, but because he could not in this instance comprehend their operation); Cullen’s *autocrateia*, or *vis med. nat.*; Whytt’s *sentient principle*; Broussais’ *vital chemistry* (and here we seem to have an approximation towards the truth in the case); Culpepper’s *vital spirits*, &c. By others, it has been designated the *living principle*, *living powers*, *powers of life*, *vital force*, *vital essence*, *vis insita*, *vis vitae*, *vis conservatrix*, and so on to the end, if indeed there be any, of the chapter.

Notwithstanding the marked discrepancies thus existing be-
tween the advocates of this principle, we find them generally agreeing upon the following points: First, that the vital principle superintends and controls the involuntary functions of the system; secondly, that it resists the ordinary chemical affinities between the elements of tissues during life; thirdly, that it tends to resist the encroachments of disease, and to repair injuries received by the organism.

The question now arises, do the phenomena exhibited by living bodies, require any such principle as the vis medicatrix naturæ for their explanation? If not, is not such a principle an useless burden upon our science? And can a principle in medicine be useless, without being at the same time a positive evil? Does not the doctrine alluded to blind the physician as to the true action of remedial agents, by teaching him that he cannot cure disease, but can only throw in a may-be assistant of nature; while he ought to know that chemical affinities reign in living as well as in dead matter; and that he can, if he will, learn what those elements are of which the diseased tissue possesses too much or too little, and remove or furnish them accordingly? While physicians thus err with regard to the very object and action of remedies, no matter how honest their convictions or how zealous their efforts, thousands of victims must pay the forfeit of their ignorance. Nor are these views unsupported by authority—it is gratifying to find a confirmation of them in Carpenter's Elements of Physiology.

I now ask attention to the four following propositions:

First. The properties of chemical compounds vary according to their composition. The air we breathe,—that happifying compound, the nitrous oxide, or laughing gas,—and the corrosive and deadly nitric acid, are each composed of precisely the same elements, nitrogen and oxygen, merely united in different proportions. Now, this is worth thinking of. Give a man one mixture of these elements and he laughs or rants like a madman, and then recovers and forgets it. Give him another mixture of the very same elements, and lesions, agony, and death follow! What is it, that gives to these almost similar compounds such opposite effects and qualities? I answer,

Secondly. The new set of actions exhibited by new combinations of material elements, is due to the evolution, in the latter,
of properties before latent, and the rendering latent of others before sensible; in other words, the conditions in which an element is placed, determine the properties it will exhibit. To illustrate: Carbon is a solid, oxygen a gas: unite them in certain proportions, and we have another very different gas—carbonic acid; combine this with still another gas, ammonia, and we have a white solid, carbonate of ammonia. Here we see a change of properties with every change of condition. Again, oxygen supports combustion and respiration: unite it with sulphur and it will now support neither, but will powerfully corrode; combine this new product with magnesia, and it will cease to corrode, and may be swallowed in large doses with at least temporary good effects. Most wonderful transformations, we are ready to exclaim; and yet there has taken place no real transformation through all these changes. The oxygen, which we should expect by this time to have been forever lost in the compound, may be obtained again, precisely what it was before its union with the sulphur, possessed of all and only the properties of pure oxygen, and ready to combine again, or a thousand times, or an infinite number of times, with sulphur or any other substance, and come out unmingled, unimpaired, genuine oxygen in the end. The same is true of all other chemical elements. Now if this is so, (and we know it is,) then it follows, that even in the sulphuric acid, or in the sulphate of magnesia, the oxygen still remains unchanged and unchangeable, and that it exhibits new properties, not because it becomes any thing more or less than oxygen, but because it is oxygen existing under a new condition. It follows universally then, that when any chemical element passes from the state of a simple to that of a compound, or from one compound into another, it has properties rendered latent which before were sensible, and others made sensible which before were latent. Thus, it is a property of oxygen, while a simple, to produce flame when in contact with combustibles; but combine it with hydrogen, and although it remains, as I flatter myself I have plainly shown, genuine and unchanged oxygen; yet, no sooner does it enter upon this new condition of a hydrogen-compound, than the former property of supporting combustion becomes latent, and another, the very reverse of
this, becomes sensible. If it be objected that the result is due to the hydrogen, which does not, even when uncombined, support combustion, we will take another property of water against which such an objection cannot be urged. Water manifests the property of combining with the metallic salts, almost without exception, as part of the process of chrysalization; while neither of its component elements can be made to perform an office at all analogous to this.

Thirdly. The human body is entirely and solely composed of chemical elements. It is built up of solid and fluid atoms like the tree, the mountain, or the great globe itself. We are masses of matter, and, so far as science is concerned, we are nothing else! It may be matter of surprise that I insist so urgently upon this point. It may be said that this is a truth which no one doubts or questions. But it is one thing to admit the truth of an assertion—quite another to appreciate the bearing of what we admit. I declare the body to be a great chemical compound. "Granted," says one, "nobody thinks of questioning it: at least, nobody who has not the hardihood to believe the evidence of his own senses." But, when I take another step upon the ground thus granted me, and declare that the actions of the body depend on the properties of its chemical constituents; and that, consequently, a fever succeeds a chill in the human mass for the same reason that a new colour comes out when new compounds are formed in a chemical experiment—i.e., because the simple laws of nature compel such results to follow such causes under such circumstances,—the theorist straightway objects: "Fever, I admit," says such a one, "is a certain condition of a certain chemical mass, the body; but it cannot be produced by simple chemical laws—it is the work of the vis medicatrix nature." Now here is an inconsistency stubborn enough to prove the death of any system. It is granting a material mass, yet denying that it is governed by the laws of matter. Men say their bodies are material, are but "clay," are "dust"; yet seem not to know what this means when they have said it. What, then, does it mean? This: that a flesh-clad skeleton is a thing like an alkali, or any metallic base, save in one sole circumstance, and that is its being a higher species of compound—the highest manifestation of affinities; no longer
dead-chemical but vito-chemical. With acids and other substances we can dissolve it, decompose it, form new compounds out of it, just as we should do in experimenting upon soda, or carbonate of lime, or fibrin, or blood; varying the mode of experimentation, of course, according to the different chemical condition of the elementary constituents in each particular case. The action of acids, alkalies, oxygen, chlorine, etc., upon the tissues, living or dead, is fixed, definite, chemical; and in many cases well understood, and will yet be understood in all. What then are the essential elements of the human fabric? They are these thirteen: carbon, hydrogen, oxygen, nitrogen, phosphorus, sulphur, iron, chlorine, sodium, calcium, potassium, magnesium, and fluorine. Copper, and a few others, are occasionally found. "But," says an objector, "these substances in the body are combined according to vital laws; they are vital compounds." This brings me to my last proposition:

Fourthly. The component elements of animal bodies are held together by no other force than that of ordinary chemical affinity. In fact, when we have admitted the body to be a mass of chemical elements, we have conceded every thing claimed in this proposition. What! is not each department of nature under the control of its own unalterable laws? And are the stubborn affinities implanted by the Creator in any variety of matter, to yield to the domination of an unknown, intangible, invisible, indescribable something, which is yet confessedly a nothing;—an immateriality, a nonentity, which, save a name, and a shrine in the brain of the theorist, claims no element of existence?

"But," say the advocates of the potent vis, "how happens it, that the elements of the body are united in such peculiar proportions, forming such peculiar compounds?" Let us see. Does it require any more "vital force" or "principle," to hold together carbon and oxygen in the fibrin of animal flesh and blood, in the ratio of 40 equivalents to 12, than it does to unite the same elements in morphine in the ratio of 35 to 6, or to unite chlorine and oxygen in hyperchloric acid in the ratio of 7 to 1; or, in fact, more than it does to unite oxygen and hydrogen in water in the simple ratio of 1 to 1? Certainly not. There are, indeed, in fibrin and morphine, other elements be-
sides those just named, but the principle would be the same were there a score of them. "Animal fibrin," it may be said, "has six different elements and casein five." I answer, so has a certain platinum-salt six elements, and common crystalized alum five; yet I suppose no one will claim any great share of "vital principle" for these latter.

Again, if we allow that hyperchloric acid exhibits one set of properties, among which is that of sourness, and morphine another set, among which is that of stupefying; shall we not admit that fibrin may exhibit still another set, among which is contractility?—and this, too, without the necessity of calling to our aid any other than ordinary physical principles. Instead of being content to explain the vital phenomena thus simply, however, the advocates of the vis med. nat. invoke the aid of a principle absolutely inexplicable in itself, or in its connexion with the organism which they say it directs. Once more, take one equivalent of carbon and two of oxygen—unite them chemically, and each is neutralized, saturated, satisfied; and will remain satisfied and combined, until dispossessed of its fellow by some superior affinity. Now, take the proximate elements of gelatin or fibrin, of blood or nerve, and are they not in every instance, neutralized, saturated, and satisfied, by their mutual attractions, as certainly and as perfectly as in the case of the most orthodox chemical compound? And will they not remain combined until forcibly separated by some superior affinity? "Why, then," it may be asked, "does the body suffer so rapid a decay after death?" I answer again, on purely chemical principles. It is a physiological fact, that among the particles of all the tissues, some are constantly becoming dead, and in this state are selected and carried off by some of the excretory organs. Now, when death of the body occurs, such of these particles as have but just become effete, ceasing at once to be eliminated from among the normal matter of the tissues, remain in contact with them, act upon them as ferments or putrefactives, and thus hasten the process of decomposition. This principle is strikingly exemplified in cases of complete suppression of urine. Of the urea contained in this fluid, Dr. Watson says, "it is a mere excrement, which, in health, is removed from the blood by the kidneys. When it is not so
carried off, it accumulates in the blood and acts as a poison, especially upon the brain."—(Watson's Pract. of Phys., p. 867.) The effects of this poisoning he tells us are "coma and death." That the effete matter, in this case, retained within the system, has acted as a putrefactive, is proved by the fact that the patient thus afflicted often becomes gangrenous before death.

Now, if such be the effect of effete matter retained in the system from the cessation of a single secretion, while all the others are active, it is easy to see what consequences must ensue when all the secretions are suddenly and simultaneously checked. The rapidity of animal decomposition after death, has long been considered a certain proof of the existence of a vital principle, which is required during life to resist the natural tendency of the organism to decay. Since, however, we have seen that this rapid post-mortem decay is really due to a mere cessation of excretion, we find here no necessity for supposing the existence of any specific counteracting principle, because nothing needs be counteracted. In life, decay goes on, and with it, pari passu, comes reparation; in death the former reigns alone, and its products not being cast forth, gain strength in the work of disintegration by their own no longer compensated reactions.

From the four preceding propositions, these conclusions necessarily follow: that all the phenomena of the human organism, in health or in disease, are chemical phenomena; that all the animal functions are but modes of chemical action; and, finally, that life is but the sum total of all the properties of matter existing in that form which we call organized.

This doctrine may be startling, but it has a broad and deep foundation. It is not built upon the superficial and treacherous sands of common notions and unlearned prejudice; nor does its corner stone rest upon the delusive basis of some gaudy phantom-cloud of theory; it stands upon simple scientific truth. It discards theory, and appeals to what we know!

The more we examine this position, the more shall we find its truthfulness commending it to us. For example: organization may exist without life; therefore, the latter is not essential to the former. Therefore, again, organization is the pre-existent, and life the subsequent, in the chain of causation. Take
another example: according to the views of the advocates of
the vital principle, "Life is a forced state, or an assemblage of
functions which resist decay." Then life is a negative state;
a state of opposition to, or absence of, decay. But death all
admit to be a negative state. Then here we have two states,
opposed as widely as human comprehension can conceive, and
yet both negative; and; most unluckily of all, an individual may
have both lived and died, and yet have enjoyed no positive
state, first or last! But this is absurd. Life is positive; we
know and feel this, and so do all that live; and death is nega-
tive enough, as we also know.

Did time and space permit, I might go on to show the origin
of a notion of a vital principle; refer to, and combat, other
arguments in its favour, and to the influence which such views
exert upon the conduct of the physician. However, I think I
have gone far enough to direct attention to this subject—farther
disquisition is useless. In conclusion: these "recuperative ac-
tions," "reparative processes," "efforts of nature," "sympa-
thies," etc., of which we hear so much in the medical world,
should be explained on purely chemical principles. I believe
the day is near at hand when they will be so explained. Such
things do exist, but we have erred in assigning the proper
causes of them. We shall one day give them a more consistent
rationale, and more appropriate names.

I have endeavoured to show that no such principle as the
vis medicatrix naturæ is requisite to an explanation of the phe-
nomena of life; if not requisite it is false, for truth is always
requisite to an understanding of the operations of nature; if
false, it is detrimental; for, as I said before, it blinds the phy-
sician to the true action of therapeutical agents, and destroys
his patient. Those, whose high prerogative it is, to have en-
trusted to their care the health and lives of their fellow-beings,
cannot, it would seem, look with indifference upon results like
these.
ARTICLE XII.

Treatment of Seminal Weakness, by Veratrine and Strychnine, with Cases. By Henry F. Campbell, M. D., Demonstrator of Anatomy in the Medical College of Georgia.

To the practitioner, the restricted treatment of Spermatorrhœa is the cause of much embarrassment and dissatisfaction. When a case of this very delicate disorder is presented, the mind at once recurs to the treatment by cautery to the seminal ducts, so successfully practiced by Lallemand, as the great remedy, and many practitioners, being of timid character or unacquainted with the mode of application, temporize with or refuse to prescribe for the case. The treatment by cauterization is, perhaps, of all modes, the most valuable now employed for the generality of cases, and we find itcommended by every writer on the subject, since the time of its introduction. Its efficacy, however, depends upon the particular pathological condition of that portion of the urethra immediately surrounding the mouths of the seminal ducts, which is generally the result of inflammation or irritation commencing in parts adjacent to or sympathetically connected with this locality. Thus gonorrhœal or blenorrhagic inflammation of the urethral mucous membrane, by extension of the phlogosis, will involve this portion; congestion or irritation, as of piles or ascarides in the rectum, or enlarged or otherwise diseased prostate, will often be found to determine the condition necessary for the occurrence of the seminal waste. In a similar manner, also, do we constantly observe an indulgence in the pernicious habit of masturbation give rise to the same irritation by the frequent and prolonged excitement to which the entire organ is subjected.

In all of the above cases, cauterization, either immediately or after preliminary treatment, is attended with the most beneficial results, and without it, all other remedies are either entirely nugatory, or afford but a temporary palliation of the disease.

Now, it will be observed that in the above condition of the parts, the seminal loss depends most frequently, so far as the ejaculatory orifices are concerned, upon a hyperæmic state of the surrounding mucous membrane, which, by the alterative effect of the cautery, is either mitigated or effaced, and thus a
healthy condition of the parts established. But there is another pathology which occasionally obtains, differing entirely from any of the foregoing, indeed exactly averse to them in every respect; for here the difficulty depends upon an atonic and enfeebled innervation of these organs—a relaxed state of all the parts connected with the secretion and elimination of the seminal fluid, resulting undoubtedly, from a partial paralysis of the nerves distributed upon these secrent surfaces. From this condition there often arises impotency of the most incorrigible character—it may be brought about in various ways: a prolonged state of subacute inflammation, venereal excesses, masturbation, or the drainage of those parts consequent upon seminal losses produced by other causes, and thus a case which in the beginning depended upon exalted innervation, in process of time, will owe its continuance to an entirely opposite condition—nervous atony, as the following case will illustrate:

**Case I.** T. J., a young man, aged about 27 years; had been the subject of seminal losses from an early age. His nervous system had become very much impaired—indeed he was affected with chorea. The losses continued daily, and on account of general prostration he was confined constantly to his bed. He had been treated for the chorea, but no attention, so far as we could learn, was given to the seminal waste. When application was made to us for treatment, the frequency of his pollutions was really fearful, they occurred generally at night, and without erection. He would find the semen on his linen in the morning, or on waking during the night, and was unable to say when the discharge took place. Being aware of the length of time the disease had existed, and also of the very low condition of his general nervous system, we were induced to view his case as one depending on nervous atony rather than inflammation or excitement: hence our treatment.

평가.

- **Of Strychnine,** . . . . . gr. 1.
- **Gum acacia e and water,** . . . q. s.

To make twelve pills. Dose, one pill in the morning and one at bed-time.

Also—평가.

- **Of Veratria,** . . grs. 30.
- **Lard,** . . 3i.
Make an ointment, with which rub well over lumbar and sacral regions, twice daily.

It became necessary to reduce the strength of the ointment, after a few days, on account of the pain experienced during its application. At the expiration of eight or ten days, the case was so much improved, as regarded the seminal losses, that the treatment was omitted. Pollutions, however, recurred, and recourse to the same treatment again put an end to the discharges. When we last heard of the case, the emissions occurred but once or twice a month, and were attended by erections and waking from sleep. He was furnished with a supply of the pills to take on any return of the disease. Although his strength increased, and he much improved in every respect, he will probably never be free from a tendency to this disorder.

In addition to the causes above enumerated, there are others which act more suddenly and directly in bringing about the same atonic condition of these organs, of which case 2nd is an example.

Case II. A. W., a gentleman of excitable temperament, aged about 42 years, had been subject to seminal losses of rather more frequent occurrence than natural.

On recovery from an attack of the Dengue, which prevailed in the city during last summer, and at which time he suffered severely from pain in the lumbar region, he found that the intervals between the pollutions were very short, and that they were invariably unattended by erections; indeed, he said that he had not experienced a full erection since his recovery, then about six weeks. He had become nervous and chilly, his hands were cold and clammy, and although a man of great vigor and robustness of constitution ordinarily, he was now enervated and dejected. He had been treated previously to his application to us, and had taken a preparation of the muriated tincture of iron and cantharides in conjunction with the cold bath to the loins, and regular daily exercise. When we saw him he was suffering from irritable bladder produced by the cantharides; he passed water frequently, and could retain but little on the bladder. The cold bath, he said, "chilled him through, and the exercise (sawing wood) fatigued him beyond all endurance,"

though his principal cause of uneasiness was his inability to produce an erection—his entire impotency, which he considered, as yet, premature in a man of robust constitution.

Treatment.—Prescribed one-twelfth of a grain of strychnine, in pill, three times a-day, and the application of veratrine ointment, 30 grs. to the ounce of lard, morning and at bed-time, to the loins and sacrum. After a continuance of this treatment, for about a month, he entirely recovered, both from the impotency and the seminal losses. Here the cause of the atony is fully apparent; the spinal irritation in the lumbar region, during the attack of dengue, had doubtless destroyed the tone of those nerves connected with that portion of the cord,—nerves which assist in forming the hypogastric plexus, and supply the organs of generation; hence their partial paralysis.

In the foregoing, we would not be understood as recommending the treatment of spermatorrhoea by veratrine and strychnine, as a substitute for any of the modes of treatment now in use, but have suggested it as applicable only in such cases as above described, wherein the disorder depends entirely upon impaired or deficient innervation.

ARTICLE XIII.

A Case of Urinary Calculus, attended with peculiar circumstances and treated by Lithotrity. By L. A. Dugas, M. D., Prof. of Surgery in the Medical College of Georgia.

The following case is reported because of certain peculiar features presented during its progress. The patient, Mr. John L. B., of Hall county, Ga., is 30 years of age, was kindly directed to my care by Dr. Richard Banks, the distinguished surgeon of Gainesville, and arrived here on the 5th of February last. Having suffered from early childhood with phymosis and an almost complete closure of the orifice of the prepuce, (which he believes was congenital), the difficulty of voiding his urine caused this to distend the prepuce into a considerable bag, to accumulate enormously in the bladder, to stagnate in the pelvis of the kidneys, and to induce very great impairment of the general health. The preputial orifice was so small as not to
admit, without much difficulty, the introduction of a knitting needle; the urine was therefore never passed off in a jet, but the patient was subjected to all the inconvenience of a continual stillicidium; he had frequent and violent attacks of nephritic pains, attended with protracted chills, fevers, and the usual concomitants of retention of urine. Yet it was not until the 20th year of his age that he sought professional aid and was circumcised by Dr. Banks. From that time his health improved rapidly; but he continued subject to occasional paroxysms of severe nephritic pains, which now became confined to the left side. These pains would extend down along the course of the ureter and continue one or more days, leaving him in a debilitated state, from which he would, however, soon recover. He is not aware of ever having passed gravel or anything like calculous matter, although his urine would sometimes present a very copious sediment.

This state of things continued until the middle of April last, when, although in good health and not having had any nephritic pain for about three months, he felt a calculus drop into his bladder. Attending to his usual avocations, he stepped out to urinate, did so without any difficulty whatever, and when in the act of buttoning up his garment, distinctly felt something fall into the bladder. He immediately mentioned the fact to a friend, and added that "it must be a stone, for its fall produced a sensation like that of a buck-shot allowed to drop into a bag."

A few hours afterwards, on again attempting to urinate, the stream was suddenly arrested by the engagement of the calculus in the urethra—the sensation being so distinct that he instinctively carried his hand to the perineum in order to force it out—but in vain;—and the same difficulty has ever since attended his micturition. These details are given as establishing conclusively the facts that he did know the precise moment at which the stone came into the bladder, and that this occurred so late as about three months after the last nephritic attack. He has experienced no pain whatever about the kidney since that. In May he was sounded by Dr. Banks, who readily detected the stone.

On the arrival of Mr. B. here, I examined him, detected the calculus, found it to be small and determined to crush it as soon
as circumstances would permit. The patient was directed to use dilating bougies, to remain quiet, to drink freely of slippery elm tea and super carbonate of soda, and to take a hip bath every night. In a week he was found to be sufficiently prepared, and (on the 12th of February) the operation was performed with Heurteloup's "brisé pierre," as modified by Charrière. The bladder being filled with tepid water, the calculus was readily seized and crushed three times, without pain. A few fragments were passed off with the water and others during the night with the urine. On the following day, finding the patient very comfortable, without any symptoms of irritation, and very anxious to get home as soon as possible, I again introduced the instrument and crushed the remaining fragments, sufficiently to allow them all to be passed out during the night. He now expressed himself "entirely relieved, and feeling like a new man." The baths, &c., were continued, and on the 16th February, I explored the bladder carefully, without being able to detect any vestige of the stone. The patient was therefore discharged.

The dimensions of the stone were accurately ascertained by the crushing instrument to be about one inch in length and half an inch in thickness. Professor Means having kindly subjected some of the fragments to analysis, informs me that they consisted of Oxalate of Lime. The stone was exceedingly hard, and tested to the uttermost the fine temper imparted to the metal by Charrière's unrivalled skill.
There are yet great truths to tell, if we had either the courage to announce, or the temper to receive them."—Disraeli.

CHAPTER I.
On the Nisus Formativus, or the Solar Ganglion. The ganglia of the sympathetic; the nervous structures first formed in the fetus. Monstrosities. Strictures on the opinions of Drs. M. Hall and Roget. Mr. Lawrence's case of acephalous monstrosity. Dr. M. Hall's division of the Nervous system; his experiment on the frog. The author's experience. Le Gallois. Hunter. Sir B. Brodie's experiments open to objection. Animal organization, its arrangement and adaptation; mind and instinct.

The object of the following papers is to prove that Life is the function of the Solar Plexus, regarding it as the root of the ganglionic or sympathetic system. That the Solar plexus is the impetrum fuciens of Hypocrates, or the materia vitae of Hunter; that it is the organ whose function may be represented as the principle or stimulus which enables every other and subordinate part in the animal economy to continue its specific and allotted labour towards the existence of the individual; that both the brain and spinal cord, in common with all the viscera, hold a similar relation to, and dependence on, the solar ganglion, as the centre of the ganglionic system, that the iris does to the retina, or the external senses do to particular parts of the cerebral mass; and these opinions the author has privately circulated for the last ten* years—that is, since 1835—as is well known to many medical friends and acquaintances. I am aware that Dr. Stevens has also advocated some such views as these; but it cannot be doubted that the priority is not with him.

INTRODUCTORY REMARKS.
On the Nisus Formativus, or the Solar Ganglion.

The physiologist, if I mistake not, will consider that my position, as explained in the advertisement to the reader, must derive no inconsiderable confirmation, from the circumstance that the solar ganglion is that particular portion of our organ-

* This and the succeeding chapters were written in 1845.
ism which is first formed in utero, and therefore may be really
considered as the germ of all the phenomena to be afterwards
developed.

Nothing can appear more reasonable than that that portion
of our organism, from which every other takes its vitality,
should enjoy a prior existence. The egg precedes the chick,
and the specific vitality of the former is impressed on the lat-
ter. The foundation is erected before the house, and the design
of the architect, it may be added, is not unfrequently to be an-
ticipated by an early examination of it. Muller says, in his
Physiology, translated by Dr. Baly, that “Ackermann asserts
that the sympathetic nerve is the part first formed in the
foetus.” Rolando, moreover, declares what has been usually
considered as the first traces of the vertebrae at the sides of the
spinal cord, in birds, to be the ganglia of the sympathetic nerve.
The assertions of Ackermann and Rolando acquire great
weight from the testimony of such men as Blumenbach and
Gall, both of whom add the authority of their illustrious
names, and confirm the former-named physiologists in their
opinions. Blumenbach says, “the nervous system,” meaning
the organic nervous system, “of the chest and abdomen, are ful-
ly formed, while the brain appears still a pulpy mass,” and re-
fers to Gall’s writings for the same views. He adds, “these
ganglia and nerves would hardly be formed before the brain and
spinal marrow, but for the sake of the organs which they supply,
and the functions of which (with the exception of the genitals,) are as perfect at birth as at adult age, while the mind and brain
are slowly perfected.”*

Ackermann, Rolando, Blumenbach and Gall, all maintain,
then, as I have shown, that the ganglionic or organic nerves of
the abdomen and thorax are the first formed in the embryo.
Now it is extremely unlikely that the development and forma-
tion of the solar ganglion—the centre and source of the organic
nerves and their anastomozing branches—should be preceded
by “organic nerves;” their dependence on it, it may be said, is
analogous to the dependence of the branches of a tree on its
root; and therefore I would claim for the solar ganglion a like
precedence. Viewing the matter in this light, it is readily seen
that the solar ganglion itself is, in the embryo, nothing more
nor less than the nisus formativus of Blumenbach, and that,
like it, it excites even in its rudimentary existence the elabora-
ted fluids of the successful coition, and like it, it vivifies and

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* Mind and brain! It is to be hoped that an improved acquaintance with the
brain and its uses, will encourage the physiologist no longer to give to a mere
function an individual existence. The brain happens to be the last of the bodily
organs so perplexed with the spirit of the ancients.
shapes the hitherto shapeless spermatic matter partly into the beautiful containing ovum, and partly into the contained embryo.

The *nisus formativus*, we are told, occur to the genital matter, when this is mature, and committed to the uterus in a proper condition, and under proper circumstances, produces in it the rudiments of conception, gradually forms organs fitted for particular purposes, preserves this structure during life by nourishing the body, and reproduces as far as it can, any part accidentally mutilated.*

The "nisus formativus," says Dr. Elliotson, in a note, "produces a being generally resembling the parents, but occasionally different." It is understood, then, that exactly what Blumenbach and Elliotson, in common with other physiologists, claim for the nisus formativus, I claim for the solar ganglion. I cannot doubt that it exercises the architectural power which is employed in man and animals—from man downwards, through the whole of animated nature, to the very lowest link in the chain of being; that to its peculiar and vital influence must be conceded, upon the grounds before stated, the wonderful and successive metamorphoses or changes which characterize, not only the intra and extra-uterine existence of the human form, but also that of animals, whether oviparous or viviparous, and under circumstances both of normal and abnormal action. No one, I think, would presume to explain the *modus operandi* of this power or influence of the solar ganglion; it is sufficient for my purpose that it exists. This question is involved, equally with that of the *cause* of gravitation or attraction, in a too Cimmerian darkness for my optics to penetrate.

If, from any cause, the organic affinities in progress in the foetus be interfered with—if the balance which must obtain in the distribution of the imponderable matters in the organic tissues be disturbed, the action of the organism and of the separate organs may be so modified as to give rise to the formation of some one kind or other of monstrosity. An injury done to a seed during its germination is seldom unattended with ill effects. The radicle or the plumule will, the one or the other, suffer, and perhaps both. The injury done may be confined to one of these parts, and yet it may very seriously affect the vital principle in operation, and so modify or aggravate the original mischief. It is just so with the foetus; any abnormal change in the component matter of any of its parts, may prove irreparable, and the effects of which being then communicated

* Blumenbach's *Physiology*, translated by Elliotson, p. 492, "Of the 'Nisus Formativus.'" The word "nisus," Blumenbach says, he has "adopted chiefly to express an energy truly vital."
to the solar ganglion, may excite so altered a vital action in it as to prove incompatible with the complete or normal development of either itself or of those parts dependent on it; and hence the existence of monstruositie§, of acephalous, and other malformed children, among whom the physical characters of the biped are more or less substituted by those of beings lower in the scale of creation. "Human monsters," says Blumenbach, "are not unfrequently met with who strongly resemble the form of brutes;" and it is "because the 'nisus formativus,' having been disturbed and obstructed from some cause or the other, could not reach the highest pitch of the human form, but rested at a lower point, and produced a bestial shape." He adds, strangely enough—"On the contrary, I have never once found among brutes a true example of montrosity which, by a bound of the nius formativus, bore any analogy to the human figure."

It may be asked, in the history of monster§, did any physiologist ever hear of one in whom there was no ganglionic system, no solar ganglion? I answer, no! Such an occurrence is wholly impossible. We have all heard of acephalous children, and of beings created without either brain or spinal cord. What, in such instances sustained intra-uterine life? what enabled the body of the creature to be nourished and developed? What, I ask, was the source of all this vitality? The solar ganglion and its branches, the ganglionic nerves! "In foetuses, without brain or spinal marrow," says Blumenbach, "the circulation, nutrition, secretion, &c., proceed equally as in others, which, besides spinal marrow, nerves, and ganglion, possess a brain," and for the same reason, he might have added, that after the removal or destruction of the brain and spinal marrow in animals, the heart still continues to act, and the blood to circulate, provided respiration is artificially supported." The reason is just this, the solar ganglion and its immediate dependencies are unaffected. With these facts before us, then, I must confess I am in ignorance of the "experience" which "shows that when the influence of the brain and spinal marrow is intercepted, although the aflux of blood may for a time continue, yet the secretion ceases, and all the functions dependent upon secretion, such as digestion, cease likewise." We are informed, too, by the same author, strangely enough, that "the functions of digestion, circulation, absorption, secretion, and all those included under the class of nutrient or vital functions, are carried on as well during sleep as when we are awake," that is, as well during the total inaction of the brain and spinal marrow, when the "influence" of both, must of course be "intercepted." Strange experience this.*

Dr. Marshall Hall, in his Lectures, published in 1842, "On the Pathology and Treatment of Nervous Diseases, evidently favours the opinion that the influence of the brain is necessary to the complete performance of the vital or ganglionic functions. "We find, says Dr. Hall, "that idiots with small brains are short-lived;" therefore "the animal functions cannot go on permanently independent of the brain." I take it that the imperfect development of the brain of the idiot must be regarded, only, as an indication of the mal-organized condition of the entire nervous system, including the spinal and ganglionic, not less than the cerebral.

In the very interesting case of acephalous monstrosity published by Mr. Lawrence, in which the brain only was wanting, we learn that all the excito-motory functions were duly performed; it gave evidences of pain, and "at first moved very briskly," and the sphincters performed their office. Such, of course, was referrible to the integrity, generally, of the spinal cord. "The child's breathing and temperature were natural; it discharged urine and faeces, and took food." The latter set of circumstances indicated the operation of the functions of the solar ganglion and its collateral parts; and without any aid from a brain. The ganglionic and spinal nervous systems were natural, and they exercised their respective functions accordingly.

In the remarkable case cited by Dr. M. Hall, of a fetus born "without either brain or spinal marrow, without a particle of either of these organs yet perfectly developed," we have a very satisfactory proof of the independence of the ganglionic functions on either the spinal or cerebral nervous systems. The intra-uterine life may be quite perfect, although there may be neither brain nor spinal marrow; but what happens the moment the child is born? asks Dr. M. Hall; it cannot breathe: it cannot live an instant." It dies truly, but not because the brain or the spinal marrow, or both, are directly essential to the continuance of the function of the solar ganglion, but because that central organ, in the absence of the motor nerves commonly supplied to the respiratory muscles, is deprived of one most material agency or power with which it, the solar ganglion, is enabled to perform one of the many indispensable functions required by the animal economy. The blood cannot, under such circumstances, be decarbonized, and the circulation of diseased blood paralyzes the vital energies of every part of the organism. The effect is the same if a person with his cerebro-spinal and ganglionic systems entire, be made to breathe carbonic acid, or any other irrespirable gas. Life, then, in such a case of monstrosity, cannot be said to cease from
the want of any direct cerebral or spinal influence. The vital actions in the lower classes of animals which have no brain, and in those, too, which have neither brain nor spinal marrow, are not less completely performed than the same in man. Secretion, circulation, digestion, &c., are as elaborately and efficiently executed in the polypus and oyster as in man, and their breathing apparatus is more simple, and independent of any addition to the organism, whereby, in man, the nature of his dependence on, and relations to, the external world are explained. His responsibility then came to be understood, and his real position as a moral being to be justly appreciated.

The experiments of Dr. M. Hall, as given in his published Lectures, appear to me to be anything than satisfactory. He introduces the subject thus:—"Until very recently, we viewed the contents of the spinal canal as a cord of cerebral nerves, and the origin of a part of the ganglionic system. Now, gentlemen, it is very possible to remove the cerebrum, the centre of the cerebral nerves, and the ganglionic system, and yet leave another kind of nervous influence remaining in the animal body. I shall take this early opportunity of showing you a simple experiment. You see here an animal (a frog) from which the head has been separated, and of course I need not tell you that with the head the brain has been entirely removed; all the viscera have also been removed, and with the viscera every portion of the ganglionic system. Now I beg here to repeat, the cerebrum, the centre of the spinal cord of nerves, and all the ganglionic, have been removed from this animal, and yet, when I pinch the extremity, it moves so as to be obviously perceptible at the remotest part of this theatre. Thus, as I said before, we have here removed the centre of the cerebral system, and the entire ganglionic system. The brain, which we know to be the centre of all the sentient and voluntary nerves, has been removed, the ganglionic system has been removed, and yet you observe something remains. Now, gentlemen, that which remains I venture to call—in contradistinction from what has been termed a cord of cerebral nerves, and the origin of the ganglionic system—the true spinal marrow. It is plain, in the first place, that it is not a mere cord of nerves; if it were a mere cord of nerves, you might divide it, and then you would intercept its influence. But, if you observe here, this influence passes not only from one extremity to the other, but it also passes from the one set of extremities to the other set of extremities; thus, it is quite plain that there is a nucleus of nervous matter between the two anterior extremities, and another nucleus between the two posterior extremities by which these nervous links are united
and associated in their motions one with another. Having
thus, then, clearly laid before you the distinction which I wish
to insist upon—namely, that there is not a division of the
nervous system into two parts only, but into three, pervading
all the different parts of the whole animal frame, I shall venture
to term them the cerebral, the true spinal, and the ganglionic
systems."

That Dr. Marshall Hall is perfectly right in considering that
the contents of the spinal canal do not constitute a cord of
cerebral nerves, and the origin of a part of the ganglionic
system, there can be, to my mind, no doubt; but I cannot
allow this opportunity to pass by me without claiming for the
illustrious Gall the honour of being the first to render this anat-
omical fact clear and distinct. He it was who demonstrated
that the spinal marrow only communicates with the brain.*

Dr. Hall has endeavoured, as it appears in the preceding ex-
tact, to prove by experiment on the frog, that on the removal
of the viscera with the solar plexus and its ganglia, the spinal
cord will still continue the excitomotory functions, the head
(and of course, brain) being at the same time dissevered from
the body, and which circumstance, of course, would prove, as
the doctor affirms it does, "that there is not a division of the
nervous system into two parts, but into three, pervading all the
different parts of the animal frame." I have on many occasions
performed the experiment on the frog as detailed by Dr.
Marshall Hall, but I have invariably found that the removal or
destruction of the ganglionic system of nerves is fatal to the
life of the animal. The vital or "true spinal" phenomena, in
that case, continue no longer than the peculiar contractile
irritability of the heart or extremity of the animal after the re-
moval of either from the trunk; proving, therefore, most
clearly, that the original power possessed by the spinal cord to
perform its peculiar functions is derived from the ganglionic
system. If the animal be not decapitated, the same result
follows the removal or destruction of the solar ganglion, and
which could not be the case if the influence of the brain were
directly required by the spinal marrow. My own experiments,
then, prove not only that there are three distinct nervous sys-

* Gall, "Sur les Fonctions du Cerveau," t. ii. p. 77, quoted by Elliotson,
in Blumenbach's Physiology. "It is remarkable," observes Dr. Elliotson,
"how many discoveries of Gall's that were denied or disregarded have
been since made by others, and were frequently contested by two parties, he and his
labours been never once thought of." Mr. Solly in his work "On the human
brain," claims to have discovered that some of the fibres of the anterior columns
of the spinal cord proceed backwards to the cerebellum, but it appears from the
authority of Dr. Elliotson, that Gall taught and published the very same fact so
long since as 1816, and that these same fibres, "decussate exactly like the an-
terior pyramids."
tems united in man—viz., a cerebral, a spinal, and a ganglionic, but also that both the first and second are dependent on the third—that they derive not only their very existence and integrity from it, but also perform their respective functions in virtue only of the influence they receive from it, and that they are, as it were, employed by it to establish our dependency on, and relationship to, the external world, of which man forms a part.

The cerebral and spinal systems of nerves together perform the animal functions, which, in the words of an eminent physiologist, prove us feeling, thinking, and willing beings; they are the actions of the senses, which receive impressions of the brain, which perceives them, reflects upon them, and wills; of the voluntary muscles, which execute the will in regard to motion; and of the nerves, which are the agents of transmission: the brain is their central organ. But the ganglionic system of nerves, with the solar plexus for its central organ, performs the vital or organic functions, or rather, supplies to each viscus the power which enables it to perform its specific functions in the animal economy. Secretion, nutrition, exhalation, and absorption, being, then, under its immediate influence and control, it must preside equally over the brain as the stomach, equally over the spinal cord as the liver. In short, the vital force of the solar ganglion, the centre of the ganglionic system, holds the same relation to the whole organism that steam does to the several parts of an engine. The said "vital force" and "steam" are equally the motive power and it may be said, that to their different states or conditions must be attributed every kind of change, however slight, of which either the animal organism or the machine itself is at any time, and under any circumstances, susceptible.

The observations already made in reference to acephalous and other monstrosities, no less than those which relate to the experiments of Dr. M. Hall and myself, abundantly prove the physiological position I have here taken—viz., that life, regarded as the "assemblage of all the functions, and the general result of their exercise," has its immediate principle neither in the brain nor in the spinal marrow, nor in any of the viscera of the chest or abdomen, but in the solar ganglion; yet it is no less certain, that all these parts or organs are necessary to the maintenance or continuance of life, as it exists in man, and the great mass of the lower classes of animals. The brain, principally, because the mechanical phenomena of respiration seem to depend upon it;—the spinal marrow, because it exercises a guardian power over the acts of ingestion and egestion;—and the viscera of the chest and abdomen, because they are necessary to the formation and circulation of the blood.

* Lawrence's Lectures, p. p. 120, 121.
The only way that I am enabled to account for the discrepancy stated in the experiment of Dr. M. Hall and myself on the frog, is, that the excito-motory action which was produced by pinching or pricking the extremities of the animal, after the removal of the viscera and the ganglionic nervous system, must have resulted from the influence of that remaining nervous principle which exists, for a longer or a shorter period, in any portion of the animal organism, after, even, its removal from the trunk or body to which it originally belonged. It is well known that Le Gallois, Prochaska, and Hunter, taught that the nervous power is generated throughout the whole extent of the nervous system, even to the smallest nerves, and that it can exist, for a certain time, in the nerves of any part, independently of its source; and there can be, I think, no doubt of it. I have seen the heart of the shark contract vigorously, for even many minutes after its removal from the animal—a fact which proves, in the words of Hunter, that the nerves of a part continue the same action which they receive.*

I may here observe, that the experiments of Sir B. Brodie to disprove the assertions and opinions of Le Gallois, "that every part of the body derives its principle of vitality and irritability from that portion of the spinal marrow from which it receives its nerves," are open to some objection. The experiments of Sir B. Brodie are contained in the late Dr. Cooke's work on Nervous Diseases, and are as follow:—

Experiment 1.—Sir B. Brodie divided in a dog the skin and muscles which lie before the axillary plexus of nerves, and afterwards the nerves themselves. He then divided the remaining skin and muscles, the cellular membrane, and every other part connecting the anterior extremity to the trunk, with the excep-

* Since the above remarks were penned, I have many times repeated the experiment of removing the viscera with the ganglionic system of nerves in the frog, and I have found much additional reason to form the conclusive opinion I have—viz., that the excito-motory phenomena demonstrated in the experiment of Dr. M. Hall, must have resulted only from the operation of retained nervous influence in the limbs of the animal, constituting an exception to the general rule which goes to show, that on the removal or destruction of the organic system of nerves, or ganglionic system, the functions of the brain and spinal cord as necessarily cease as do those of the other viscera. I have found, that, if the abdominal ganglia only be removed from the animal, the circulation and respiration, together with the spinal functions of the superior extremities, will be continued for a time, and much longer than contractions will exist in the heart after its separation from the body; proving, therefore, that the superior or thoracic ganglia have the power, in some degree, to "continue the same action which they receive" from the solar ganglion. Le Gallois cut a young rabbit transversely into halves, and because the strictly spinal functions ceased with the destruction of the cord in either half, he declared that the vital principle was seared in it. It is unnecessary to add, that the destruction of the cord by Le Gallois involved only the loss of one among the many indications or external signs of a vital principle.
tion of the axillary artery and veins, so that the vessels were completely insulated, and formed the only connexion between the limb and the trunk. The divided edges of the skin were united by sutures. Twenty hours afterwards, an incision having been made in the fore-arm, the arteries bled freely, and the blood was of a bright scarlet colour. The muscles, by means of the voltaic battery, were readily made to contract, and when several pairs of plates were employed, the contractions of the muscles did not appear to be less powerful than those which arise from the stimulus of the will.

Experiment 2.—Sir B. Brodie removed the whole of the posterior part of the spinal marrow of a frog. The wound readily healed, but the hind legs became, of course, paralyzed. Five months afterwards, the muscles of the hind legs were found still capable of powerful contractions under the influence of the voltaic battery; at the end of six months more, the muscles still retained their contractile power. The frog was then killed. The wound was found completely cicatrized; there was not the smallest appearance of regeneration of that portion of the spinal marrow which had been destroyed.

I must add, that it appears somewhat strange to me ever to expect that animal matter should resist the effects of a power so intense as that employed by Sir B. Brodie. The contractile power of the muscles when subjected to the voltaic battery, I am disposed to consider irrespectively of the source of vitality and irritability.

The above experiments are cited on this occasion, not only because I consider them illustrative of the position of Hunter and other physiologists, as above explained, but in order to show, as particularly as I well can, the precise nature of the phenomena elicited by the experiments of Dr. M. Hall on the frog, as contrasted with the results obtained by myself.

From the preceding observations it will appear that the "Formative power" of Blumenbach, or the Materia Vitae of Hunter, or the Solar Ganglion, call it by what name we will, is no less universal than the animal organism itself; and there can be no doubt that, like the animal organism, it observes corresponding varieties and gradations of form. It could hardly be expected that the "Formative Power" of the dog is similar to that of the man; or that of the first, of the reptile; and so on, through the whole of living things. The germ and its product must possess qualities common to both. It is impossible, perhaps, to demonstrate the exterior or physical characters of this "Formative power" in man or in animals, peculiar either to the same or to different species of each genus; yet is there an abundance of authority to show that such a specific difference must every-
where exist. The formative power, or the solar ganglion, regarded as the germ of all to be afterwards developed, may be said to represent, in common with the cerebral and other parts, in its successive changes in utero, its various and permanent conditions as they exist throughout the animal kingdom, beginning with the polypus, in which every vital action is conducted upon the smallest scale, by the least refined methods, and with the strictest economy of means; its apparatus being the simplest, the agents employed the fewest possible, and its various operations being carried on in one and the same place; proceeding in the mollusca, and in worms and insects, in which relations are exhibited to surrounding objects, and in which animals the senses and voluntary motion gradually make their appearance, the organic apparatus necessary to the exercise of these functions being superadded; ascending through fishes, reptiles, birds, and quadrupeds, in which the powers of sensation and motion become much more energetic, much more active, the internal life at the same time more and more developed, and the cerebral functions more and more numerous and diversified; and ending with man himself, in whom, as Blumenbach observes, the successive imposition of cerebral matter has reached its maximum; so that the summit of the nervous system, which corresponds with the forehead and vertex, is much larger in him than in any brute, and his intellect and moral feelings are proportionally greater.

Apropos, the comparative cerebral development of man and brutes is, as is well known, employed to mark the rank any one of either kind may hold in the scale of creation and intelligence; and very properly so; but it appears to me that the physiologist takes cognizance only of an effect on the development of the cerebral organism, which has resulted from the operation of a cause which he has hitherto failed to appreciate. Nothing can be more true than that "the higher we ascend, the more parts exist above the medulla oblongata, till, rising from fish and reptiles, through the numerous warm-blooded brutes—all distinguished by the relative magnitude of each cerebral part—we arrive at man," the "summit of terrestrial objects;" and it is equally true to my mind, that the successive increase of parts above the medulla oblongata is attributable to the operation of a preliminary cause—viz., the Solar Ganglion, the source of all animal life, whether cerebral, spinal, or organic. Surely if the ganglionic system be deemed either necessary or competent to preside over the vital actions necessary to the perfect development of the amynencephalous monster of Dr. M. Hall; if the secretion, nutrition, circulation, &c., as carried on in it, in virtue of the said ganglionic system, are sufficient for
its growth and maturity, and for the perfectibility of its several organs, as the liver, spleen, heart, &c., and the consequent exercise of their functions, why should we doubt its powers to preside over the vital actions necessary to the entire foetus? If the ganglionic system be sufficient to develop and mature a liver, a heart, and a spleen, and to excite them to the exercise of their appropriate functions in the animal economy, there is no reason why it should not do the same for the brain and spinal marrow. There is certainly much reason, as I trust has been shown, to feel satisfied that it does so; and that, moreover, to the modified operation of the solar ganglion must be referred all the varieties of life, psychical, and corporeal, which everywhere abound.

To proceed:—On tracing the animal organization from above downwards, we observe generally a gradual diminution or simplification of parts, and which in every case is proportionate to the wants and adaptations of the animal. The decreasing cerebral organism, for instance, marks the downward progress of the animal in the scale of intelligence and feeling. This is seen throughout the vertebrated animals, as the mammals, birds, reptiles, and fishes. The insect tribes generally can hardly be said to have more than a mere rudimentary brain; they have certainly a medulla oblongata, in which the nerves of the external senses take their origin. The spinal system, so far, is perfect in all its parts, and all the strictly vital functions are in full operation. In the annelida, however, we mark a very considerable falling off: the absence of every thing like a brain, and of the external senses, leaves the animal to exercise only a strictly spinal and ganglionic existence. The excito-motory function, in itself, seems perfect, and like it, the organic functions appear on a par with those of the mollusca. The only advantage of the annelida is probably in its means of progression. One more step downwards, and the ordinary medusa is seen a mere mass of living gelatinous matter, without the least indication of even a spinal life, and nevertheless executing the organic functions of assimilation, digestion, secretion, circulation, nutrition, absorption, &c. This last step of the ladder constitutes the first of the intra-uterine life of the foetus; and it may be said, that just so many steps as it takes the physiologist to trace the successive and organic changes from man to the medusa, the same are required to trace the foetus through its various metamorphoses during its intra-uterine existence; and there can be no doubt, as has been before observed, that each diminution or addition of parts, both in man and animals, is but the visible effect of a corresponding variety andgradation of the nisus formatus, or the solar ganglion, the germ of all to be afterwards developed.
Physiology and Pathology of the

"First chain of being, which from God began,  
Nature's ethereal, human, angel, man,  
Beast, bird, fish, insect, what no eye can see,  
No glass can reach, from infinite to thee:  
From thee to nothing."  
Pope.

It may be added that the possession of the *three nervous systems* in man and in the higher order of animals does *not* presuppose that those which have only *two* or even *one*, have been insufficiently provided for. The organism of the polypus and oyster is as nicely adapted to their wants and the circumstances which surround them, as is the organism of man.

In many instances among the lower classes of animals it appears that Nature has intended so to economize her means that one part shall serve the purposes of two or even more, and in others she has so concentrated her forces that it is really astonishing. The reproduction of lost parts in the lobster and crab, and many other crustacea; and the extraordinary activity of certain of the external senses in some animals higher in the scale of organization than the crustacea, almost make one doubt on which side to consider the advantages! A division of labour is generally regarded as indispensable to perfectibility, but among the lowest classes of animals we find the opposite principle in operation:—thus the solar ganglion in certain animals executes the functions of both the spinal cord and the cerebrum; for in the absence of the brain and spinal cord, it is occasionally seen that both sensation and voluntary motion exist in the zoophytes. In the manner in which the infusoria and actiniae pursue their prey, and in their selection of it; in the facility with which they recede from whatever may prove hurtful to them, and turn aside when they encounter one another, together with the highly sensitive and irritable nature of the organism of the medasuriae generally, "we can hardly fail," as Dr. Roget truly observes, "to recognize the evidence of voluntary action." Herein we get at the nature of animal *instinct*, and which, in the absence of everything like a cerebrum and spinal cord, must be regarded as a specific function of the ganglionic system. Dr. Roget says, in his chapter on the "Comparative Physiology of the Nervous System," p. 538, "But whatever may be their extent, it is probable that the *sensorial operations* of the zoophytes take place without the intervention of any common centre of action," meaning thereby that the *sensorial operations*, so-called, are performed independently of a brain. The same may be said of the mollusca and articulata. There are times, moreover, when the *vertebral animals*, as fishes, reptiles, and birds, including the mammalia, and even *man* perform actions of an instinctive and intellectual character, and that, too, *without the intervention of any common centre*
of action. What is the course of that instinctive agency which determines the young among the several classes of animals above enumerated, including man, to seek each its particular means of support. In what originates the very keen choice which is displayed by all of them for that which nature has so especially predestined for their respective uses? What determines the peculiar habits and mode of life of any one of them? The immature condition of the brain in the infant being renders it perfectly impossible that it can exercise any, even the slightest, influence in the matter; and no one could venture to affirm that the spinal cord took any part in it. There can be no reason to doubt, but, on the other hand, every reason to feel assured, that to the same cause of the "sensorial operations" of the zoophytes, and of that peculiar instinct which enables the lower classes of animals generally to provide, not only for all the necessaries of life, but even to guard against contingencies and anticipate difficulties, whether they relate to the kind of habitation, the mode of progression, or to the kind of food required for their sustenance; in a word, to the same cause, the formative power or solar ganglion, which so beautifully adapts their individual habits, pursuits, and inclinations, to their peculiar organic conditions, and so providently harmonizes the natural laws, must also be referred whatever of instinct is, at any time, manifested in man, including the vertebrated animals.

The sudden and peculiar shrinking of the hydra when under the influence of fear, and the extreme caution and dexterity displayed by the infusory animalculæ in avoiding obstacles of any kind while swimming together in myriads in a single drop, are instinctive vital actions, arising from an inherent preservative principle, derived from the solar ganglion, and similar in its nature to that which induces even us, in the moment of danger and doubt, to place our extended palm across the praecordia—thus the affected miss, though ignorant of physiology or pathology, and perhaps of all other ologies, if either alarmed, or professing to be so, at any sufficient or insufficient cause of personal danger, quickly applies her hand to the praecordia; as if the solar plexus screamed "take care of me now." What more reasonable than to expect that that organ, the sum of whose function may be in one word described as life, should preside over actions of the kind mentioned above, so indispensable as they are to both its integrity and well being!"

The instinctive and mental (cerebral) faculties are occasionally seen acting in combination—e. g., the martins which, in a spirit of retaliation and vindictiveness, built up the hole which had access to the nest that certain sparrows had robbed them of, and so buried alive the predatory occupiers in a grave of
their own seeking, afford an instance of a clear and distinct process of thought, of cerebration. The original construction of the nest was instinctive or ganglionic, but the subsequent act certainly cerebral; whilst both were perhaps of a decidedly "intellectual character." Dr. Darwin tells the following anecdote:—"A wasp on a gravel walk had caught a fly nearly as large as itself. Kneeling upon the ground I observed him separate the tail and head from the body part, to which the wings were attached. He then took the body part in his paws, and rose about two feet from the ground with it; but a gentle breeze wafting the wings of the fly, turned him round in the air, and he settled again with his prey on the gravel. I then distinctly observed him cut off with his mouth, first one of the wings, and then the other, after which he flew away with it unmolested by the wind." Now, I take it that the mere pursuit and selection of the fly by the wasp as its prey was an act purely instinctive, whilst the clipping off of the wings under the circumstances narrated shows it to have been cerebral.

The constructive habits of the bee, as shown in the mathematical accuracy with which each cell of the honey-comb is formed, are certainly ganglionic or instinctive in their nature and origin; if the same structure had even been conceived and executed by man, it would have been an act of the brain, and an equal perfection of it could only have resulted from habit and experience. Similar observations will apply to the beaver, and not less so to many birds, &c. Such must be directly seen to be the legitimate and only conclusion, from the fact, that in some animals, without even a vestige of brain or spinal marrow, analogous phenomena are presented to our attention; the ganglionic system in them, as in the amyencephalous monster of Dr. M. Hall, is the only power of any kind they can command; they possess none other, and therefore must it be conceded, that the "sensorial operations," so called, are occasionally performed independently of a brain; and what is more, "the actions which are at one time instinctive, may at another spring from a different principle."—[London Lancet.

On the Secreting Function of the Colon. By Jas. Paul, M. D.
(Read before the District Medical Society for the County of Mercer.)

Although great and deserved attention is paid to the secretions in disease, both urinary a faecal, and in a great many of the diseases to which the human frame is liable, particularly in fevers, there is no surer criterion to lead us in our prognostica-
tions, or guide us in our remedial efforts than the appearance of
the excretions. I do not know if we are so thoroughly ac-
quainted with the philosophy of the faecal discharges as we
ought to be, or that we view them altogether in the physiological
bearing to which they properly belong in the animal economy.

We are, I think, too much in the habit of viewing the ex-
crements merely as an index of the food having undergone the
proper and necessary process of digestion, and when we see
pieces of undigested aliment mixed up in the faeces, we natural-
ly conclude and say that the substances consumed, whether of
potato, apple, carrot, or whatever else has been partaken of,
has not been digested.

Even this, however, is not without its use—for although in
such cases the pressing symptoms, whether of croupy cough,
nervous twitches, or convulsive spasms, are relieved by evacu-
ating the alimentary canal of foreign and irritating substances,
it yet enables us to note what portion of the digestive function
is complete, whether the deficiency lies in the non-rendering
the vegetable food into the saccharine principle, or otherwise,
and so to alter the food to that which can be digested, and direct
our remedial efforts to that portion of the function which is
deficient.

My purpose at this time, however, is not with the function
of digestion, but to direct our attention to the faecal secretions
or excretions, and to the colon, or large intestine as a great
secreting organ.

Every practitioner is more or less acquainted with the ap-
pearance of the secretions as they are passed from the body of
a patient laboring under fever—the brownish watery discharges
having a cadaverous or fleshy smell, the black or dark green
discharges resembling blubber, or the green fat of turtle, having
a highly offensive and putrid odor—and the gradual return to
the yellowish watery discharges having as convalescence is
established, more consistence, and the more genial odor of
proper faeces. I do not intend to enter into, neither is it
needful that I should; the various appearances of the faecal dis-
charges in disease, nor the altered appearances caused by
various remedial agents.

It has been a question among physiologists of the older
school, whether absorption takes place in the larger intestines?
On this subject, Blumenbach has the following—"It has been
inquired whether lacteals exist also in the large intestines, and
their existence has been contended for from the effects of par-
ticular injections, nutrients, inebriating, &c., and also by
the circumstance that the faeces if retained for any length of
time become hard and dry. Although these arguments do not
demonstrate the absorption of genuine chyle below the valve of Fallopius, nevertheless, it is rendered probable by the visible existence of an abundance of lymphatics in the large intestines having the same structure and function with the lacteals, for these absorb lymph from the intestines during the absence of chyle.

"But the very different structure of the internal coat of the large intestines from that of the villous coat of the small, strongly argues that they are not naturally intended to absorb chyle."—Blumenbach, 233.

Our present views of the transudation of liquids through animal texture, will readily enable us to comprehend how absorption may take place, and nourishment be conveyed into the system when thrown into the large intestines, and even only into the rectum by means of injections. Nor is it at all incompatible with physiological facts that absorption and secretion should go on in the same organ, and through the same texture by different sets of vessels.

The same unsatisfactory knowledge, if I may be allowed the expression, exists regarding the functions and uses of the mesenteric glands of the colon. Prof. Grant, treating of these organs, says: "There are nearly a hundred of these organs on the human lacteals, and about a fourth part of these belong to the colon; but the changes they effect on the fluids which are incessantly passing through them during life, and even for some time after death, or the uses to which they are subservient in the economy, are still unknown, like the functions of many other obvious parts of our most complicated and wonderful fabric."—Prof. Grant's Lectures, Jan. 26, 1824.

Following up the argument of the absorption of chyle, and its having been seen in the mesenteric veins, Blumenbach says: "The assertion that chyle has been seen in the mesenteric veins requires further investigation and proof; so that I cannot believe that they carry anything more than blood, being carbonized and destined for the formation of bile."—Blumenbach, 234.

Here, then, we find the blood loaded and surcharged with that principle, of which a great portion of the faeces is composed.

Having thus briefly alluded to the views generally and formerly entertained by physiologists, let us enter more minutely into the structure of that portion of the large intestines in which this most important function is situate. "A part of the faeces, however (says Carpenter), may be derived from the secretions of the enteritic mucous membrane, and of its glandulæ; the surface of the former, with its simple follicles,
probably secretes nothing but mucus; but the glandulae with which it is so thickly studded appear to serve as the channel for the elimination of putrescent matter from the blood. There can be no doubt that a large quantity of fluid is poured out by these glandulae when they are in a state of irritation from disease, or from the stimulus of a purgative medicine; since the amount of water discharged from the bowels is often much greater than that which has been ingested, and must be derived from the blood."—Carpenter, 501.

For a description of these glandulae, allow me to transcribe from the same author the following: "The whole mucous surface of the intestinal canal is furnished with glandular follicles of a very similar character; of which some approach those of the stomach in complexity of structure, whilst others evidently correspond with the crypts of ordinary mucous membrane. An innumerable multitude of pores are easily seen by the aid of a simple lens to cover the whole internal surface of the large intestines, and these are the entrances to tubular follicles closely resembling those of the stomach, but more simple in structure. Their caecal extremities shut against the submucous tissue; towards the end of the rectum, however, they are much prolonged, and constitute a peculiar layer between the mucous and muscular coats; the tubes which are there visible to the naked eye being erect, parallel, and densely crowded. These glands probably from the peculiarly thick and tenacious mucus of the large intestine."—Carpenter, 668.

And of the functions of this glandular structure, the same author observes, "Although the particular use of each variety of the intestinal glandulae cannot yet be determined, there seems little doubt that their general function is to eliminate from the blood those putrescent matters which would otherwise accumulate in it; whether as one of the results of the normal waste of the system, or as produced by various morbific causes which act as ferment, and thus occasion an unusual tendency to decomposition in the solids and fluids of the body. That the putrescent elements of the faeces are not derived from the food taken in, so much as from the excreting action of the intestinal glandulae, appears from this consideration among others; that faecal matter is still discharged, even in considerable quantities, long after the intestinal tube has been completely emptied of its alimentary contents. We see this in the course of many diseases where food is not taken for many days, during which time the bowels have been completely emptied of their previous contents by repeated evacuations, and whatever then passes in addition to the biliary and pancreatic fluids must be derived from the intestinal walls themselves. Sometimes a co-
pious flux of putrescent matter continues to take place spontaneously, whilst it is often produced by the agency of purgative medicine. The 'Colliquative Diarrhoea' which frequently comes on at the close of exhausting diseases, and which usually precedes death by starvation, appears to depend not so much upon a disordered state of the intestinal glandulae themselves, as upon the general disintegration of the solids of the body, which calls them into extraordinary activity for the purpose of separating the decomposing matter."—Carpenter, 670.

What I have just read is so comprehensive, and brings the subject so forcibly and powerfully to the mind as to preclude the necessity almost of entering more fully upon it.

My attention was particularly drawn to this subject by the frequent occurrence of immense quantities of the morbid and putrid discharges by stool, in tropical fevers immediately before returning convalescence. At the commencement of the disease, the alimentary canal would be carefully emptied by repeated doses of purgative medicine, the fever would continue, watery stools would supervene; at this period the patient would take the simplest nourishment, and that in small quantities, and in many cases none at all, the stomach rejecting every particle of food exhibited—in the progress of the disease, the patient prostrated and nearly fainting on the least exertion, large dejections would occur of dark-colored gelatinous offensive matter—quarts, and I may say gallons on some occasions, are passed off at repeated operations—and although the patient at this time would be scarcely able to move or speak, yet after such evacuations he would feel more easy—a moisture appear on the surface—the critical moment being seized, and nourishment with wine or brandy exhibited—the patient slumbers, and from that time convalescence progresses.

And what is the result if this dark offensive matter is not thrown off? It is more than probable that the fever will continue, and in more favored climates a slow and dilatory convalescence may ensue, or the whole system becomes corrupted, and in a tropical climate putrefaction succeeds almost ere the being has ceased to breathe.

In the epidemic which has so lately made such havoc and run its course in some cities of the Union, causing such fearful mortality, the non-performance of the proper functions of the secreting glands of the intestines is no doubt a principal effect. Without entering into the manner in which the morbid poison of the cholera acts on the system, we see an abeyance of the proper secretions—of bile, urine, and faecal discharges, and in their stead a watery secretion is ejected, even with force, from the stomach and intestines, without straining, and without pain;
indeed, so offensive is the presence of this secreted fluid to the stomach and intestinal canal, that the patient can scarcely control its ejection for a few seconds. And this unusual parting with the serous portion of the blood leaves the remaining portion thick, viscid, and incapable of entering the minute or capillary vessels, and collapse is the consequence—but arrest the serous discharges, and once produce a faecal evacuation with tinges of biliary secretion, and there is every chance of the recovery of the patient. Hence, it is obvious that the secreting organ of the large intestines is seriously affected in this formidable disease. I call it formidable from the fatality attending the visitation, but in my opinion controlable in a great majority of cases where the patient has been timely put under the care of the physician, and remedial and energetic measures have been pursued.

Every practitioner will no doubt bring to his recollection cases in which the patient, even after repeated and free evacuations, will answer to the inquiry regarding his feelings, "I am better—my medicine has acted very well—still I feel as if there was yet something to come away." Is it not probable that this feeling, indescribable to the patient, not amounting to pain, and relieved by a copious evacuation has been owing to the supercharged state of the mesenteric veins, and the relief the consequence of the active secretion from the glandulae which has been the subject of consideration.

The secretion of the liver is looked for, and the returning appearance of bile in the faecal discharges is held in great estimation, and properly so, by most, if not by all practical physicians; its proper action is absolutely necessary to recovery from disease and the enjoyment of health. It is not my object to withdraw attention from that most important organ, but to direct more particular attention to the colon as a great secreting organ; that the faeces, which in health may contain that portion of the food which has not been absorbed into the system, more especially when a superabundant quantity of aliment has been consumed, is for the most part secreted by the large intestines, from which the deleterious and disintegrated portions of the organic mass is passed away, and the system freed of much of the superabundant carbon which may not be required for the purposes of respiration.—New Jersy Medical Reporter.

On the Functions of the Liver. By M. Bernard.

M. Bernard in a recent course of lectures delivered at the "College of France," reiterated his views respecting the functions of the liver, and endeavoured to confirm them by addi-
tional experiments. Although we have already adverted to the various papers he has from time to time published on the subject, a brief recapitulation of the points he believes proved may not be uninteresting, and will be best managed by stating them in the form of propositions.

A. On the Formation of Sugar by the Liver.

1. In an animal that has been prevented access to saccharine and amylaceous food, the blood entering the liver contains no sugar, but that which leaves it always contains it. Dogs fed for six weeks exclusively on meat present large quantities.

2. It is not only the blood of the organ, but its tissue also, that contains it in abundance.

3. It is found in the livers of all the domestic animals, in birds, fish, reptiles, and even oysters and snails. Towards the fifth month it is found in the foetal liver, and continues increasing; and it exists even in the embryos of oviparous animals.

4. The quantity calculated from actual measurement to be contained in the liver of a healthy adult, who was guillotined while fasting, was 23 grammes 267 milli-grammes. In a diabetic subject, the liver contained 57 grammes. In the liver of an ox the total quantity was calculated at 243 gr.

5. As a general rule, there is most sugar in the liver of those animals which consume aliments containing sugar. The longer the abstinence the less the quantity.

6. There is more found in adult animals than in young.

7. Although repeated experiments constantly confirm M. Bernard's original assertions that irritation of the olivary bodies of the medulla oblongata induces an almost immediate increase in the quantity of sugar, yet the supposition it did so by irritating the origins of the eighth pair of nerves is erroneous; for if these nerves be divided, the increased secretion still goes on.

8. Whether the left or right olivary body, or the interval between them, be pierced, the quantity of sugar is alike increased in the urine; but in the first two cases the animal turns continually to the left or the right, and in the last progression occurs in a straight line. The quantity produced, within certain limits, is increased with the size of the instrument used. In rabbits the sugar-secretion continues for forty-eight hours after, and in dogs for four or even seven days. The same results follow, whether the animal is fasting or not.

9. During this increased secretion, the animal is in constant agitation; its respiration is accelerated, but its temperature is diminished some degrees. The quantity of urine is increased, besides becoming saccharine.

10. The sugar once produced whether by the liver or by means of aliment, undergoes destruction in the lungs; but its
disappearance is not, like its production, under nervous influence, but is a chemical phenomenon which may take place in contact with air externally to the lungs. The destruction in the lungs gives rise to the production of carbonic acid, which is liberated from the air passages. In animals whose olivary processes are pierced, this is given out in larger quantities, and their blood becomes blacker.

11. This diabetic sugar is especially distinguished by the large quantities which can be destroyed by the lungs, being as 15 to 2½ as compared with grape sugar. Cane sugar introduced into the blood does not disappear by the lungs, but escapes by the urine.

12. Various circumstances may impede or prevent the secretion of sugar by the liver, as severe pain or lesion of the nervous system (except of the olivary bodies). Diseases may produce the same effect. Thus sugar has been found to cease being secreted in diabetics during the paroxysm of ague, in pneumonia, &c.

13. Additional experiments have shown M. Bernard the error of the hypothesis he advanced, that glycosuria was due to an affection of the pneumogastric nerves; and he is now disposed to regard it as due to a special although unknown alteration of the liver itself, which is indeed generally hypertrophied in this disease.

b. Formation of Fatty Matters by the Liver.

1. In spite of the great variety of fatty substances, animal and vegetable, the animal that consumes them always produces the same description of fat, owing to the elaboration they have undergone in the economy.

2. To become absorbed, fatty matter must previously have become emulsioned, and the pancreatic juice is the fluid by which this is accomplished. Its power of effecting this depends upon an organic matter analogous to ferments.

3. The amount of fatty matter introduced as food is far from explaining the quantity possessed or produced by the individual. There is no fat in the blood which enters the liver, but there is abundance in the blood that leaves it, and therefore its formation within this organ is certain.

4. It is, as in the case of sugar, during digestion that fat is produced in the liver, and after abstinence it disappears. Sometimes it is very abundant, especially in suckling women; whence probably arise the fatty matters of the milk, for the fat of the liver offers most analogy to butter. In such women, the blood itself contains much fat.

5. The fat received in the food after decomposition by the pancreatic juice, and the fat from the liver, both enter the
blood, and are not entirely destroyed in the lungs, in as much as the arterial blood still contains abundance. As the venous blood contains hardly any, and the vena cava none, we must conclude that the greater part is destroyed in the general capillary system.

6. The production of fat in the liver seems, like that of the production of sugar, to be under the influence of the nervous system; and if this undergoes violent lesion or perturbation, its production ceases. It is remarkable, too, that in proportion as the quantity of sugar increases after puncture of the medulla oblongata, that of the fat diminishes. The same is observed in diabetes; for from the livers which are loaded with sugar, not an atom of fat can be extracted.

7. Although healthy urine has been shown to contain some fat, yet this sometimes predominates so as to constitute a disease under the name of fatty or chylous urine, frequently coexisting with a similar state of the blood. This is probably due to the superabundance of fat secreted by the liver, and constitutes a (so to say) fatty diabetes, just as the excess of sugar does a saccharine one.

8. The products of digestion may thus be said to induce three principal diseases—the sugar, diabetes; the fat, the so-called chylous urine; and albumen, the albuminous diseases.

c. Fibrin formed in the Liver.

1. The blood entering the liver contains little fibrin, and coagulates with difficulty even when the animal is fed on flesh. The fibrin of the aliments is dissolved by the gastric juice, and converted into a matter analogous to albumen, termed by Mialhe albuminose. But the blood which quits the liver contains much fibrin and therefore the albuminose of the blood of the abdominal veins has become transformed into fibrinous matter.

2. It is during digestion that the blood, traversing the liver, becomes loaded with this abundance of fibrin.

d. Secretion of Bile.

1. The secretion of bile differs from those already named, as it is continuous, while they occur only during digestion.

2. The bile is not a mere excrementitious fluid, but influences digestion usefully, contributing with the gastric and pancreatic juices to constitute that most powerful solvent—the intestinal liquid.

3. The bile seems to be essentially endowed with anti-putrefactive properties. It regulates the chemical reactions occurring during digestion, prevents fermentation, and opposes the formation of the gases which result from the decomposition of azotised and non-azotised aliments.
4. When bile is prevented reaching the intestine, putrefactive fermentation, no longer opposed by the acids of this fluid, induces diarrhoea; which may also be induced by a predominance of alkali in the intestines, and may be under such circumstances advantageously treated by acids.

v. Résumé. From what has preceded, it is evident that sugar, fat, and fibrin are fabricated in the liver, and that whatever the alimentation may be, this organ transforms it into appropriate matter of nutrition, so that the great variety of food taken does not derange the composition of the blood and prevent its being identical. In a chemical point of view the organ is then of great consequence, and is properly regarded as one of sanguification. While in the herbivora, whose aliments furnish much sugar, this secretory organ furnishes least sugar, in the carnivora, who ingest much fatty matter, it secretes least fat. So, too, the liver forms fibrin abundantly, in proportion as the vena portae contains less. The liver, therefore, while it is an organ of sanguification, is always one for adjusting the equilibrium.

If the above products furnished by the liver serve to keep the circulating fluid in a composition essentially fit for nutrition, the bile, acting in opposite direction, contributes to the same end, by removing the principles that are in excess, especially carbon; so that the liver must be considered not only as an organ of sanguification and equilibrium, but also one exerting a depurative action on the blood.


1. Two powerful causes—the pressure of the abdominal viscera and the venous aspiration—contribute to this; but other contrivances are required to meet the varying degrees of plenitude to which the organ is liable.

2. Certain vessels seen easiest in the horse, communicate directly between the vena portae and vena cava, conveying a portion of the blood without its having undergone modification in the capillary circulation of the liver, and operating as a kind of diverticulum, preventing the organ from being too greatly and too suddenly engorged.

3. Congestion of the liver and heart, in the case of unusual afflux of fluids, is further provided against by the agency of a special hepatico-renal circulation, not so distinct in man, in whom the liver is liable to become congested by over-exertion, as in the horse, in whose liver this does not produce the same effect. [We have already (No. X., p. 246) described the apparatus by which this is supposed to be carried on, and expressed our conviction of the fancifulness of the suggestion.]

4. The active and abundant circulation through the liver is
an important source of animal heat, the blood leaving the organ having acquired an additional temperature of about 2° Fahr.—
*L'Union Médicale*, 1850, Nos. 82, 85, 88, 91, 98, 103, 106, 113, 115.

We think that there is quite enough of probability in some of M. Bernard's assertions, to encourage further enquiry; but we must enter our protest against the hasty and dogmatic manner in which he builds up his conclusions on a very slender basis of evidence. It will be seen, even from his own admissions, that he has done this in regard to the influence which he supposed to be exerted through the eighth pair of nerves on the production of sugar; and the recent researches of Frerichs and Lehman on the Chemistry of digestion (of which we shall give an account in our next Number,) have shown him to have been no less hasty in his deductions on the agency of the pancreatic fluid.—*Medico Chirurgical Review.*

*Electro-Physiological Researches. Seventh Series.* By Signor C. Matteucci.

In this memoir, Professor Matteucci, after recapitulating the results of his previous researches on Electro-physiology, published in the 'Philosophical Transactions,' proceeds to the relation of new experiments. He first shows that nervous filaments made to conduct an electric current in a liquid are not capable, like metallic wires, of acting as electroids, and giving rise to electro-chemical decomposition. The solution employed was that of iodide of potassium; the nerves, two large ones, taken from a living animal, each of which was separately attached to the metallic extremities of a pile of fifteen couples. No trace of decomposition followed; and he concludes from hence, that the conductibility of nervous matter is due to the liquid part of the matter itself.

He then gives further experiments on the relative conductibility of muscles and nerves, with a view to ascertain whether, when a current was impelled through a mass of muscles, any part of the current might have passed through the nervous filaments spread through the muscle. For this purpose he inserted the nerve of a galvanoscopic frog into a hole made in a piece of dead muscle, through which he then passed a very powerful current: no contraction followed in the galvanoscopic frog. When muscles still retaining their irritability were substituted for the dead muscle, induced contractions occurred in the galvanoscopic frog during the passage of the current. He concludes that when the poles of a pile of twenty-five or thirty elements are applied to the surface of the muscles of a living
animal, the phenomena produced by the passage of the current must depend either on the direct action of the current on the muscular fibre, or on the indirect action or influence of the electric current transmitted by the muscular fibre to its own nervous filaments, or rather to the nervous force existing in those filaments.

Referring, then, to an experiment related in a preceding paper, in which the lower limbs of a frog, united to the spine only by the lumbar nerves, are placed astride two glasses containing water, with each foot immersed, and in which a current, after traversing the two limbs, and consequently the two nerves, in opposite directions, so modifies at length the excitability of the nerves, that, on opening the circuit, only the limb in which the current has been passing inversely contracts, he shows that if in this state what may be called the "inverse" nerve be touched by a piece of muscle, although the circuit is continued, yet the limb contracts as though the circuit had been broken. In fact, the muscle, by its greater conductivity, becomes traversed by the current in place of the nerve. Again, if after the former part of the experiment has been performed, the portions of nerve which had hitherto been buried among the crural muscles be dissected out, it is easily seen that their excitability has not been affected like that of the lumbar nerves, because the current, in place of traversing them, has traversed only the crural muscles. The nerve has had its excitability modified in only that part of its course in which, being laid bare and isolated, it has necessarily conducted the current.

M. Dubois Reymond ('Comptes Rendus') has related an experiment seeming to lead to the inference that section of the spinal marrow increases the excitability of the lumbar nerves, at least during a certain period of time. In order to test the accuracy of this conclusion on so important a point, M. Matteucci institutes a number of very accurate experiments, in which he measures the excitability of the lumbar nerves after section of the spinal marrow, by means of the apparatus of Breguet, used and described by him in a former paper. His first results show that "the contraction excited in the muscles of a frog, of which the spinal marrow has been divided from twelve to eighteen hours, is stronger than that obtained under the same circumstances from the muscles of a frog just killed, without having been previously subjected to any injury to its nervous system." But subsequent experiments have satisfied him that this result depends not on the separation from the spinal marrow, but rather on the repose in which the muscle has been permitted to remain; for without division of the medulla, nearly the same force of contraction existed after the same
interval of time. He finds, indeed, that the only alteration which the excitability of a nerve undergoes by separation from the nervous centres, consists in its being more readily exhausted under the action of stimulants, the longer the period that has elapsed since its detachment.

The author then proceeds to relate the nature of the strict analogy existing between electricity and nervous force. As electricity is developed under the influence of the nervous current in the organs of electrical fishes, so, as a converse of this phenomenon, electricity may develop the nervous force. After adverting to the well-known analogy subsisting in every particular between the phenomena of the electrical organ and those of muscles, he aderts to the old experiment of passing a current through the muscles of the thighs of a living animal, the positive pole being placed now above, now below, so that it may be supposed that the current passes in the two cases of opposite directions as regards the nervous filament distributed in the muscles. He then points out that the effects of a current directed downwards, in the direct course of the nerves, are a strong contraction of the muscle traversed, and also of the muscles of the leg below; while the effect of a current in the opposite or inverse direction is pain, together with contractions less violent and always confined to the muscles traversed. The contractions (especially of the parts below) indicate a current of nervous force propagated towards the muscles, while the pain indicates a current towards the nervous centre. Now, bearing in mind that it had been proved by direct experiments that an electric current traversing a muscle never quits the muscular fibre to enter the nervous filaments, it seems clear that the phenomena just spoken of are exclusively owing to the influence exerted by the electricity passing through the muscles on the nervous force contained in the nerves; and also that this nervous force acts peripherad or centrad, according to the direction of the electric current which excites it. The great importance of the conclusions drawn from these experiments consists in this, that they lead to the same law which establishes the analogy between nervous force and the electrical discharge of fishes. The paper concludes with some further considerations intended to confirm this law.—[Philosophical Transactions, 1850.

On the Treatment of Rheumatism by Lemon Juice. By G. Owen Rees, M. D., Assistant Physician to Guy's Hospital.

Although the treatment of rheumatic diseases by lemon-juice has received a considerable amount of favourable notice from
the profession, I am still inclined to believe that it has scarcely
gained the credit it deserves. This would appear to depend in
some degree on its use in cases which experience has now
shown me are but ill-adapted for its exhibition, and which are
in all probability improperly placed by our pathology in the
same category with those forms of the disease in which early
benefit is derived from the administration of the remedy.
There is much indeed in the history of those conditions design-
nated rheumatic to lead us to hope, that as medical science
advances, important distinctions will be made where none are
as yet recognized.

From the experience I have now had in the use of the rem-
ey, I feel I have sufficient evidence before me to justify the
opinion, that there are certainly two forms of rheumatic disease
which cannot be benefited by the administration of lemon-juice.
The first of these is generally observed in cachectic subjects,
and for want of a better name I shall call it cachectic rheuma-
tism. It occurs in all classes of life, but more commonly, I
believe, among the lower orders. It is more frequent in fe-
males than in males. The swelling and redness of the parts
affected are less marked than is generally the case in acutely
painful rheumatism. The pain is, however, very severe, and
occasionally partakes of the neuralgic character. The patient
is sometimes anemic, and on inquiry we may perhaps discover
a history of long mental or physical suffering. The skin is per-
spirable; the pulse weak and rapid; the tongue varies, being
sometimes moist and white, and sometimes clean and less moist
than natural. In cases of this description I have not succeeded
in relieving the patient by the exhibition of the juice; and if
occasional relief has been obtained, the disease has shown a
tendency to relapse, and become unmanageable under a con-
tinuance of the remedy. It may perhaps be well to mention,
that in these cases I have derived the greatest benefit from the
exhibition of opium in full doses at frequent intervals. The oth-
er form of rheumatism in which I have failed to obtain relief by
the administration of the juice is that attendant on syphilis.
In all the cases in which I have made trial of it among the fe-
male out-patients at Guy’s Hospital, it has failed to exert any
beneficial influence. The nature of the disease, so distinct
from that of ordinary rheumatism, never indeed gave me any
great hope of success. If we except the diseases above des-
cribed, and cases simulating rheumatism, but really connected
with ordinary dyspepsia, or, as is sometimes the case, with the
existence of Bright’s disease, my continued experience has but
the more persuaded me of the great value of lemon juice as a
remedy for rheumatism. Its action is most remarkable causing
cessation of pain and decrease of swelling and redness, such as we can rarely obtain with colchicum, even when administered in large and hazardous doses. That lemon juice sometimes fails to effect this rapidly is certainly true, and that too with respect to cases apparently identical with those in which early benefit has been observed; but the history even of these less favourable instances will generally bear comparison with the results obtained by the ordinary plans of treatment; and it is my full conviction, that since lemon juice has been introduced at Guy's Hospital as a remedy for acute rheumatism, the period during which it has become necessary to confine patients so affected to bed has been very materially lessened.

I am anxious now to direct attention to a class of chronic rheumatic cases, in which I have used lemon juice with very great advantage. I allude to such as are connected with deposit of lithate of soda in and about the smaller joints, and which partake more or less of the gouty character. I have met with great success in this form of disease by the continued use of lemon juice in combination with small doses of the tincture of the sesquichloride of iron, and in several instances have effected absorption of deposits which have resisted all other plans of treatment. A case of the above description was lately reported to me, in which like success attended the administration of the lemon juice alone. The patient, a lady, had been a cripple for several years, and was eventually restored by persevering in the use of the remedy for six or eight weeks.

Lastly, with respect to the dose in which the juice ought to be administered. Experience has shown me that it should be larger than I was at first inclined to consider necessary. In acute rheumatism, from one to two ounces should be given every four or six hours; and should pain be felt in the bowels, or diarrhoea occur, which is very rarely the case, four or five minims of tincture of opium may be added to each dose of the remedy.—[London Lancet.

Cases of the Termination of Acute Rheumatism in Suppuration. By MM. Fleury, Andral, and Trousseau.

A prolonged and interesting discussion has recently arisen at the Académie de Médecine, upon the occasion of the presentation of a report by M. Martin Solon, upon the proposition of M. Dechilly to treat acute rheumatism by covering all the affected joints with large blisters, a plan, as might be supposed, that met with little favour. The opportunity was taken to enter into the question of the nature and treatment of the disease at large, and several sittings were occupied in discussing this. We
have no intention of following the various speakers, since much that was said consisted of a reiteration of what is already known, or has been sufficiently refuted. M. Bouillaud defended his doctrines with his accustomed ability and want of success; and M. Piorry disputed with him the parentage of the practice of bleeding coup sur coup, which every one else has abandoned as mischievous. We will briefly notice a portion of the address of M. Malgaigne.

M. Malgaigne, after expressing his conviction that physicians would be less discrepan in their opinions concerning the disease, if they studied first its monarticular form, as found in the surgical wards; and, adverting to the fact of the utter ignorance which prevailed concerning inflammation, until Hunter studied its phenomena, at the surface of the body, and scattered the former hypotheses of physicians to the winds; stated that suppuration is by no means an uncommon termination of the disease, but that it then comes under the care of the surgeon. He believes that physicians are too easily contented with the removal of the general symptoms, and allow a patient to leave the hospital when a considerable amount of pain or debility of the joint continues. Under favourable circumstances, Nature herself will complete what is sufficient; but, at other times, the patients resort to the surgical wards, "to have their cures cured." He thinks, too, that in appreciating the employment of different remedies, we are too ready to yield them praise as they successively appear, without reflecting upon the natural tendency of this, and of all articular inflammations, to a cure, provided the parts are kept in quietude, and free from the irritation of external agents. He believes that amidst the multiplicity of formulæ, the natural indications are often neglected; one of the principal of which he considers to be, to protect the perspiring surface from the effects of cold, which, in most cases has indeed been the original cause of the disease. The perusal of all modern cases proves the great inattention showed to this point, the patient being allowed to uncover himself to satisfy every want, or undergo any application; and in this way the disease may be rendered obstinate and relapsing.

Some of the speakers laid considerable stress upon the rarity of the termination of rheumatism in suppuration, and this has led to the publication in the medical journals of some examples of it. Professor Fleury, of Clermont, states that, up to 1848, he had always believed with M. Chomel, that rheumatism never so terminated; for, practising in a part of the country wherein the disease is of frequent occurrence, he had never met with a case of such before, although he had frequently had cases transferred to his surgical wards from the physicians'
under the idea that such was the case. The present case occurred in a youth, æt. 18, of sound constitution, and hitherto of good health. He was admitted into the Hotel-Dieu, at Clermont, 2d October, on account of acute rheumatism of the shoulder and knee, induced by sleeping in a damp chamber. Suppuration was set up, notwithstanding active antiphlogistic treatment, in both joints, the abscesses being left to discharge themselves; and he died on the 12th of November, of purulent infection. On examination, the articular surfaces were found denuded, a metastatic abscess existed in the right lung, but no other disease of any of the viscera was found.

M. Andral read the next case to the Academy. A woman, æt. 67, of feeble constitution, was admitted into La Charité early in July last, suffering from pneumonia, from which she rapidly recovered by bleeding and tartar emetic, and was in a state of convalescence, when, from the effect of a current of air, she became attacked with acute rheumatism of the shoulders, unattended with complication, the attendant fever being great. She was bled, which so enfeebled her as to forbid the repetition; and next day twelve grains of quinine in the twenty-four hours were prescribed. The disease proceeded on to a fatal termination with fearful rapidity, without any complication occurring, any abnormal sound of the heart, or any other joint participating. She died on the eighth or ninth day, having exhibited no other symptoms than intense pain in both shoulders, a pulse of constantly increasing frequency, and a state of general anguish and rapid sinking, resembling that observed in acute peritonitis. The most careful examination of every organ failed to elicit any explanation of the issue; nor were there any signs of phlebitis or purulent infection. Both shoulder-joints, however, were found filled with white, homogeneous pus, and the synovial membrane was of the intensest red, the articular cartilage retaining its normal colour. Some of the bursæ in communication with the joints were also filled with pus; but external to the joints all was normal, bones, periosteum, and muscles having undergone no change whatever.

M. Trousseau relates a case also, which occurred in a child æt. 9, who, having always enjoyed good health, and being unexposed to privations, was attacked with intense scarlatina, and, during its prevalence, various of the joints became the seat of acute rheumatism. She died on the fifth day of the scarlatina, and third of the rheumatism. On examination, the various organs were found in a healthy condition, with the exception of the pleura, which contained a considerable quantity of serosity. Both shoulder-joints, and those of the elbow, knees, and ankles, were filled with considerable quantity of greenish, well-formed
pus, accompanied by considerable vascularity of the subsynovial cellular tissue.

M. Trousseau observes, that all practitioners who have much observed disease in children, must be aware what a powerful effect the exanthemata exert in engendering a purulent diathesis. If this child had contracted the rheumatism unconnectedly with the scarlatina, it would have probably determined the synovial effusion usually found; but the scarlatina having changed the crasis of the blood, developed the suppurative diathesis, and converted a trifling affection into one of an irremediable character.

Was not the old woman, whose case is related by M. Andral, reduced, M. Trousseau inquires, by the debilitating treatment to which she was subjected, to a condition analogous to that in which scarlatina so often places children?


Results of Revaccination in the Prussian Army, during 1849.

During the year 1849 there were 51,637 individuals revaccinated, of whom 39,116 had distinct cicatrices of the former vaccination, 8706 had these in an imperfect condition, and 3815 were destitute of them. The vaccination

Pursued a regular course in . . . . 30,457
An irregular one in . . . . 8467
And failed in . . . . 12,713
Succeeded on repetition in . . . . 2862

Thus, then, of the 51,637 vaccinations, 33,319 were quite successful; vesicles running a normal course being produced. This proportion, amounting to 64 per cent., is nearly 1 per cent. more than was obtained in 1847 and 1848.

Of the different forms of variolous disease which appeared in the army throughout 1849, only 62 cases occurred, and were distributed as follows:

<table>
<thead>
<tr>
<th>In persons not revaccinated</th>
<th>Revaccinated without success</th>
<th>Revaccinated with success</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Varicella</td>
<td>2</td>
<td>6</td>
<td>5</td>
</tr>
<tr>
<td>Varioloid</td>
<td>14</td>
<td>17</td>
<td>9</td>
</tr>
<tr>
<td>Variola</td>
<td>6</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>22</td>
<td>25</td>
<td>15</td>
</tr>
</tbody>
</table>

In almost every case the disease ran a mild course, and frequently was quite insignificant. One case only was fatal. A recruit vaccinated when a child had not been yet revaccinated, and died on the 10th day.—Med. Zeitung, 1850, No. 19.
We have been careful to record abstracts of these annual official returns, testifying as they do most strikingly to the value of the practice of revaccination, through the agency of which smallpox has now for many years been well-nigh extinguished in the immense Prussian standing army. To the greater prevalence of this practice may in part, also, be attributed the much fewer deaths from variola which take place in Berlin as compared with Prussia at large. Thus, while in 1840 1 death in 227:2, was due to smallpox in Berlin, 1 in 173:7 was the proportion for Prussia. In 1845, the numbers were 1 in 4,562 to 1 in 171, and in 1848, 1 in 1022:6 to 1 in 244:7. While the average of 9 years, 1840–8, gave 1 death from smallpox in 289:2 deaths in Berlin, and 1 in 159:7 in the Prussian States.—See Med. Zeitung, No. 10. Ibid.

On Vaccination and Revaccination. By M. Craninx.

An interesting discussion has lately taken place at the Belgian Academy of Medicine, upon the subject of vaccination. The following were the conclusions of M. Craninx, the reporter, which were affirmed by the academy:—1. Variola and varioloid are but degrees of the same affection. 2. Simple variola may attack the same individual twice, but scarcely ever in rapid succession (coup sur coup). 3. It may also attack persons who have been properly vaccinated, but it is then generally mitigated. (M. Lombard observed that the word “generally” must be dwelt upon; for subjects who, to all appearance, have been well vaccinated, at a distant period occasionally die from variola. He added, that in the dreadful epidemic which has just devastated Liege, this was the case, while none of those who underwent revaccination took the disease.) 4. Variola after vaccination, is almost without example within the next ten years; but it is observed from time to time in those who have been vaccinated for more than twenty years. It is, however, very rare after forty. 5. It is of more frequent occurrence, but, at the same time, milder, in the vaccinated, than in persons who have already undergone an attack of it. 6. Varioloid is observed oftener than variola after vaccination, and is not infrequently observed in children; but it increases both in frequency and severity from ten to twenty-five or thirty years. 7. Variola and varioloid in the vaccinated, not following the same course in respect to frequency or intensity as in the non-vaccinated, the cases in which they are seen among the former cannot all be explained upon the supposition of a faulty vaccination, but upon that of a diminution of the preservative action of vaccination. 8. Perhaps we should admit incomplete vacci-
nations possessed of a less degree of preservative power, and capable of becoming sooner exhausted. In this point of view, sufficient importance is not attached to the general reaction which should accompany the vaccine eruption, indicating the action of the virus upon the general economy. 9. If the protective power of vaccination has become enfeebled by time, if not in all, at least in several individuals, there is not sufficient evidence to show that the vaccine, considered in itself, has lost its efficacy since the first years of its discovery. While there is doubt, it is better to revert to the cow-pox whenever the opportunity presents itself. (Upon this resolution M. Seutin remarked that, believing as he did, that the vaccine lymph which existed is efficient, and that it fails either from not having been taken well, or owing to individual susceptibilities, he considered this conclusion would spread needless alarms. M. Lombard observed, however, that the new cow-pox, recently imported from England, certainly exhibited a more certain and more active effect.) 10. As the immunity conferred by vaccination is not indefinitely absolute, revaccination, at least for a great number of individuals, is rationally indicated. 11. Observation shows, that when it succeeds, the second vaccination produces phenomena very nearly like the first, so that we would, à priori, anticipate the same effects from it. 12. Experience has determined this point: it has proved that a recent revaccination preserves from variola and varioloid, and that, practised on a sufficient scale, conjointly with vaccination, it constitutes a sure means of arresting the progress of this malady when it appears epidemically. 13. It succeeds best in proportion as it is most required, that is, the more remote the period is since the individual has had variola, or has been vaccinated. 14. If it does not succeed at a first attempt, it should, if necessary, be repeated several times. 15. During the prevalence of an epidemic of variola or varioloid, it is prudent to revaccinate all those whose first vaccination dates ten years back, and all those whose first vaccination gives rise to any doubt. 16. Revaccination may be performed almost indifferently with the lymph of a primary or a secondary vaccination. 17. It is imprudent to inoculate with the lymph of spontaneous varioloid; nevertheless, in the time of an epidemic, if vaccine lymph could not be possibly obtained, we should be authorized in the employment of this fluid, and to transmit it as we do vaccine lymph. 18. If revaccination is so useful a thing, at least for a certain number of persons, vaccination loses none of its importance; and the government and the profession should exert all their influence to enable the entire population to participate in its benefits.—[Gaz. Méd., No. 27. Ibid.}
Abortive Power of Collodion in Smallpox.

A case has recently occurred in the wards of M. Aran, at the Bon Secours, in which the good effect of collodion was proved to be as decisive in confluent smallpox as it had been found before in the more simple form. It occurred in the person of an unvaccinated young man, and the collodion was applied to all parts of the face but the lips and ears. Through this transparent covering the progress of the pustules was observed to become at once arrested, while those uncovered continued enlarging. Moreover, a part of the covering having been destroyed without being observed for some hours, the pustules thus exposed immediately began to develop themselves until again arrested by a reapplication. The ears, too, were now covered, and the progress of the pustules stopped there. In a few days the collection peeled off; the skin looking as after erysipelas, but no cicatrices were to be observed, though in other parts of the body they existed in abundance, the eruption having been very confluent.—[Bull. de Thérap., vol. xxxix, p. 369. Ibid.]

Progressive Muscular Atrophy—a new disease.

To Dr. F. A. Aran, of Paris, is due the credit of first calling the attention of the profession to a formidable affection of the muscular system, to which he has applied the name of Progressive Muscular Atrophy. That a disease of such striking features, and so common as to have been observed by the author eleven times in a comparatively short period, should have been overlooked or not accurately studied before, can only be explained by its great resemblance to certain forms of paralysis, and by the tendency of the age to refer to the nervous system all lesions of motion as well as of sensation. We must confess that this has been our error in one case which came under our observation, and which we now recognize very clearly as belonging to the class of affections treated by M. Aran. The case to which we allude was that of a much esteemed professional brother, who, in the prime of life and the possession of a vigorous constitution, perceived that he was gradually losing the power to flex the thumb of one hand. The loss of the use of the thumb having become complete, the finger next to it began to weaken and also became useless; the middle finger followed next, and thus, successively, all the fingers of that hand
Progressive Muscular Atrophy.

became powerless. The loss of voluntary motion invaded the wrist, then the elbow, and finally all the muscles of the shoulder. When it reached the elbow of this limb, the thumb of the other hand began to give way precisely as the first had done, and the disease progressed in this limb as it did in the other, until both arms were left dangling as lifeless appendages to a robust frame. It is worthy of remark, that such was the slow progress of the malady that its ravages were not complete until the lapse of, I think, two years; that during the whole of this time the patient’s general health was perfect; that the sensibility of the affected parts was entirely normal; that he suffered no pain; and that the loss of motion regularly coincided with a complete atrophy of the muscles. The limbs and shoulder blades appear completely emaciated and are soft and flabby to the touch. Although about ten years have elapsed since the occurrence of this affliction, he still enjoys fine health and unimpaired mental powers, and is enabled to discharge the duties of an active practice in the country. Sensibility being yet perfect, he judges of the pulse as accurately as ever, when his fingers are placed upon the artery by the assistant who accompanies him.

Our friend was not only treated by ourselves, but also sought the advice of most of the distinguished practitioners of the United States, in vain. He submitted patiently to the trial of every remedy and mode of treatment that had ever been recommended in paralytic affections, without any modification or check of the disease. M. Aran, as will appear below, thinks that galvanism will sometimes arrest its progress; but it proved unavailing in our case.

The very great length of Dr. Aran’s monograph precludes it from our pages, but we translate from the Archives Générales de Médecine (Oct. 1850) the following corollaries:

"1. The muscular system may be affected with atrophy, perverted nutrition, and probably a cellulo-adipose transformation of the muscular fibre, independently of any lesion of the central or peripheral nervous system and of impaired circulation."

"2. This atrophy may be partial, affecting a greater or less number of the muscles of the superior extremities, or general,
invading nearly all the muscles of animal life; but, in whatever form it may occur, it is attended with the singular circumstance that, in the affected limb, some of the muscles will retain their perfect integrity in the midst of a large number of others which have been destroyed and transformed."

"3. This affection usually shows itself first in the upper extremities, and is characterized first by weakness and subsequently by emaciation of the parts implicated, by cramps, by subsultus of the tendons, and by fibrillar contractions. The morbid action terminates in the complete destruction of the affected muscles and most probably in the transformation of these into a cellulo-fatty tissue."

"4. This disease occurs sometimes spontaneously, without evident cause, and in other cases follows violent and continued action of certain muscles. It always affects the young, robust and healthy, and never fails to prove, however limited, a fearful infirmity."

"5. Its duration is usually long, its development slow and progressive, and its termination almost invariably the complete destruction of the muscular tissue affected. It rarely remains restricted to the muscles originally invaded, but generally extends to others in the same limb, or shows itself in the same muscles of the opposite limb."

"6. So long as the muscular tissue of the affected muscles has not been completely destroyed or transformed into a cellulo-fatty substance, the muscular fibre will retain its irritability and electric sensibility. This is an important feature, for it may serve to distinguish progressive muscular atrophy from other affections resembling it, especially progressive paralysis unattended with mental alienation and paralysis induced by organic or traumatic lesions of the nerves."

"7. When the transformation of the muscular tissue is complete, no treatment will restore its integrity; but before this, the progress of the disease may possibly be checked by the local application of galvanism to the muscles."

From the above, and especially from the first section of M. Aran's corollaries, it will be perceived that the error into which we, as well as others, have fallen, consisted in attributing to the nervous system a lesion which really belongs to the muscular system. Our author has had the opportunity of verifying his positions by post-mortem examinations, and affirms that he has not been able to detect any lesion whatever of the nervous centres, nor of the nerves themselves, in these cases. We are aware that examinations of the kind are rarely satisfactory in
nervous disorders; yet, when taken in connection with the appearance of the muscular tissue and the history of the disease in question, we feel strongly disposed to assent to the pathological inferences of M. Aran. The subject is one eminently worthy of farther investigation.

**Collodion in the Treatment of Symblepharon.**

The Bulletin Gén. de Théráp. contains an ingenious plan devised by M. Cunier for the relief of adhesions of the eyelid to the eye. The indication being to maintain the lid everted after cutting up the adhesions, sufficiently long to allow the incisions to heal; this is accomplished in the following manner. In adhesions of the lower eyelid, a narrow strip of linen moistened with collodion is applied just below the eyelashes and parallel with them, so as to secure two bits of thread placed transversely beneath the linen with their free extremities hanging down. A similar strip, with threads beneath, is fixed over the malar bone. When entirely dry, the threads from above are tied to those from the cheek, sufficiently tight to depress or evert the lid, and to maintain it so. In adhesions of the upper eyelid the second strip should be placed upon the forehead, for the purpose of drawing up the eyelid when the threads are tied. M. C. reports several cases in which this plan was entirely successful. In two of the cases the eversion was maintained nine days, and for three weeks after only a few hours each day. In another, six days sufficed. The eye is to be protected from dust by a thick veil or shade.

**Remarks on the use of Bromide of Iron.** By Edward Gillespie, M. D., of Brady's Bend, Pa.

Having been practising medicine for some five years past in the neighbourhood of Freeport, in Armstrong county, in this State, where a considerable quantity of Bromine is manufactured, I have been led to somewhat extensive employment of a ferruginous compound of this article, the results of which have proved so satisfactory, that they may perhaps be not destitute of interest to the readers of the Examiner. The compound which I employ is a bromide of iron of my own preparation, and this is the only form in which I use the
bromine. It has now in my hands entirely taken the place of iodine, appearing to me to meet all the indications for which that medicine has been exhibited, and with much greater efficiency. Indeed, the bromide has become one of my indispensible in practice, hardly subordinate in importance to my calomel or opium.

The cases in which I have been in the habit of using it are scrofulous tumours, inflammations of the glands, both acute and chronic, erysipelas, suppression of the menses, tetter, and in most cases where chalybeates are administered. Enlargement of the parotid, submaxillary, or cervical glands, whether from scrofula or other causes, I have never yet failed to discuss, provided they had not progressed to suppuration; and I may speak from an experience of not a few cases, and many of them of long standing. When suppuration does take place, the discharge soon ceases after lancing, and the orifice quickly heals by applying a solution of the bromide over the surface occupied by the tumour, and keeping a small plaster of basilicon ointment on the orifice. My method of using it in cases of tumors is to apply a small portion immediately over the tumour twice a day by means of a feather, and at the same time to administer it internally, commencing with eight or ten drops morning and evening in half a teacup of cold water, increasing a drop or two every day until nausea is produced, (which may be termed the point of tolerance.) The dose is then to be reduced five or six drops and continued. This is the invariable rule I lay down for its internal use. I have given it to advantage in cases of felon, where a red and very painful streak would run up the arm, causing inflammation of the axillary glands with general febrile symptoms. Some of these cases present rather an alarming appearance for a time, but have always terminated favorably in my hands by a strict antiphlogistic treatment, and the use of the solution as a local application to the inflamed arm and glands.

Last spring an erysipelas epidemic raged in a district of the country north-west of this, proving extremely fatal, and causing considerable alarm in the section where it prevailed. It exhibited quite a preference for the fair sex, nine-tenths of those attacked having been females. The first symptoms were chills, followed by a high grade of fever and sore throat; from 24 to 36 hours after the attack, the throat became so much swollen that deglutition was very painful, and in many cases entirely impeded. The breathing was very laborious. The tongue was also much swollen, so much so as in many cases to protrude from the mouth with an extremely thick black coat on the upper surface. In this stage it was generally called
“black tongue.” In from 48 to 72 hours from the commence-
ment of the attack, when it pursued its natural course, the ears
became red and inflamed, the redness and inflammation exten-
ting rapidly over the face, head, neck and shoulders. The
eyes became entirely closed, the nose nearly covered by
the swollen cheeks, the lips puffed out to an enormous extent,
and the head, to use the expression then common, “as big as a
bushel.” Perhaps an idea may be conveyed of their appear-
ance by likening it to that of persons drowned in warm weather,
whose bodies have remained in the water a week or two, with
the face and head painted scarlet after being removed. When
they arrived at this point they were vulgarly termed “swell
heads.”

Occasionally the disease would appear on one ear and extend
over the face to the median line. When this was the case, one
side of the face would be swollen and the other perfectly
natural, which gave the patient a very grotesque appearance.
It would not remain long in this situation, however, until the
sound ear would become red and the disease would soon hasten
across the face to meet its companion.

When it did not appear on the skin or could not be brought
out by artificial means, the patient generally died in a short
time from suffocation. But it could in nearly all cases be
brought out by the use of some highly stimulating lotion or the
application of a fly blister to the neck. Still the danger
was imminent either from sloughing and gangrenous inflamma-
tion of the cellular tissue, or a transfer of the disease to the brain.
The patient, by external revulsion, was generally enabled
to swallow, which of course was a strong point gained, and by
the judicious use of internal remedies and proper local applica-
tions he now generally recovered. I must not omit to state
that I found the free use of the lancet eminently serviceable
whenever the state of the pulse required it.

With regard to local applications, I may say that I experi-
mented with a variety of articles. In one case I applied
exclusively the acetas plumbi in solution—in another the
ethereal tincture of iodine, in another strong mercurial ointment,
in another solution of corrosive sublimate, and finally the
bromide of iron in solution. The progress of these different
applications I watched for a couple of days, the internal treat-
ment being the same in all. The acetate of lead appeared to
have no influence on the disease whatever. It progressed as
rapidly as though nothing were applied, although the solution
was as strong as an ounce to a pint and a half of water, and kept
constantly applied by means of muslin dipped in the solution.

The tincture of iodine appeared to do better—it retarded but
On Lupus. By M. Cazenave.

M. Cazenave rejects the term lupus exedens of Rayer, inasmuch as every lupus is exedens, this being the essential character of all forms of it. What has given rise to the term is the fact that there are two principal varieties of lupus, the ulcerated, and another in which instead of ulceration there is hypertrophy; but this latter form is no less destructive, and after a cure, though no solution of continuity has taken place, there is yet loss of substance and a cicatrix. With Biett, Cazenave admits the form of lupus which destroys the surface, that which pene-
Operation for Ingrowing Toe-Nail. By M. Baudens.

M. Baudens states, that he has performed the following operation more than 200 times without accident of any kind, little pain being caused and that only for a few seconds. The right hand is armed with a narrow, straight bistoury, held like a knife when cutting a pen. The free extremity of the toe is firmly fixed by the thumb and index finger of the left hand, so as to render the diseased part prominent. The operator now carries the edge of his knife (on the outer or inner side of the phalanx according to the situation of the disease, and equidistant from the root of the nail and the next phalanx) perpendicularly down to the bone, and then inclines it towards himself, shaving the phalanx, and carrying off at one stroke the degenerated soft parts, the diseased portion of the nail, and the corresponding portion of the matrix,—the removal of this last being indispensable, in order to render the reproduction of the disease impossible. For two or three days he keeps the parts surrounded by ice (which however, is no essential part of the plan, but his mode of treating recent wounds in general,) when granulations spring up, and eventually a horny description, of
cicatrix, forms an excellent substitute for the nail.—Gaz. des Hôpitaux, No. 77. Ibid.

Enlargement of the Aponeurotic Orifice of the internal Saphena Vein in cases of Varicosed Veins of the Legs.

We condense from the Bulletin Gén. de Thérap. the following particulars in relation to this operation, which was performed a few years ago by M. Herapath, of Bristol, but a full report of which was not made. M. Malgaigne has recently performed the same operation, and reports the case as follows:

J. D., aged 26, was admitted into the hospital in July, 1850. The internal saphena vein of the left side was varicose, and a varicocele also existed upon the same side. Both these affections commenced at the age of seventeen, and had increased to such an extent as to prevent the patient from pursuing his occupation. The internal saphena was varicose from the internal malleolus to the point at which this vein passes through the aponeurotic orifice into the femoral vein. There were several tumors along the course of the vein, formed by its tortuosities.

The varicocele was quite large, the testicle a little atrophied, and in the engorged epididymis was a tumor the size of a small nut. The operation was performed on the 21st of July. The patient being placed upon his back, the leg flexed and turned a little outwards, an incision was made over the saphena orifice and parallel with the course of the vein. The parts were carefully dissected until the fibrous band of the orifice could be distinctly felt. A grooved director was passed beneath the fibrous band of the ring, and an incision made upwards through the band. Considerable inflammation and a rupture of the vein ensued. The wound, however, was cicatrized the twentieth day. The patient left the hospital seven weeks after the operation, very much relieved, though not entirely cured. The tumors along the course of the vein had very much diminished and the varicocele entirely disappeared.

Orchitis treated by Laudanum externally.

The Journal des Connaissances relates the following cases of Orchitis, relieved by the application of laudanum:

Case I. M. V., 22 years of age, of good constitution and sanguine temperament, during the course of an acute urethritis was attacked with orchitis of the left side. Compresses, moistened with laudanum, were constantly applied to the part. In two days the pains had entirely disappeared, and upon the seventh the testicle had resumed its normal volume.
Case II. J. M. B., a coachman, 43 years old, of a nervous, sanguine temperament, received a kick upon the right testicle, from which resulted a traumatic orchitis. Compresses, moistened with laudanum, were applied: the pains ceased the next day, and the swelling in six.

Case III. M. Mar, aged 27 years, of a feeble and lymphatic constitution and bilious temperament, had a double orchitis developed in consequence of an injury. The testicles were very large and very painful. The pains ceased in fourteen hours under the application of laudanum, and upon the fifth day the patient was entirely relieved.

Case IV. M. S., aged 20 years, of very nervous temperament, was affected with a blenorrhagic urethritis. The same treatment was adopted. The pains disappeared upon the third day, and a radical cure was accomplished upon the seventh.

Case V. M. F., aged 51; good constitution, nervous temperament, had orchitis of the right side in consequence of an injury. Same treatment: cessation of the pains in two hours, and a radical cure in four days.

Miscellany.

Notices of New Books.—We are indebted to those enterprising publishers, Messrs. Lindsay & Blakiston, (through Jos. A. Carrie & Co., of this city,) for the following works:


This little book is written in an agreeable style, and well calculated to produce confidence in the use of anaesthetics, especially of sulphuric Ether, which the author seems to prefer to all others.


We are here presented in a convenient form the principal instruments used for extracting teeth, an estimate of their relative value, and directions for using them judiciously.


This is always a welcome visitor, bringing in a compact form the doings medical of the last six months. The present number is not as complete as its predecessors, owing to the Editor's domestic afflictions.
We doubt not, however, that the work will sustain its well established reputation.

**Importance of Latin and Greek to the Physician.**—While it would be preposterous to deny the great importance of a classical and refined education to physicians as well as to the other learned professions, and indeed to all men, we must acknowledge our belief that, under existing circumstances, it is impossible to carry out the recommendation of the American Medical Association in relation to the dead languages. The editor of the Transylvania Journal indulges in the following sarcasm on the subject:

"It has always appeared to us as a laughable absurdity for the Association to be so gravely emphatic on the subject of 'the classics,' while not a tithe of them can master a chapter of Viri Romæ, or stumble through a forced version of the first paragraph in the 'pons asinorum.' That the amount of Latin and Greek which is usually cudgelled into a boy's brains, through some mysterious route beginning at the posteriors, may be of no vital disadvantage to him when he has tossed his Virgil to the jakes, shaken his fist under the pedagogue's nose, and turned medical student, we cheerfully admit, with a proud reference to the small stock of Latin maxims which we have preserved from the ruins of a 'classical education,' and which we refresh whenever our pedantic vein approaches, by reference to a dictionary of quotations.

"We commenced the study of the profession with a full faith in the extent and profundity of our classical acquirements, and, possibly, might have passed muster before a committee of the National Association; but we found to our consternation that Tityrus and Melibæus were asses in the matter of pukes and purges, and, alas! not a word of squirts and clysters, or of medical reform, was to be found from one end of Tooke's Pantheon to the other, and the naked gods and goddesses were utterly worthless even for the purposes of the dissecting room.

"We shall insist, whenever the Greek and Latin clause is brought before the Association again, upon the members being put through their moods and tenses, and a parsing 'spell.

"Gentlemen may therefore anticipate an opportunity of displaying the tattered remnants of schoolboy erudition; and we would advise every one to stuff the old, and much sworn-at grammar in his portmanteau, and to go through a course of sprouts with some strong armed disciplinarian, in order to revive those early and fresh 'classical memories which are so closely allied to the penitential visitations of the much abused seat of honor.'"

**Diet Drink.**—In the spirit of our motto, we do not hesitate to "adopt what is good wherever we may find it." We therefore present our readers the subjoined recipe, which has been extensively used by the
unprofessional in this city, and in many instances with the most signal advantage. It is said to have been first introduced by some of the emigrants from the French West Indies many years ago. The profession will recognize in it the principal features of the Lisbon Diet Drink and others of the class. We will not stop to canvass the heterogeneousness of the compound nor the apparent incompatibility of the ingredients. It is especially recommended in scrofulous and syphilitic affections of a chronic character, and also in chronic rheumatism and old ulcers; the calomel being omitted in cases attended with no syphilitic taint. It is certainly far preferable to the various nostrums sold at exorbitant prices as "syrup of sarsaparilla," and which for the most part contain not a grain of sarsaparilla.

Sarsaparilla, cut up and bruised} of each 12 oz.
Sassafras root, cut up, Guaiacum shavings,
Mezereon, 1 oz.

Pour four gallons of boiling water upon the above ingredients, cover the vessel, let it stand 24 hours, and then add

Carbonate of Potash, 6 drachms
Pulvd. Crude Antimony, \{ of each 1 drachm.
Alum, \frac{1}{2} oz.

The two last articles to be tied up separately in a bit of old linen—then boil until reduced to one gallon. About 15 minutes before taking off the fire, add

Coriander seed, 6 drachms,
Senna, \frac{1}{2} oz.
Calomel, (tied up in linen,) 1 drachm.

When the tea is perfectly cold, strain through a cloth, bottle, and keep in a cool place. Of this the patient should take \frac{1}{2} pint an hour before each meal. It may be sweetened if desired with sugar-house syrup. The patient should take it at least 6 weeks—and the tea be made fresh whenever the supply is exhausted.

During this treatment the patient should avoid salted provisions of all kinds, spices, and all irritating articles of food or drink; and should also avoid exposure to cold or wet weather. The best diet is plain bread and fresh meats of any kind, save pork.

Physicians in Erie County.—It seems that in Erie County, (Pa.) there are 79 practitioners of medicine. "Of that number, twenty are members of the county medical society. Six are graduates of respectable schools, who are not members. Ten who are neither graduates nor licentiates are considered respectable practitioners, as they
practise the profession to the best of their ability, in accordance with
the principles of the orthodox system, without resorting to any of the
devices of quackery to obtain business. Thirteen who profess to be-
long to the regular system are, both by their education and practice,
the veriest quacks in the country. Four who practise Homœopathy,
Allopathy, or anything else by which they can obtain a share of the
'loaves and fishes.' Two 'Simon pure' Homœopathists. Four
Uroscopists. Three females, who are without any education, but
who pretend to practise the various departments of the profession.
Five 'eclectic or reformed practitioners.' Ten 'Botanic, Thomsonian,
or Herb Doctors.'" Vive la Bagatelle!

The Ravages of Consumption and other leading Diseases in Boston
for five years.—Mr. Simonds, the City Registrar, states that for five
years ending 1850, 250 persons have been accidentally killed in
Boston, 116 have died of apoplexy, 1,484 of disease of bowels, 261
of disease of bladder, 156 of congestion of brain, 2,838 of consump-
tion, 461 of convulsions, 449 of croup, 101 of cancer, 612 of cholera,
286 of cholera infantum, 148 of canker, 267 of childbed diseases, 310
of diarrhoea, 965 of dysentery, 325 of dropsy, 675 of dropsy on the
brain, 137 drowned, 49 delirium tremens, 166 erysipelas, 728 scarlet
fever, 738 lung fever, 1,237 typhus fever, 108 brain fever, 224 hooping
cough, 296 disease of heart, 103 intemperance, 1,302 infantile
diseases, 113 liver diseases, 434 inflammation lungs, 395 of marasmus,
465 measles, 389 old age, 116 pleurisy, 146 palsy, 17 rheumatism,
43 disease of spine, 57 scrofula, 59 suicide, 349 small-pox,
463 teething, 74 tumor, 28 ulcers, and 36 worms.

Mortality of Boston in 1850.—From the Report of the City Regis-
trar for 1850, it appears that the total number of deaths for that year
was 3667, being about 1 in 38 inhabitants. 586 died of consump-
tion alone.

Mortality of Lowell in 1850.—The number of deaths in this city
during the last year was 492.

Davey on the Ganglionic Nerves.—Having presented our readers
the views of Marshall Hall on the cerebro-spinal system, we are hap-
py to have it in our power to offer them those of Mr. Davey in relation
to the Ganglionic Nerves. They constitute a sort of complement to
the studies of Hall, and will doubtless be read with much interest.
Mr. D. is evidently a profound thinker, reasons well, and conveys his
ideas lucidly. The study of the nervous system is so important and
so attractive that we hope to be pardoned for giving to it so many of
our pages.
American Medical Association.—We are requested by the Editors of the Charleston Medical Journal to state that the American Medical Association will convene at Charleston on the first Tuesday of May next, instead of the second Tuesday, as was erroneously announced in their advertisement.

Medical Society of the State of Georgia.—The annual meeting of this Society will be held at Atlanta, on the second Wednesday of this month (April). Dr. Arnold, of Savannah, was appointed to deliver the Address—and Dr. Le Conte, of Macon, the alternate. The well merited reputation of these gentlemen will secure a literary as well as a professional treat to those who may attend. The facility with which Atlanta may be reached from a great portion of the State will enable a very large number to assemble.

Medical College of Georgia.—The course of Lectures in this Institution was closed on the last day of February, after a session of four months, during which there occurred not the slightest incident to mar the good feeling which prevailed between the Faculty and Students, nor to lessen the high esteem in which the class has ever been held by the community. There were in attendance 159 gentlemen, of whom 127 were from Georgia, 13 from Alabama, 12 from South Carolina, 2 from Mississippi, 1 from Ohio, 1 from Tennessee, 1 from North Carolina, 1 from Kentucky, and 1 from Arkansas.

Fifty members of the class, having complied with all the requisitions of the College, were graduated on the 4th day of March. The Doctorate having been conferred by Ex-Governor Schley, a very appropriate, chaste and creditable address was delivered by Dr. C. T. Quintard, of Cobb county, and a valedictory full of warm-hearted and touching sentiments by Dr. R. E. J. Thompson of Burke county. The following is a list of the Graduates.

<table>
<thead>
<tr>
<th>Name</th>
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<td>J. P. McCord</td>
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<td>James T. Reid</td>
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