MEDICAL AND SURGICAL JOURNAL.

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NATIONAL MEDICAL ASSOCIATION.

VOL. IV.—1848.—NEW SERIES.

Augusta, Ga.

JAMES McCafferty,
PRINTER AND PUBLISHER.

1848.
PART I.—ORIGINAL COMMUNICATIONS.

ARTICLE XI.

Electro-Physiology. Thoughts upon the adaptation of the Animal Organism to the generation and maintainance of Electro-vital Currents, &c. By A. Means, M. D., Professor of Chemistry and Pharmacy in the Medical College of Georgia, and of the Physical Sciences, Emory College, Ga.

The theme which has elicited the present dissertation, together with the tenor of argument adopted in its discussion, has already, under another form, met the public eye. But the subject having been regarded of sufficient interest to the profession to entitle the views there advocated to a place in the pages of the Journal, I have consented to furnish them for publication, together with such additional reflections as the very limited time at my control will allow me to supply. It is due perhaps to myself, as well as to the scientific and practical character of the organ through which this communication is now presented, to entreat for it an attentive and unprejudiced perusal, and to express the hope that whether the views which it inculcates be adopted or rejected, they will not, after such examination, be regarded as the mere visionary speculations of a prurient and ambitious philosophy, which constructs its airy fabrics without the supports, and beyond the region of facts, but as the patient deductions of sober reason, purporting, at least, to be drawn from ample experiments, and from the known operation of recognized and established physical laws, some of them, it is true, at first sight, novel and startling in their character, but nevertheless, demanding the confidence of the honest and intelligent enquirer after truth.
Our undisguised conviction of the growing and invaluable importance of Electro-physiology to the medical philosopher as well as the practicing physician, must be our apology for so earnestly inviting professional attention to the subject.

Since the body of the arguments here presented were drawn up in their present form, it is proper to remark that the elaborate and scientific researches of Professor Matteucci, of the Pisa University, embodied in his "Lectures on the Physical Phenomena of Living Beings," has reached me, and to which I will occasionally take the liberty to refer. And although the views of this profound physiologist may not, in all their details, harmonize precisely with some which are respectfully maintained in the present article, it is unaffectedly gratifying to find the great fundamental doctrine here defended, unequivocally announced, as the only reasonable conclusion to be drawn from his laborious and critical experiments upon animal nature,—I allude to the generation of electric currents in the human body as the functional result of certain portions of its organism. His language is—"It would be absurd to suppose that the chemical actions of living beings, all of which develope heat and often light, would not be accompanied by the production of electricity." From his experiments he says, "the existence of an electrical current in the muscles has been well demonstrated, and its principal laws are established." An opinion to which we ourselves have been recently committed before an intelligent class, he fully sustains—viz., that "Galvani's assumption" (advocating the existence of animal electricity, and generally supposed to have been disproved by the after experiments of Volta, &c.) "was not erroneous, since a great number of facts discovered by him are certainly due to the electricity developed in, and proper to animals."

While it might under other circumstances constitute a subject of interesting enquiry to trace the triumphant progress of the science of Chemistry through the last half century, and individualize its immense contributions to our profession and to the world at large, the object had in view in this essay will limit us to the examination of a peculiar class of facts (to which allusion has already been made in the foregoing remarks), disclosing new and important principles which deservedly command the increased attention of the philosophic world at the present
moment, and destined, as we believe, to effect signal revolutions in the psychological, as well as physiological views which have heretofore obtained among the ranks of the learned.

To the investigations of Chemical Philosophy have been assigned, the laws and properties of that invisible, potential and universal agent, whose mysterious modus existendi has hitherto baffled the penetration of the astutest intellect, but whose illimitable power and ubiquitarily presence are so strongly vindicated in the roll of the thunder, the whirl of the water-spout, and the coruscations of the Aurora, or in the less startling, but no less interesting modifications of its action, detected in the violent and spasmodic throes of the human muscle—the intensity and brilliance of the charcoal lights, and the vivid and instantaneous combustion of the metals in the line of a Galvanic circle, or in its still more recently recognized forms of Terrestrial Magnetism, Magneto-electricity, and Electro-physiology.

To the views, then, which have forced themselves upon our attention in examining this strange and subtle, but effective and pervading agent, in its connexions with the animal economy and the laws of life, we beg leave mainly to confine the investigations which may follow.—Nor in canvassing the topic before us, will our limits allow, (did the reliable data at our control justify it,) that detailed survey and elaborate argumentation which a persistent and incorrigible scepticism may demand, and which the ever accumulating resources of science shall, at no distant day, triumphantly furnish. The recent ascertainment and novelty of many of the facts to be submitted, must, in the present state of our knowledge, necessarily leave any theory projected for their solution, embarrassed with unexplained difficulties which time and research can alone dissipate. It is the province of sound philosophy ever to make a clear distinction between facts and the reasons of them. One fact properly authenticated may not be rejected or challenged on the claims of a thousand adverse theories, though the rationale of its origin may remain unexplained for centuries. The very spirit of the Baconian philosophy supposes the previous evidence and patient classification of facts, from which physical laws are to be deduced, and rational theories constructed. And when in the progress of discovery the accumulation of authenticated testimony re-
quires the abandonment of a supposed law, or the renunciation of a favorite theory,—candor, conscience, and science, demand at our hands its prompt surrender. But when the field of observation is large, interesting, and comparatively unexplored,—with only a few well defined and settled points within the range of intellectual vision, and these, in their relationships and bearings open to enlightened conjecture, theory, cautiously adopted, is not only admissible, but by systematizing our views, stimulating enquiry, and directing experiments, is powerfully instrumental in evoking truth and enlarging the boundaries of knowledge. Such, precisely, are the conditions which surround us when attempting to prosecute our enquiry into the subtle and recondite causes of vital phenomena by the aid of the guiding lights which Electricity and the cognate Sciences hold up to our view. In former ages this whole interesting region lay profoundly submerged in the deeps of popular and professional ignorance. All was one wide waste of waters where the Ark of speculation floated on in its devious and doubtful course. But time has made its steady progress:—the deluge has begun to assuage, and the pioneer dove, which had once and again been despatched by philosophic Enquiry, only to return on drooping wing from her cheerless flights, has at length appeared with the olive leaf in her beak. Summit after summit now peers above the flood, until a hundred lofty peaks are glowing in the sunshine of science and the Ark is seen settling on the Ararat of Truth. And although the physiologist of the present age cannot yet define all the connexions which subsist between these bright elevations, that lie like sun-lit islands upon the retiring seas, yet the waters will have soon found their lowest level, and their beautiful natural relationships will be distinctly traced to the great *fundamental range* of *physical laws*, which sustain and characterize the whole animal organism.

But more directly to the execution of my purpose. So uniform and harmonious is Nature in the maintainance and execution of her laws, that by the aid of observation and analogy, we may generally determine with tolerable precision the habitudes, functions, or phenomena of bodies, from their position, conformation or structural arrangement. With such inimitable exactitude are these laws observed that a *single* fossil bone,
exhumed from its isolated bed, by the unerring physical characters which it bore, enabled the learned and sagacious Cuvier to read its natural history—mentally to reconstruct the whole skeleton, and to classify the original animal with the genus and species to which it belonged. Indeed but for these invaluable indications, our researches in Comparative Anatomy, Physiology, Pathology, Hygiene, Mineralogy, Geology, and the kindred sciences, must be seriously impeded if not finally arrested. In view of this pervading and operative rule in physics, then, we propose briefly to examine whether the conformation, organic structure, and physico-chemical phenomena of the human body, seem to indicate an adaptation, or conformity to the known laws of the electric fluid, in its variously modified forms of action. Allow me, however, in advance, to remark, that, at the present day, to doubt the physical agency of light, heat, electricity and molecular attraction, in controlling the elements and determining the functions of organized living bodies is to overlook the palpable analogies of Nature, and defy the latest and clearest conclusions of experimental philosophy. What candid observer can fail to recognize in the vegetable and animal economy, the presence and activity of the same laws which govern the inorganic kingdoms, only modified and made subordinate for the time being, to the supremacy of the vital principle? Light, acting upon the leaves of vegetables, effects the decomposition of carbonic acid gas and the exhalation of oxygen, after the same manner that in the presence of chlorine, in inorganic bodies, it liberates the same gas by the decomposition of water. Light is refracted too by the lenticular structure of the human eye, just as by a glass lens of similar curvature. Caloric is radiated and absorbed by plants and animals as well as by inorganic bodies. Electricity finds a ready transmission along the living vegetable and animal tissues, as though they were lines of iron or copper wire, and decomposes the circulating salts of the blood, just as it effects analogous changes in saline solutions beyond the dominion of life; while the laws of chemical affinity are continually active in maintaining or destroying particular aggregations of molecules, often different, it is true, from the inorganic arrangements of the same elements, but dependent solely upon their previous existence and properties for all their
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new phenomena; for, in the appropriate language of Liebig, "all the organs together cannot generate a single element, carbon, nitrogen or a metallic oxide." Surely then we are authorized to commence the survey we have intended.

1st, then:—Electricity may be generated by the friction of solids, or of solids and fluids.

This well-known law is exemplified among solids, by rubbing together two electrics—as, silk and glass—cat's fur and sealing-wax, &c. May not the warmth produced by brisk friction of the hands together, depend upon the calorific energy of the electricity thus evolved from the non-conducting cuticle—and its immediate absorption and diffusion through the humid subcutaneous tissues? In advocacy of this view, it may be stated that if the epidermic surface be moist, and therefore unfavorable to electric accumulation, heat cannot be generated, or feebly, at best; just as the bits of wood used amongst some of the least civilized nations for kindling their fires, must exhibit dry surfaces before ignition is effected.

But, again, let a portion of Mercury be included in a thin glass tube, a foot long, and well secured by a cork—then shaken briskly from end to end—the cork removed, and the tube presented to an electrometer, and it will give signs of strong electrical excitement. Now does not the whole sanguiferous circulation, by a kindred process, contribute to the supply of the norman amount of electricity which the animal body requires, in the constant friction of its fluid mass against the sides of the tortuous cartilaginous tubes through which it passes, hurried on by the powerful vis a tergo of the great central muscle—resisting in its pulmonary and systemic career the superincumbent atmospheric pressure of more than thirty-two thousand pounds upon a body of ordinary dimensions, while the compressions and concussions which are the necessary results of muscular contractions and expansions, contribute their quota to the general stock? The important discovery recently made in frictional electricity, comes in opportunely to sustain the views here entertained, viz., that globules of water, and of several other fluids, hurried on with great velocity through tubes by the impulsive force of steam or compressed air, evolves electricity freely. Indeed, the most powerful arrangement hitherto known for the
production of \textit{quantity} is a hydro-electric machine, constructed upon the principle above named, by Mr. Armstrong, and exhibited two or three years since at the Polytechnic Institution, in Regent-street, London. Such was its power that even paper and wood shavings were inflamed in the course of the spark.

2ndly. \textit{Electricity is evolved by changes in the condition of bodies from solids to fluids, and from fluids to gases, or the converse, as proved by Harris, Turner, Lavoiser, and La Place and others, and also by chemical combinations and decompositions, as amply illustrated in the experiments of Pouillet on Carb. Acid—Wollaston upon the oxidation of electrical amalgam, &c.}

The elements of bodies are known to exercise certain electrical relationships to each other:—those which are most highly \textit{positive}, as Carbon, Hydrogen, Potassium, Sodium, &c., exhibiting the most vigorous affinity for those on the \textit{negative} extreme, as Oxygen, Sulphur, Nitrogen, Chlorine, &c. Now these are the \textit{very elements} which are found to be in most active play in the animal economy, and in the exercise of their affinities might be expected to evolve electrical currents proportionate to the intensity of their chemical action, and we only regret that our limited time will not allow us to trace the various chemical reactions incessantly going on among these elementary bodies in the animal organization. It is due, however, to a clear conception of our views that specific reference should be made to \textit{some} of the widely prevalent and well known operations which are constantly going on in the inorganic as well as the organic kingdoms around us.

The results of this law, then, are seen exemplified on the most magnificent and grand scale in those meteorological changes which mark the varied year. The evaporation going on over the whole \textit{liquid} surface of our globe, by which water assumes an aeriform condition, and again the condensation of vapor, thus formed, in the higher regions of the atmosphere into fluids, and solids, as rain and snow, or hail, all serve to liberate immense volumes of the electric fluid. For a similar reason, the sudden and violent changes of chemical condition produced by the molten mineral masses and hot elastic vapors, disgorged from volcanic craters when coming in contact with the cool and open air, generate abundantly those vivid lightnings which have for ages
past blazed around the summits of Etna and Vesuvius during their great eruptions. Now, recent investigations in organic chemistry have disclosed the fact, that large quantities of this fluid are evolved during the most silent and gentle of the vital changes, as in the germination of seeds, and during the respiration of plants through the expanded surface of their leaves and petals. Pouillet has shown "that the surplus electricity arising from a verdant area of 100 yards square, is sufficient to charge a powerful battery." Water is undergoing perpetual decomposition in the process of vegetable nutrition, and Faraday, after patient experiment upon the subject, has announced the opinion that the quantity expended in separating the elements of one single grain of that fluid, would have produced a strong flash of lightning!—Thus, under the higher laws of animal life and within the pale of the human constitution, similar changes are incessantly going on, attended by similar evolutions of the electric fluid. Oxygen, entering the circulation by pulmonary endosmosis, unites with the Iron of the red blood-globules, and is borne onward as the Hydrated peroxide of the metal in solution, until by a vital process it assists in effecting the transformation of the various tissues—absorbs a portion of their carbon—then becomes Carbonate of the protoxide, and after reaching in its career a surface containing Oxygen and Hydrogen, undergoes another decomposition by which Carbonic Acid is eliminated and Hydrated peroxide of Iron again formed to recommence the accustomed circuit. The changes of the ingesta which occur in the animal stomach, and the auxiliary organs of digestion and assimilation, furnish additional sources of electro-accumulation.

According to the recently expressed views of the Professor of Pisa, the muscular currents, whose existence has been demonstrated, depend for their origin upon "the electric conditions which are produced by the chemical actions of the nutrition of the muscle"—the muscular fibre being regarded as the morphological element whose transformation, effected by the contact of the oxygenized blood, evolves molecular currents, which arising from a multitude of similar points united by a good conductor, and communicating with other points which have not undergone similar metamorphosis, may originate general currents.—
In this view, the "blood charged with oxygen and the muscular fibre" become the elements of a pile, i.e. "the liquid and zinc.

But in the complicated organism of the human body, it is neither philosophical, nor necessary to the maintainance of the views which we urge, to limit the generation of electrical currents to one class of causes alone, and we are therefore warranted to admit their formation from any structural arrangement or vital action in the system, competent to produce them. This leads us to notice another law of our fluid.

2ndly. It is known to be generated directly under the dominion of the vital principle, and by the exclusive agency of the living tissues, as in the Torpedo and Gymnotus electricus of Surinam, and to manifest all the striking results found from its action in the inorganic kingdom, as shocks, sparks, evolution of heat, chemical decomposition, deflection of a galvanometer and magnetism.

The electro-physiological phenomena exhibited by these animals, have utterly exploded the opinion that the presence of metals was indispensable to the production of voltaic electricity. Indeed additional evidence of the fallacy of this dogma has been found in the electrical results which have followed from the lamellar arrangement of charcoal and plumbago; while by combinations of moist masses of animal and vegetable structure, as muscle and brain, beet root and wood, &c., the interesting truth has been established that, under given conditions, the organic kingdoms possess independent electro-motive power.

Some valuable facts here call for our attention, derived from the recent critical and accurate experiments of Prof. Faraday, upon the Surinam eel, and from the Report upon the Voltaic power of the Torpedo, made to the Academy of Sciences at Paris a few years since. First:—that the membranous and columnar arrangement of their electric organs generate and retain large quantities of electricity, notwithstanding the diffused moisture of the whole interior and adjacent surfaces, and in defiance of the good conducting medium in which they move, which in the case of inorganic generators, would lead to the speedy dissipation of the current but here, as in the case of chemical affinities acting under the authoritative supremacy of the vital principle, we are furnished with another instance of
complete and essential subordination of ordinary laws to the modifying and controlling powers of life.

Second:—In the language of the Report, “that the electricity which produces the discharge, proceeds from the last lobe of the brain, and is transmitted by the nerves to the brain”—for in the experiments of the examining committee, the nerves, when tied, were found, promptly to check the flow of the current, indicating, as they say, “in the nerve a peculiar molecular disposition for the transmission of the fluid; an opinion which finds support in the fact, that the uninjured nervous trunks and filaments of every animal heretofore submitted to experiment, have furnished it an instantaneous passage throughout the line of communication, but when in any instance bisected or crushed, refusing to convey it beyond the breach or laceration.

But again, within the present year, Prof. Liebig, in prosecuting his “investigation of the constituents of the animal fluids which are found without the blood and lymphatic vessels,” has succeeded in demonstrating the existence of “free lactic and phosphoric acid in the whole organism wherever muscle is found”—and what is still more strangely true, but corroborative of the views here presented, “in the animal organism, acids and alkalies are found separated by a membrane, constituting myriads of little galvanic circles, which, as such, must produce chemical and electrical effects.” So that the long repudiated doctrine of the acidity and alkalinity of the animal fluids, taught with so much eclat 190 years ago, by the popular Professor of the Leyden University, De le Boé Sylvius, however in that age, misapprehended and misapplied, seems not to have been entirely chimerical.

Whether, however, this view be admitted or rejected, recent anatomical investigations, as reported by modern micrographers, have disclosed the interesting fact that the construction of muscular fibre is almost exactly analogous to the electrical organs of fishes—consisting of longitudinal striae, and transverse discs—the latter being “perfectly rectilinear and the included spaces perfectly rectangular,” and in the language of Matteucci, “it is very remarkable that with respect to the general circumstances of the two phenomena the same laws preside over the discharge of electrical fishes and muscular contraction.”
4thly. *Inorganic currents pass with immense velocity along an unbroken conductor,* and with greatest intensity when defended from lateral escape by the investment of a *non-conductor,* as silk or cotton thread, varnish, &c.

The nervous tissue constitutes, unquestionably, the grand o5og, or pathway along which this ethereal agent effects its instantaneous and invisible passage to the remotest organs of the system, and the neuri-lemma or unctuous theca which invests the tissue in its trunks and thousand ramifications, is as we regard it, but a *non-conductor,* which seems designed to prevent an undue lateral waste of the passing current, precisely as the varnished cotton or silk wrapping secures greater certainty of transmission along copper wires. And in striking resemblance to such galvanic wires, every nervous filament is only *covered* in its passage and left *open* at its *cerebral* and villous extremities. More remarkable still, each filament in every fasciculus or bundle of nerves issuing from the brain, has its own separate theca or membranous coat, as if to prevent confusion in the transmission of the neuro-voltaic currents, and secure, unexpended, their appropriate electro-force to the respective points of distribution. In further accordance with these views, it is an imposing fact, that *adipose matter,* a bad conductor,* in the language of Richerand, "covers and surrounds the extremities of the nerves, diminishing their susceptibility, which is always in an inverse proportion to corpulence,"

—a beautiful arrangement and admirably adapted to guard against too rapid an escape of this energizing fluid from the fine filiform extremities of these delicate conductors, and to reserve it for the functional demands of the various organs. "In fact," adds this eminent physiologist, "it is observed that persons subject to nervous affections constantly join an extreme *lean*ness to an excessive *sensibility,*

—accompanied too, as our experience authorizes us to add, with functional derangements, and general constitutional debility—the electric *waste* being thus made to exceed the electric *supplies* necessary for the maintenance of hygienic action. Indeed the law of insulation, or electro-retention, seems to be observed throughout the animal economy. The organs of secretion,

*And hence tallow is employed to retain amalgam upon the rubber of our electrical machines.*
over which the distinguished Marshall Hall predicted that electricity would exercise an extensive influence, and which has since been so ably and satisfactorily verified by Dr. Wilson Phillip and others, are generally found with non-conducting investments. The Liver is surrounded with the membranous and lubricated linings of the abdominal cavity in front, and the oleaginous surface of the viscera, and the hepato-gastric omentum in the rear. The Kidneys are literally immersed in adipose matter, while the Mammary glands are liberally supplied with a thick tunic of the same insulator. These may be regarded as but interesting specimens of that electric precaution which nature has manifested in regard to glandular structures generally. The same defensive measures have been adopted for the circulatory system.

As, in the calibre of the sanguiferous tubes, chemical changes and consequent electric evolutions are perpetually going on to supply animal heat, and for other vital purposes, it would seem extremely appropriate that lateral radiation should be prevented by sufficient non-conductors. Now in accordance with this anticipation, the great central organ, the Heart, always containing blood in a highly positive condition—ever fresh from the re-oxidizing region of the lungs, is encompassed by fatty and membranous textures, while, in the language of the author already quoted, "adeps is found in great abundance in the direction of the blood-vessels." Yet with all this delicate conformity to electric law, there must occur, in its passage a diffusive expenditure of the fluid, which it would seem should be compensated by timely accessions from some adequate source.

In the construction of our Telegraphic lines, it is well known to electricians, that the length of the wire determines the strength of the battery. As the first is extended, the second must be increased to allow for lateral waste or defective conduction, and if the route be continued beyond a convenient distance, re-lay batteries must be interposed at intervening points to re-inforce the waning current.

Now, may not the mysterious ganglionic system,—that puzzle of all former physiology, be intended as a series of re-lay batteries, stationed along the nervous routes, to re-supply the partial exhaustion, and maintain the normal momentum of the electric
forces? And to give plausibility to this suggestion, it must be remembered that these multiplied nervous centres generally occur in the neighborhood of the large secreting organs, and where electro-vital accumulation seems to be most demanded.

It is interestingly true, and to some extent an entirely analogous arrangement, that in the electric organs of the Torpedo, which consist of from four to five hundred parallel prisms, each separated by transverse diaphragms with intervening cells, each containing water, albumen, and chloride of sodium, the nervous distribution is abundant and peculiar, "forming a great number of closed circles, each of which has one (nerve,) in the cerebral lobe, and another in the wall of the cell of the organ."

Indeed, dissections of the Torpedo and Gymnitas show that the ganglia and nerves of their electrical apparatus exceed in extent all the rest of the nervous system put together. "The analogies," says Matteucci, "between muscular contractions and the discharge of the Torpedo are complete; every thing which destroys, augments or modifies the one, equally effects the other." The shock which it communicates is decidedly a voluntary act, and so completely under the control of the will, that it can at pleasure discharge either the whole or a part of its organ.

In this class of animals we have, beyond question, the nervous power converted into electric force; and why may not the converse be true, viz., that electric force may be transformed into nervous power? The reciprocal generation of distinctive phenomena, both in the in-organic and organic kingdoms, all clearly traceable to a community of agency, and indicating throughout the presence and control of electric currents, modified only by the organization, the condition, or the circumstances of the bodies through which their manifestations are made, may be regarded as settled results in science. To illustrate:—in the inorganic universe, electricity produces chemical action, and chemical action, in return, evolves electricity. Galvanism (only another form of the fluid) generates magnetism, and, conversely, magnetism originates powerful galvanic currents. Again, galvanism produces caloric, and caloric reciprocally sets in motion strong thermo-electric currents, capable even in the laboratory of producing results identical with those of gal-
vanism, as shocks, sparks and magnetism. But this correlation of physical forces, or convertibility of power, is to be found in the vegetable kingdom also. Plants are now known, through the activity of their vital forces, to throw off immense quantities of electricity, during the progress of healthy growth, while electrical action, in return, has exhibited effects almost magical in rapidly developing all the phenomena of vegetable life. Now let us ascend to the more complicated structure of the animal kingdom, and when it is incontestibly established that in the case of electric Fishes nervous power is converted into electric force, why should it be regarded either unphilosophical or improbable—nay, are we not constrained to expect, that electro-dynamic manifestations should be the result of nervous power:—or, in other words, that under the laws of animal life they are convertible forces.

While the Tuscan professor does not consider the vis nervosa to be identical with the electric current, he is commendably guarded in detailing the result of his experiments. When attempting to deflect a galvanometer by exciting irritation in the nerve of a living animal, he says, "I must confess that whenever the experiment was well made, I never obtained evident and constant traces of the electric current." Again, in endeavoring to effect the same thing by the aid of a helix, he adds, "I never observed constant signs of the induced current in the spiral." Upon the subject of neuro-electric currents, therefore, we must still regard the affirmative results of the experiments of Dr. Prevost, of Geneva, in 1838, sustained subsequently by those of Prof. Zantideschi and Dr. Favio, and hereafter referred to in this article, as uninvalidated. But it has been objected that when a nerve is ligated, the parts beyond the ligature upon which it is distributed, cease to feel or act under the determination of the will, while an electric current, sent along the same nerve, passes to its extremity and exhibits its characteristic effects upon the contractility of the muscular fibre, and that therefore electricity is not identical with the neuro-vital power. Now it does seem to us that a fair and ingenuous admission of existing laws, and all the facts involved, would very much weaken, if not entirely remove the force of this objection, however honestly suggested or honor-
ably maintained. First, then, let it never be forgotten that those physical laws which ordinarily regulate and govern the elements of inorganic matter, are at once modified, suspended or abrogated when those elements are transferred to the dominion of life and made subordinate to its higher control, and the very same agent which, beyond the powers of life, was characterized by certain and unchanging indications, when marshalled within the circle of vitality, is seen under new aspects and often capable of higher results, while its identity remains undoubted. Mark the peculiar and complex combination of the simple substances, oxygen, hydrogen, carbon and nitrogen, in inorganic compounds,—the multiplicity of the atoms employed, and the diversity of their chemical aggroupments in constituting such forms of matter as sugar, starch, muscle, ten- ton, cartilage, &c., &c., and that just as soon as the vital principle has fled, and the unrestrained play of inorganic affinities commences, these compounds are suddenly resolved into their elements, which, again, instantly re-unite under new atomic arrangements in the formation of water, carbonic acid, ammoea, &c. Witness, also, the suspension of the ordinary laws of caloric in the uniformity of animal temperature, whether at the equator or the arctic circle:—under a heat of 352° Far. with the "oven girls of Germany," or in the bleak atmosphere of the mariner in the polar seas at 50° below O° Far.

Now we have only to suppose that vital currents are graduated in their momentum to suit precisely the exceedingly delicate tissue which they are designed to traverse, viz., the pulpy or fluid matter invested by the neuri-lemma, and that the normal electric impulse is too feeble to pass the obstruction and put in motion the molecules beyond, while an artificial current, will pass over a breach of continuity, even in wire, to make its circuit.* This fact seems to have modified the views of Prof. Matteucci himself, in his examination of induced currents, and after having ascertained that "very feeble electric discharges," whose presence could not be detected "either by the galvanometer or any other instrument," produced contractions in

* In connection with this explanation, however, it must be recollected, that by Prof. M's experiments on an insulated nerve, ligated, the current "was weakened and more feeble" in its manifestations below the cord.
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frogs, he tried such weak discharges from a Leyden jar upon a galvanoscopy frog, and admits that after "a great number of endeavours," he could discover no difference between the inductive effects of such currents and those produced by the normal muscular currents of the animal. Before closing our remarks upon this department of our subject, we cannot forbear calling attention to the very recent anatomical discovery, that the muscular fibres are directly continuous with the tendinous fibres in which they terminate, and that the sarcolemma, or superficial investment of the muscle, stops abruptly short at the junction of the muscle with the tendon. In this arrangement, therefore, we have "some reason to consider the tendon as having the same electrical state as the interior of the muscle, so that by establishing, by means of a good conductor, a circuit between the tendon and the sarcolemma which covers the muscle, we put in circulation a portion of the muscular current already proved to exist.

5thly. The phenomena of Electricity are only manifest when the electric equilibrium is disturbed and then restored, by instituting a current between the positive and negative surfaces.

Now the most recent and thorough investigations in neurology authorize us to believe in the circulation of electro-vital currents, along this sensitive line of conductors, giving strong indications of conformity to the above law of the inorganic fluid. To adopt the language of a distinguished member of the Royal Academy of Medicine in Paris, (Dr. Husson.) "the structure and functions of the nervous system have of late become the study of physiologists, and the opinions of Reil, D. Autenreith, and M. D. Humbolt as well as the recent works of M. Bogros, seem to place beyond a doubt not only the existence of a nervous circulation, but also the exterior expansion of this circulating fluid,—an expansion which takes place with such force and energy as to create a sphere of action that may be likened to that in which we observe the action of electricity." These views receive further support from the researches of Prof. Zantideschi and Dr. Favio, who assert the existence of two sets of neuro-electric currents—one superficial, and going towards the cerebro-spinal axis, the other more deeply seated and going from that axis to the surface. Now, should the super-
ficial or returning current not be traceable by any tests now at our control, we are fairly authorized to infer its existence from a recently discovered fact in telegraphic electricity—viz., that it is only necessary to make provision for the outgoing current along a single wire, and by allowing the extremities, each to come in contact with the ground, though fifty miles apart the returning current effects its invisible passage along the earth to its point of exit—faithfully completing its electric circuit, after having performed the task assigned it. But infallibly to establish the existence, not only of currents, but voltaic currents along the nervous cords, we must refer to a fact which finds its anologue in another law of the fluid in its inorganic manifestations.

6thly. A current passing under given circumstances, at an angle of about 90° from a soft iron bar, instantly converts it into a magnet.

The capability of our fluid to generate magnetism is too well known to require illustration here. Now the interesting experiments of Dr. Prevost of Geneva, as reported through M. De la Rive to the French Academy in '38, clearly settles the existence of such currents; for Dr. P. "succeeded in magnetizing very delicate soft iron needles, by placing them near to the nerves, and perpendicular to the direction which he supposed the electric current took. The magnetizing took place at the moment, when, on irritating the spinal marrow, a muscular contraction was effected in the animal."

7thly. Electricity enters and escapes from pointed conductors with great facility.

We see an obedience to this law interestingly exemplified in the animal phenomena of taste, absorption, &c. To the pen of that great physiologist, Sir Charles Bell, we are indebted for an accurate and graphic description of these delicate processes, given, it is true, without any apprehension of the conclusions to which his anatomical testimony might lead. He says, "the papillæ, which are the organs of taste, are to be seen on the point and edge of the tongue, and consist of a pretty large, vascular soft point, which projects from an opaque, and white sheath. If we touch one of these papillæ with the point of a brush" (dipped in vinegar) "and at the same time apply a mag-
nifying glass, it is seen to stand erect, and rise conspicuously from its sheath, and the acid taste is felt to pass backwards to the root of the tongue." The simple rationale of this process may be thus enunciated, viz: the acid, being a negative electricity, excites the positive electricity of the nervous villi, and attraction and erection are the natural consequences, as the applied finger produces the extension of cotton fibres upon a charged prime conductor. Our time forbids the further prosecution of these interesting examinations, and we must only remark, that Sir Charles Bell's detail of the apparatus and process of absorption, furnishes to our minds satisfactory proof of the electrical character and action of the Lacteals and Lymphatics. The "lanuginous surface" of the intestines, the "small filaments" which are seen by "a magnifying glass," projecting from the surface "like hairs," when stimulated by the negative contents of the bowels, and then "erected" in the act of absorption—all speak plainly the electric nature of this process.

8thly. Electricity expands fluids without chemical change, and increases the velocity of their motion through capillary tubes.

A fluid passing by drops from a capillary orifice, as soon as electrified by contact with a charged conductor, flows in a fine but rapid and continuous stream, until the communication is broken. May not this agency be the primum mobile of the circulation in the proper capillary tubes, forming the anastomosing net-work between the veins and arteries?—for it seems to us, from the minuteness of their calibre and the ordinary density of the blood, it is impossible satisfactorily to account upon any other received hypothesis, for the constant and speedy movement of that fluid in these remote quarters.

9thly. Curved or spherical surfaces retain accumulated electricity best.

This great law of our fluid is regarded in the cylindrical form and rounded extremities of every Prime Conductor, and the globular knob of every Leyden jar, and yet it is strange that no writer, with whom we have met, seems to have recognized a conformity to it, in the general contour of the human body. The undulating outline and beautiful rotundity of the human figure, have sprung the imaginations of enraptured poets, and
furnished a theme for adoring lovers:—rhetoricians have lectured upon the purity of taste, and philosophized upon the "curved line" as the "line of beauty;" but it seems never to have caught the observation of poets, lovers, or rhetoricians, that man was shaped for the material world in which he moved and in conformity with the great physical law which control the elements within and around him. Our tastes are given us by a benign Creator, to meet the circumstances of our being and administer to the pleasures of life. But had Heaven so constituted these tastes, the pleasing emotions which are now excited by the gentle curve of Beauty's cheek, and the graceful roundness of her sylph-like form, would have been characterized by equal intensity had that cheek stood out a triangle, and that form an obelisk.

Was not, then, the great design of our external conformation to give additional security against an excessive discharge of this vitalizing fluid? Surrounded, as we are, on every hand and at all times by an aëreal medium, often transformed by suspended moisture, into a rapid absorbent of electricity—a fluid so indispensable in its control over the animal functions, special guards seem to have been thrown around this exalted sphere of its action. Besides the nervous sheaths, the sanguiferous tubes, and the oleaginous accompaniments of both, the exposed outposts of the system are fenced in by a general subcutaneous expansion of adipose tissues—itself surmounted by a final and admirably insulating investment, in the squamous cuticle, which strictly conforms to electric laws in its curvilinear adaptation to the whole corporeal surface, and is supplied with an oily secretion, which, while, indispensable to healthy existence, is nevertheless constituted a negative electric to facilitate the accomplishment of the same grand end. Many warm-blooded animals whose position in the scale of being, requires that they should be almost constantly immersed in water, as the whale, seal, walrus, &c., are protected against undue electrical exhaustion and consequently from an abnormal reduction of temperature, even in the conducting medium through which they move, by immense masses of non-conducting unctuous matter which surround the whole body to a considerable depth under the cutis vera. It is an interesting and relevant
fact, which Chemistry has recently disclosed, that the horny texture of the epidermis, is not only in chemical composition nearly the same, but in non-conducting power precisely similar to hoofs, hair, horns, nails, claws, wool, &c., and is completely represented (where, according to our view, its insulating presence is demanded) in the corneous covering of the epidermis which lines the inner surfaces of the blood and lymph vessels—of the intestinal canal and the passages from most glands, as well as of the mucous membrane of the lungs. The extremities of animal bodies, therefore, and those parts approximating most to points, are, in accordance with the same design, guarded by insulators. Hence the beautiful adaptation of the hoofs and horns of quadrupeds—the talons and beaks of birds, &c., to effect the high purposes of Nature.

The very instincts of mankind seem to have led them, in many instances, to the adoption of habits conformable to the action of this law. Nor is this remark limited to civilized more than to savage life. Artificial heat, by drying the air and the cutaneous surface, conduces largely to electrical retention, as well in the rude hut of the Laplander, as the costly parlor of the American. So do the greasy skins, furs and feathers of the Indian tribes, and even the rancid and offensive fish oil with which the New-Hollander besmears his body, while the enlightened civilization of cis-and trans-atlantic states, effects the same object in the non-conducting textures of the cottons, linens, woolens and silks, with which they are clothed. The same instinctive conformity to the inflexible habitudes of our fluid, may be found in the sleeping arrangements of both savage and civilized life. For while the organic electricity of the Western Indian is preserved upon his buffalo and bear-skins, and that of the wild Polynesian upon his dry grass and mats, the Asiatic reposes electrically safe upon his muslins and silks and hair matresses, and the European and American upon their cotton stuffs, blankets and feather-beds. In accordance with these views, the health and longevity of our race must be materially affected by the moisture or dryness, and consequent electrical condition of the atmosphere. Hence on the lofty table-lands of Mexico, 8000 feet above the level of the sea, and amid whose pure, and dry, and transparent air, the moon is
seen as a sheet of silver, and the stars as burnished gold, embossing a vault of Lapis Lazuli—human life, according to the testimony of Humbolt and Murray, is frequently extended to the long period of “100 years, and is still green and vigorous,”—while according to the same testimony, down the slopes extending to the sea, “where humid winds and frequent fogs prevail,” and where corporeal electricity is therefore rapidly absorbed and lost, the air is almost fatal to human life. Here we are furnished too with a satisfactory explanation of the deleterious consequences resulting from exposure to damp sheets or garments, and especially in the case of invalids or enfeebled constitutions, where the electro-generative forces are weak and unable to compensate for the waste by absorption—hence functional derangements rapidly supervene.

Suffer us now, after having traced this parallelism of electrical action between inorganic and organic, inanimate and animate matter, briefly to refer to some facts within reach of most observers, illustrative of the control which the electric current exerts over the excitability of the nervous tissue and the functional phenomena dependent upon its action.

1st. It increases, under appropriate polar arrangements, the peristaltic motion of the entire intestinal canal.

2nd. A galvanic line of communication established by a conducting wire and terminal plates, between two slightly excoriated surfaces on the human body, soon presents, under the positive pole, active inflammation, excess of nutrition, and if kept within conservative bounds, a rapid restoration of the parts; while the negative surface indicates an enfeebled vitality, deficiency of nutrition, and an approach to gangrene and mortification.

3rd. The circulatory salts of the human body may be decomposed at the cutaneous surface, by a similar arrangement—the acid collecting at the positive pole, and the alkali at the negative—each being indicated by its peculiar characteristics.

4th. Neuralgic pains have often been relieved by the passage of a thunder storm—a phenomenon, for which a rational solution is only to be found in the fact, that the changed electrical condition of the atmosphere had effected a disturbance in the electrical equilibrium of the system—producing, perhaps, an
abnormal and irregular circulation of the neuro-electric currents, a state of things which was at once relieved, as soon as the atmospheric balance was restored by the discharged clouds.

5th. Cases of Hemiplegia and other paralytic affections have often found essential relief from the application of the electric fluid in some of its forms. Under the generating power of a large electro-magnet, and revolving armature, I have seen a case of paralysis of the muscles of the eye, cheek, lips, &c., entirely relieved, after a few applications of fifteen minutes each, which had resisted the ordinary treatment for several months previous.

6th. Irregular and spasmodic actions in the limbs or joints, dependent, as we suppose, upon the disturbed electro-vital currents which traverse the system, will frequently find a remedy in the use of a similar instrument. My esteemed colleague, in the chair of Surgery, has kindly furnished me with a case of spasmodic contraction of the flexor muscles of the knee-joint, which yielded to the first application of a moderate magnetoelectric current.

7th. The beautiful and careful experiments of Broussais show the control of the electric fluid over the processes of absorption and deposition. He speedily generated a milky cataract in the eye of a pig, by introducing into the crystalline lens a fine copper wire, connected with the negative pole of an active galvanic series, and two weeks afterwards, as speedily removed it by reversing the poles.

8th. Satisfactory experiments by Dr. Wilson Phillip, and since, I believe, "publicly tested in most of the medical schools of Europe," have shown that Respiration and Digestion can, for some time, be carried on after the bi-section of the Pneumogastric nerve which so largely controls these functions, by sending a positive electric current through the pulmonary and gastric segments.

From our acquaintance, then, with an agent so prompt and powerful in its control over the sensibilities and functions of the animal organism, may we not, hereafter, be able intelligibly to trace the methodus medendi of many remedies, and the rationale of certain pathological phenomena heretofore enveloped in perfect mystery? Does not acu-puncturation, formerly
employed more extensively than at present, in cases of cephalalgia and rheumatism, owe its curative efficacy to the conducting power of the inserted needles which convey silently off the excess of electricity collected in the part? Again, may not the etiology of malarious and contagious diseases, which has long lain in profound and unapproachable obscurity, be more satisfactorily explained by admitting the agency of electrical affinities than upon any other hypothesis? The human blood, in a normal and healthy condition of the system, is in a positive state, which is constantly maintained by the activity of the generating sources within—an excess generally passing off in silence from the cuticular surface, so that out of 356 experiments made by Mr. Hemmer of England, upon the “uncovered skin,” 322 indicated the presence of positive electricity. This surplusage of the fluids upon the surface, we believe to be indispensable to the healthful condition of the whole animal economy, and that when, from any cause, it is diminished or ceases, diseased action ensues. I have just received an interesting communication from Mr. D. Ruggles, a blind man, of Northampton, Massachusetts, who has for years been able to determine upon the character of diseases from the electrical manifestation furnished by the skin to his acute sense of touch. “These symptoms,” says Mr. R., in his letter to me, “vary in healthy persons and in invalids; in the former, I can feel a regular emission of what I believe to be electricity, from the pores of the skin in any part of the body, and especially near the wrists; in the latter, this symptom is feeble and often intermitent, and in some individuals, it is not perceptible.” He then gives in detail the peculiar electrical states, exhibited in several different diseases, as detected by sensation.

Now, by the testimony of the best authorities to which we can have access, it may be regarded as certain, that the pestilential exhalations which escape from animal putrefactions—vegetable decompositions, &c., &c., and, indeed, all the ascertained causes of epidemic and infectious diseases, are in an electro-negative condition, and when the human body is surrounded by a highly charged negative atmosphere, instead of the naturally positive state of dry and pure air, the result must be the rapid absorption and exhaustion of the positive corporeal
supplies, until the electro-vital resistance is overcome, and functional aberrations supervene. May we not in this way, largely account for the ennui and lassitude so commonly experienced in a damp atmosphere, where the conducting power of the medium too rapidly carries off the organic currents, and thus superinduces a general enervation:—the barometrical column in the mean time, indicating too little reduction in atmospheric pressure to have produced such striking effects upon the animal sensibilities.

Once more,—we believe that the true pathological distinction between the chronic and acute forms of Rheumatism, will be found to depend upon the electro-negative condition of the parts in the former, and their electro-positive states in the latter—the curative applications plainly appropriate in the one, being contra-indicated in the other. The high inflammatory action, arterial turgescence, florid surface, and great pain in acute articular Rheumatism, giving evidence of an excess of the positive fluid, which is but increased by stimulating applications, warm covering, &c., and attended by an aggravation of the prevailing symptoms, and which can only be successfully treated by withdrawing a portion of blood, (electro-positive) by venesection or otherwise—the application of negative-electrics, as vinegar, anodyne lotions, &c., and thin investments around the joint:—or in short, by such remedies as will discharge the excess of the positive fluid. Whereas in the chronic form, the absence of capillary engorgement, heat, redness, &c., and an abatement of pain from warm covering indicate a minus condition of the part, and require that the electric equilibrium should be restored by favoring the accumulation of the positive fluid, by warm poultices, flannel or silk bandages, or other non-conductors. In accordance with their views, therefore, in acute Rheumatism, or an electro-positive condition of the part, allow us respectfully to suggest the use of a flexible metallic bandage, or strips of tin-foil upon linen, studded thickly with metallic points, directed outward, which may be readily prepared by driving small tacks through the bandage, and applying their heads towards the cutaneous surface;—keeping the whole moist, in the mean while, by embrocations of tobacco and vinegar, or other negative electric.
Lastly:—The singular phenomena attendant upon etherization, or the use of the Trichloride of Formyle (chloriform), which belongs to the same class of volatile fluids, for which we have yet seen no plausible philosophical solution, may be fairly traced, we think, to the electrical affinities at play in the pulmonary organs and the sanguiferous channels, and directly affecting the whole nervous tissue. The views here inculcated, it must be remembered, recognize all sensation and motion, as dependent upon nervous energy, and the latter as only maintained by the presence of electric currents. Now we have tested by repeated experiments, that the vapor of Sulphuric Ether, is always negative in the presence of a positively excited body, and when freely inhaled, it passes readily by imbibition, through the mucous lining of the air cells, into the circulating mass of blood, whose normally positive condition is rapidly reduced, until the supply is inadequate to maintain the integrity of functional action in the sensiferous nerves, and consequent insensibility follows. If the inhalation is continued, the motor system of nerves next lose the necessary amount of electrical stimulus, and the whole muscular tissue is relaxed, and voluntary motion suspended; and if persevered in too long, the involuntary motion of the heart, arteries, &c., cease from the same cause, and death ensues. When, however, moderately administered, spontaneous restoration may be expected from a re-supply of the positive fluid, furnished by the still active electro-motive resources of the system.

Some experiments recently made by M. Ducros for the purpose of determining the efficacy of Electricity in recovering inferior animals from the effects of inhaled ether, and published in the August number of the London Lancet, greatly strengthen our opinions as to the rationale of Letheonization. M. Ducros states, "that the phenomena produced by the vapor of ether on chickens and pigeons last from seven to eight minutes; but if these birds, when thus under the influence of ether, are submitted to the action of electricity by placing them on the isolating stool, and allowing a current of positive electricity to pass into them, they recover from their insensibility in about thirty seconds. If they are placed on the electric conductor, they are aroused in ten seconds; and if they are placed at the extremities
of the conductors, and thus made to receive electric shocks, their vigour is instantly restored. When submitted to the action of the simple apparatus of Clarke, the electro-magnetic current is equally instantaneous in effecting their restoration. The influence of negative electricity, instead of abridging the insensibility, appears to prolong it."—Comptes Rendus and Medical Gazette.

**ARTICLE XII.**

*Notes of an Operation for Lithotomy, performed under peculiar circumstances.* By Henry Gaither, M. D., of Oxford, Ga.

Setting out at an early hour on the morning of the 3rd of April, 1847, Professor E., accompanied by Dr. Means and myself, of this place, and Dr. Hendrick of Covington, after a ride of sixteen miles reached the point of our destination. Mr. R., the patient, was found at the residence of his father, in company with a few friends, awaiting the arrival of the Surgeon. He is a young man of about 20 years of age, and had been afflicted with Stone in the Bladder from early childhood. He is of ordinary size, moderate embonpoint, and although of rather a sallow complexion, not un-prepossessing in his appearance. He had visited Augusta some weeks before to consult Dr. E., who, by the use of the sound, satisfied himself as to the nature of the disease; but the patient preferring to undergo the operation at home, returned thither, and underwent the usual preparatory treatment, until the day above mentioned, which had been expressly set apart for its performance. The impression made upon my mind, on seeing the patient that day for the first time, was not, I must confess, at all complimentary to my capacity for readily discerning character, either in countenance or conduct. For I thought I saw before me one naturally endowed with a goodly degree of fortitude, and on this occasion nerved to such a point of sturdy endurance that nothing could shake it, and his manly port, and dignified reserve, seemed to justify the opinion, but the result did not verify it.

After all things had been duly arranged for the operation,—the patient placed in an appropriate posture upon the bed,—the
sound introduced, &c., &c., the surgeon proceeded to his work.

The bilateral operation was performed, using a double lithotome, similar to that of Baron Dupuytren. Time, 45 minutes; stone small.

The following is its analysis, by Prof. Means:

"EMORY COLLEGE, OXFORD,"

May 21st, 1847.

Dear Doctor—The dimensions of the calculus taken from Mr. R. on the 3rd ult., and submitted to me for analysis, were as follows—viz., in its greatest circumference 2 inches, in its least 1 3-4, and its weight 47 grains. Its shape an irregular oblate spheroid, with exceedingly rough tuberculated surface, exhibiting under the microscope an investment throughout its entire extent, of extremely minute sparkling octahedral crystals of the oxalate of lime. When sawn through at right angles to its longest diameter it exposed a uniformly concentric structure, distinctly traceable, and conforming in the line of strata to a small cavity in the centre of the mass, studded with crystals similar to those upon its surface. The body of the stone wore the nutmeg hue, and under microscopic examination gave evidence of imperfect crystalization, characteristic of the mulberry calculus.

Yours truly,

To Dr. Gaither."

A. MEANS.

There were several peculiarities in this case worthy of a passing notice. 1st. The smallness of the stone, considering the length of time it had been forming. 2nd. The depth of the bas fond or lower fundus of the bladder,—thus shaped doubtless by the long residence of the calculus in this yielding sac, causing it to elude my explorations with the sound, but which availed not against the more accustomed hand of Dr. E. Nevertheless, after the incision was made, the stone was not so readily seized by the forceps as usual, perhaps, partly owing to its size, but chiefly to its location. 3rd. This case is further interesting from the operation having been performed contrary to the will of the patient, or rather after his fortitude had forsaken him; for it seems the touch of steel more than equalled his anticipations, as a stroke or two of the scalpel dissipated his courage, changed his purpose, and reconciled him to longer companionship with the old tormentor. But his friends thinking him incompetent,
in that unbalanced state of mind, to decide so important a matter, urged the surgeon to proceed, which he did: a number of the medical brotherhood, assisted by a layman and ligature at each leg, holding amain—the patient vociferating lustily, threatening and struggling violently . . . . . he partly succeeded in disengaging himself from his manifold encumbrances; but half coaxed, half coerced, he was soon again in bonds, when the writhings and exclamations commenced anew. . . . . But while we deeply sympathized with the interesting and afflicted young man, we could not but feel that the whole scene presented a rare combination of the ludicrous with the grave. The distinguished surgeon in the mean time calm and self-possessed amid the general commotion, proceeding secundum artem when he could, and maintaining a “masterly inactivity” when he should.

On the 14th of the month, (being the eleventh day after the operation,) the urine permanently resumed its natural channel without pressure on the perineum or any artificial aid. The patient has now fully recovered, not having had a bad symptom since he submitted to the knife. This leads to the 4th and last reflection,—that a skilful and expert operator may expect a favorable issue in such cases, although subjected to unnecessary and vexacious interruptions and delays from the violence and insubordination of a half delirious patient.

**ARTICLE XIII.**

**The Removal of a Foreign Body from the Duct of Wharton.**

By H. F. Campbell, M. D., Demonstrator of Anatomy in the Medical College of Georgia.

The novelty of the following case will be seen to warrant its publication.

Of Foreign Bodies in the Duct of Wharton, so far as we know, there is on record but one case, which is that presented by M. Robert to the Anatomical Society of Paris, and which indeed has been considered quite remarkable. It occurred in the person of a shoemaker, in which case the orifice had been found to admit a piece of hog’s bristle which subsequently became the nucleus of salivary calculus.
Case. Julia, a nurse, aged 14 years, while engaged at work, with a pin in her mouth, felt pain under the tongue, and endeavored to remove the pin, but on feeling for it could only find the point protruding at the side of the frænum linguae. Her efforts to extract it by the point caused it entirely to disappear; becoming alarmed, she called for assistance. On examination, there could not be seen the least trace of any foreign body whatever: she said that “the pin was under her tongue, and had gotten into the flesh head-foremost.” It gave her no pain, except when disturbed with the fingers; the orifice of the Whartonian duct was patulous and some saliva was flowing from it. On applying the finger to the floor of the mouth the pin could easily be felt near to the base of the lower jaw—though from the distance to which the head had proceeded towards the caecal extremities of this duct, it was impossible to protrude it by applying pressure from behind, and further, from the handling to which the parts had been subjected, the point had been pushed out of the direction by which it entered, and having pierced the side of the duct was resting on the alveolar process. It was very moveable, and receded on the slightest pressure.

Failing of its removal by manipulation, the following method was adopted:—Its exact situation being ascertained, the object together with the parts surrounding it was seized by the forefinger of the left hand in the mouth and the thumb in the digastric region, and pressed outward against the inner surface of the lower jaw under the alveolar projection: a tenaculum was then introduced from within outward through the mucous membrane, (avoiding the situation of the gustatory nerve which near this place crosses the duct,) so as to enclose the duct and hold the pin fixed; on elevating the tenaculum, the point of the pin became prominent about three lines posterior to the orifice of the duct. The mucous membrane and coats of the duct being cut through with a scalpel, the pin was removed with the dressing forceps by the point which protruded through the opening of the incision. A copious discharge of saliva followed its removal. The incision healed rapidly, and the patient recovered without any trouble. The pin was 11-4 inches in length, and of a proportionate thickness.
Ned, a very powerful young man, belonging to Mr. H. of Washington county, Ga., entered my Surgical Infirmary on the 21st of January, 1847. Three years before he had received the blow of a stick upon the top of his left shoulder which confined him for six months. A fistulous opening soon after occurred about the middle of the collar bone, from which spiculae of bone have occasionally been discharged. A portion of bone is now presented at this issue, which is the centre of a large tumor occupying the place of the left clavicle. So critical is the case, that a colleague objects to an operation upon the diseased mass. He did not consider the surgeon justified under so great danger to life.

On the 26th, five days after the arrival of the patient, assisted by several friends, the following operation was performed before the Medical Class:—The sternal extremity of the clavicle was first attempted to be dislocated, but as this was found difficult to accomplish on account of hemorrhage, &c., a long incision was made over the length of this bone, and deeply into the tumor, passing through the periosteum. A portion of the clavicle, including its entire circumference and measuring 4½ inches, was now extracted through this opening. There were also some smaller pieces removed during the operation. Twelve or more arteries had to be ligatured, two tents were placed in the wound and the usual dressing of adhesive plaster, compress and bandage, was applied.

No unfavorable symptoms arose during the after treatment. The patient was sitting up on the third day, and he left for home in about three weeks, the wound not then however entirely closed. He returned, by appointment, to see me a month after this date,—a small specula of bone was extracted, all discharge ceased, and the patient soon completely recovered. There exists now no deformity, no perceptible tumefaction, the patient suffers no pain, and is considered as well as he ever was—is, in fact, one of the strongest men in his county.
On the Endemic Gastro-follicular Enteritis, or "Summer Complaint" of children, as it prevails in the United States. By Edward Hallowell, M. D., Fellow of the College of Physicians of Philadelphia, Member of the Academy of Natural Sciences, &c.—(American Jour. of Med. Sciences.)

Cholera Infantum, or "the summer complaint" of children, has been considered peculiar to the United States. Billard, in his work on the diseases of infants, alludes to its occasional existence in Paris. In the United States it prevails to a great extent, and the mortality from it is extreme. It occurs in all our large cities, carrying off several thousand children annually; it commences in the Southern States in May, and in the Middle and Western about the beginning or middle of June, and continues until near October, the greater number of cases being observed in July and August. It is found chiefly in the lanes and alleys of our large cities among the poorer classes of society, but those in the higher ranks are by no means exempt from its attacks. It is stated by Dr. Condie, that during a period of fifteen years from 1825 to 1839 inclusive, 3352 infants perished of this disease in Philadelphia, being almost ten per cent. of the whole number of infants under five years who died during that period. In St. Louis, Missouri, during the years 1841, 1842, and 1843, 238 children died of it. In 1823, 253 died of the same complaint in Baltimore. The average number of deaths annually in Philadelphia is about 200. The disease is confined almost exclusively to children between four and twenty months of age; cases, however occur as early as the age of two months, and at as late a period as three or five years.

Causes of the Disease.—Cholera infantum is considered to be dependent for its production upon a heated, confined, and impure atmosphere, acting "directly upon the skin, and indirectly upon the mucous surface, at a period when the latter is already strongly disposed to the disease from the effects of dention, and from the increased development and activity of the muciparous follicles which takes place at that period." The circumstances of its origin, however, are involved in doubt, and can only be determined by future and more correct observation.
The exciting causes are stated by Dr. Dewees to be improprieties in diet and clothing. He observes also, that it is very often aggravated by worms, but such a complication has not come under our notice.

*General description of the disease.* Cholera Infantum may be divided into three stages, based upon its anatomical characters. In their description we shall be guided chiefly by the results of our own observations.

*Symptoms of the first stage.*—This usually commences with diarrhoea, succeeded by vomiting, or with vomiting and purging; these symptoms are soon followed by fever of a remittent type with evening exacerbations; the pulse is small, quick, and frequent, occasionally full, and sometimes tense; the brain is often affected sympathetically; this condition is manifested by a tendency to delirium; the eyes have a fierce and wild expression, and the face is flushed; the stools in this stage vary much in consistence; at times they are thin and watery, but often pasty or mush-like; their colour differs also greatly in the course of the day, and from one day to another; in a number of instances they presented the appearance of chopped egg, upon which boiling water had been poured; occasionally they consisted almost entirely of mucus. The period at which the vomiting is observed varies; it occurs usually on the second, but often as late as the fourth or fifth day; in some instances there is no vomiting throughout the course of the disease; in one case it did not make its appearance until a few days before death; the matter vomited consisted of the contents of the stomach, which were returned almost immediately after their entrance into it; these were more or less mixed with mucus; in infants at the breast the milk was returned in a curdled state, having an acid smell; in one instance it had the appearance of coffee grounds; the vomiting occurred for the most part three or four times a day, and sometimes oftener.

*Temperature of surface.*—The skin was occasionally moist, more frequently dry, warmer upon the head and abdomen; the latter is mostly warmer than the rest of the body, and often decidedly hot; the temperature of the extremities is natural, or more generally cool; occasionally it is warm; sometimes the lower extremities are cool while the upper retain their usual heat. The respiration, except in those cases complicated with other diseases, as hooping-cough or measles, was free, the number of respirations in the course of the minute amounting to 20, 24, 28, 29, 30, 33, 36, 40, 44, 48, 53, 55, 56, 60, 64, 66. When over 30 the respiration was more or less interrupted. The tongue in this stage was observed to be moist, but was often red at its tip and edges, and coated at its base with a yellowish or brownish yellow fur.
The countenance in the early stage, except when the attack was violent, was good, the eyes being bright and animated; occasionally the child would fall into a sleep from which it was easily roused. There was usually a considerable degree of irritability and restlessness, the little sufferer being pacified with difficulty. The sleep was often disturbed. The abdomen was occasionally tense and tumid, and somewhat painful on pressure; the thirst was often intense; it now and then happened, however, that drink was refused.

Anatomical characters.—These consist in an undue development of the follicles both of the stomach and intestines, or of one of those organs without inflammation of the mucous membrane. Children rarely die of cholera in the early stage; opportunities, therefore, seldom occur of observing the morbid appearances. M. Billard, who had ample opportunities, for the study of the diseases of children at the Hôpital des Enfans Trouvés of Paris, states that he had seen isolated follicles and follicular plexuses of the intestinal tube in considerable numbers and developed without being inflamed in twelve infants; three were aged from eight days to three weeks, two aged two months, the remaining seven were from nine months to one year; the symptoms of the cases he has published correspond so closely with those of cholera infantum, that, to use the language of Dr. Horner, it is evident had they occurred in this country, they would have been named, and in fact are cases, of cholera infantum. M. Billard states, that most of these children had arrived at the period of dention, so that there appeared to be a remarkable coincidence between the appearance of the teeth, and that of the organic development of the follicular apparatus of the intestines, the follicles performing an active part in the process of digestion by furnishing the surface of these organs with a fluid which in all probability assists in the elaboration of food. Dogs, he observes, and other carnivorous animals remarkable for their digestive powers, possess this apparatus in a high degree of development. In a lioness which died in this city some years ago, and of which I had the opportunity of making a post-mortem examination, the isolated follicles of the intestines were one-fifth of an inch in diameter.

The follicles are sometimes found to exist in great numbers from the first period of life, but in general they are not very numerously developed, except at the period above mentioned, or at a still more advanced age. (Billard.) Roederer and Wagler, in their work De Morbo Mucoso, in which they describe the symptoms and anatomical characters of a gastro-follicular enteritis that prevailed in Gottingen in 1760 and 1761, give very beautiful and accurate drawings of the mucous follicles in a state of abnormal development.
The muciparous glands of the mucous membrane are, it is known, of two kinds, the isolated and the agminated. The isolated follicles are found both in the stomach and intestines, but are much more abundant and less uniformly developed in the former than in the latter; the agminated follicles or glands of Peyer occupy the free border of the intestine; these are rarely affected in cholera infantum. The isolated follicles are found less abundantly in the jejunum than in the other portions of the small intestine. They are usually about the size of a pin's head, and have not inaptly been compared by Dr. Horner to grains of sand sprinkled over the surface of the intestine. They are elevated above the surrounding surface of the membrane, and have each in their centre a small grayish point. They consist simply of a duplicature of the mucous membrane, and are readily effaced by passing the handle of the scalpel over them with some force; on cutting them open they are found to contain a small quantity of fluid. These glands receive each, according to Lieberkühn, Meckel, and Beclard, an artery, a vein, and a nerve. They occupy both the summit and the interstices of the valvulae conniventes, and are found disseminated over every part of the intestine, both upon its free and attached surface. (See case of Charles Morand in Billard, *Maladies des Enfants*, and of Marie Boulefray in the work of the same author, entitled "De la Membrane Muqueuse gastro-intestinale dans l'état sain, et dans l'état inflammatoire, ou recherches d'anatomie pathologique sur ses divers aspects, sains et morbids." Paris, 1825.)

*Treatment.*—We have thought it proper to intercalate with our own, the opinions of older and more experienced members of the profession, more especially those of Dr. Chapman, Prof. of Practice in the University of Pennsylvania. His acute perception of symptoms, appears to have impressed him more fully than most others with the importance of depletory measures in the treatment of this disease. *Preventive means.*—In the beginning of June examine the condition of the gums of the child, and if swollen, lance them and send it into the country. A part of the country should be chosen which is elevated, where the air is pure and dry, and where there are no large streams nor stagnant water. Chestnut Hill, in the vicinity of Philadelphia, offers superior advantages in this respect. If it be impossible to remove the child to the country, especially if the apartments of its dwelling be not large and freely ventilated, let it be carried into the open squares of the city, or taken frequently across the Delaware in the afternoon. The sleeping apartments of children should be large and well aired. They should sleep upon a mattress or blanket folded upon the floor of the room or crib, and the covering should be light; they should be immersed in a cold
bath at least once a day, or be freely sponged with cold water; the mortality among children in Philadelphia is said to have greatly diminished since the introduction of the Schuylkill wa-
ter; the child should be confined to the mother's breast, care being taken not to overload the stomach; indeed, it often hap-
pens that the breast is given to the child when it requires only drink; the stomach then becomes distended and vomiting often ensues. Attention during the first year should be paid to the diet of the mother; she should avoid articles of a flatulent or indigestible character. Dr. Parrish recommends as a preven-
tive means, when a predisposition to cholera is suspected, the occasional use of nutricious animal fluids; the sucking of small pieces of salt meat, as ham or dried beef, he observes, will some-
times be found productive of advantage. With the same view of giving tone to the stomach, he recommends that aromatics, as ginger tea, be used habitually during the summer, in those cases in which there is strong reason to apprehend the occurrence of cholera. This treatment may possibly be applicable under cer-
tain circumstances, as in the case recorded by him, but as a general rule we are not disposed to recommend it. Indeed, he himself observes, that it is applicable in all its details only to those in whom there is every reason to apprehend that the only alter-
native is between almost certain death and the most careful prophylactic treatment.

_Treatment of the first stage._—We have seen that the first stage consists chiefly in an abnormal development of the mucous follicles of the stomach and intestines. This, as observed by M. Billard, is not, properly speaking, a true inflammation, being rather an intermediate stage between the normal state, and the state of inflammation. The follicles are simply in an excited condition, induced as there is reason to suppose, by the power-
ful influence of heat combined with malaria, acting upon the nervous system. The object of treatment, therefore, is to subdue this excited condition, and to restore the healthy state of the skin, with which, and the mucous lining of the alimentary canal, there is a powerful sympathy. The functions of the liver, it is probable, are more or less impaired, but of this we have no direct evidence. If the child be not weaned, it should be confined to the mother's breast, care being taken to avoid overloading the stomach, thus adding to the irritation which already exists. If weaned, it should be confined to milk and water, rice, barley, gum, or toast water. The infusion of the benne leaf (Sesamum orientale), is also employed in this city, and is a useful remedy. The gums should be carefully examined and lanced if swollen. The most important point of treatment, however, is early removal to the pure air of the country. This should be done as soon as the
disease has declared itself. Dr. George B. Wood, Prof. of Materia Medica and Pharmacy in the University of Pennsylvania, states, that during the whole period of his practice, (nearly thirty years,) but one case occurred to him, so far as he can recollect, of a fatal termination of this disease, when the child had been sent into the country in the early stage of it. (Pract. of Med., vol. i. p. 673.)

Blisters behind the ears have been highly recommended at this period of the disease, and we believe the practice is attended with decided advantage. Dr. Parrish was the first to suggest them. They should be applied immediately. The advantage arising from the early application of blisters behind the ears is confirmed by the late Dr. Eberle, a distinguished practitioner of this city, favourably known by his writings on the management of children. He observes, "during the last seven years, I have treated but few cases in which I have not at once applied blisters behind the ears, and I may confidently affirm, that since I have adopted this practice, I have been much more successful in the management of the disease than formerly. Their good effects arise, no doubt, from the counter-irritation they produce." The warm-bath should be administered every night and morning, and the child on coming out be gently rubbed with a piece of soft flannel; should there be much cutaneous sensibility, a portion of salt and mustard may be added to it. With a view of allaying the vomiting, various remedies have been employed. Injections of salt and water have been recommended by Dr. Dewees. Lime-water and milk, and the neutral mixture may be used for this purpose. Dr. Chapman states, that he has found the irritability of the stomach most effectually allayed by lemonade in doses of a teaspoonful, frequently repeated. It should be made pretty sour. Great advantage may also be derived from the frequent use of Seltzer or soda water. Dr. Parrish was in the habit of recommending it to be put up in \( \frac{3}{4} \) ss phials, the contents of one of which to be given at a draught. The soda powders may also be employed. Chicken water was also directed with the same view. Stimulants, as strong coffee, sulphuric ether, turpentine, &c., are objectionable. Dr. Condie states, that when the irritability of the stomach has been excessive, he has rarely failed in allaying it by the administration of the acetate of lead, in solution according to the following formula. R.—\( \text{Aq. puræ } \frac{3}{4} \); \( \text{acet. plumb. } \text{grs. v; acid acet. impure. } \frac{1}{3} \text{v; sacch. alb. pur. } \frac{3}{10} \). Sig. A teaspoonful may be given every hour or two until the vomiting be suspended. We have been in the habit of directing the blue mass mixed up with gum arabic, with a view of overcoming the irritable condition of the stomach, and usually with success, or small doses of calomel. (\( \frac{1}{3} \)) of a grain every two or three hours, either alone or in combination with a very minute
quantity of opium, \( \frac{1}{16}, \frac{1}{8}, \frac{3}{16}, \frac{3}{8} \) th of a grain.\) The blue mass may be given as follows: B.—Mass. ex hydrarg. grs. iv; g. acacia pulv.; sacch. alb. aa \( \frac{3}{6} \) ss; aq. \( \frac{3}{6} \) iss. M. Sig. A teaspoonful every three hours.

If the vomiting be obstinate, a Cayenne poultice or small blister may be applied to the epigastrium. Should the disease continue, we next have recourse to small doses of calomel and ipecacuanha in doses from \( \frac{1}{16} \) to \( \frac{1}{8} \) of a grain of the former, and from \( \frac{1}{8} \) to \( \frac{1}{2} \) a grain of the latter, every two or three hours; advantage may sometimes be derived from substituting a small quantity of Dover's powders, (from \( \frac{1}{4} \) to \( \frac{1}{2} \) a grain,) for the ipecacuanha. We should be extremely cautious, however, in the use of opiates in this or indeed in any stage of cholera infantum. Benefit may also be derived from the application of a bread and milk, or mustard poultice over the whole abdomen, or, as advised by Dr. Eberle, a poultice composed of two or three teaspoonfuls of powdered black pepper, with a few teaspoonfuls of Cayenne mixed up with a common poultice. Embo
croations to the abdomen and lower extremities, with spirits of camphor, may also be used with advantage. Should there be symptoms of acidity, which may be ascertained by testing the stools with litmus paper, a few grains of magnesia may be given, and should the discharges continue so as greatly to debilitate the patient, two or three grains of prepared chalk may be added to the prescription of calomel and ipecacuanha. We cannot, however, protest too strongly against the injudicious use of astringents in this or any other stage of the disease. We once witnessed a case in which cerebral symptoms of an alarming character supervened in consequence of a sudden arrest of the alvine discharges by means of the chalk mixture, and the child's life became a forfeit.

Second stage.—The vomiting which, in the commencement, was more or less frequent, now occurs but seldom, while the diarrhœa continues; the stools vary much in appearance, but are more or less bloody and painful: there is also much restlessness, and the child is observed to draw up its limbs at the time of the discharge; the predominating colour of the stools is dark
green, looking like chopped spinach; the colour, however, is occasionally lighter, but mixed with portions of a darker hue, or with lumps of yellow more or less curdled. They are often of a bright yellow or chrome colour, or of a dark brown or chocolate colour, caused by the admixture of grumous blood. The appearance of the stools varies much in the course of the day, the change of colour probably depending upon the greater or less quantity of bile and acid in the intestines; the abdomen is more or less tumid and painful on pressure; tenderness of the abdo-
men, with drawing up of the limbs, and bloody discharges are the most important signs in this stage of the affection; the temperature of the abdomen is usually elevated, while that of the extremities is cool; the pulse is small and feeble, or it is frequent and tense; occasionally it is intermittent; as the disease advances, the emaciation already observed progresses, the skin about the neck and thighs hanging in folds; the eyes become sunken in the orbit, and each is surrounded by a dark areola; the nose is sharp, and the lips are shrivelled; the feet become oedematous, and the cutaneous sensibility is so much impaired that flies collect upon the face without causing any uneasiness; petechiae are occasionally observed at this period; the tongue is dry and incrusted, and covered with aphthæ, and deglutition is now more or less painful; the child is often observed to thrust its fingers far back into the mouth, from dryness of the fauces; the appetite becomes greatly impaired, and there is almost constant thirst. Dr. Dewees mentions the eruption of a quantity of minute vesicles upon the chest, which he considers a fatal sign. Dr. Condie states that he has known many instances of recovery, even when the eruption has been most extensive and distinct. We have observed it but in a single instance; the eruption, however, was not confined to the chest, but occurred in other parts of the body. Dr. Chapman speaks of the appearance of pink-colored stools as a fatal symptom; this does not correspond with our own observations.

Anatomical characters of the second stage.—These consist essentially in inflammation with softening of the mucous membrane and ulceration of the follicles, more especially of the large intestine. The mucous membrane of the stomach in many cases presents its usual appearance and consistence; in others it is more or less injected and softened, the softening extending occasionally to all the coats, resembling the condition described by Cruveilhier, as characteristic of the disease termed by him maladie gastro-intestinale des enfans, and by Jaeger, Gairdner, and others, softening of the stomach.

Rilliet and Barthez in their work on the diseases of children, notice the correspondence between the symptoms of softening of the stomach as described by Jaeger, and those of cholera infantum; but an examination of the cases recorded in this paper will show that this condition of the organ is but rarely observed. The lining membrane of the stomach is not unfrequently covered with a layer of whitish opaque mucus easily scraped off with the handle of the scalpel; the mucous follicles both of the stomach and intestines are more or less apparent; the mucous membrane of the small intestine is occasionally softened, and for the most part pale in the greater portion of its extent, contrary to
the statements of Dewees and others, who consider the small intestine as being the exclusive seat of the disease. In one case the portion of intestine inflamed (the lower portion of the ileum), presented a brick-dust colour interrupted with alternations of a pale yellow, mottled with red in some points; minute vessels were seen freely inosculating with each other; in other portions the inosculations were less distinct, there being a uniform reddish tinge. In another it was of a dull red, or brick-dust colour, minutely injected with red vessels, and in several points, especially upon the surface of the valvulae conniventes, presented a dotted appearance; it occupied a portion of the intestine four inches in extent from the pylorus. In another case, (Case X.,) the duodenum at its upper portion presented a slight shade of pink, with a few minute arborizations, and in several other instances there was a slight degree of inflammation affecting the duodenum at its upper extremity. There was also a slight inflammation of the glands of Peyer in one or two cases, but for the most part they presented nothing remarkable. The small intestines contained a considerable quantity of orange coloured mucus. The large intestine was more or less inflamed and softened in almost every instance; the inflammation existed in the form of bands, and presented a dotted arborescent appearance; in one case these bands were longitudinal; they were five or six inches in length, and several lines in breadth; in another case the bands were about two inches in length, having a minutely arboriform appearance, and were of a deeper red than the surrounding membrane; the first was situated one and a half inches from the cæcum, the second six inches from the first, and extended nearly the whole circumference of the gut; it was three inches in length and very minutely injected, but not so much as to destroy the arboriform arrangement. In most of the cases the redness was diffused with occasional ramifications; in one instance the inflammation occupied the whole extent of the colon; it was of a vivid red throughout, and the membrane was much thickened. The inflammation was here also for the most part diffused, or in the form of bands occasionally presenting a ramiform appearance, the minute vessels freely inosculating with each other. From the margin of the follicles minute vessels were seen to radiate to the surrounding membrane, occupying the entire surface of the intestine, showing that the inflammation commenced in the follicles and extended subsequently to the mucous membrane. The follicles were often found to be more or less ulcerated, the ulcerations sometimes extending as far as the muscular coat; the ulcerations were more numerous and penetrated more deeply in the rectum than in other portions of the intestine; it was often completely riddled with them; we have not observed the sur-
rounding membrane to be implicated to any extent; the mucous membrane was more or less softened in the greater number of cases; in one instance it was thickened; the membrane in this case was intensely inflamed. The coats of the intestine were covered with a layer of mucus, sometimes so thick as to diminish considerably its calibre. It ordinarily contained a quantity of grayish coloured faeces of the consistence of gruel. The lungs presented nothing remarkable—but a slight engorgement posteriorly except in three cases, one of which was complicated with measles, and the remaining two with hooping-cough; in these cases the usual appearance of lobular pneumonia were present. In one case the patient had been attacked with pleurisy in consequence of exposure to the night air; at the autopsy a considerable quantity of pus was found effused in the cavity of the right pleura, and the lung was more or less disorganized. The peritoneum presented its usual healthy colour in all the cases observed; the liver was greatly enlarged in but a single instance, contrary to the statements of most authors who affirm this to be uniformly the case; the gall bladder was more or less distended with dark coloured bile staining the finger a deep yellow; the mesenteric glands were not enlarged; the spleen and kidneys presented nothing remarkable. In nearly all the cases the veins of the pia mater were more or less distended; the arachnoid was pale and moist, except in one case in which there was a slight opacity at the base of the brain; there was more or less effusion in the subarachnoid cellular tissue, for the most part limpid; occasionally it presented a whitish, opalescent or citron coloured appearance; the pia mater was more or less injected, but the injection for the most part appears to have been confined to the larger ramifications; it was easily removed by traction from the surface of the brain; the substance of the brain presented its natural appearance except in two cases, in one of which the central, and in the other both the central and the cortical portions were injected; it was softened in four of the cases; there was little or no effusion in the ventricles; in one instance the lateral ventricles appeared to be quite dry as if wiped with a cloth.

Treatment.—We have seen that the second stage is characterized chiefly by tenderness of the abdomen on pressure, drawing up of the limbs, and bloody stools, symptoms which depend upon inflammation of the mucous membrane, more especially of the large intestine. The treatment, therefore, in this stage should be antiphlogistic. There can be no doubt, we think, that the mortality from cholera infantum has arisen in a great degree from not keeping its inflammatory character sufficiently in view. We have found inflammation of the mucous membrane of the large intestine in every autopsy that we have made, and evidence
of its existence in an advanced stage of the disease clearly demonstrated in all the published cases that have come under our observation.

The chief object of the present essay, indeed, is to direct the attention of the profession to the above fact, and to the importance of antiphlogistic treatment, instead of the purgative plan usually pursued and with such fatal results. When the abdomen is distended and painful on pressure, with a tense, frequent or full pulse, v. s. should be resorted to. This is occasionally required at the commencement of the first stage, when there is much cerebral determination; should v. s. not be sufficient to remove the inflammatory condition, or when the state of the pulse does not indicate it, leeches or cups are to be applied to the abdomen; we have not been in the habit of directing cups in this affection, but from the great benefit which we have seen result from their use in the lobular pneumonia of children, we have no hesitation in recommending their employment. Mothers naturally object to what they conceive to be a harsh remedy, but by persuasion they can generally be induced to submit to it, and the great advantage we have uniformly derived from their employment in the last mentioned disease, we think warrants their use in this. The amount of pain is much less than is supposed, and the quantity of blood is more suddenly and effectually abstracted than by leeches, besides which there is no risk of subsequent hemorrhage. One, two, three, or four cups may be applied to the abdomen, and be repeated should pain on pressure or the bloody discharges continue. It should be remembered that the reaction in children is seldom great, and that the most intense inflammation of the mucous membrane may exist, while the temperature of the skin is but little elevated; or may be quite cool, and the pulse feeble. Stimulants in these cases are too often given, and may destroy the patient; the true course is to pursue a cautious antiphlogistic treatment, supporting the patient at the same time by the blandest articles of nourishment. It has been advised to apply leeches to the anus, and this may occasionally be done with advantage. Injections of cold water, or iced water as the severity of the case may require, are recommended by Dr. Miller of New York, and we believe with great propriety. The remedy, he observes, though generally advisable, appears to be best adapted to that period of the disease when the alimentary canal has been previously well emptied of its acrid and offensive contents. Should there be reason to suppose the existence of such accumulations, the discharges being watery and mixed with indigestible food; with a tumid state of the abdomen, a grain of calomel may be given every hour or two until the bowels are disturbed. We have observed that the
small intestines are but little affected in this disease, and we should think, therefore, that no objection could be made to the use of mild laxatives for this purpose, the treatment being the same as in dysentery. Castor oil, the oleaginous mixture in small doses, or the oil of butter, may also be employed. Injections of the liquor plumbi subacetat. dilut. (3 j to a gill of water) are also productive of benefit, or the acetate of lead, in the proportion of five grains to a gill of water, for a child of two years. The internal remedies should be small doses of calomel and ipecacuanha as prescribed in the first stage, or the same dose of calomel combined with \( \frac{1}{2} \) to \( \frac{3}{4} \) a grain of Dover’s powders every three hours. It may often be advantageously associated with acetate of lead, to the amount of from \( \frac{1}{4} \) to \( \frac{1}{2} \) of a grain, but we believe this remedy better adapted to a more advanced period of the disease. When there is much irritability, and the skin not preternaturally dry, the ext. hyoscyam. may be substituted for the Dover’s powders. Emetics we consider decidedly objectionable in every stage of cholera infantum, notwithstanding that they have been recommended by high authority.

It will be observed that inflammation with ramollissement of the mucous membrane of the stomach, exists in a large proportion of cases, and emetics under such circumstances must be decidedly injurious. With regard to purgatives the same objection applies. Laxatives may occasionally be proper when there is reason to suspect the accumulation of irritating matters in the intestine, and of them the best, as above mentioned, is calomel either alone or in combination with a small quantity of Dover’s powders (one-quarter to one-half of a grain), and followed by a dose of castor oil. We cannot too strongly urge upon the young practitioner the necessity of caution in the use of opium in this disease, or indeed in any other in which there is a determination to the head. The warm bath is a useful remedy, unless the child be too debilitated; he should be immersed in it up to the neck, and cloths wrung out of cold water applied at the same time to the head, in order to lessen the determination to the brain. Should the application of cups or leeches to the abdomen not be sufficient to remove the inflammatory symptoms, and the pulse be feeble or the patient much exhausted, blisters may be resorted to, but great care should be exercised in their employment lest gangrene ensue. We have seen very troublesome consequences arise from the application of blisters to children, and in one instance we think the child lost its life from their imprudent use. They should never be suffered to remain more than three hours, and after their removal, a large emollient poultice should be applied over the whole abdomen. Should there be symptoms of cerebral congestion manifested by stupor, rolling
about of the head, or a disposition to coma, cloths wrung out of cold water, or vinegar and water, or a mixture of equal parts of lead water and spirits of wine should be applied to the head. Should these symptoms continue, leeches in small numbers may be applied to the temples or behind the mastoid processes. Counter irritation should also be made by stimulating pediluvia, or the application of sinapisms to the extremities.

Cholera infantum not unfrequently becomes chronic, the symptoms being very much the same as those of ordinary diarrhoea, or the patient may sink into a typhoid state. The remedies in this case consist of the warm bath, to which salt, mustard, brandy or Cayenne pepper may be added, counter irritating applications to the abdomen, and the internal use of mild astringents. When the diarrhoea is such as to exhaust the patient, the cretaceous preparations may be cautiously employed, great care being taken not to arrest the discharges too suddenly.

The following prescription has been proposed by Dr. Parrish for this purpose. B.—Potassæ sub-carb, 3j; gum acaciae, 3j; tr. opii, gtt. vj; aq. cinnam, 3iss; sacch. alb., 3j. M. A teaspoonful to be taken every two or three hours. Should this not be sufficient, the following may be employed. B.—Test. ostrear. ppt., 3iss; gum acacia, 3j; tr. thebaic, gtt. x; sacch. alb., 3j; aq. pur. vel aq. cinnam, 3iv. M. Sig. A teaspoonful every two hours.

Dr. Condie states that he has derived great devantage from the use of charcoal in chronic cases of this affliction, when the discharges were of a dark colour, acrid and offensive. He employs it in combination with powdered rhubarb, ipecacuanha, and the extract of hyoscyamus, according to the following preparation. B.—Carb. ligni, 3j a 3ij; pulv. rhei, 3ij; ipecac, grs. iv a grs. xij; ext. hyoscyam. nig. grs. xij. M. ft. chart. xii, Sig. One to be taken every three or four hours. Lime water and milk may also be given in these cases, also equal parts of charcoal and magnesia.

Care ought to be taken not to continue the use of the charcoal too long; as serious accidents are said to have arisen from its accumulation in the bowels. The infusion of soda and hickory ashes is said also to be beneficial. The syrup of rhubarb may be given in doses of from twenty drops to a teaspoonful every two or three hours, or the powder according to the following formula. B.—Pulv. rhei, grs. xv; pulv. ipecac. grs. v; magnes. calcinat. grs. xx; sacch. alb. 3j; tr. opii gtt. x; ol. anis. gtt. v or gtt. vi; aq. 3iij. M. A teaspoonful every hour or two (Dr. Chapman). Columbo root in powder or infusion may also be employed. (Dose from two to three grains.) The infusion of the common bogwood (hematoxylon campechianum),
Dr. Chapman states, was much employed by Dr. Physick in this stage of the disease. The dose is a teaspoonful. A decoction of the bark of the pomegranate root (punica granatum), or of the flowers, is also considered useful. The best of all these vegetable astringents, according to Dr. Chapman, is a strong infusion of the leaves of the dew (rubus trivialis) or of the blackberry root (rubus villosus). The dewberry is preferable from its greater strength. The dose is about a teaspoonful. The alum plant (Heuchera Americana), a common plant in the neighbourhood of Philadelphia, has also been highly recommended as an astringent in this affliction. Alum, in the dose of one or of two grains with a small quantity of opium may also be employed, or the acetate of lead in combination with the same remedy. Dr. Eberle states that in the advanced stage of this disease, he has occasionally derived considerable benefit from the use of the tartrate of iron according to the following formula. B. — Ferri tartrat. gr. xl; syr. zingiberis, 5 ss; aq. pur. 5 j. M. From twenty to forty drops to be given to an infant four or five times daily. Dr. Chapman advises the sulphate of iron under the same circumstances. B. — Ferri sulphat. grs. ij; acid sulph. gtt. x; sacch. alb. 5 j; aq. 5 j. M. Dose a teaspoonful as often as necessary. Dr. Meigs has written favorably of a plunging tepid bath made of the infusion of the white oak bark. American Medical Recorder, vol. iii. p. 507. He states that it produced a rapid amendment in one case in which he tried it, and a perceptible improvement in another. When the discharges from the bowels are small in quantity, thin, dark coloured, and highly offensive, with flatulency, the spirits of turpentine may be given. Turpentine in the acute form should never be employed. It is a "deadly remedy." The following is the formula proposed by Dr. Condie. B. — Mucilag. g. acacie, 5 ij; sacch. alb. 5 vj; spt. æth. nitros, 5 ij; spt. terebinth. 5 ij; magnes. calcinat. grs. xij; spt. lavand. comp. 5 ij. M. Sig. A teaspoonful three times a day, or oftener when the child is over two years of age. The juniper oil is also considered an excellent palliative for this purpose. B. — Ol. junip. 3 ij; sulph. ether 5 ss; tr. opii. gtt. xl. M. Sig. From ten to 15 drops from three to four times daily. The balsam copaiba may also be employed. The dose is from three to five drops. Dr. Parrish states that he has frequently directed an infusion of bark and cinnamon in lime water in the following proportions. B. — Best bark coarsely powdered, 5 ss; cinnamon 5 ij; lime water 5 ij. M. It should be suffered to stand a little while and then decanted; a dessert spoonful may be taken several times a day. With this remedy we have no experience. The bark jacket is also occasionally employed. Injections of bark may likewise be given. These remedies should be employed
only when the symptoms are of a typhoid character, the vital forces being insufficient to sustain the patient. When the child is greatly exhausted, stimulating frictions to the body with flannels wrung out of hot brandy and water, or whiskey should be used, or if the exhaustion be extreme, it may become necessary to resort to simulants internally, as wine whey, or a weak solution of carbonate of ammonia. Dr. Eberle states that in these circumstances he has derived great advantage from the tincture of cinnamon in doses of from fifteen to twenty drops in some mucilaginous fluid every four hours. When the discharges are very frequent, attended with great exhaustion, the spiritus aromaticus is a useful remedy. Dr. Hartshorne, one of the most eminent practitioners of this city, recommends the use of creosote in the advanced stage of this disease. The following is a formula he employs. B.—Creosote, gtt. j.; test. ostrae. preparat., 3ij.; g. acaciae pulv., 3ss.; aq., 3vj. Dose a teaspoonful every two hours for a child two years of age.

Tannin, we would suppose might also be advantageously employed in the chronic form of the disease when the discharges are abundant. It is said to be less likely to irritate the stomach and bowels than the ordinary astringents. The dose for a child of two years is one-fourth of a grain every three hours, or of the pure tannin one-twenty-fourth of a grain repeated as often.

When there is an aphthous condition of the fauces, Dr. Parrish thinks he has found nothing do so much good as a gargle of lime water and bark. Dr. Griffiths, he observes, in some protracted cases of cholera, was in the habit of prescribing scalded lemonade to the child, and with a very happy effect.

Great attention must be paid to the diet. If not weaned, the child should be confined to the breast, with the occasional use of barley water, toast, or gum water. So long as the inflammation is inactive, or when it has subsided or has assumed a chronic form, articles of a more nourishing kind may be allowed, as boiled milk, tapioca, arrow root, sagu, or thin oatmeal gruel, or flour boiled in milk; the flour should be put in a rag, and then boiled until it becomes hard, and grated. This, we believe to be a most excellent article of diet. We know a remarkable instance of chronic dysentery in the adult, cured by small doses of calomel and opium, and confinement to this diet when all other means had failed. In the chronic form of the disease when the patient is greatly debilitated, the appetite occasionally becomes craving for certain stimulating articles of food, which it may be right to gratify. Dr. Parrish relates several instances of this kind in his lectures. Dr. Wistar, he observes, used to mention the case of a child that was brought to the parlor while the family were at
dinner. It was extremely weak, and seemed to be in the last stage of the disease. It showed a strong disposition for some ham which was on the table. The black skin covering the ham was the part which is seemed particularly to desire. It was gratified, and it did not discontinue sucking the piece until it had deprived it of its nutritious juices. From this time it began to recover, and ultimately got well. Dr. Wistar was so convinced of the importance of the above practice that he used to tempt his little patients with small pieces of ham. Some would eat it, others seemed to have no desire for this kind of food. In the latter case he did not press it upon them. Dr. Parrish states that he often prescribed the essence of ham in these protracted cases of cholera. He directs the juice to be bottled up to prevent it from becoming rancid, and to be used as occasion requires.

He also relates an instance of a child under similar circumstances that seemed very anxious to eat some butter which was on the table; this child was also indulged, and it continued to devour the butter, lump after lump, until it had made way with the whole. From this time it was allowed as much butter as it desired, and under this plan it recovered.

The same directions with regard to ventilation apply to this as to the first stage.

Third stage.—Symptoms. The symptoms indicative of this stage of the affection are an unusual disposition to drowsiness or stupor, rolling of the head, and chewing motion of the under jaw, succeeded by convulsive movements or rigidity, of one or more extremities followed by paralysis. When the disease has progressed thus far, it may be considered almost, if not entirely beyond hope.

Anatomical characters.—These consist essentially, in disorganization of the structure of the brain from softening of its tissue. The softening is sometimes general, but is more often confined either to the cortical substance, or to the central portions of the brain and cerebellum. The softening may exist to such a degree as to cause the brain readily to give way on slight pressure, or its substance may be rendered quite diffusible so as to resemble cream. These effects are the result of long continued irritation; the substance of the brain when cut into, usually presents numerous red spots from effusion of blood. The pia mater is more or less injected, and its veins much distended. There is also effusion of serum in the subarachnoid tissue, and to a greater or less amount in the lateral ventricles. This, however, is not always the case, the surface being sometimes quite dry.

Treatment.—Notwithstanding the hopeless condition of the patient, it is our duty to make use of such means as afford any, even the slightest prospect of relief. These consist in the appli-
cation of leeches to the temples and to the mastoid processes, with blisters to the nape of the neck. They should be dressed with mercurial ointment. The treatment in fact is the same as in tubercular meningitis, and we think we have derived more benefit from the use of blisters in that affection, than from any other means. Cloths wrung out of cold water, or of vinegar and water, should be at the same time kept constantly applied to the temples.

Diagnosis.—Cholera infantum may be confounded with tubercular meningitis, or dropsy of the brain. From this, it may be distinguished by the frequency of the discharges, whereas, in the former affection the bowels are usually torpid, and by a proper acquaintance with the natural history of the disease. In tubercular meningitis the premonitory symptoms are such as indicate an affection of the brain; it occurs for the most part in delicate scrofulous children. Cholera infantum commences with looseness of the bowels. In tubercular meningitis, the cerebral symptoms predominate in the commencement. The child is restless and irritable, and complains of acute pain in the head, referring it chiefly to the forehead: the pain is intermittent, and is usually accompanied with a peculiar cry, which has been considered by Coindet and others as pathognomonic; the sleep is more or less disturbed, and there is frequent tossing about of the hands; the head is rolled from side to side, and there is more or less moaning and grinding of the teeth; delirium is almost a constant symptom, and the countenance assumes a peculiar characteristic appearance; this is so marked that even the nurses at the Children's hospital of Paris, easily recognize the disease. It is only in the advanced stages, that cholera infantum can be confounded with tubercular meningitis when the patient relapses into a state of drowsiness or stupor; which is a prominent symptom of the advanced stage of hydrocephalus, and is often accompanied or preceded by convulsions. Cholera infantum may be confounded with the typhoid fever of children. To this affection it bears a close resemblance; it may be distinguished from it, however, by the absence of gargouilliment, of the numerous lenticular spots which in typhoid fever usually make their appearance from the sixth to the twelfth day, by the agitation and slight delirium at night; the prominence of the spleen, the character of the fever, which is more intense, and continues beyond the ninth day; and the existence of the sibilant rale, all of which are prominent, although not constant symptoms in typhoid fever.*

The resemblance between the two diseases is such that it is often impossible to distinguish them apart. Cholera infantum

* Rilliet et Barthez, Traité clinique et pratique des maladies des enfans, t. ii. p. 312.
may also be confounded with softening of the stomach. The similarity between the symptoms of gelatinous softening of the stomach, as described by Jäger, and those of cholera infantum, appears indeed to be striking; the coincidence has been observed by Rilliet and Barthez, who do not describe the latter disease as a distinct affection occurring in Paris. The following are the signs of gelatinous softening of the stomach, as laid down by them in their invaluable work. If a child be taken suddenly with obstinate vomitings which persist, with instatiable thirst, with pain in the abdomen, with abundant diarrrhea; if at the same time it emaciates with rapidity, whilst the gastric symptoms almost exclusively predominate, we may then infer a gelatinous softening of the stomach.—(Tom. i. p. 467. Art. Gastrite et Ramollissement de l'Estomac.)

Prognosis.—The prognosis in cholera infantum may be considered favorable when the pulse becomes slower, when the temperature is restored to the surface when the vomiting ceases, and the alvine discharges become less frequent, and more natural; an opposite opinion may be found when the pulse continues feeble; the surface remains cold; the discharges become very frequent, resembling the washings of meat, accompanied with great uneasiness and jactitation, or a disposition to stupor; should there be rigidity and a partial loss of power of the extremities, the patient may be considered almost if not entirely beyond the reach of art.

(The Cases are omitted.)

Flatulence. By Robert Dick, M. D.—(London Lancet.)

Flatulence of the stomach and bowels has two principal sources—the liquid and solid alimentary ingesta, and (as some assert) exhalation from the mucous membrane. We must frankly own that we have yet met with no grounds other than conjectural for the latter view; we are aware of no facts that prove it. True, indeed, John Hunter—an authority not lightly to be questioned—supposed exhalation from the mucous surface to be an occasional source of gaseous distension; still we must repeat our opinion, that the alleged fact rests on no positive evidence; while there are not a few strong presumptions against it, into the consideration of which, however, it would not be expedient to enter now. Suffice it only here to observe, that if the rapid meteorismi or pneumatoses which arise in the last stages of adynamic fevers, &c., seem to prove the fact of the sudden secretion of gases by the mucous membrane, is it not just as likely, we would ask, that the phenomena named
are due to the suspension of secretion and nervous action in the stomach and bowels, and the opportunity thence afforded for the play of the ordinary chemical affinities in the aliment or excretions in the stomach or intestines—nay, perhaps, to some morbid secretions, the consequence of depressed or dormant vital powers, and which actually favour the occurrence of ordinary chemical action in the contents of the bowels, and the thence resulting extrication of gases? This, at least, is a more probable supposition than the other.

On the same principle, I would account for the air eructated in gastritis, hepatitis, &c. The vital and conservative power of the mucous membrane being in these cases greatly reduced, while, at the same time, the temperature of the stomach is greatly augmented, the play of non-vital chemical affinities is favoured—the stomach’s own infra-natural secretions becoming the ready subject of these.

A third source of gaseous fluid in the stomach and intestines may be named, though we consider it as of little importance—namely, the atmospheric air swallowed in the acts of mastication and deglutition, and mechanically contained in the articles eaten, as, for example, in the pores of bread, &c.

The gases of the stomach are principally nitrogen, oxygen, and carbonic acid, nearly in the proportion of atmospheric air. The gases of the intestines are those now named, and, in addition, carbonetted hydrogen, hydrogen, and occasionally sulphuretted hydrogen. The intestinal gases are further often loaded with vaporous particles of the fætid contents of the bowels.

Flatulence, as we have formerly remarked, is often due to an inefficient action of the liver, and a deficiency of bile in the intestines. Whatever promotes the hepatic secretion tends to remove flatulence of this organic; hence, a few drops of colchicum wine are often effectual. Still more sure are minute doses of mercury. An ante-dinner and an evening pill, consisting of a grain of blue pill and three of extract of rhubarb, acts with wonderful good effect in many cases of this kind, in which, along with flatulence, there are slight constipation, yellow furred tongue, ill-tasted mouth, &c. As in gastro-duodenitis, there is often, from the vascular tumescence of the duodenal mucous membrane, a constriction, and sometimes complete temporary occlusion of the mouth of the ductus communis choledochus with, of course, interruption to the discharge of bile; hence, in part, the flatulent eructations, &c., which accompany gastro-duodenitis. It is far from unlikely that the pancreatic duct and secretion are often affected in a similar way; but for some unaccountable reason, it has not pleased pathologists of any age to pay much attention to this unobtru-
sive viscus—some seeming even to think that it, as well as the spleen and supra-renal capsules, are not necessary, because not understood.

_Treatment._—When the tongue is pale, when there is no tenderness on pressure at the epigastrium, or in the right hypochondrium, when there is no thirst, no dry heat of skin, and no quickness of pulse, flatulence requires carminatives, bitters, and even stimulants. Thus the patient may be directed to use freely any of the following waters:—cinnamon, fennel, cassia, pimento, peppermint, pennyroyal, mint, Cologne, lavender, caraway, aniseed, dill, balm; to these, some of the respective tinctures may be added. With the carminative waters just named, one or more of the following bitters may be given—camomile, quassia, columba, absinthium, rhubarb, to which may be added valerian, castoreum, and camphor. As an excellent of flatus existing in the bowels, assafoetida, or oil of turpentine, the former given by the mouth, or in injection, the latter, in injection, are superior to all things else, excepting, perhaps, the infusion and spirit of armoracia.

Secondly. If flatulence is accompanied with a dry and prematurely red tongue and fauces, with thirst, heat of skin, tenderness of epigastrium, scanty and high-coloured urine, heartburn, &c.—in short, with symptoms of inflammatory irritation of the gastro-duodenal mucous membrane, then alternatives are clearly indicated, or rather such substances as promote the secretion of the mucous membrane; these are ipecacuanha, sulphur, potassio-tartrate of antimony, the various preparations of mercury, magnesia, iodine, nitrate of silver. These we would be disposed to give a trial to successively, almost in the order in which we have named them. But a great variety of other means may be tried, and among these the following, in those cases in which flatulence is accompanied with obvious torpor and fulness of the liver, as well as with gastric irritation. The wine of colchicum, for example, may be given with a few grains of the sulphate of potass, or if there are acid eructations and heartburn, with carbonate of magnesia; the infusion or tincture of arnica may be given in the same combinations, and so may the powder and extract of cusparia. In short, instead of perplexing our minds with the confused subdivisions of authors, whose classifications betray they had no clear and scientific notions of the proper treatment of flatulence, the simple point to be ascertained and kept in view is, whether flatulence (always a mere symptom) is or is not accompanied with inflammatory irritation, is or is not attended with stomachic debility—and according as we decide these queries, we adopt the former or latter modes of treatment above enumerated.
When the eructations are acid, the most of vegetables in common use, except the cereal, must be abstained from. As Dr. Prout remarks, that, in the treatment of saccharine diabetes, he has seen the incautious use of one or two ripe pears undo all the apparent improvement of weeks or months of skilful medicinal and dietetic management, so it often happens in persons subject to flatulence, that a very minute and apparently trivial indulgence induces not unfrequently the utmost degree of uncomfortable gaseous distention, with its attendant sufferings, headach, &c. This is less to be wondered at, when it is considered that, according to Dr. Hales, the quantity of gas extricated from an apple, in the course of its undergoing the fermentative process, amounts to nearly 700 times its bulk.

Cases occur in both sexes of a sort of passive flatulence, so to name it—namely, meteorismus, unattended with any marked signs of stomachic or intestinal irritation, or with much discomfort, excepting the frequent necessity of getting rid of the flatus. In such cases, the flatus is usually nearly or wholly free of ill-odour, and probably consists of nitrogen, oxygen, and perhaps carbonic acid, in nearly the proportions of atmospheric air. The treatment of these cases I have found more troublesome than there simple nature would lead, a priori, to expect. One or two have entirely baffled every form of treatment adopted, and the last accounts from one patient, a clergyman in the South of England, inform me that the annoying affection continues just as it was when he first put himself under my care nearly two years ago.

There can be little doubt that the occurrence of flatulence is immensely favoured by the temperature at which many persons swallow soups, coffee, tea, &c., and the debilitating effect which large and systematic potations of the latter have on the functions and secretions of the gastro-enteric mucous membrane. The truth is, that cold, applied in drinks of low temperature, and even in iced fluids, is not less remarkable as a stomachic tonic, than is the external application of cold as a tonic of the sentient and motor nerves.

In connexion with the present notice, we refer the reader to the former notices of carminatives, condiments &c., in preceding numbers of The Lancet.
# Table of the Discovery of Metals

[Taken from Prof. Liebig's Lectures.]

## TABLE XI.

*Table of the discovery of Metals.*

<table>
<thead>
<tr>
<th>Names of Metals</th>
<th>By whom discovered</th>
<th>Date of Discovery</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gold</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Silver</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Iron</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Copper</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mercury</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lead</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tin</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Antimony</td>
<td>Described by Basil Valentine</td>
<td>1490</td>
</tr>
<tr>
<td>Bismuth</td>
<td>Described by Agricola</td>
<td>1530</td>
</tr>
<tr>
<td>Zinc</td>
<td>Mentioned by Paracelsus</td>
<td>16th century</td>
</tr>
<tr>
<td>Arsenic</td>
<td>Brandt</td>
<td>1733</td>
</tr>
<tr>
<td>Cobalt</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Platinum</td>
<td>Wood, Assay Master, Jamaica</td>
<td>1741</td>
</tr>
<tr>
<td>Nickel</td>
<td>Cronstedt</td>
<td>1751</td>
</tr>
<tr>
<td>Manganese</td>
<td>Gan and Sheel</td>
<td>1774</td>
</tr>
<tr>
<td>Tungsten</td>
<td>D'Elhuyart</td>
<td>1787</td>
</tr>
<tr>
<td>Tellurium</td>
<td>Muller</td>
<td>1782</td>
</tr>
<tr>
<td>Molybdenum</td>
<td>Hielm</td>
<td>1782</td>
</tr>
<tr>
<td>Uranium</td>
<td>Kalproth</td>
<td>1789</td>
</tr>
<tr>
<td>Titanium</td>
<td>Gregor</td>
<td>1791</td>
</tr>
<tr>
<td>Chromium</td>
<td>Vauquelin</td>
<td>1797</td>
</tr>
<tr>
<td>Columbium</td>
<td>Hatchett</td>
<td>1802</td>
</tr>
<tr>
<td>Palladium</td>
<td>Wollaston</td>
<td>1803</td>
</tr>
<tr>
<td>Rhodium</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Iridium</td>
<td>Descotils and Smithson Tennant</td>
<td>1803</td>
</tr>
<tr>
<td>Osmium</td>
<td>Smithson Tennant</td>
<td>1803</td>
</tr>
<tr>
<td>Cerium</td>
<td>Hisinger and Berzelius</td>
<td>1804</td>
</tr>
<tr>
<td>Potassium</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sodium</td>
<td>Davy</td>
<td>1807</td>
</tr>
<tr>
<td>Barium</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Strontium</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Calcium</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cadmium</td>
<td>Stromeyer</td>
<td>1818</td>
</tr>
<tr>
<td>Lithium</td>
<td>Arfwedson</td>
<td>1818</td>
</tr>
<tr>
<td>Zirconium</td>
<td>Berzelius</td>
<td>1824</td>
</tr>
<tr>
<td>Aluminium</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Glucinium</td>
<td>Wöhler</td>
<td>1828</td>
</tr>
<tr>
<td>Yttrium</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Thorium</td>
<td>Berzelius</td>
<td>1829</td>
</tr>
<tr>
<td>Magnesium</td>
<td>Bussy</td>
<td>1829</td>
</tr>
<tr>
<td>Vanadium</td>
<td>Sefström</td>
<td>1830</td>
</tr>
<tr>
<td>Latarium</td>
<td>Mosander</td>
<td>1839</td>
</tr>
<tr>
<td>Didymium</td>
<td>Mosander</td>
<td>1841</td>
</tr>
</tbody>
</table>

*Known to the Ancients.*
**TABLE XII.**

*Table of ascertained Points in the range of Temperature.*  
(Graham.)

<table>
<thead>
<tr>
<th>Deg. Fahr.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Greatest artificial cold, Thilorier</td>
</tr>
<tr>
<td>Solid compound of alcoholic and carbonic acid melts</td>
</tr>
<tr>
<td>Greatest artificial cold measured by Walker</td>
</tr>
<tr>
<td>Temperature of planetary space, Fourier</td>
</tr>
<tr>
<td>Greatest natural cold observed by Ross</td>
</tr>
<tr>
<td>Greatest natural cold observed by Parry</td>
</tr>
<tr>
<td>Sulphuric ether congeals</td>
</tr>
<tr>
<td>Melting point of solid mercury</td>
</tr>
<tr>
<td>Proof spirit freezes</td>
</tr>
<tr>
<td>One part alcohol, three parts water, mixed, freezes</td>
</tr>
<tr>
<td>Strong wine freezes</td>
</tr>
<tr>
<td>Ice melts</td>
</tr>
<tr>
<td>Medium temperature of the surface of the earth</td>
</tr>
<tr>
<td>Heat of human blood</td>
</tr>
<tr>
<td>Wood spirit boils</td>
</tr>
<tr>
<td>Alcohol boils</td>
</tr>
<tr>
<td>Water boils</td>
</tr>
<tr>
<td>Tin melts</td>
</tr>
<tr>
<td>Mercury boils</td>
</tr>
<tr>
<td>Red heat, Daniell</td>
</tr>
<tr>
<td>Heat of a common fire</td>
</tr>
<tr>
<td>Brass melts</td>
</tr>
<tr>
<td>Silver melts</td>
</tr>
<tr>
<td>Cast iron melts</td>
</tr>
</tbody>
</table>

**TABLE XIII.**

*Of the Boiling Points of Liquids, determined with precision.*  
(Graham.)

<table>
<thead>
<tr>
<th>Boils.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hydrochloric Ether</td>
</tr>
<tr>
<td>Sulphuric Ether</td>
</tr>
<tr>
<td>Bisulphuret of Carbon</td>
</tr>
<tr>
<td>Ammonia (sp. gr. 0.945)</td>
</tr>
<tr>
<td>Alcohol (sp. gr. 0.798)</td>
</tr>
<tr>
<td>Water</td>
</tr>
<tr>
<td>Mitric Acid (sp. gr. 1.42)</td>
</tr>
<tr>
<td>Crystallized Chloride of Calcium</td>
</tr>
<tr>
<td>Oil of Turpentine</td>
</tr>
<tr>
<td>Naptha</td>
</tr>
<tr>
<td>Phosphorus</td>
</tr>
<tr>
<td>Sulphuric Acid (sp. gr. 1.843)</td>
</tr>
<tr>
<td>Whale Oil</td>
</tr>
<tr>
<td>Mercury</td>
</tr>
</tbody>
</table>

(M. de l'Académie, from Medico-Chir. Review.)

M. Martin-Solon recently (Nov. 1847) read at the Académie an interesting paper upon the condition of the urine in typhoid fever, the principal points of which are thus summed up:—

1. The urine in typhoid fever is less abundant, higher colored, and generally more dense, than in health. 2. It is as acid as in the normal state, and sometimes more so. 3. It is rarely alkaline, but in consequence of its large proportion of urea, it readily passes into the condition of alkalescence. So abundant is the urea, that sometimes a nitrate may be at once formed by the addition of nitric acid without any preliminary evaporation,—a density of from 1·030 to 1·036 indicating this condition.

4. Generally transparent, the urine is sometimes clouded with mucus (the enaorema of the ancients), or by an excess of too sparingly soluble salts, which give it a “jumenteux” appearance, and which give rise to sediments, formed especially of uric acid and the urates with coloring matter. 5. That critical signs deduced from these appearances are not to be depended upon.

6. That in transparent urine, nitric acid sometimes gives rise to no reaction, but in other cases produces a claudiness immediately. 7. The same thing is observed in “jumenteux” urine, when rendered clear by filtering. 8. That this cloud, of a peculiar tormentous aspect, formed by a bi-nitrate of ammonia, but the nature of which is perhaps not yet entirely known, is seen especially at the period of the resolution of typhoid fever and acute diseases, which it precedes and announces; and according to our clinical observations (in 54 cases) possesses a critical value which deserves attention. 9. That the bile undergoes a notable alteration during typhoid fever, which is doubtless the cause of the appearance of biliverdine in the urine. 10. That the urine sometimes becomes temporarily albuminous during the course of acute diseases; but that the congestion of various organs, especially partaken of by the kidneys, and the especial tenuity of the blood in typhoid fever, render such temporary albuminuria far more common in this than in other affections. 11. Temporary albuminuria is especially seen in severe cases of typhoid, and generally gives rise to the most unfavorable prognosis. 12. Temporary albuminuria may sometimes become continuous, and the kidneys then exhibit the usual pathological characteristics of confirmed albuminuria. 13. The inspection of the urine throws light upon the progress of a case of typhoid fever, and may serve as a means for the direction of its treatment.
PART III.—MONTHLY PERISCOPE.

Foreign Bodies in the Stomach. (Union Médicale.)—M. Gaide reported to the Medico-Practical Society of Paris, the case of a young man who had gotten a fish-bone in his throat, and who in attempting to remove it with a fork, this latter slipped into the pharynx. Consulting an officer of health, he, instead of removing the fork, advised some sweet oil to the throat. In short, the patient swallowed the fork, which still remains in his stomach. His health has not suffered much, he only feels slight pain each day at the period of digestion. M. G. mentions another case in which he made a post-mortem examination of a patient who had often told him he had swallowed a fork ten years before his death. He found, in fact, the fork in the stomach, which was placed longitudinally to its great curvature, the four prongs being enveloped and fixed in voluminous fleshy projections. In connection with this subject, the American reader must be told that the forks of France are made of silver and are four-pronged.

Angioleucitis and Phlebitis. By M. Velpeau.—In both cases red streaks or lines exist, but in phlebitis beneath these are voluminous, indurated cords. These are not present in angioleucitis, because the vessels are small and do not become indurated. This has led me to lay down as an aphorism; Angioleucitis is seen, but not felt; while phlebitis is felt rather than seen: so that the affections might be distinguished even with closed eyes.—[Gaz. des Hôp., from Médico-Chirurgical Review.

Potion against the obstinate vomitings of pregnant women. By M. Privat. (Journal des Connaissances Médico-Chirurg.)—

Alkaline.
Bicarbonate of Soda, 3 grammes.
Extract of Henbane, 20 centigrammes.
Syrup, 15 grammes.
Mint water, 60 grammes.

Acid.
Citric Acid, 3 grammes.
Syrup, 15 grammes.
Water, 60 grammes.

Give a spoonful of each, mixed together, every hour.

Treatment of the Aphthous Eruption (thrush) in Infants. (Bulletin Général de Thérapeutique.)—Aphthæ is one of the most common affections of suckling children. It is fortunately very trifling in the vast majority of cases. Idiopathic, it is of little importance, but when complicated with another disease, enteritis, &c., it may become quite serious.

Prof. Trousseau's mode of treatment is this:—Take equal portions of Honey of Roses and Borax, say 10 grammes of each, saturate a fine piece of linen with the mixture, and apply to the buccal cavity five or six times a day. This generally eures in two to three days. When, however, the case is obstinate, M. T. has then recourse to another means—viz., Nitrate of Silver, 5 grammes, to Water, 30 grammes. This is in like manner to be applied to the whole aphthous parts. Two
to three applications will generally cure the most obstinate thrush. In
the severest cases, the distinguished professor does not hesitate to use
the solid nitrate of silver.

The Children of Dwarfs not necessarily small.—Dr. Pidduck states
that the children of dwarfs do not necessarily partake of the diminu-
tive size of their parents. There was a well known instance of a
g Glover and his wife, who lived opposite the Infirmary in Edinburgh:
their height did not exceed forty inches; their only daughter was at
least five feet high, and so robust as to be able to carry both her pa-
rents, one on each arm, at the same time. —[London Lancet.

On the Use of Ocular Douches for the Treatment of Purulent Ophthal-
mia of Infants, Opacities of the Cornea, &c. By M. Chassaignac.—
M. Chassaignac has for the last six months employed irrigation of the
eye for the treatment of the ophthalmia of young infants with the
greatest success; so that while formerly blindness at the Foundling
Hospital was constantly occurring from this cause, it is now seldom
so produced there. The child is laid on a table, and water allowed
to flow from a small tap through a tube over the surface of the eye
during from 5 to 15 minutes several times a day. M. Chassaignac
has discovered that in this disease a pseudo-membrane is frequently
produced, the removal of which much expedites the treatment. The
mortality of children suffering from disease of the eyes during the
last ten years was 1 in 3; while since this plan has been adopted, it
has been but 1 in 8. In the course of investigation, this means was
found applicable to several other inflammatory conditions of the eye,
and also especially for the removal of opacities of the cornea which
resist ordinary means. Accounts of its really remarkable success in
this last important application, have just been published by one of the

Punctures of the Scrotum in Hernia Humoralis. By M. Velpeau.—
The little operation I practise almost entirely relieves the pain, and
produces no inconvenience. I gently grasp the inflamed part with
my hand, so that the thumb and index-finger may thrust the fluid which
the hernia vaginalis contains towards the surface. I pass the lancet,
held like a pen, perpendicularly into the most fluctuating portions of
the tumour, so that its point may enter the tunica vaginalis, and in
this way puncture two, three, or four times the portion held in my
hand. Generally a little jet of fluid is discharged, and if any inflam-
mation occur, a cataplasm is applied. In almost all the cases the pain
and redness diminish at once, and the scrotum recovers its sup-
plenness. These punctures may be made at any stage of the affec-

Lithotomy and Lithotrity. (Archives Générales de Médecine.)—At
the close of a long discussion in the Academy of Medicine in Paris on
the subject of lithotomy and lithotrity, M. Gailliard, Surgeon-in-chief
of the Hospital of Poitiers, presented the result of 27 cases of stones coming under his care—23 were men, and 4 were women; 21 were adults, and 6 below 16 years old. Two patients were so ill that they could be subjected to no surgical operation. Of 25 operated upon, 16 were cut, and 11 lithotritised, making 27 cases; 2 patients were subjected first to crushing, which failing to relieve them they were subsequently lithotomized—these two were cured. Lithotomy did not succeed with them because in one the stone had formed around a pin, and in the other upon a piece of catheter. Of the 25 patients 23 were cured and 2 died. All those recovered upon whom the crushing process was used, and two who succumbed from lithotomy, one died on the sixth day, of suppuration of the cellular tissue of the pelvis, and the other on the sixtieth day of bronchitis. This is certainly excellent success.

Efficacy of Cotton against the pain of Orchitis. (Bulletin Général de Thérapeutique.)—M. Fredeanelli relates, in the gazetta Toscana delle scienze medico-fisiche, a case where all the ordinary means had failed to relieve the pain of a swelled testicle, a layer of carded cotton and a restricted diet, enabled the patient at once to attend to his business.

The flexed and straight positions in Fractures of the Thighs. (Jour. de Médecine de Lyon.)—Prof. Bouisson, of Montpelier, proposes to treat oblique fractures of the thighs by the combination of the two positions, the bent and straight. He recommends the flexed position during the first fifteen or eighteen days, and afterwards the straight to be permanently continued.

French and English made Instruments.—The reviewer of Civiale's work on Lithotritry in the first No. of the two English Quarterly's combined, viz., Johnson's and Forbes' Review, (who he is, or who indeed is the Editor of the Journal, no one knows, for no name is appended to it,) makes the following remarks:—“As some explanation of the cause why the French makers are so much better known than our own all over the continent, we may mention that we only paid M. Charrière 35 francs for this instrument, (less than 30 shillings,) and it was beautifully finished. A friend of ours paid nearly four times this sum to an English maker of some reputation, and this very instrument broke in our hands while we were experimenting with pieces of coal on a table.” This is a just tribute to that most celebrated of all instrument makers, Monsieur Charrière of Paris, a member of the Legion of Honor, &c., &c. We have used the workmanship of his hands since 1830, in the various surgical operations, and have never once been disappointed in them nor detected a single flaw.

How to remove rust from iron and steel, and how to prevent their being affected by it. (Journal des Connaissances Médico-Chir.)—M. Heusler, druggist at Longuyon, recommends the articles to be first
oiled; at the end of one or two hours remove the oil with blotting paper or linen; rub then the rusted parts with a mixture of 16 grammes of tint of Savon and 8 grammes of purified Potash. Leave them ten minutes without touching them, then rub with a cork until all the rust is removed, and wipe with a piece of cloth.

To prevent an instrument from rusting, make a mixture of 5 parts of varnish with oil of flax-seed, and 3 parts oil of rectified turpentine. Rub this on them with a sponge and let it dry. Keep the articles in a dry place and free from dust.

MEDICAL INTELLIGENCE.

Chloroform—the great discovery and blessing of the age.—We ventured in our last No. to express a very favorable opinion respecting the anaesthetic properties of chloroform, and stated we were engaged in testing its virtues. We had proposed not only to report in our present issue the results of our experiments, but to give a detailed account of the facts collected on this subject during the month. These, however, have so accumulated, that we shall be compelled to omit many, or simply narrate them, referring the reader to the sources whence they are derived.

We shall first attempt to answer the question in a plain and practical manner, which is now so repeatedly asked, What is chloroform? It is a transparent, volatile fluid, heavier than water; burns with difficulty; has an agreeable odour, and first a pungent, then a very sweet taste. Its physical properties may be compared to chloric ether. It was discovered in 1831, by E. Soubeiran, chief pharmacist to the hospitals of Paris. Liebeg, soon after this, described it—Flourens first experimented with it—and Dumas, dean of the Faculty of Sciences and Arts, in Paris, determined its true chemical nature and gave it its nomenclature. Chloroform is a compound of the following elements: Formic acid, which was first detected in the red ant, hence the name, (from formica, an ant,) is composed of 2 proportions of carbon, 1 proportion of hydrogen, and 3 proportions of oxygen. By the chemical action of chlorine gas upon formic acid, the oxygen of the acid is replaced by 3 proportions of the chlorine: this new product is chloroform. It is technically called the trichloride of formyl, because of the union of three proportions of chlorine gas; and formyl, because as the formic acid is decomposed, the gas unites with its supposed base or hypothetical radical, to which the name of formyl is given. Chloroform is then composed of carbon, hydrogen and chlorine, and these united in the proportions, represented by the chemical signs C2, H1, Cl3.

It is said, a Mr. Guthrie, of one of the New England States, at the suggestion of Prof. Silliman, also discovered chloroform, about 1831.

A formula for preparing chloroform may be found in our February No. At present, chemists and druggists are engaged in searching for some cheap mode of obtaining it. We paid $4.50 for a pound. The high price has led to adulteration, chiefly with alcohol. We fortunately possess an easy test for detecting this. Mons. Mialhe says, if the chloroform be dropped into water, it sinks to the bottom, and the fluid remains transparent; but if impure, the water becomes milky.
To Prof. Simpson, of Edinburgh, is alone due the credit of applying chloroform as an anaesthetic means in the practice of medicine. We are free to express the opinion, that Mesmerism, or rather the investigations connected with the subject, have led to the wonderful and miraculous introduction of ether and now of chloroform, in the healing art; may we not add, of the preventing art to pain and suffering.

But to our own experiments, already alluded to; and to be brief, we confine our observations to cases occurring since the 1st of January, and which were witnessed by the Class of the Medical College of Georgia. They are eight in number, in which anaesthetic means were employed.

Jan. 4th. Restoration of the Vagina, while the patient was under the anaesthetic influence of Sulphuric ether. She had given birth to a dead child, after three or four days labour, about seven years ago. From Vaginitis, probably, the parts since had gradually continued to close up. A probe cannot now be introduced, still there is a stillicidium of menses like fluid nearly all the time, flowing out at a point within the fourchette. Aided by the Prof. of Obstetrics, Dr. Coe, of DeKalb county, and several of our Students, the operation of re-opening the vagina was commenced; but from the violent strugglings of a powerful woman, we had to desist. The ether, on a sponge, was now forcibly held to her nose, when she became insensible to the knife, which was continued cautiously working its way up to the os tineae, only easing when the finger could be introduced. We have some doubts if the operation could have been performed in this case, without the induction of the anaesthetic condition. The patient possessed great strength and was obstinately opposed to the use of instruments.

Jan. 5th. Amputation of the Leg, for necrosis—complete insensibility was produced by the inhalation of sulphuric ether. The patient was a youth, aged 20, (white); he had to be urged for several minutes to breathe the ether; experienced disturbed dreams, but states he knew nothing of the operation.

Jan. 22d Amputation of the Thigh, for white-scalling of the knee—insensibility but for a moment from breathing the chloroform. With all our industry and anxiety on the subject, we could only procure a very small quantity of the Trichloride of formyl, and for this we were indebted to Dr. Barry, of the house of D'Antignac & Barry. The preparation acted promptly, but before the operation was even commenced, its effects had passed off. Four ounces of chloric ether were then faithfully inhaled, but failed to produce insensibility in this case.

Jan. 21st. Removal of a large fibrous tumor (5 lbs. 23) from the Thigh—total insensibility by sulph. ether. This was a very aged man, the sciatic nerve was exposed and dissected from the tumor for several inches; the patient lay like a subject on the table during the operation, occupying about nine minutes.

Jan. 24th. Amputation partial of the Foot—complete anaesthesia by the sulph. ether. This patient was 8 years old, and after overcoming his repugnance to breathing the ether, was promptly effected by it.

Jan. 29th. Amputation partial of the foot—complete, death-like insensibility produced by chloroform. This case was that of an adult, who refused to inhale either of the anaesthetic agents. A sponge saturated with chloroform was forcibly held to her nose and mouth, and in a few seconds she was rendered insensible. She remained so for more than half an hour after the operation was performed and the dressing applied. The chloroform was prepared by Dr. Barry.

Feb. 9th. Dislocation at the shoulder-joint—neither the chloroform nor ether acted
satisfactorily in this case. The patient, an Irishman, had been addicted to spirits. There were slight convulsive movements produced.

Feb. 11th. Amputation at the shoulder-joint—complete insensibility by chloroform. This was a very satisfactory case—the patient had received a gun-shot wound 48 hours previous to the amputation; the parts injured were in a high state of inflammation, yet he evinced no sensibility. He says he knows nothing of the operation.

Chloric ether failed to produce anaesthesia in one of these cases—it was faithfully tried.

Sulphuric ether succeeded in inducing this state in four of them—the insensibility being complete, but requiring great encouragement to induce the patients to breathe it, and some time was lost in each instance.

The chloroform acted promptly and efficiently in all the cases to which it was applied, giving entire satisfaction; but the insensibility was not continued long enough in one case, on account of the limited supply of it.

We give our decided preference to chloroform, over ether.

We use a sponge or handkerchief, held to the nose and mouth, pouring upon it from 50 to 120 drops. The article we are now using was purchased from Mr. Risley, of the firm of Haviland, Risley & Co., and was made by Rushton & Co., New-York.

The journals and even the news-papers of our country, are beginning to teem with cases relating the wonder workings of chloroform. As these may be accessible to our readers, we close this notice by reference to testimony received in its favor by the last arrivals from Europe.

In the London Lancet, for January, 1848, will be found related several cases of difficult parturition, successfully relieved without pain to the mother, from the inhalation of chloroform. These are by Prof. Murphy, of the University College, London.

Holmes Coote, Esq., Demonstrator of Anatomy to St. Bartholomew's Hospital, relates two cases of Lithotomy, one in a man, and another in a boy, successfully performed under the effects of chloroform. So also may be seen in the same Journal, accounts of operations performed under the same influence, by Tatum, H. C. Johnson, Cæsar Hawkins, Pettigrew, &c. The late Mr. Liston, Lawrence, Phillips, Furgusson, Key, Syme, &c., have all likewise used it.

From the Bulletin Général de Thérapeutique Médicale et Chirurgical, published in Paris, December, 1847, we gather the following facts in relation to the application of Chloroform to surgical operations:

The chloroform has already been employed in a great number of different operations. At the Hotel Dieu, Messrs. Roux and Blandin were the first to experiment with the wonderful properties of this preparation. The results of M. Roux confirm those collected by Dr. Simpson of Edinburgh. He has operated for a voluminous sarcocele of the testicle, (castration); amputated the penis; removed the whole mamma for a cancer; amputated the thigh, &c. In all these cases the anesthesia was obtained more promptly by the chloroform than with ether. From half to one minute, at most, the insensibility was complete. None of these cases experienced symptoms of repugnance to inhale the gas, or irritation of the air passages, or extraordinary hallucinations or dreams, but awoke in a pleasant state. Two, however, had disturbed sleep and loquacity compared to that produced from the inhalation of ether.
M. Blandin has operated by lithotripsy for stone, fistula in ano, a large abscess in the buttock, &c. He compared the insensibility of his patient to death itself. At the St. Louis Hospital, M. Jobert, (de Lamballe) has amputated the thigh, dilated the neck of the womb, operated for strangulated hernia, &c., and in every case the insensibility was promptly produced and satisfactorily maintained during the operation, and the awakening was very rapid.

M. Velpaeu, at La Charite, after his experiments with the chloroform in several operations, thus expresses himself:—its action is at once more prompt, more complete, more durable, and less disturbing than that of ether.

Prof. Sédillot, of Strasbourg, also recognized the anesthetic properties of chloroform, and declares it to be more prompt and more persistent than that of ether.

M. Amussat and Prof. J. Cloquet, also report their operations performed under the influence of the chloroform.

The following we take from the first No. of the new British and Foreign Medico-Chirurgical Review, January, 1848:

"The information which we have obtained from various sources, enables us to confirm, in the fullest degree, the statements put forward in the first instance by Dr. Simpson, with regard to the advantages of Chloroform over Ether. The more rapid and complete production of the insensibility, the facility and freedom from injurious effects with which this may be almost indefinitely prolonged, the quickness with which its effects subsequently pass off, and the almost invariable absence of any unfavourable influence that can be fairly attributed to its use, all concur with the ease and readiness with which it may be administered, and with the absence of necessity for any special apparatus for the inhaling process, to give to Chloroform a decided superiority, and, in fact, to make it as nearly perfect as any such agent can be expected to be, the varieties and idiosyncrasies of the human constitution being duly kept in view.

"We have reason to believe, not merely that chloroform will universally replace ether, but that the majority of those practitioners, who, for various reasons, objected to the inhalation of ether, are already yielding to the virtues of chloroform; and we trust that the earnest appeal which has been made by Dr. Simpson, in reference to the prevention of human suffering which its use may procure during the process of parturition, will not be without its influence on those engaged in obstetric practice. Whether it should not be exhibited in an easy natural labour, is a question which may be safely left, we think, to the decision of the patient; but that in difficult and protracted labours, of almost every description, and in nearly every case requiring manual interference, great and varied benefits are derivable from its use, seems to be the concurrent testimony of all who have employed it under such circumstances. In a case recently published by Dr. Simpson, (Lancet, Dec. 11, 1847,) a patient was kept under its influence for thirteen hours consecutively, the labour being rendered tedious by the narrowness of the pelvic canal, and the child being at last delivered by the forceps. If any permanently injurious influence were to be dreaded from the exhibition of chloroform, it would surely be manifested in such a case as this; and yet we are assured by Dr. Simpson, that the child when born showed no other want of vital power than was fully accounted for by the long-continued pressure to which it had been subjected; and that the mother's recovery was remarkably rapid, the child also speedily becoming perfectly well.

"We are much regret to find that Dr. Simpson's philanthropic efforts for the relief of human suffering, have been opposed on religious grounds by some well-meaning individuals, who consider that we are not justified in doing anything to alleviate or remove the effect of the curse pronounced upon our first progenitrix. Of course, to be consistent, such persons should set their faces against every kind of assistance which the skilful obstetrician can afford to the suffering mother, as well as to all the improvements in machinery, &c., by which the labour of man can be in any degree diminished, and Adam's share of the load thus lightened."
We lastly let Prof. Simpson speak himself, on the subject of his great discovery:

"Is it right for the physician to interfere with these fearful sufferings and agonies, in order to save and shield his patients from the endurance of them? Is it proper for him to exercise the skill of his art, so as to moderate and remove these, 'maximos et fere intolerabiles dolores'? Would it be fit and needful in him to use human means to assuage the pangs and anguish attendant upon the process of parturition in the human mother?"

"These questions, and questions like these, I have often, during the currency of the present year, heard complacently put by medical men—men, too, whose opinions and actions, in other matters and in other respects, were fully and truly actuated by that great principle of emotion which both impels us to feel sympathy at the sight of suffering in any fellow-creature, and at the same time imparts to us delight and gratification in the exercise of any power by which we can mitigate and alleviate that suffering. Such questions, I repeat, are seriously asked by physicians and surgeons; the professed object of whose whole science and art is the relief of human disease and human suffering. They are questions propounded with all imaginable gravity and seriousness by individuals who (in a mere abstract point of view) would, no doubt, strongly object to being considered as anxious to patronize and abet the continuance of pain, or traffic in the perpetuation of human sufferings of any kind. Nay, probably at this date there is not one in twenty, perhaps not one in a hundred, of the physicians and surgeons of Great Britain, who have, as yet, thought seriously upon the propriety of annulling the tortures attendant on human parturition, or who have acknowledged to their own minds the propriety of bestirring themselves, so as to be able in the exercise of their profession, to secure for their patients an immunity from the throns and agonies of childbirth.

"Perhaps, as an apology for their indolence and apathy, some may be ready to argue, that the pain and suffering attendant on parturition is not dangerous and destructive in its results, however agonizing and distressing it may be to the patient during its continuance. But the argument is fundamentally unsound. All pain is, per se, and especially when in excess, destructive, and may be even fatal in its action and effects. It "exhausts" (says Mr. Travers) "the principle of life." "It exhausts" (says Mr. Burns, of Glasgow) "both the system and the part." "Mere pain" (observed the late Dr. Goell) "can destroy life." And the great pain accompanying human parturition is no exception to this general pathological law; for, in fact, the maternal mortality attendant upon parturition regularly increases in a ratio progressive with the increased duration of the woman's sufferings. The statistical data published by Dr. Collins, in his excellent report of the Dublin Lying-in Hospital, affords ample proof of this as a general principle, with regard to the effect of pain in protracted parturition. For, according to calculations which I have made from Dr. Collins' data, while in the women delivered in the Dublin Hospital, and whose sufferings were terminated within two hours, only one in 320 of the mothers died; where the labour varied in duration from two to six hours, one in 145 of the mothers died; in those in whom it continued from seven to twelve hours, one in eighty died; where it endured from twelve to twenty-four hours, one in twenty-six died; where it lasted from twenty-four to thirty-six hours, one in seventeen died; and out of all those whose parturient sufferings were prolonged beyond thirty-six hours, one in every six perished.

"Again: Some may possibly be inclined to reason, that any means by which we could produce a state of anaesthesia, or insensibility to the physical pains of labour, must of necessity be of such a character as to add to the perils and dangers of the patient. I believe this argument to be as futile and untenable as the one that I have just noticed. Indeed, judging from analogy, and from what is the fact in surgery, I believe that, as a counteraction to the influence of pain, the state of artificial anaesthesia does not only imply a saving of human suffering, but a saving also of human life. Out of above 900 cases of the larger amputations performed during the current year, upon patients etherized or in an anaesthetic state, and which I have collated from different hospitals in Great Britain, Ireland and France, a smaller proportion died than formerly used to
perish in the same hospitals under the same operations without etherization. Thus, under amputations of the thigh, Malgaigne found that in the hospitals of Paris (1836-1841,) 67 in every 100 died; in Edinburgh the mortality of this operation in the years during which the hospital reports were published, (1839-1842) was 50 in every hundred; Mr. Phillips (1844) found the average mortality 40 in 100; Dr. Lawrie at Glasgow (1839,) 40 in 100.* I have notes of 135 cases in which this same operation has been performed during the present year in hospital practice upon patients in an etherized state. Out of these 135 cases 33 died, or only 24 in 100. Hence, I repeat, that the condition of anaesthesia not only actually preserves the patient in surgical practice from agony and torture, but actually preserves him too from the chances of danger and death. And I firmly believe, that the superinduction of anaesthesia in obstetric practice will yet be found to diminish and remove the perils as well as the pains of labour.

*In a paper which I wrote in February last, "On the Employment of the Inhalation of Sulphuric Ether in the Practice of Midwifery," I observed, "The question which I have repeatedly asked is this—Will we ever be 'justified' in using the vapour of ether to assuage the pains of natural labour? Now, if experience betimes goes fully to prove to us the safety with which ether may, under proper precautions and management, be employed in the course of parturition, then, looking to the facts of the case, and considering the actual amount of pain usually endured, I believe that the question will require to be quite changed in its character. For, instead of determining, in relation to it, whether we shall be 'justified' in using this agent under the circumstances named, it will become, on the other hand, necessary to determine whether, on any grounds, moral or medical, a professional man could deem himself 'justified' in withholding and not using any such safe means, (as we at present presuppose this to be,) provided he had the power, by it, of assuaging the pangs and anguish of the last stage of natural labour, and thus counteracting what Velpeau describes as 'those piercing cries, that agitation so lively, those excessive efforts, those inexpressible agonies, and those pains apparently intolerable,' which accompany the termination of natural parturition in the human mother." "Since the latter end of January I have employed etherization, with few and rare exceptions, in every case of labour which has been under my care, and the results, as I have already stated in the Lancet, have been, indeed, most happy and gratifying. I never had the pleasure of watching over a series of more perfect or more rapid recoveries; nor have I once witnessed any disagreeable result to either mother or child. I do not remember a single patient to have taken it who has not afterwards declared her sincere gratitude for its employment, and her indubitable determination to have recourse again to similar means under similar circumstances. Most have subsequently set out like zealous missionaries, to persuade other friends to avail themselves of the same measure in the hour of suffering. And a number of my most esteemed professional brethren in Edinburgh have adopted it with success and results equal to my own. At the same time, I most sincerely believe that we are, all of us, called upon to employ it by every principle of true humanity, as well as by every principle of true religion. Medical men may oppose, for a time, the superinduction of anaesthesia in parturition, but they will oppose it in vain; for certainly our patients themselves and their friends will force the use of it upon the profession. The whole question is, I believe, even now, one merely of time. It is not—Shall the practice come to be generally adopted? but—When shall it be generally adopted? And, for my part, I more than doubt if any man (rejecting willingly its benefits) is really

*The following table exhibits the actual number of the cases of Amputation of the Thigh referred to in the text, with their respective results.—

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<thead>
<tr>
<th>Name of Reporter</th>
<th>Cases</th>
<th>Deaths</th>
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<td>Malgaigne, Paris</td>
<td>201</td>
<td>126</td>
<td>62 in 100</td>
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<td>Peacock, Edinburgh</td>
<td>43</td>
<td>21</td>
<td>50 in 100</td>
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<td>263</td>
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<td>Lawrie, Glasgow</td>
<td>154</td>
<td>73</td>
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</tbody>
</table>

Total | 1088 | 453 | 44 in 100 |

Upon patients in an anaesthetic state, 135 | 53 | 24 in 100 |
justified, on any grounds, moral or medical, in deliberately desiring and asking his patients to shriek and writhe in their agonies for a few months, or a few years longer, in order that, by doing so, they may defer, forsooth, to his professional apathy or pan ter to his professional caprices and prejudices."

_Successor of Liston, in the University College of London.—_Prof. Syme, of Edinburgh, has, we learn, been appointed to the office vacated by the death of Mr. Liston. This may be a good appointment, but from our knowledge of the two Surgeons, the successor is greatly inferior to the lamented deceased.

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<table>
<thead>
<tr>
<th>Sun Risc. Ther.</th>
<th>2 P.M. Ther.</th>
<th>Wind</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>55° 29' 98-100</td>
<td>61° 83-100</td>
<td>s</td>
<td>Cloudy—storm last night.</td>
</tr>
<tr>
<td>33° 83-100</td>
<td>58° 94-100</td>
<td>w</td>
<td>Fair.</td>
</tr>
<tr>
<td>30° 83-100</td>
<td>56° 94-100</td>
<td>s</td>
<td>Fair.</td>
</tr>
<tr>
<td>29° 93-100</td>
<td>56° 94-100</td>
<td>n.w.</td>
<td>Fair.</td>
</tr>
<tr>
<td>29° 96-100</td>
<td>62° 93-100</td>
<td>s</td>
<td>Fair.</td>
</tr>
<tr>
<td>29° 72-100</td>
<td>70° 66-100</td>
<td>w</td>
<td>Fair.</td>
</tr>
<tr>
<td>29° 67-100</td>
<td>58° 72-100</td>
<td>n.e.</td>
<td>Fair.</td>
</tr>
<tr>
<td>29° 72-100</td>
<td>50° 53-100</td>
<td>s</td>
<td>Cloudy.</td>
</tr>
<tr>
<td>29° 54-100</td>
<td>53° 61-100</td>
<td>n.w.</td>
<td>Fair—blow—storm last night.</td>
</tr>
<tr>
<td>29° 71-100</td>
<td>44° 30-100</td>
<td>n.w.</td>
<td>Fair—blow.</td>
</tr>
<tr>
<td>29° 32-100</td>
<td>45° 17-100</td>
<td>e</td>
<td>Cloudy in afternoon.</td>
</tr>
<tr>
<td>29° 10-100</td>
<td>53° 6-100</td>
<td>n.w.</td>
<td>Cloudy.</td>
</tr>
<tr>
<td>29° 10-100</td>
<td>47° 7-100</td>
<td>n.e.</td>
<td>Cloudy.</td>
</tr>
<tr>
<td>29° 7-100</td>
<td>52° 30</td>
<td>n.e.</td>
<td>Cloudy.</td>
</tr>
<tr>
<td>29° 30</td>
<td>68° 95-100</td>
<td>s.e.</td>
<td>Fair since 12 M.</td>
</tr>
<tr>
<td>29° 95-100</td>
<td>75° 92-100</td>
<td>s</td>
<td>Fair—some flying clouds.</td>
</tr>
<tr>
<td>29° 95-100</td>
<td>62° 97-100</td>
<td>s.w.</td>
<td>Cloudy.</td>
</tr>
<tr>
<td>29° 93-100</td>
<td>58° 87-100</td>
<td>n.w.</td>
<td>Cloudy—sprinkle last night</td>
</tr>
<tr>
<td>29° 17-100</td>
<td>49° 15-100</td>
<td>n.e.</td>
<td>Cloudy.</td>
</tr>
<tr>
<td>29° 14-100</td>
<td>62° 29-100</td>
<td>n.w.</td>
<td>Cloudy.</td>
</tr>
<tr>
<td>29° 85-100</td>
<td>66° 89-100</td>
<td>s.w.</td>
<td>Fair.</td>
</tr>
<tr>
<td>29° 94-100</td>
<td>66° 96-100</td>
<td>s.w.</td>
<td>Fair.</td>
</tr>
<tr>
<td>29° 30</td>
<td>67° 30-100</td>
<td>e</td>
<td>Fair—very dusty.</td>
</tr>
<tr>
<td>29° 10-100</td>
<td>62° 10-100</td>
<td>e</td>
<td>Cloudy—sprinkle.</td>
</tr>
<tr>
<td>29° 91-100</td>
<td>53° 29-100</td>
<td>s</td>
<td>Rain all day. 1 2 nights &amp; 1 day 2 1/2 inches.</td>
</tr>
<tr>
<td>29° 50</td>
<td>68° 50-100</td>
<td>s.w.</td>
<td>Fair.</td>
</tr>
<tr>
<td>29° 70-100</td>
<td>65° 72-100</td>
<td>n.w.</td>
<td>Fair—breeze.</td>
</tr>
<tr>
<td>29° 74-100</td>
<td>73° 77-100</td>
<td>w</td>
<td>Fair.</td>
</tr>
<tr>
<td>29° 83-100</td>
<td>62° 81-100</td>
<td>s</td>
<td>Cloudy—sprinkle. 35-100.</td>
</tr>
<tr>
<td>29° 73-100</td>
<td>63° 65-100</td>
<td>s.w.</td>
<td>Cloudy—sprinkle—rain at night</td>
</tr>
</tbody>
</table>

17 Fair days. Quantity of Rain 2 inch 85-100. Wind East of N. and S. 9 days. West of do. do. 15 days.