bolic acid (one of the products of coal-tar) led them to combine five per cent. of it with the salt previously employed. By this means a disinfecting powder was produced, which has proved remarkably efficient in all instances where it has hitherto been tried; in districts infested with fever, and in cases of far advanced decomposition.

MORE than two months have elapsed since the occurrence of that terrible explosion at the Lundhill Colliery, whereby nearly two hundred men were swept into eternity at one fell swoop. But it is only now that the water, admitted to extinguish the fire, has been so far removed as to allow the recovery of any considerable number of the bodies. So decomposed and disfigured are those hitherto removed, that a committee of medical men have pointed out the disadvantage of allowing any attempts at recognition by friends or relatives. The remains hitherto recovered present the appearance of having been subjected to the action of both fire and water, since the pit was on fire for three days before the water was turned in. An admirable example, in order to avoid as far as possible the dangers of naked lights, has been lately set at the Balleswidden mines in Cornwall, where works have been erected, and apparatus is now being fitted, for the purpose of introducing gas into the pit in place of candles. We see no reason why the electric light should not be adapted to this purpose.

Correspondence.

"Audi alteram partem."

THE EXCITO-SECRETORY SYSTEM; CLAIMS OF HENRY FRASER CAMPBELL, M.D., OF AUGUSTA, GEORGIA, U.S.

BY MARSHALL HALL, M.D., F.R.S.;
OF THE INSTITUTE OF FRANCE; ETC., ETC.

To the Editor of THE LANCET.

SIR,—I have received a printed letter, addressed to me by Dr. Campbell, of Augusta, Georgia, U.S., stating his claims to priority in the detection of the excito-secretory sub-system of the spinal system, and requesting me to use my influence to obtain its insertion in THE LANCET. May I therefore beg that it may, if possible, appear in that publication?*

"A Claim of Priority in the Discovery of, and also the naming of the Excito-Secretory System of Nerves. By HENRY FRASER CAMPBELL, M.D., of Augusta, Georgia, U.S.A., Member of the American Medical Association, Professor of Comparative Anatomy &c. in the Medical College of Georgia, and Senior Editor of the Southern Medical and Surgical Journal.

"EXCITO-SECRETORY SYSTEM OF NERVES.

"LETTER TO DR. MARSHALL HALL, OF LONDON.

"Augusta, Georgia, U.S.A., March 2, 1857.

"MY DEAR SIR,—In the number of the London LANCET, republished in this country, for March, 1857, I have just read a paper from your distinguished pen; and in this paper you announce a system of Excito-Secretory nerves, in the following connexion and in the following terms:—

"In a memoir read at the Royal Society in February, 1837, I announced the existence of an excito-motory system of nerves.

"I believe I may now announce a system or sub-system of excito-secretory nerves, not less extensive."

"As the above announcement is here made in close relation with a discovery long admitted to be your own—viz., that of the excito-motory system of nerves, and inasmuch as in your subsequent remarks you attribute the proposition to no one else, I am left to infer that it is deemed by you an original de-

duction from the admitted facts of anatomical and physiological science, as developed by observations and experiments during the last and the present century. Some of these last—viz., the experiments of M. Claude Bernard, of Paris—you adduce, with the apparent intention of fortifying the views you here express.

"Finding in none of your communications upon this interesting topic, any mention made of my name or of my records, I am, with regret, impelled, from considerations of courtesy to you, and of justice to myself, to call your attention to the registration of my own labours in the same important field. I will, however, first direct you particularly, though briefly, to several portions of your own communication, in order that they may be placed in convenient juxtaposition with my own records, without giving the trouble of each time referring to the pages of THE LANCET:

"But the most remarkable proof of the doctrine which I am endeavouring to unfold is furnished by the brilliant discovery and skilful experiments of M. Cl. Bernard."

"And you here refer to his well-known experiments on the pneumogastric nerve in its relation to the secretions of the liver, published in his Lectures on Experimental Physiology during the winter session of 1854 and 1855."

"In the earlier part of your communication (March, 1857,) you thus announce the addition of this, as you suppose, new sub-system, to what you term the 'Diastaltic Nervous System,' the term 'henceforth' apparently being used to date the initial moment of an era:

"Henceforth the diastaltic nervous system must be divided into two sub-systems:

I. The Excito-motory.

II. The Excito-secretory.

"The former is extended to the entire muscular system; the latter is diffused over the general system as the blood is diffused over the system."

"Again, in reference to the pathological relations of the excito-secretory system, you remark,—

"The pathology of the excito-secretory sub-system remains to be investigated and traced. A partial keen current of air falling on any portion of the skin may induce inflammation in any susceptible internal organ. An extensive burn or scald is apt to produce pneumonia."

"And as my last quotation for the present:

"But here I close this brief communication. My present object is only to draw the merest sketch of this vast subject, which demands a most extensive and cautious series of experiments and observations. The efforts of many labourers, through many years, will be required fully to develop the two sub-systems of the diastaltic nervous system.

"I propose shortly to treat this important subject at greater length, and with more details."

"Now, my dear Sir, by a reference to the following series of records, running through a period of nearly seven years, you will at once perceive that the excito-secretory function of the nervous system has been the subject of earnest and diligent inquiry, and also of plain record, with me, for a length of time far anterior to that at which either yourself or M. Bernard had published anything on the subject.

"You will herein also perceive that this system of nerves has been plainly recognised and set forth, as considered in its relations to pathology, through which, indeed, its physiology has been mainly deduced by me. And lastly, that this system of nerves, before plainly stated and amply discussed, was, as early as May 5th, 1853, in the presence of the American Medical Association, the highest tribunal in the medical sciences within my reach, publicly named by me the Excito-Secretory, and that, too, in juxtaposition with, and contradistinction to, your own discovery—viz., the Excito-Motory function." (pp. 1—3.)

"June, 1850.—Permit me now, respected Sir, to refer you to the pages of the Southern Medical and Surgical Journal (new series), vol. vi. No. 6, June, 1850. Part I.—Original communications. Article XV., page 321. You will in this place find the paper just cited, published—viz., 'An Essay on the Influence of Dentition in producing Disease. By Henry F. Campbell, M.D., Demonstrator of Anatomy in the Medical College of Georgia.' Here you will find that I have in the beginning sketched prominently the two orders of phenomena which occur during the period of dentition,—viz., the convulsive and the secretory, explaining the first easily enough by a reference to the principles of excito-motory action laid down by yourself; whilst the other set of phenomena I presented in such a manner as that, from them, the excito-secretory function of the nervous system became an obvious and an unavoidable deduction: by

* Dr. Campbell's letter consists of sixteen dense octavo pages, is very diffuse, and contains needless repetitions, as the whole of p. 7—9, and p. 11—13. We have therefore inserted it in a form suited to our space. We have omitted no important paragraph.—[Ed. L.]

* Leçons de Physiologie, p. 325. Paris, 1855.

this means mutually establishing a physiological principle before scarcely ever broached or hinted at; and, in the second place, leaving no chance to escape the necessary admission that this set of phenomena, before perfectly inexplicable to the profession, could only be rationally interpreted by the admission of that very physiological principle. In doing this, the 'two sub-systems,' as you now term them, were, throughout, kept in close relation, but in decided contrast, the one being used occasionally, it is true, to illustrate the other, but never for a moment becoming confounded with the other: thus—'Now let us inquire how far these phenomena are dependent upon dentition; and ANALOGY with the EXCITO-MOTORY system will much assist us in our argument. We have seen that local irritation can, through this system, produce convulsions by the reflex function of the nerves, the sensitive branches of the fifth pair becoming excitor to the motory-spinal nerves; and so, may we justly infer, do these same branches, under certain circumstances, become excitor to the SECRETORY filaments of the sympathetic, distributed so abundantly to the intestinal canal by a transmission of this irritation through the various ganglia with which it is connected.'"

"Without further remark at present, I will lay before you that portion of this Essay which embodies my first record upon the excito-secretory function of the nervous system:—

"From the above considerations we are induced to conclude that the convulsions are often produced by the irritation of dentition, and can be directly referred to this as the sole cause.

"We arrive now at a point in this somewhat obscure and much disputed question which, perhaps, affords more ground for doubt than any of the foregoing,—viz., a consideration of the pathogenic influence of dentition in the cholera infantum, or diarrhoea, so uniformly co-existent with this process. Unlike the convulsions, the analogy between which and certain known and established phenomena of the excito-motory system, which it is only necessary to refer to, and their operation is plain and intelligible, this new set of symptoms, if we refer them to the process of dentition, requires us to look yet deeper into the mysteries of our nervous organization, and to venture still one step further on the terra incerta of sympathetic interpretation.

"In order to apply our arguments, let us hastily review the foregoing investigation, that they may bear more fully upon this part of our question; and, firstly, we have seen that inflammation, pain, and irritation are produced locally by the process of dentition, evinced by restlessness, biting, &c. Secondly, we have seen that this local irritation can be transmitted by excito-motory influence to other and distant parts of the body, manifested by convulsions. We have also endeavoured to corroborate this latter opinion by a reference to the order of succession in the nerves in which this irritation occurs, and also by a comparison of these phenomena with other well-understood and established analogous phenomena. Heretofore we have had to deal entirely with functions of the cerebro(?)-spinal system of nerves; but to account for this second and more obscure part of our problem, we must look in vain to any direct anatomical connexion between the fifth pair and the rest of this system of nerves. We are forced to seek out other connexions, indeed somewhat more intricate and indirect, but fortunately no less legitimate and definable. We have now to consider a set of organs which, unlike the voluntary muscles, have no connexion, or rather, we would say, emphatically, they have a connexion, though indirectly, with the cerebro-spinal system. We mean the abdominal viscera, which we know are almost altogether supplied from the great sympathetic system of nerves. Now, in the prosecution of our inquiry it becomes necessary, to the elucidation of the question, to trace out the same connexion between the fifth pair and the sympathetic or secretory, as we did between the fifth pair and the cerebro-spinal and motory nerves; and then, should we succeed, we will briefly inquire into the bearing which this connexion and its possible results may have upon our question."

"At the fifth annual meeting of the American Medical Association (1852), held in Richmond, Virginia, not being present myself, I was appointed by a special committee, to prepare an essay on the subject of 'Typhoid Fever,' which essay was read before that body in New York, in May, 1853. In this paper, I took occasion to consider carefully the ganglionic system, in the support of the position therein assumed, that all typhoidal fevers were manifestations of disease through the secretory system of nerves. While thus engaged, my attention was called to certain experiments performed by Mons. Claude Bernard, of Paris, and made public through the *Gazette Médicale*,

and translated in the *New Orleans Medical Register*, together with his deductions therefrom.

"On examination, finding that they contained what at that time appeared to me the germ of a theory similar to mine, recorded in June, 1850, though he refers to them as 'a set of phenomena identical with those occurring in the cerebro-spinal system of nerves, denominated excito-motory by Dr. Marshall Hall,' while I had deduced this excito-secretory system (in 1850), saying 'analogy with, the excito-motory system will much assist us in our argument;' and further, inasmuch as this distinguished gentleman's report presented itself to my mind at that time, somewhat in the form of an announcement, I deemed it advisable to appeal to our National Medical Congress, in the following brief memoir, praying permission to record before them, MY CLAIM TO PRIORITY, and also my protest against the palm of originality attaching to Mons. Claude Bernard:—

["Abstract from the Transactions of the American Medical Association: Meeting held in the City of New York, May 3rd, 1853.]

"Dr. CAMPBELL, of Georgia, submitted a paper on a question of priority in reference to the discovery of the reflex relation subsisting between the cerebro-spinal and sympathetic system of nerves.—See *Minutes of Sixth Annual Meeting*, vol. vi., p. 89."—(pp. 9, 10.)

"In conclusion, let us define the position which, at the end of our investigation, we feel warranted in assuming. It is the following:—That in the anatomy and physiology, as well as in the dependent analogies of the process of dentition, we feel ample ground for the opinion that the diseases pertaining to this period may be dependent, and, in many instances, are entirely so, upon the local irritation attending the process, being transmitted through the cerebro-spinal system of nerves, producing convulsive diseases in the motory apparatus, or through the sympathetic, causing derangement of the secretory organs, particularly of the alimentary canal, by the sway which it exercises over the arterial system from which these secretions are eliminated."

"In the above brief quotation, it will be observed that the doctrine of the reflex function between the cerebro-spinal and sympathetic systems is plainly enunciated, and not only is the physiological fact noted, but we there also have surmised the transmission of permanent irritation, or of paralysis from the cerebro-spinal to the sympathetic system, giving rise to various aberrations in nutrition and secretion. This opinion we have held for years, teaching to our classes that there existed between the cerebro-spinal and the ganglionic system of nerves, a relation similar to that between the sensitive and motor branches of the cerebro-spinal, and which Marshall Hall terms excito-motory; while we have termed that between the cerebro-spinal and sympathetic systems excito-secretory."—(p. 13.)

"And now, my dear Sir, I will close this already too prolonged communication; as courtesy to you, and justice to myself, were professedly the instigating causes of its inditement, I do most sincerely hope, that in the too earnest establishment of the latter, I have not at any moment even appeared to have forgotten the former.

I am, Sir, with feelings of great respect,

Your obedient servant,

"To Marshall Hall, M.D., F.R.S., &c." "HENRY F. CAMPBELL."

It would be unjust to deny that Dr. Campbell has the merit of having first called attention to the excito-secretory sub-system in the year 1850, and that he imposed this very designation in 1853.

So far Dr. Campbell's claims are undeniable, and I would say "palmar qui meruit ferat."

But Dr. Campbell's observations will be seen to be limited to pathology, and indeed to dentition, and are the result of mere observation, with an occasional glance at physiology; no physiological instance of the latter being adduced distinctly or emphatically.

Now M. Claude Bernard's labours are experimental, and of the most recondite character:

"If the pneumogastric nerves be divided in the neck, the formation of sugar in the liver is arrested; if the lower portion of these divided nerves be galvanized, no effect is produced; but if their upper portion be galvanized, the formation of sugar is restored!"

The fact that a profound interior physiological secretion is one of reflex action is demonstrated!

Other physiological instances are freely adduced.

I arrive at this conclusion: the *idea* and the *designation* of an *excito-secretory* action belong to Dr. Campbell, but his details are limited to pathology and observation. The elaborate experimental demonstration of reflex *excito-secretory* action is the result of the experimental labours of M. Claude Bernard. And now I say—"suum cuique."

My own claim is of a very different character, and I renounce every other. It consists in the vast *generalization* of *excito-secretory* action throughout the system:

"There is, perhaps, not a point in the general cutaneous surface in which tetanus—an *excito-motor* effect—may not originate; there is scarcely a point in which internal inflammation—an *excito-secretory* effect—may not be excited."

Every point of the animal economy is in *solidarité* by a reflex *excito-secretory* action with every other!

I here observe that this *excito-secretory* action cannot be designated *diastaltic*. It is certainly *dia-energetic*; but it does not assume the form expressed by the Greek term, *στέλλω*. A new designation is required, and I propose at once the plain and simple one of *dia-centric*. Thus the in-going nerves are *centripetal*; their influence traverses the spinal marrow, and is *dia-centric*; it is reflected along *centrifugal* nerves.

One remark more. The *diastaltic* system extends to the internal muscular organs, as well as the external. I would therefore speak of

1. *External diastaltic action*, and of

2. *Internal diastaltic action*.

The former has been amply elaborated and traced in my various publications; the latter remains for new investigation.

The former applies to all orifices and exits, and all tubular structures leading to them; the latter to all internal muscular organs—the heart, the stomach, the intestines, &c.

I trust Dr. Campbell will be satisfied with my adjudication. There is in the *excito-secretory* function, as applied to pathology, an ample field of inquiry for his life's career, and it is indisputably—HIS OWN. He first detected it, gave it its designation, and saw its vast importance.

I am, Sir, your obedient servant,

April, 1857.

MARSHALL HALL.

PROHIBITORY MEASURES, QUARANTINE, AND THE MURRAIN.

To the Editor of THE LANCET.

SIR,—An Order in Council, of the 2nd instant, prohibiting the importation of cattle, hides, horns, and hoofs, from those districts of the Continent in which murrain is now prevailing, has had the unfortunate effect of directing attention too exclusively to prohibitory measures, and measures of quarantine, as preventions against the extension of murrain to this kingdom. I beg to submit to you the following observations, tending to show that such measures, uncombined with measure of internal hygiene, are worthy of little confidence:—

1. Since 1837, a singular predisposition to the development of epizootic diseases has brooded over Great Britain and Ireland. During that period, not a single year has elapsed without an epizootic of one form or other prevailing, in a marked degree, amongst domestic animals in both kingdoms. A similar predisposition to the development of epizootic diseases has also been observed, during the same period, upon the Continent. The parallelism between the epizootic constitutions of Great Britain and Ireland, and of the Continent, would alone lead to the conclusion that the conditions requisite for the development of murrain already exist in the United Kingdom, or that they are in progress of development, and, consequently, that measures of prevention are requisite *within* the bounds of our own country and of Ireland.

2. "Pulmonary murrain" is prevailing in several districts of Germany, and the terrible "dysenteric (or *choleraic*) murrain" which ravaged Asia Minor in 1855, and epizootic contagious typhus, are prevailing in other districts of Europe. One or other of these three forms of epizootic disease may assume a pre-eminence, and become the *murrain*, or the different diseases may rage with different degrees of intensity in different districts. The wide development, in a murrain-like form, of these three diseases, at one and the same time, indicates that other and more potent agencies than contagion are concerned in their development. Moreover, the contagiousness of pulmonary and dysenteric murrain (certainly of the latter) is somewhat doubtful. Of the wide-spread agencies which lead to the development of epizootics over large tracts of country, we know little; but of the local agencies which govern and foster the development of epizootics, we know much. Over-

crowding, bad ventilation, and pollution of the air, from any and every source, have as important an influence in predisposing to the development of epizootics as of epidemics. Moreover, contagion or infection alone are insufficient to account for the development of epizootics or epidemics: there must be a condition of things favourable to the action of contagion or infection. Given the contagious or infectious matter, the probability is, that unless a predisposing cause be present, the poison will not act. Hence the paramount importance of measures of internal hygiene as preventives of murrain.

3. The "lung-disease," which is now prevalent amongst cattle in England, is, I believe, identical with the pulmonary murrain on the Continent. This "lung-disease" has, in certain districts, during the last four or five years, shown indications of assuming an epizootic character, by its increased virulence, and by the mode in which it has seized upon and devastated crowded cattle-sheds. In this district, the disease is rapidly assuming all the characters of the true murrain. Several farmsteads have been ravaged by the disease within the last twelvemonths; and, in some instances, in addition to other measures, it has been necessary to close the cattle-sheds, in order, if practicable, to effect their disinfection. In all the farms which I have visited, where the disease has raged, I have found the cattle-sheds over-crowded (in one instance, seventy cattle were accustomed to be stalled where twenty ought not to have been), the ventilation was bad, and the subsoil beneath the stalls a deep mass of decomposing organic matter. My experience of this "lung-disease" (termed locally, *the new delight*), has led me to conclude that it differs in some important particulars from ordinary epizootic pleuro-pneumonia. After death, as a rule, no morbid changes are found in the pleuræ, and there is an absence of plastic exudation in the lung. The lungs present the appearances of the asthenic pneumonia of fever, and the disease itself has the characters of a true febrile disorder, complicated with a pulmonary affection, the latter probably having the same relation to the former which the intestinal affection has to the general disorder of the system in epizootic contagious typhus.

Here, then, we have the gradual development within the kingdom of a formidable epizootic disease, which is thought to be exceedingly contagious, which is certainly highly infectious, and which is to all intents and purposes a true pulmonary murrain. This affection can be combated alone by measures of internal hygiene.

I am willing to believe, that prohibitory measures and quarantine may be of some use, but the experience of all epizootics and epidemics hitherto has shown that such measures are at least of doubtful value, and that their adoption, uncombined with measures of internal hygiene, is, as a rule, a grave error. Moreover, the history of the epizootic constitution which now broods over Great Britain and Ireland, and the parallelism of that constitution with the epizootic constitution prevailing on the Continent; the history of the development of the present diseases which are prevailing in a murrain-like form on the Continent; and, more particularly, the existence in England of a virulent "lung-disease" amongst horned cattle, whether the identity of this disease with the pulmonary murrain on the Continent be admitted or not,—these considerations are sufficient to show that internal measures of hygiene are of paramount importance in our farmsteads, and that an undue faith in prohibitory measures, or measures of quarantine, would be a deplorable error.

I crave, therefore, your influence in directing the attention of our farmers to the urgent necessity which exists for the better ventilation, greater cleanliness, better paving (so as to be impermeable to wet), and diminished crowding of cattle-sheds.

I have the honour to be, Sir, your obedient servant,

J. N. RADCLIFFE, M.R.C.S.E.,
Bramley, April, 1857. Late of the Ottoman Medical Staff.

TREATMENT OF CANCER BY CAUSTIC.

To the Editor of THE LANCET.

SIR,—The treatment of cancer by caustics, now revived, is attracting so much attention by the profession, that I feel called upon to place before your readers a few facts connected with the subject. The public mind has become unduly excited by most exaggerated statements of the wonderful success of certain professors, as some time back by mesmerism, table-turning, spirit-rapping, &c. &c.

It certainly must be admitted that the treatment of cancer by the knife in most cases is far from satisfactory. In such a