

that this is impossible, as no relation exists between the resistance of the body and the tension of the current on the spinthermeter. For example, if in place of the body a spinthermeter was substituted it would be found that the distance between each of the points of the spinthermeters would be equal to one-half the distance measured between the points of the first one. Again, if the body was placed in circuit with the spinthermeter and the resistance of the former gradually reduced to a short circuit, it would be found that the voltage on the spinthermeter would be reduced to *nil*. The voltage is annulled in consequence of a short circuit having been made, showing that resistance bears no relation to the potential difference. Consequently, whatever the resistance of the body may be, when placed in circuit, the same voltage would be measured between the apparatus and earth as that on the body. The body when thus placed in circuit would take the difference in current which could be registered on a meter if it were connected in series, the voltage remaining constant. If the current measured on this meter was added to the current measured on a second meter, the latter being connected to zero, it would be found that the total of the two readings on the meters would be equal to the current passing to zero when the body was short-circuited.

The above would be in ratio to any resistance placed in the external circuit, showing that resistance does not cause a drop in potential or annul voltage. The contention that 25 feet of No. 14 copper wire cause a large drop of potential is, I venture to assert, not tenable, as the resistance of this length of wire equals approximately 0.15 ohms. The copper wire short circuits the apparatus, and the apparent drop in potential on the spinthermeter is due to this short-circuiting. The physical data given by Dr. Sloan under which his experiments were carried out are such as to question the conclusions arrived at by him as to the physiological effects of high-frequency high potential currents upon the body. In order to study the physiological effects resulting from the action of high-frequency currents on the body it is essential that a given wattage acting over a given time be maintained on it, the wattage being obtained from ampèrage and not from voltage. Further, it is necessary that the electrodes be kept at the normal temperature of the body, otherwise no accurate records can be made, and this is particularly the case when observations are being taken regarding the increase of temperature due to these currents.

As to the query what effects would be observed if the same amount of current was maintained but at different voltages, the answer to this is, as the voltage is increased a corresponding fall in current will take place, and contrariwise until a minimum voltage of from 80 to 100 is obtained. At this voltage the maximum current which can be tolerated by the body without injuring it is five ampères, or 400 watts. My contention is that it is the quantity of current which passes through the body that produces the physiological changes in it, but the wattage must be obtained by current and not voltage. Should my statement be challenged the matter can be easily set at rest by a comparative study of the effects of these currents upon the body under the following conditions. Let the body be subjected to 300 watts, the wattage being made up as follows: first, 60,000 volts at five milliampères; and secondly, 100 volts at three ampères.

In conclusion, I may say that those who hold that when the body is subjected to these high voltages only a very small quantity of current is passed through it are fully justified in their contention. I agree with Dr. Sloan that it would be well if a scientific investigation committee was appointed to consider the whole matter relating to the administration of these high potential currents in order that the subject may be placed upon a sound scientific basis.

I am, Sirs, yours faithfully,

Cardiff, July 26th, 1907.

J. CUNNINGHAM BOWIE.

TRYPSIN IN THE TREATMENT OF CANCER.

To the Editors of THE LANCET.

SIRS,—I have read with the greatest interest the able and impartial leading article on the above subject in THE LANCET of July 27th in which the independent theories of pancreatic treatment by Dr. J. Beard and by Dr. J. A. Shaw-Mackenzie are clearly differentiated. In view, however, of your statement that "so far theory only has spoken but Dr. Beard proceeded to test his theory by the injection

of trypsin into some mice which had been inoculated with Jensen's mouse tumour," whatever the value of the treatment may be, I desire to draw your attention to the fact that on the publication of Dr. Beard's communication in THE LANCET of Feb. 4th, 1905, p. 281, suggesting pancreatic treatment, Dr. Shaw-Mackenzie had already proceeded to put his own theory into practice by injections of trypsin, originally prepared for him by Mr. F. W. Gamble, and by pancreatic preparations, orally and locally, as noted and first published in THE LANCET of Feb. 11th, 1905, p. 386. I am, moreover, in a position to speak with authority in this matter, inasmuch as Dr. Shaw-Mackenzie was associated with me in the treatment of some cases of inoperable cancer under my care in the Royal Hospital, Chelsea, and when his researches were being made. To my knowledge more than one patient had apparently derived advantage from the trypsin treatment before any experiments on mice were made, nearly a year later.

I am, Sirs, yours faithfully,

THOS. LIGERTWOOD, C.B., M.D. Aberd.

Chelsea, S.W., July 27th, 1907.

THE MEDICAL USES OF ESPERANTO.

To the Editors of THE LANCET.

SIRS,—An International Congress of Esperantists is to be held at Cambridge in the month of August. Necessary preparations are bringing the great auxiliary language into the ken of many English folk who have hitherto been blind to its existence, and it is certain that in two months' time very few newspaper readers will retain their vague impression that Esperanto is a sort of grass. Even already, it may be, most British medical men will be interested to learn how Esperanto can be of use to them in their profession.

Its uses.—Medical work, more than most kinds of work, embodies the principle of universal brotherhood. The human frame has been much the same in all historic ages; health, all the world over, is to be had by obeying the same few laws; disease, in all known races, arises from similar causes and is amenable to similar treatment. And the grand impulse which prompts our service in the cure of disease and the preservation of health is happily common to all peoples. Surely, then, the medical worker, of all workers, needs an international tongue which can effect an understanding between him and all who need his help, as well as between him and all those who can assist him to greater helpfulness. That there is use for such a language in the relationship between patient and medic (and why not medic? *cf.* cleric, mechanic, stoic, &c.) even the most stay-at-home practitioner must feel. Travel is easy nowadays, and people are so enterprising that it is common enough for foreigners to come to this country with little or no knowledge of English. In my own small experience I have had to deal with French, German, Italian, and Japanese patients who could not speak my mother tongue. The medic who travels abroad is, of course, much more liable to be thus handicapped. In such a predicament Esperanto becomes increasingly available. Already there are 35,000 Esperantists who have taken the trouble to register their names. And others without number, in over 100 different countries, have acquired the *lingvo*. That there is use for such a language in international medical congresses is even more obvious. Few English medics can understand a French, or German, or Italian speaker; and still fewer can discourse in these tongues. When it comes to Norwegian, Russian, or Dutch the case is worse. Thus our polyglot medical gatherings, which ought to be so helpful, must surely be an exasperating linguistic Babel. That there is use for such a language in international medical literature is more evident still. At present valuable work is being recorded in all manner of languages. Much of it is translated and re-translated into a variety of different tongues, but at what an expense of time and labour and printed space! Surely it would be an economy for all if every writing that promotes the health of man were accessible in one easy language. One translation would then serve for the whole world—nay, before long no translation would be required; the worker would himself record his results in the international language.

These considerations are so evident that for centuries men have been trying to select or invent an international tongue. Three plans have been possible: 1. Selection of a dead language, such as Greek or Latin. This plan has had a fair trial for centuries and it has failed. These languages are

too difficult for the average man. 2. Selection of an easy living language. This also has the experience of centuries against it. No living language is easy enough. No living language can surmount the barrier of international jealousy. 3. Invention of an easy and neutral language. This has been attempted some hundreds of times. Naturally, all these artificial languages have been neutral enough, but so far only one has been easy enough. And this unique language is Esperanto.

Its easiness.—That Esperanto is easy anyone may prove to himself at the cost of a few pence and a few minutes. Its inventor says, "My whole grammar can be learned perfectly in one hour." Leo Tolstoy says that in two hours he was able to read Esperanto fluently. Sir William Ramsay says that an English child in six months can read, speak, and write it. My own experience is confirmatory so far as reading is concerned, but, of course, accurate writing is more difficult and fluent speaking is more difficult still. Yet by dint of teaching a class I have satisfied myself that illiterate Englishmen can acquire the language in an astonishingly short time.

The simplicity of Esperanto depends on the following facts: 1. All international words are transferred to Esperanto with merely a phonetic modification—e.g., teatro, telefono. This practice is an especial boon to the reader of medical literature, for in such writings international words bulk largely. 2. There is a groundwork of easy root words (about 2000), most of which are known already to an educated man. 3. These are varied by the addition of about 36 affixes, whereby extraordinary precision and most copious diction are attainable. 4. Grammatical inflections are cut down to the minimum, and, being based on the vowels a, e, i, o, and u, they are easily remembered as well as euphonic. 5. Pronunciation is unmistakable. It is rigidly phonetic. Each letter is sounded. The word-stress is always on the second-last syllable.

Its adequacy.—That Esperanto is adequate for converse between doctor and patient follows from the fact that it is adequate for all the ordinary relations of life. Recently on being introduced to a young German who knew no English, I found that we were mutually comprehensible in Esperanto. Here is another testimony: "Yesterday a young man comes to my house and asks to speak with me. I meet him, and he greets me forthwith in Esperanto. It is a young Russian. He knows not a word of French, I cannot speak a syllable of Russian. But we had our dear *lingvo internacia* in which we conversed for a good hour without even noticing any difference in our mode of pronunciation. And yet we had learned it by ourselves, from a little text-book, thousands of miles from one another." (M. d'Eyssautier.) Here is yet another witness: "I can prove to our sceptical friends that, without knowing a single foreign language, I am corresponding with persons of 17 different nationalities, amongst whom are to be found Frenchmen, Germans, Englishmen, Swedes, Norwegians, Italians, Spaniards, Portuguese, Americans, Africans, &c." (Dr. J. Ostrovski.) Moreover, those who have taken part in the various international Esperanto congresses aver that they have had no difficulty in conversing on all imaginable subjects with Esperantists of most diverse nationality. That Esperanto is adequate for use in international medical congresses follows also from its success in the various Esperantist congresses. At Dover in 1904 five nations took part; at Boulogne in 1905 22 nations took part; and at Geneva in 1906 23 nations took part. Speeches, debates, and business, as well as concerts and plays and social gatherings are all easily practicable in Esperanto.

That Esperanto is adequate for the purposes of medical literature can be learned from the study of one number of the *Internacia Revuo Medicina*.¹ Thanks to the number of international words in medical writings any practitioner ought to be able to read this *Revuo* with no better aid than a halfpenny key to Esperanto. Then he will see that Esperanto can express all that English or French can convey and the parallel columns will prove to him that it is more terse than either. Indeed, considering that the inventor of Esperanto, Dr. Ludovic Zamenhof, is a practising medical man, it is only to be expected that the language should be suitable for medical purposes. Growing numbers of practitioners have been learning it in Britain and far greater numbers have mastered it abroad. An Esperanto medical dictionary is in preparation.

Suggestions.—I have tried to show that Esperanto may prove useful in the course of medical practice, that Esperanto must prove useful at international medical congresses, and that Esperanto has proved useful in the publication of international medical literature. I would suggest, in conclusion: 1. That Esperanto should be made a compulsory subject in our medical preliminary examinations, and that in all medical schools the students should be encouraged to read, and write, and speak in Esperanto. This, with their native tongue, will suffice them for scientific purposes all the world over and will save them their laborious yet unfruitful study of the other modern languages. 2. That Esperanto should be adopted as an official language at international medical congresses. It will speedily oust its rivals. 3. That, as a preparatory measure, each nation should appoint a standing medical literature committee, which would annually decide what among the records published in its mother tongue are of permanent value, and would forward that material to an international committee for republication in Esperanto.

As a hobby.—But it would be unfair to close without a word or two on the attractiveness of the study of Esperanto as a hobby for medical men. It is a quiet and clean occupation; it can be pursued in the pauses of one's practice; it is in itself a keen intellectual pleasure; it opens up a wide and curiously varied range of literature; it throws a marvellous light on our English language, on grammar, and on points of style. Withal, proficiency in this language is rapidly attainable; every one may reasonably count on mastery; and then there comes the strong delight of wielding skilfully this brilliant, supple, clear, and comely mental tool. Further, Esperanto broadens a man's outlook; it can give to the loneliest country doctor correspondents and human interests in every quarter of the globe; it can make him indeed a citizen of the world and a universal brother. More than that, it has realised to such an extent the vague, expectant aspirations of our time that for many a man and woman, even now, it shadows forth the coming world religion.

I am, Sirs, yours faithfully,

W. WINSLOW HALL, M.D. Edin.,
Diplomito de la Brita Esperantista Asocio.

July 20th, 1907.

BEES' STINGS AND RHEUMATISM.

To the Editors of THE LANCET.

SIRS.—In connexion with the correspondence which has appeared in your columns upon the subject of bees' stings and rheumatism, it is interesting to recall that several years ago a patient wrote me asking whether physicians of to-day continued to use bees for stinging the inflamed joints in rheumatism as a curative measure, stating that he had read in an ancient classic, the reference to which I have forgotten, that such treatment was practised along the eastern shores of the Adriatic, I believe, at some time prior to the Christian era.

I am, Sirs, yours faithfully,

Chicago, June 17th, 1907.

EDWARD F. WELLS, M.D.

THE SHADOWGRAPH BOUGIE IN URETERIC SURGERY.

To the Editors of THE LANCET.

SIRS.—Few surgeons, I take it, who are working at renal or ureteric surgery would care to operate without the advantage of a good shadowgraph ureteric bougie. In a small number of cases the bougie is indispensable, for it enables the surgeon to detect false radiographic shadows and thus to avoid an extensive exploration upon the pelvic part of the ureter.

Unfortunately, a foreign firm has placed upon the market a shadowgraph ureteric bougie which exactly resembles the bougie used in England, the Marshall shadowgraph bougie. A foreign specimen was handed to me and to prove its value I placed it and a Marshall bougie on a radiographic plate. The foreign-made bougie left a faint shadow but the Marshall a strong black shadow. To obtain the best results it is necessary to secure the Marshall or one which casts an equally strong shadow.

I am, Sirs, yours faithfully,

Savile-row, W., July 22nd, 1907.

E. HURRY FENWICK.

¹ Paris: 33, Rue Lacépède; monthly, 1s.