that the excellence of the new water-supply and the facilities which the system affords for obtaining it have impressed the native population. It is only the high-caste Hindu residents on the banks of the river, accustomed to draw their water directly from the Ganges, we are told, who do not care to avail themselves of the new water-supply. The cost of this public work and of the new drainage scheme is very considerable, however, and a source of grave financial difficulty, according to our Indian contemporary, the *Pioneer Mail*, which calls upon wealthy Hindus to show their veneration for the holy city by contributing liberally to a scheme which will secure their sacred river, the Ganges, from pollution. Benares is a large and very interesting native city, but, it must be confessed, a very insanitary one, and it is a matter of surprise that outbreaks of cholera and other diseases are not more severe and frequent than they are. There cannot be a doubt that these public works will lead to a great improvement in the health of the inhabitants.

Surgeon-General Richardson, the retiring Inspector-General of Hospitals for the North-West, was recently entertained at a farewell dinner given by his brother officers at Lucknow. The *Pioneer Mail* says that the Government loses one of its best servants by Surgeon-General Richardson's early retirement, and the Medical Department one of its best friends.

BACTERIOLOGICAL LABORATORY AT NAINI TAL.

The establishment of a bacteriological laboratory near Naini Tal is at present under the consideration of the Financial Department of India, with a view to the provision of the necessary funds.

PROMOTION AFTER HALF-PAY FROM SICKNESS OR DISABILITY.

The *Pioneer Mail* publishes the following decision, which will apply to the Indian Medical Service: "The Secretary of State for War has decided that when an officer, belonging to a corps in which promotion by time service is the rule, has been placed on half-pay for disability contracted in and by the service he should, on restoration to full-pay, reckon towards promotion his time on half-pay, not exceeding one year; but no officer should be promoted whilst remaining on the half-pay list."

Correspondence.

"Audi alteram partem."

"THE PHYSIOLOGICAL EFFECTS OF HIGH FREQUENCY ELECTRIC CURRENTS."

To the Editors of THE LANCET.

SIRS,—Mr. Swinton's letter in THE LANCET of Oct. 14th seems to throw no further light on this subject. The effects on the body are perhaps not altogether proportional to the magnitude of current passed and the density. In the case of the discharge from a Leyden jar we have a comparatively feeble current oscillating many hundreds of thousands of times per second and at a potential of some thousands of volts, and yet such a rapidly alternating current gives rise to energetic physiological effects. Broadly speaking, an alternating current at ordinary frequencies acts chiefly on the nervous system; a continuous one acts more by chemical means, causing electrolytic decomposition of the contained saline fluids. Dr. F. Peterson, in a report of experiments read before the School of Mines, Columbia College, N.Y., on July 30th, 1888, came to the conclusion that rapidity of alternation alone sufficed to make a current more destructive to life, a rapidly alternating current being more deadly than a continuous one of double the voltage. This, we now learn from the recent experiments of M. Nicola Tesla and M. d'Arsonval, holds good up to a certain point only, and magnitude of current as measured in amperes seems to form the prime factor. Contrary to what obtains in the case of metals the carbon filament of a lamp decreases in resistance as the temperature rises with an ordinary continuous or direct current. With an alternating current the resistance, on the contrary, increases until with currents rapidly alternating millions of times per second the effective resistance of the carbon filament is enormously increased.¹ Hence, applying Joule's Law ($H=C^2 Rt$) to high frequency currents, the resistance is enormous, while the current is

proportionally small; and yet the total energy represented in watts consumed by the lamp is the same as it would be with a current of greater magnitude at a lower pressure. The volts are numbered by thousands while the current is only a few milliamperes; but this only proves that so much energy was employed in bringing a lamp filament to incandescence. Is there evidence to show that this energy actually passes through the tissues of the body? With ordinary frequencies the resistance of the human body to an alternating current is less than to a continuous one of the same voltage—just as, in the case of carbon, as soon as the ordinary frequencies are exceeded the resistance offered to the passage of currents rapidly rises. Professor Clerk Maxwell asserted, and Lord Rayleigh later on experimentally confirmed, the fact that with currents of high frequencies transmitted along metallic wires self-induction causes the current to glide over the surface of the conductor without penetrating to the interior at all. What obtains for metallic conductors may be equally true as regards the human body. The late Dr. W. H. Stone, in the Lumleian Lectures, 1886, compared the human body subjected to alternating currents from an induction coil to a condenser, and asserted that with rapid intermissions it was probable that a current did not fully pass before it was neutralised, in whole or in part, by the succeeding current of opposite sign coming from the opposite direction.—I am, Sirs, yours faithfully,

WM. G. SUTHERLAND, M.B. Aberd.

Capheaton, Newcastle-on-Tyne, Oct. 16th, 1893.

"SCARLET FEVER AND RÖTHELN."

To the Editors of THE LANCET.

SIRS,—As it appears I have not made the points of difference between rötheln and scarlet fever sufficiently plain, allow me to place them side by side so that they may be readily taken in at a glance:—

<i>Scarlet Fever.</i>	<i>Rötheln.</i>
1. Patient feels ill.	1. Patient scarcely feels ill at all.
2. Initial fever lasts one week at least.	2. Initial fever lasts three or four days.
3. Period of incubation, as a rule, from twenty-four to seventy-two hours.	3. Period of incubation most commonly about eighteen days.
4. Submaxillary glands, as a rule, enlarged.	4. Glandulæ concatenatæ, as a rule, enlarged, but not the submaxillary.
5. Tongue strawberry-looking, red papillæ showing through the fur.	5. Tongue almost natural.

As a physician remarked to me, the rash and peeling cannot be considered as diagnostic points.

I am, Sirs, yours truly,

Surbiton, Oct. 18th, 1893.

F. P. ATKINSON.

IMPORTATION OF RAGS.

To the Editors of THE LANCET.

SIRS,—I am sorry to see by THE LANCET of July 22nd p. 215, the decision arrived at, at the Dresden Conference with regard to the question of restriction on the importation of rags, as likely to lead to further relaxation, for rags, above all things, may be looked upon as the most dangerous carriers of disease germs or poisons. As a resident in the far East for many years, and being well acquainted with the filthy habits of Eastern natives generally (the Japanese always excepted) as well as knowing their utter ignorance and negligence of all sanitary precautions and practices, I can but look upon it as a grave mistake and as a retrograde step. Large quantities of rags are, I believe, exported both from China and India, and it would be difficult to find a more suitable cultivating medium, in which all the essentials of growth are combined with sufficient moisture and the requisite heat provided, than the hold of a vessel travelling through the tropics. Thus, the importation of every conceivable infectious disease, from leprosy and cholera to ringworm, is made an easy matter, and all the money expended on sanitary precautions, improvements, hospitals, &c. is virtually useless whilst this loophole in the first line of defence is left unclosed. Though it has not been proved that cholera has been conveyed by rags, yet the probability is very great that the microbe or poison, be it what it may, can be transported in them, as is known to occur in woolsorter's disease from wool which is simply unwoven rag. When imported these rags have to be sorted for both paper-

¹ Electrician, vol. ii., 1892.