its being situate in the section of maximum luminosity of the flame, is a somewhat delicate one, and ought, if possible, not to be disturbed oftener than is necessary for changing the lamp. Moreover, while the raising of the lamp would depress the light which passes through the refracting portion of the apparatus it would have precisely the opposite effect upon the portions which pass through the totally reflecting prisms placed above and below the refracting part, which would then throw the rays upwards to the sky, where they would be useless. But any desired change could be effected by surrounding the flame with prisms spheric on their inner faces, and concentric with the foci of the different parts of the apparatus, so as to depress the rays before they fall upon the main apparatus. Those prisms which subtend the lens would have their thicker ends lowest, and those subtending the reflectors would have their thicker ends uppermost.

The great disadvantage, unless in the case of electric lights, of employing the temporary apparatus which has just been described, arises from the loss of light by divergence, due to the relation subsisting between the radius of the flame and the radii of curvature of the apparatus itself.

But this loss may be prevented by another plan. Outside of the apparatus, and either close to it, or what would be more convenient, close to the glazing of the lantern, movable refractors made of panes of plate glass could be placed during fogs. In ordinary states of the weather, these fog screens, which would be hung by chains passing over pulleys fixed to the top of the lantern, would be close to the inside of the parapet wall of the light-room, and below the apparatus. If these refractors were fitted with counter-weights they could, in the course of a few minutes, be hauled up in front of the apparatus by the hand when the thick weather came on, and pulled down again when it became clear. The panes of plate glass which act as refractors, would be of prismoidal section vertically having their thicker ends placed downwards. The vertical angle of the prisms would in each case depend on the height of the light-room above the sea, and the distance off shore to which the strongest beam of light required to be dipped during fog. But after more fully considering the question, I have come to the conclusion that a great improvement could be effected even without resorting to temporary expedients. From a series of observations made with two kinds of photometer by Messrs. Stevenson, in 1865, on the penetrative power of light from a first order lens and cylindric refractor, it appears that for an angle of 0° 30′ in altitude above the plane of maximum intensity, and for 0° 30′ below that plane, the power of the light does not vary more than at greatest from 4 to 6 per cent., and that if the strongest part be sent to the horizon, about one-half of the whole is sent uselessly to the skies.

Power of Lens in the Vertical Plane.

° ′		Means of four sets of observations.
0 40	above the level of maximum	·90
0 30	,, ,, ,,	·94
0 20	,, ,, ,,	·97
0 10	,, ,, ,,	·98
0 0	maximum power	1·00
0 10	below the level of maximum	·99
0 20	,, ,, ,,	·97
0 30	,, ,, ,,	·96

Note.—These results, which are the means of four sets of observations, did not extend further in the vertical plane.

Result of Dipping Light as Proposed, Contrasted with Present System.

Present System. Above horizon. ° ′	Power.	Proposed System. Above horizon. ° ′	Power.
0 40	·90 lost on sky.	0 20	·90 lost on sky.
0 30	·94 ,, ,,	0 10	·94 ,, ,,
0 20	·97 ,, ,,	0 0	·97 on horizon.
0 10	·98 ,, ,,		
0 0	1·00 on horizon.		
Below horizon.		Below horizon.	
0 10	·99 on sea.	0 10	·98 on sea.
0 20	·97 ,,	0 20	1·00 ,,
0 30	·96 ,,	0 30	·99 ,,
		0 40	·97 ,,
		0 50	·96 ,,

Applying these observations, so far as they extend in the vertical plane, to the case of lighthouses elevated much above sea-level, we see that to dip the strongest beam to a point much nearer the shore than the sea horizon, while it would not appreciably affect the visibility there, would even, so far as the observations go, increase the power of the light nearer the shore. Those who have been close to a lighthouse on a hazy night must have noticed the luminous rays passing through the air far above the sea-level, and cases are adduced by Mr. Beazeley of shipwrecks having occurred when the light could not be seen by the sailors, although their vessels were stranded close to the tower. As the lens has the greatest divergence, and is the only agent for giving light near the shore, it only should be dipped so as to throw as few of the rays as possible uselessly on the skies, while the reflecting prisms, which have much less divergence, will remain as at present throwing their rays to the horizon. By this different distribution of the light from the lens and the prisms, although the strongest beams from the lens were dipped 0° 20′ below the horizon, which causes a loss there of 3 per cent. of lens power, yet the loss on the *whole* light coming from both lens and prisms, taken at Mr. Chance's valuation of 70 and 30 respectively, will be reduced to only about 2 per cent., while the sea near the shore will be more powerfully illuminated than at present. It may, however, be fairly questioned whether the strongest beam ought not to be dipped to 0° 30′, as this would still further increase the power near the shore, and would only depreciate the light at the horizon by about 5·8 per cent. It is well to remember that, should the flame, through neglect of the keeper, fall at any time below the standard height, such a defect will operate most injuriously on the light falling near the shore, and not so much on that sent to the horizon. Now there can be no question that in all ordinary cases a vessel with such an offing as twenty miles, which is the sea-range due to 300 feet of elevation, is in a far safer position than if she were within a mile or two of the shore, and hence the propriety of increasing the light near the shore so long as we do not to any appreciable extent reduce it at the horizon.

T. STEVENSON

MEDICAL ENDOWMENTS AT OXFORD

WE have been requested to publish the following details of existing endowments assigned by founders to the study of Medicine and of Human Anatomy and Physiology as bearing on Medicine :—

I. The Regius Professorship of Medicine, as at present constituted, is worth about 500*l.* a year. The items are : (1) from the Queen's exchequer, 35*l.*; (2) as Master of Ewelme Almshouse, 250*l.*; (3) as Aldrichian Professor of Medicine, 126*l.*; (4) examination and graduation fees, 70*l.* to 100*l.*

II. Lord Lichfield's Clinical Professorship, which is not united with the Regius Professorship, is worth 200*l.* a year.

Dr. H. W. Acland holds both the Regius and the Clinical Professorships : no instruction is given by Dr. Acland in either capacity.

III. The Linacre Professorship of Physiology and Anatomy has absorbed the old foundations for the encouragement of human anatomy, namely, the Tomlinsian Prælectorship and the Aldrichian Professorship. It is worth 800*l.* a year, the sum which Merton College pays in place of the original endowment entrusted to it by Thomas Linacre, founder of the College of Physicians, and once a lecturer on medicine in Oxford. The Linacre Professor is engaged in teaching Comparative Anatomy to candidates for the B.A. degree.

IV. A separate Demonstratorship of Anatomy, worth 200*l.* a year, also still exists, and was intended by the commissioners of 1852 to provide for the teaching of human anatomy, as designed by Tomlins and Aldrich. The gentleman who holds this post is Curator of the Museum of Comparative Anatomy and does not teach Human Anatomy.

V. The beautiful old Physic Garden founded by Earl Danby in 1622 is another heirloom of the Medical Faculty of Oxford. The chair of Botany was endowed by Dr. Sherard and the College of Physicians of London elect the professor. By special provision, the clergy are excluded from this professorship, and *preference is to be given to a medical graduate.* The chair is now worth, with later additions, about 400*l.* a year.

VI. Lastly, a very important trust fund is administered by the governing body of Christ Church, the bulk of which was left by Dr. Matthew Lee in 1755 to provide for anatomical teaching in relation to medicine *exclusively.* Dr. Lee's expression of his intentions is very clear and precise. He assigns, in his will, 100*l.* a year as the salary of a reader in anatomy; 50*l.* for expenses of two bodies and dissection; 30*l.* to a reader in mathematics and physics, and the remainder to be given in annual prizes of 10*l.* to scholars from Westminster School. The trust is now worth 3,400*l.* annually. It is spoken of in the return made by Christ Church to the Commissioners of 1874 as "Dr. Lee's Benefaction for Senior Students in Natural Science." This is not quite accurate: firstly, because Dr. Lee designed the major portion of his benefaction for students in anatomy as bearing on medicine, and not for natural science generally; and, secondly, because Christ Church uses nearly half of Dr. Lee's trust-money to pay classical scholars from Westminster School; whilst the remainder is used to support a most efficient chemical laboratory, and to pay, in part, the salaries of the accomplished chemist, zoologist, and physicist, who are styled "Lee's Readers." No part of Dr. Lee's bequest is now assigned to medical studies, though it should be stated that the present application of Dr. Lee's fund has obtained Parliamentary sanction.

ON THE THERMAL PHENOMENA PRODUCED BY THE PASSAGE OF ELECTRICITY THROUGH RAREFIED GASES[1]

A PORTION of the experiments described in this paper were made before the publication of Wiedemann's experiments on the same subject. The authors state that if they had known of the work of the German physicist they would probably not have undertaken the investigation, but they have continued the experiments and think them worthy of description as the methods employed differ from those of Wiedemann.

The apparatus used consisted of ordinary Geissler tubes, the electrodes being in wide tubes connected by a narrow one. A large Ruhmkorff's coil with a secondary wire 100,000 metres in length was set in action by two large Bunsen cells, and the current was made and broken by a Foucault's interrupter. In order to measure the induced current a reflecting galvanometer was employed, being placed at such a distance from the coil that the effect of the electro-magnet on the needle was very small; this slight deviation was, however, applied as a correction in all the readings. It was first proved that the current induced on completing the primary circuit was incapable of passing through the Geissler tube, for the galvanometer needle was equally deflected whether placed in the secondary circuit or not, indicating that the movement of the needle was due solely to the direct action of the magnet of the coil; on the contrary, when the primary circuit was broken, a considerable deflection of the needle occurred when the galvanometer was in the secondary circuit, and a slight one, but in the opposite direction, when the needle was influenced by the magnetism of the coil alone.

Tubes containing chlorine, carbonic anhydride, and hydrogen, were employed in the experiments, the electrodes being soldered to the wires from the coil by means of Wood's fusible alloy. The narrow part of the tube was placed in a copper cylinder containing water, or preferably mercury, in which a delicate thermometer was immersed, the deflection of the galvanometer was read every thirty seconds, and the thermometer every minute. When the current indicated by the galvanometer was greatest the increase of temperature was most rapid, but the important fact shown by these experiments is that in every case the rise of temperature divided by the deflection is a constant. Unfortunately the different constants are not comparable, as the experiments were not made with the same tube containing the different gases at known pressures, but with different tubes of nearly the same sizes; but the pressures of the gases are not given.

Some experiments were undertaken to determine the heating effects in the neighbourhood of the electrodes. For this purpose the upper end of a Geissler tube containing chlorine was placed in the calorimeter, the latter surrounding the part of the tube containing the platinum wire. When the electrode was negative about eight times more heat was developed than when it was positive. As the quantity of heat produced when the electrode was positive was very small the relation between the deflection of the galvanometer and the rise of temperature was not so regular in the different experiments as in the other case; and when the electrode was negative it was observed that the quantity of heat increased a little more rapidly than the deflection. More accurate results were obtained by immersing the lower end of the tube in the calorimeter; under these circumstances the quantity of heat collected when the electrode was negative was 22·8 times as great as in the experiments in which it was positive, and while the deflection of the galvanometer varied from 100 to 640, the rise of temperature divided by the deflections increased from 100 to 120 only.

It being suspected that the different effects at the two electrodes might be due to a cause similar to the Peltier effect in solid conductors, an attempt was made to discover if the positive electrode is cooled during the passage of the electricity. There appeared to be a very slight diminution of temperature at the commencement of the experiment, but it was soon marked by the conduction of heat from other parts of the tube.

The calorimeter was next placed on the wide part of the Geissler tube, but not surrounding the electrode, which was 16·5 mm. from the calorimeter. In this case, also, a larger quantity of heat was developed near the negative electrode than near the positive, but the ratio was only 4·9. When a portion of the narrow part of the tube was placed in the calorimeter, that near the negative electrode was slightly more heated than the other portion. When a tube containing hydrogen was used similar results were obtained, but the difference between the quantities of heat at the two ends was very much less than in the case of chlorine.

The next series of experiments was made to determine the effect of different diameters of tube. For this purpose a U-tube containing air of the pressure of two mm. was used, one limb of the tube having a sectional area of 36·3 square mm., the other 12·6 square mm., both limbs being surrounded by calorimeters. The quantity of heat developed in the narrow tube was only very slightly greater than in the other, the ratio being about 1·1. By using another tube with the areas of 116·9 square mm. and 4·5 a similar result was found, but in this case the ratio was not greater than 1·2.

[1] By Dr. Naccari and M. Bellati (vol. iv. ser. v., degli *Atti del R. Instituto veneto de Science, Lettere ed Arti*).

NOTES FROM NEW ZEALAND

THE following notes have been sent us from New Zealand by Mr. T. H. Potts, of Ohinitahi:—

Maori Food Feast.—At the great meeting of Kingite natives convened by Tawhaio to meet Sir George Grey and the Hon. Native Minister, amongst other very interesting incidents was the food feast which was held at Hikurangi on May 8.

A procession formed of several hundreds of women, each carrying a neatly woven basket filled with food, proceeded through the village till it arrived opposite to Sir George Grey's tent; at a given signal the baskets were placed on the ground and stacked into a huge heap. The presentation of each article of food was accompanied with an appropriate chant or ngori, with dancing and facial contortions of an extraordinary character, many of the most ancient persons of different hapus taking part in the celebration.

Amongst the various articles of vegetable food in season was offered:—

Pohua.—The root of *Convolvulus sepium*, as flowery as a potato with a slightly bitter taste.

Sowthistle.—*Sonchus oleraceus.* The Hauhaus, when compelled to use cooked sowthistle, found to their surprise they did not lose condition on this spare diet.

Para.—The thick solid scale from the rootstock of the grand fern *Marattia fraxinea.* This edible was pinkish or pale purple when cut, solid, tough, almost tasteless, with a slightly bitter flavour.

Marnaku.—This esculent appeared in thick junks of about a foot in length; it is the mucilaginous pith of the great black tree-fern *Cyathea medullaris.* It was presented ready dressed, was soft, very sweet to the palate.

Roi.—The rhizome or root of the bracken *Pteris aquilina*, var. *esculenta.* It was offered in the uncooked state, in which it is usually kept ready for use.

Tawha.—The prepared berries of a common forest tree *Nesodaphne tawha.*

Hakeke.—The Jew's-ear fungus *Hirneola auricula-Judæ.* It is found in the forests of Pirongia; that which grows on the Karaka is most esteemed.

On Moa Remains, &c.—There has been so warm a controversy as to the probable date of the extinction of the dinornis, that