

front view was a long bell-pull, hanging nearly from the ceiling to the floor. A mouse (I fancied, larger than the other mice) deliberately climbed to the top, turned himself round, and for some minutes quietly surveyed the room; then deliberately descended; and, in two or three minutes, not a mouse was left in the room. I slept in the same room many weeks after this occurrence, but I never again perceived the sign of a mouse.

I imagine that the mice inhabiting the house had perceived that this room was now partially inhabited, and that they suspected that it would probably contain something interesting to them; that, acting under a general, or chief engineer, they directed the whole strength of their tribe to work an entrance into the room; that their chief engineer, as soon as an entrance was gained, proceeded to examine the contents of the captured fortress; and that, thoroughly disappointed, he gave the signal for retreat, which the whole body of mice instantly obeyed.

September 10

A. B. G.

### "Cholera and Copper"

WITH reference to the letter on the above subject in this week's NATURE, it is quite true that the last visitation of cholera was especially severe here, yet in no single instance was a worker in the copper works of the neighbourhood attacked. It is the common boast of the copper-men that, although they lost many members of their family, living in the same house, by the dread disease, yet neither in the last visitation nor the previous ones was there a copper-man, *i.e.* a man working at a furnace, attacked.

There is no doubt that these men take large quantities of copper sulphate into their systems, for not only do they breathe the fine dust of regulus always floating about, but they handle their food with unwashed hands, or, if washed, not washed clean, and that their hands are covered with soluble copper salts is evidenced by their action on the iron tools which they handle, these quickly receiving a deposit of metallic copper.

This seems to be pretty fair evidence that copper is a preventive for cholera.

I may point out that it is not copper or any of its compounds which injures the vegetation, but sulphur dioxide, the principal gas evolved in smelting copper ores, and which goes by the name of "copper smoke."

W. TERRILL

Ffynone Club, Swansea, September 8

### Antiquities saved by Protective Resemblance

A LARGE number of pillar stones marked with crosses, early Christian inscriptions and oghams, have been destroyed in Britain by farmers during the present century; a still greater number must have been destroyed before these objects began to attract special attention. A great number of the still remaining examples have been utilised as gate-posts and rubbing-stones for cattle, *i.e.* upright stones set up in fields by Welsh farmers for cattle to rub their itching skins against. This fortuitous resemblance of the slightly squared inscribed stones has protected them from destruction. A few of the flatter examples have been utilised as bridges over narrow streams. Nearly all the examples which have not resembled the above-mentioned objects have met with destruction. It is a sort of survival of the fittest.

In Wales there are many ruined churches and monastic establishments with interiors gutted. Most of the old stone altar-slabs have so closely resembled doorsteps, that they have been saved. It is no uncommon thing to see an altar-slab with its five little crosses utilised as a doorstep to a cottage near a deserted church.

The bowl of a font often bears a sufficiently strong resemblance to a pig-trough to insure its preservation, and if the font is not visible in a ruined church the strong probability is it will be found utilised as a pig-trough in some neighbouring farmyard. Fonts with shallow bowls are specially preserved.

Stone coffins sometimes owe their preservation to their resemblance to and suitability for horse-troughs.

In some instances old churches are now used as barns, and in others as residences for farmers or farmers' men; sometimes a wooden floor has been erected across an old church and the upper part used as a store for hay, and the altar end as a pantry. I have seen the recess of the piscina furnished with a wooden door and the interior used as a cool receptacle for butter and lard. A fortuitous resemblance has protected it.

I could write out a large number of examples of the above and other curious instances of "protective resemblance" in antiquities. Indeed the above facts are so well known to antiquaries that, unless very inconvenient, no "rubbing-stone" or stone gate post is left unexamined in a strange district. Doorsteps, flat stones across streams, and stone hog-troughs are always carefully scrutinised by experienced archæologists.

WORTHINGTON G. SMITH

### Meteor

A METEOR of surpassing brilliancy made its appearance here at about 4.46 p.m. on July 12. Its form might be described as somewhat rocket-like. It was observed streaming slowly from the west in an easterly direction, at an apparent altitude of about 45 degrees. Some idea of the brilliancy of this phenomenon may be formed when it is mentioned that it was seen in broad daylight, the sun setting on that day at 4.35 p.m. I notice the meteor was observed over a wide extent of country on the Canterbury Plains; it was noticed from Christchurch, and also at Raigora, to the north.

THOMAS H. POTTS

Ohinitahi, New Zealand, July 14

### The Meteor of August 19

THE meteor described in your issue of August 23 (p. 389) was well seen here (lat. 1° west, long. 54° 15' north) and formed a splendid object. It bore a little east of south, and its apparent path was nearly horizontal from west to east, towards and at about the same declination as the full moon. It would be interesting if its height above the earth were approximately ascertained and stated from the various observations made.

The Grange, Nawton, Yorkshire

C. D.

### HERMANN MÜLLER

THE news of the death of Hermann Müller of Lippstadt will come with a sense of personal loss to many of our readers, who have looked with interest for his frequent contributions to the columns of NATURE on the branch of natural history which he has made specially his own—the mutual relations to one another of insects and flowers in promoting cross-fertilisation. Much as we owe to this subject to some of our own naturalists, especially Darwin and Lubbock, the chief authority in it is, and probably always will be, Hermann Müller. Any future inquirer will necessarily turn, for the main part of his information, to his two great works, "Die Befruchtung der Blumen durch Insekten," published in 1873, and "Alpenblumen, ihre Befruchtung durch Insekten," published in 1881. The mass of information contained in these volumes is simply marvellous. In the first place the author has worked out with the greatest care the structure of those classes of insects which play the greatest part in the fertilisation of flowers with regard to their capacity for collecting nectar or pollen, and for carrying pollen from flower to flower. A very large proportion, including all the commoner ones, of the species which make up the phanerogamic flora of Central Europe are then taken up *seriatim*, the structure of the male and female organs described, illustrated often with very careful drawings, and always with reference to any special contrivances connected with the mode in which insects obtain the honey; and then a list is given of all the insects which he has observed visiting the flower. No one who has worked in the same field will fail to recognise the unflinching trustworthiness and accuracy of his observations. The "Befruchtung der Blumen" has only during the present year been presented to English readers in Mr. D'Arcy Thompson's translation, with an appreciative preface by the late Mr. C. Darwin, a notice of which will shortly appear in our columns. But these two works by no means exhaust Prof. Müller's labours in his favourite subject, as his numerous contributions to our columns show. He was also a frequent contributor to the German periodical *Kosmos*, discussing, with great wealth of knowledge and acute reasoning, the

origin of species, the genesis of the colours of flowers, the laws of variation, and other similar subjects. Dr. Müller's contribution, "Blumen und Insekten," to Schenk's "Handbuch der Botanik," which forms a part of the "Encyclopædie der Naturwissenschaften," now in course of publication, is an admirable *résumé* of the whole subject.

Dr. Müller died in harness, having fallen a victim to an attack of inflammation of the lungs at Prad, in Tyrol, on August 25. A. W. B.

SECOND NOTE ON THE ELECTRICAL RESISTANCE OF THE HUMAN BODY

THE fact that the note on this subject inserted in NATURE, June 14, p. 151, was copied *in extenso* by the *Electrical Review*, by the *New York Electrical World*, and I believe by some other papers, as well as the fragmentary way in which these observations must of necessity be obtained, encourages me to ask for a little further space. This is the more pardonable as the writer in the former paper, in two editorial articles which he founds on my observations, shows ignorance and misconception of certain physiological facts involved in them—a misconception the correction of which by myself he does not think fit to publish.

On August 23, during my visit to the ward, it became obvious that a hopeless and incurable case of renal disease was rapidly sinking. It occurred to me that the patient, being in a state of uræmic drowsiness almost amounting to coma, there would be no inhumanity in adding small electrical currents to the other stimulants which as a last chance we were sedulously administering. I accordingly immersed his feet, which were rapidly getting cold, in hot baths of salt and water connected with Wheatstone's bridge. This and the brandy caused a decided rally, and the temperature became normal, viz. 98° F. The resistance then taken was 1100 ohms from one foot to the other. At 3 p.m., however, he rather suddenly relapsed, his hands and nose becoming cold. The following series of observations was taken:—

2.55	p.m.—temperature 98°	...	...	1100
3.0	"	...	...	900
3.5	"	...	...	870
3.7	"	...	...	850
3.12	"	...	...	840
3.13	"	...	...	820
3.22	" temperature 95°	...	...	800

We concluded that death was imminent, and I ceased the experiment, intending to renew it after the event. But on returning to the ward at 4.36 I found him somewhat better and warmer. I applied the large leaden poles, to which I will refer presently, to both feet, so as to reduce the resistance to a minimum. The following remarkable series of resistances was obtained. The thermometer,<sup>1</sup> being found too slow in its action to follow the flickerings of the expiring lamp of life, was not used, the hand applied to the skin being quite competent to detect the great changes of surface heat:—

4.36	p.m.	...	...	640
4.40	"	...	...	600
4.45	"	...	...	570
4.50	" (rally)	...	...	750
4.55	" (relapse)	...	...	700
5.0	" (great rally)	...	...	770

He was still very cold, but began to ramble in his usual incoherent way (having been slightly deranged for several years), and I therefore left him for the night. On returning next morning early I found he had died an hour and a half later. Had I not been greatly fatigued myself, I should have stopped to secure an observation during post-mortem refrigeration, and before the access of rigor

<sup>1</sup> In the axilla. I hope to use surface thermometers on a future occasion. In my former paper the axillary temperature obviously lags behind that of the extremities.

mortis. As it was I found the corpse in full state of rigidity. We managed to have the testing apparatus set up by 12.30, and without any great disturbance of the body I applied the leaden poles.

After some preliminary tests I obtained two excellent observations with reversed currents, and found them both exactly alike at 1150 ohms.

Then came the last experiment with which I now have to trouble you, namely, the question of skin resistance. A tremendous hubbub has been made about this since the time of Duchenne. I believe it has been enormously exaggerated. My anonymous critic of the *Electrical Review* quaintly says: "We most of us" (*sic*) "know the effect of keeping the feet in salt and water, or water alone" (he does not name soap and water!) "for any length of time. The skin turns white and swells, enlarging the pores (*sic*); indeed nearly the whole of the outside skin is of a spongy nature." I need not prolong the quotation, because I simply deny his facts, except where foot-washings have been "like angels' visits," &c., &c. The carefully-prepared epidermis of my patients is entirely free from this hypothetical and inaccurately stated cause of error. So I hope is mine; indeed I feel the full value of the implied limitation of the cautious phrase "most of us." Seriously speaking, it is too bad that an observer of average capacity, and I hope moderate honesty, should be accused of such elementary blunders on mere *a priori* grounds. Now for fact: Before going to the deadhouse I had provided myself with two silver needles, used for the electro-puncture of aneurisms, and intended to convey a very strong coagulating current from a powerful battery. I inserted one of these to the depth of three inches into the plantar muscles of each foot of the corpse, leaving everything else untouched. I expected the enormous reduction of resistance above named. To my surprise the Wheatstone bridge gave 1200 ohms in either direction of current, or 50 more than with large lead and salt-water electrodes. This alleged skin resistance is then only true in the dry state, and is easily conquered by very simple means. Cases of diabetes have been cited in confirmation of this supposed resistance, and it has been explained by the peculiar dryness of the skin in this complaint. A patient now in my ward, though a tall emaciated man with long spindle shanks, only gives 1340 ohms from foot to foot, with either salt-water baths, or with the lead electrodes as here described. This is rather under than over the average.

One word as to the lead electrodes themselves, and the manner of using them. The intelligent and kind lady nurses of our hospital, whom I like to call by their grand old name of "sisters," and who throughout this inquiry have seconded me in the most self-sacrificing way, are instructed to get ready certain patients for me each morning. The process consists in wrapping both hands and feet in coarse flannel saturated with strong warm brine for an hour before the experiment. Sometimes the process so graphically described by my commentator occurs, and is dealt with accordingly. I then proceed to wrap the members one by one in a surgical covering of flannel soaked in the same conducting solution. Over this I fold, also in surgical fashion, a strip of thin sheet lead about eighteen inches long, and one and a half inches broad. On the top of all is an ordinary spiral bandage, which moulds the whole to the shape of the limb, and squeezes out superfluous fluid. An indiarubber covered wire leads to my testing table. I may add that each hand or foot is separately deposited on one of the vulcanised rubber waterproof sheets commonly used in the wards, and which I find to be excellent insulators. The first few observations are commonly rejected; always if they show any suspicion of diminishing. But after even half an hour's maceration this is rarely the case. Between every two observations I put the patient himself on short circuit, to discharge any currents of polarisation