

## Photographic Irradiation

IN NATURE, vol. x. p. 245, Mr. W. C. Crofts adds his experience to those previously given in your journal, and gives his conclusion as opposed to that of Mr. Aitken (vol. x. p. 185). Like most conclusions based on incomplete evidence, it does not conclude anything. The fact is as I have stated it in my previous note (vol. x. p. 205) on the subject, and when I return to England I will be most happy to demonstrate it to anyone who cares to examine the question thoroughly. Mr. Crofts' experience with the Liverpool dry plates agrees with my own, for these plates are prepared with a pyroxyline which gives a minimum of irradiation when "backed," and give the best quality of image for scientific purposes attainable with a bromide film; but certain qualities of pyroxyline prepared in precisely the same way will show irradiation that nothing can cure, even when used for making transparencies by contact, where, of course, there can be no question of influence of any optical defects. The unquestionable fact that a collodion-albumen film acts in so totally different a manner from one of bromized collodion should prove that the lens has next to nothing to do with it.

My conclusions may be very imperfect, but so far as they go they are definite, and are drawn, not from two or three, but from hundreds of experiments with all kinds of dry plates and many different samples of pyroxyline, and whatever they may be worth, they fully support Mr. Aitken's views.

New York, Aug. 19

W. J. STILLMAN.

## Pflüger on the "Salivary Glands" of the Cockroach

I WAS much interested in reading Prof. Redfern's able address at the British Association this year, more especially with that portion which dealt with the observations of Prof. Pflüger on the histology of the so-called "salivary glands" of the cockroach. In the year 1871 I wrote a short paper in Professors Humphry and Turner's *Journal* (vol. v. p. 242 *et seq.*) upon these organs. In this I ventured to doubt the truth of the generally accepted hypothesis as to their functions. My reasons for so doing may be summarised as follows:—1. The appendages in question are perforated throughout by ramifying spirally coated tubules differing only from tracheæ in this respect; during their passage through the organs in question they receive a layer externally of yellowish tissue, which may be, as Prof. Pflüger suggests, epithelial glandular tissue. 2. These tubules with the sacculi opening into them can be more or less fully injected with a liquid by simply immersing the insect in a suitable menstruum, and placing it under the exhausting receiver of an air-pump. This experiment demonstrates indubitably that this tubular system contains an *elastic fluid*, which for anatomical and other reasons I conclude to be air. 3. As far as my experience carried me, the sacculi, the supposed reservoirs of the saliva, never contained naturally any liquid whatever, but upon opening the thorax were invariably found to be collapsed and apparently empty. This is precisely what would occur supposing that during life they were filled by and communicated readily with the external air.

I have not yet had an opportunity of referring to Prof. Pflüger's paper, and I am consequently obliged to accept his statements at second hand. In noticing the intimate connection there is between these organs and the nervous system of the insect, he confirms what I have myself observed. It is some years since I last anatomised a cockroach, and meanwhile I suppose these insects have utilised their organs in the way mentioned by Prof. Pflüger, and we can now see "transparent drops . . . transuding from the ends of cells when the saliva has been made to flow by irritation of the gland." On looking over my microscopic specimens I find that I still have by me one showing the so-called "salivary duct" and a sacculus injected in the way I have mentioned. Any one may satisfy himself that this result is feasible by trying the experiment. In doing so the only caution required is to exhaust the air gradually and to keep the immersed insect in a partial vacuum for a few hours. Failure under these circumstances is almost impossible.

London, Sept. 2

W. AINSLIE HOLLIS

## THE CONFERENCE FOR MARITIME METEOROLOGY

THE Conference, held at the Meteorological Office, 116, Victoria Street, for the purpose of reconsidering the decisions regarding maritime meteorology made

at the Brussels Conference in 1853, has concluded its sittings, and the Report of its proceedings will be presented to the Permanent Committee, appointed by the Meteorological Congress of Vienna (of 1873), which holds its meeting at Utrecht in the course of the present week. The Conference consisted of twenty-five members, belonging respectively to every maritime country of consequence in Europe, except Sweden and Turkey. India and China were also represented. Prof. Buys Ballot was elected president, and Capt. Hoffmeyer and Mr. Scott, F.R.S., secretaries. It met on the 31st ult., and at once subdivided itself into two sub-committees, dealing with the various questions connected with (1) "Observations," and (2) "Discussions." Each sub-committee held four sittings, and at the closing meeting of the Conference the several resolutions framed by the sub-committees were adopted, in most cases unanimously. Inasmuch as the Conference was an outcome of the Vienna Congress, these resolutions will not be published until they have been communicated to the Permanent Committee as above mentioned. Their general scope is towards the attainment of greater uniformity in the methods of meteorological observation at sea, and of subsequent publication of the results. On Thursday, by kind permission of the Astronomer-Royal, the members went to Greenwich in the morning, where they were conducted over the magnetical and meteorological department by Mr. J. Glaisher, F.R.S. In the afternoon they spent some hours at Kew Observatory, where they were received by Mr. Jeffery, the superintendent, and in the evening the whole party was entertained at dinner at the Star and Garter, by some of the members of the Meteorological Committee. On Friday several members availed themselves of the great courtesy of the War Office, and repaired to Woolwich, where they were conducted over the Arsenal by Colonel Field and other officers connected with that department. Finally, on Saturday, they inspected the Meteorological Office, where the meetings of the Conference had been held, and paid special attention to the arrangements there existing for reproducing the records of the photographic and other instruments at the several observatories in the United Kingdom.

## ON SEWAGE AND SEWAGE FARMING

## No. 1.—Northampton.

AFTER having had practical experience of the fertilising effects of sewage and liquid manure, I have for several years devoted part of my leisure time to an examination of the arrangements adopted by the principal cities and towns for disposing of sewage. At first I looked at it from the agricultural stand-point; but as I proceeded with the inquiry I had to widen the range of view.

The place I visited last is Northampton. I propose at present to write a concise note of what the authorities of that town have done.

Northampton has a Board of Commissioners for dealing with sewage and kindred nuisances, which is distinct from the corporation. I believe their number is limited to twelve; of whom six belong to one political body, and six to the other. These twelve Commissioners, as a body, must, therefore, be non-political; six of one being equal to half-a-dozen of another.

The town contains at present about 50,000 people. Many experiments were made at the expense of this body for purifying the sewage. At last they adopted the scheme which I proceed to describe.

Near the town there is a number of tanks in which the sewage is allowed to settle for some time so as to enable the more bulky of its solid contents to fall to the bottom and be collected. Deprived of these solid matters, the sewage is conveyed in a main culvert, about four miles from the town, where it is received on a tract of ground



containing upwards of 300 acres, which was purchased at a cost of 130% an acre. I may mention that all the figures were obligingly communicated to me, verbally, by the chief officer of the Commissioners. Up to the present the outlay has amounted to upwards of 84,000*l*. The soil is not naturally the best adapted for sewage-farming; it does not, however, offer any insuperable obstacle to success. The sewage is received at the highest point of the farm, from which it flows by gravitation to the lowest, which is several feet below the river that runs by, and into which the sewage passes after it has undergone clarification.

The sewage is distributed over the farm by a simple system of carriers, and it is used mainly for irrigation. After it goes over one plot it flows to another, and so onwards. At the lowest part of the farm a permanent plot of osiers has been planted; the intention being that this plot will serve as a filter-bed for abstracting from the sewage all offending material which is not taken out by irrigation. After percolating through the soil of this osier-bed, the clarified sewage is received in a second, or outlet culvert, which is about two miles long, and in which the fall—one foot per mile—is less than that of the river.

Under cultivated crops of all kinds at the present time, there are about 100 acres. There is one good plot or field of Italian rye-grass; one good, and one indifferent plot of mangold wurzel; and one good plot of beans. A large field of Italian rye-grass has utterly failed, and in its place grew a luxuriant crop of weeds, which would have proved an attractive feature in a botanic garden. There are other failures on which it is useless to dwell.

The land is not farmed in what could be called a skilful manner; indeed, the engineer frankly said that up to the present, farming had been a secondary object with the Commissioners.

The greater part of the uncropped land has been recently purchased. It is now being prepared for the sewage at a cost which will doubtless exceed 20% an acre. I cannot help thinking that a simpler scheme would answer equally well for irrigation.

It will be understood at once that the inhabitants of Northampton have been rid of the abominable stench which the sewage formerly inflicted on them. But there remain for consideration two points of very great importance to the people who live along the river below the sewage farm. In the first place, if the sewage be not deprived of its organic impurities on the farm, it must, on mixing again with the river, cause a fresh nuisance. That the people do think so is evidenced in a newspaper report which lies before me; and judging from what I saw of the effluent water, I can sympathise with these people. I took a small bottle of this water, which I find contains a large quantity of organic matter. As it went on the osier-bed it was still sewage most unmistakably; and when the pores of this bed—this so-called filter bed—become full of the organic impurities, as they soon must, the complaints will become louder and louder, and justly so.

I have a second objection to the arrangements here adopted, and it is this: What guarantee is there that the *contagium* of any infectious disease which may be in the sewage is destroyed? That *some* of it would be oxidised or destroyed in flowing over the ground is certain; but the necessities of the case require that the whole of it should be destroyed. I have made experiments which prove conclusively that the *contagium* of infectious cattle diseases is not destroyed in flowing over land, nor in passing through such a filter as is here provided; and as there is no evidence to show that the contagious principle of human infectious diseases is not equally active, it cannot be said that the Commissioners of Northampton have satisfactorily disposed of the sewage of that town.

THOMAS BALDWIN

## NOTES

WE take the following from the *New York Nation* of Aug. 20:—"The American Association for the Advancement of Science has held its annual meeting at Hartford during the past and present week. The most important business before the meeting has been the consideration and adoption of a new constitution, designed to remedy a long-continued evil growing out of the popular character of the Association. The scientific character of the papers and proceedings has very frequently been such as seriously to compromise the standing of the Association in the scientific world. To remedy this, it has been decided to select from the members those who are engaged in science and form them into a separate class of 'Fellows.' All the officers of the Association are now to be chosen from this class, and the power of the several committees to exclude improper or unsuitable communications has been increased. All friends of science will await with interest the working of this improvement. The necessity of some vigorous and effective measures must be obvious to any one who will simply examine the lists of papers presented for reading. Among some hundred authors, the number of really eminent men may be counted on one's fingers, while the large majority are entirely unknown, and present papers which, so far as can be judged from their titles, are of no scientific importance. We greatly doubt whether this evil will be cured by anything short of a radical change in the publishing system of the Association. So long as there is a volume of 'Proceedings' to be published, so long will there be a pressure on the part of the less desirable class of members to have their papers printed, and this pressure can be resisted only by a little more moral courage on the part of the Standing Committee than it has hitherto exhibited. While such papers are admitted, we may be sure that few of the abler members will wish their productions to be seen in such company. It is gratifying to notice that the present meeting exhibits a decided improvement in this respect, and that notwithstanding the general unimportance of the communications, the subjects of ether and atoms do not appear among those discussed before the Association."

UNDER the Principalship of Monsignor Capel, a Catholic College is shortly to be opened in Kensington, in which the Natural Sciences will be taught without restrictions. A museum, a laboratory, and lecture rooms are in readiness; and in the Educational department more than one appointment has already been made. Mr. St. George Mivart is to lecture on zoology during the winter months, and on botany in the summer. Mr. Barff is to lecture on chemistry. From what we hear, it will not be for lack of means that this institution will not be successful.

AMONGST those who will probably be candidates for the professorship of Zoology and Comparative Anatomy, now vacant in University College, London, are Mr. E. Ray Lankester, Dr. J. Murie, and Mr. H. Seeley.

DR. ALLEYNE NICHOLSON has been appointed to the chair of Biology and Physiology about to be established in the Durham University Colleges of Medicine and Physical Science, Newcastle-on-Tyne.

ON the 3rd inst. the Bishop of Exeter laid the foundation-stone of a high-class school, to be conducted under the provisions of the Endowed Schools Act, at Newcastle-under-Lyne. His lordship dwelt chiefly on the advantages of a modern education, embracing chemistry, mineralogy, and mathematics, as compared with the old Latin and Greek system. He congratulated the borough upon doing the most important work that not only the district, but the whole of England could be engaged in, by establishing a school in which boys might not only be taught a little Latin and less Greek, but might be taught modern languages and natural science, so as to fit them for the future occupations of life.