respect to the *invention* of the "lightning-conductor." Frahclin, whose first "lightning-rod" (1752) anticipated the French *para-tonnerres* by a good many years, was in France somewhere about this time, and their introduction into the latter country was probably due to his initiative.

One other extract may be given for what it is worth. Perhaps the two kinds of lightning observed may have some analogy to the A and B discharges noted by Sir Oliver Lodge:—

"It has been completely demonstrated, by a great number of observations, that the lightning often rises from the earth. If the electricity, the true cause of lightning, is in excess in the clouds, the discharge is earthwards. If, on the contrary, it is accumulated in the bosom of the earth, it escapes to expand itself into equilibrium in the atmosphere. In order that a building may be defended against these two dangers, it is therefore necessary to establish *ascending lightning-conductors* [*des para-tonnerres ascendants*] against the lightning which rises, as they have been established against that which falls. It is necessary to have recourse to the ascending lightning-conductors of the Abbé Bertholon. He has safeguarded in this way a belfry at Lyons, on which the thunder (*sic*) had very often fallen." (The appropriateness of the example cited is very far from clear.)

The extracts are from vol. 6, pp. 238-242, of the work mentioned. H. C. BROWNE.

Dublin, July 27.

Fish Poisons as Insecticides.

In many widely separated tropical countries it has been the rather curious custom of the natives to catch fish in lakes, rivers, and creeks by means of certain poisonous plants; the leaves, stems, or roots being used for this purpose. The water extract obtained by macerating the appropriate part of the plant is poured into the stream, and the fish being rapidly stupefied by it are readily caught. The practice is now generally discouraged, owing to the heavy mortality ensuing amongst the small and immature fish.

Extracts obtained from some of these plants have been shown to have an insecticidal action of a high order. Among these are different species of *Derris* and *Tephrosia*, both of which contain non-nitrogenous constituents highly poisonous to fish. Recently, Mr. R. A. Altson, of the Botanic Gardens, Georgetown, British Guiana, has secured for us two plants employed by the aborigines of that country as fish poisons and known to them as "Black and White Haiari."

Mr. Altson refers these plants to the order Leguminosæ and states that the Indians use them in the following manner: "The roots of White Haiari and the stems of Black Haiari are beaten out into a 'horsetail' and shaken into water, which afterwards is thrown into the creek. In about ten minutes the fish in that area are either stupefied or killed and float to the surface."

Extracts prepared from Black and White Haiari with water and organic solvents have been recently tested in this laboratory as contact insecticides, and both, but particularly those prepared by the use of organic solvents, have been found to be highly poisonous to aphides.

It is of interest that all of the above plants belong to the order Leguminosæ, while those of other natural orders which are used as fish poisons have not so far proved in our investigations at Rothamsted to be of much interest from an insecticidal point of view.

Various investigators have isolated the poisons from *Derris elliptica* and *Tephrosia vogelii*, but little is known of their constitution although suggestions

have been made as to a possible lactone structure. No information is available, so far as we are aware, about the toxic constituents of Black and White Haiari. We have, however, obtained colourless crystalline derivatives from both, which may be of significance in this respect.

Black and White Haiari may prove of economic importance as insecticides. F. TATTERSFIELD.

Rothamsted Experimental Station,
Harpenden, July 15.

X-Ray Diffraction Patterns from Plant Fibres.

DIFFRACTION patterns obtained from plant fibres, ramie, hemp, etc., by using a method similar to that of Hull for crystal powders (*Phys. Review*, 10, 2, 661, 1917), do not agree in certain particulars with the data reported by Herzog and Jancke in *Zeits. für Physik*, 3-3, 196 to 198, 1920. They give a list of eight sets of planes, based on data obtained by using the "white light" radiation from a copper anticathode, and eliminating by inspection the $K\beta$ reflections. In our work, molybdenum radiation was used and a monochromatic beam was obtained by filtering through a zirconium oxide screen.

As will be seen in the table, several interplanar spacings check satisfactorily; others, however, do not. We found that by manipulating the exposure and size of slit, a line which might be accepted as 5.80 under one set of adjustments could be resolved into two lines, 6.10 and 5.40. Similarly, 3.30 and 2.60 lines were resolved as shown in the table. Merely for convenience the lines are designated by the figures which express the value of the interplanar spacings. Certain orientations of the bundle of fibres were also necessary in order to produce the separation of the lines.

INTERPLANAR SPACINGS IN PLANT FIBRES.

Reported by Herzog and Jancke. $K\alpha Cu = 1.54$.	New Values.	Remarks.
5.80	6.10 5.40	Resolved
4.02	3.98	
3.30	3.40 3.20	Resolved
2.90		$K\beta$ line
2.60	2.62 2.58	Resolved
2.18 2.01 1.10	2.17 2.03 1.11	

The so-called 2.90 line was readily found when the unfiltered beam was used, but when the $K\beta$ wavelengths were screened out, it failed to appear. The $K\beta$ reflection from the 2.60 planes seemed to have contributed largely if not entirely to that line. Among the thirty odd lines which we found with the monochromatic beam there appears a very faint 2.93, but that line is so weak that it does not seem probable that it is the one which Herzog records.

Only the few lines needed to make the above corrections are reported here; a more detailed discussion of the patterns and the lattice will appear elsewhere.

O. L. SPONSLER.
University of California, Southern Branch,
Los Angeles, California.