

were removed, 90–93 per cent of the hydrochloric acid and 97–98 per cent of the grit and dust from the pulverised fuel boiler. The exit gas from the plant is so free from sulphur dioxide that it is practically odourless, although the sense of smell can detect a very minute trace of this gas.

#### River Flow Records

THE paper on "Flow of the River Dee" (Aberdeenshire), by Capt. W. N. McClean, read before the British Association meeting at Aberdeen last September, has been issued in pamphlet form, reprinted from *Engineering*, with a memorandum which indicates the progress made in the survey of the river subsequent to the original date of the paper, and an addendum illustrating the manner in which the records are to be set out in tabular form for publication. The Dee has a catchment area of 790 sq. miles to Aberdeen, and for the purposes of the survey it was divided into four subsidiary areas, with flow-gauging stations at Balmoral, Dennet, Cairnton and Cults. The author states that he has found that the summer flow in certain Scottish rivers of about 100 to 700 sq. miles catchment, may be taken, roughly, as from 1/5 to 1 cu. ft. per sec. per sq. mile, according to area. Flood flows are much more complicated. The author further notes the difficulty of measuring low flows with current meters, as they are at present not very reliable for velocities of less than 1 ft. per sec. He suggests the difficulty may be overcome in the future by a temporary contraction of the channel, so as to increase the velocity. Two types of apparatus are in use on the Dee: namely, one in which the meter is suspended from a wire and another in which a rod is the means of support. It is known that, in turbulent flows, the wire-suspended meter tends to set to the current and to give excessively high values. The combined use of the two methods enables a serviceable comparison to be made of their respective accuracies. The records obtained should prove of great public utility and the co-operation of two authorities directly interested, the City of Aberdeen and the Fishery Board of the Dee, has been secured in establishing the gauging stations. Capt. McClean points out that if there were a recognised association for these river records, the water interests would become subscribing members of the association, receiving the completed records in return for the standard tables of water levels prepared by themselves.

#### Thunderstorms in Great Britain

THE third annual report of the survey of thunderstorms in the British Isles, entitled "Summer Thunderstorms", has been received (Huddersfield: Thunderstorm Census Organisation. 2s. 6d.). Much of it has been written by Mr. S. Morris Bower, the honorary director of the Survey, but articles have been contributed by Sir C. V. Boys on "Progressive Lightning" and by S. T. E. Dark on "Trees Struck by Lightning". The Survey is an amateur enterprise somewhat similar to what the British Rainfall

Organization was in its early stages. Its development is doubtless made more difficult because the economic importance of the distribution of thunderstorms is, at present, less than that of rainfall. There is the further difficulty that the study of thunderstorms cannot be effectively prosecuted apart from the general study of synoptic meteorology, except in limited directions. In the purely statistical problem of obtaining the best possible cartographical representation of the occurrence of thunder, the Survey had the advantage in 1933 of a number of voluntary observers—1,291—nearly four times greater than the number of full climatological stations co-operating with the Meteorological Office, an advantage greater than the numbers alone suggest in that the observers at official stations do not concentrate on one phenomenon. This report deals with some of the statistical results obtained in 1933, and also includes maps showing the number of days on which storms occurred in different parts of the British Isles in each of the months April–September 1932. The frequencies shown give the number of civil days during which one or more thunderstorms pass overhead, and are therefore not comparable with figures based on the international definition of a day of thunderstorm at any place as one on which thunder is heard at that place. The article on "Trees Struck by Lightning" is accompanied by some interesting photographs showing spiral scoring of tree trunks; it can be seen that the lightning may descend the tree either in a left or a right hand spiral. Sir C. V. Boys's article deals with photographic studies of the duration and length of individual flashes, their direction and velocity, and suggests means for initiating a flash by firing a rocket into the thunder cloud, to assist in studies of this kind.

#### The Imperial Forestry Institute, Oxford

IN the tenth annual report of the Imperial Forestry Institute for the year 1933–34 (Oxford: The Holywell Press Ltd., 1934) it is stated that the number of students was still considerably below normal, owing to the stoppage of the recruitment for the forest services of the Colonial Office, though it compared favourably with the number of the previous year. Apart from regular students, a number of forest officers, at home on leave, and others attended the Institute for short periods to work in the libraries and the laboratories. The Institute is still short-handed so far as the staff is concerned. During the year, a decree was passed by the University allocating a site within the Parks area for the erection of a new building for the Department of Forestry, including the Imperial Forestry Institute. Some progress has been made in regard to preliminary plans and estimates for the building; but it has not yet been possible to commence building operations owing to lack of sufficient financial provision; this matter, it is said, is receiving further attention. The income of the Institute is made up of grants from the Crown Agents, Dominions and others, Forestry Commission, and the Department of Scientific and Industrial Research. An interesting part of the report is given