

direct stroke, but by a portion of the flash leaving the main conductor and taking a circuitous path round the unconnected metal work outside and inside the buildings.

Quite the most interesting case is that at Possingworth House, struck in June and again in August, 1902, although the roof fairly bristled with air terminals, every chimney being protected, mostly with its own conductor and earth connection. It is probable that on the second occasion the flash divided, one part selecting a chimney stack, which is damaged, bending the air terminal to an angle of 45 deg., while the other, neglecting the many points, fell on an unprotected statue much lower than the chimney and went to earth by the iron frame of a conservatory, showing the unreliability of a number of independent conductors which should have been interconnected by means of a horizontal wire led along the ridge; this would in all probability prevent any serious damage. Sir Oliver Lodge has shown by an interesting experiment that a column of hot air is often selected by a flash although a lightning rod may be affixed to the side of the chimney. Most of our large stacks have a band of metal to which the air terminals are fitted, and from these two conductors should be led to earth. The method adopted in Germany appears to be simpler, and consists of a heavy iron frame rising to a sufficient height above the stack, and continued at the apex so as to form an aigrette. That lightning may prefer the smoke issuing from a chimney was

shown by the stroke at the East London Waterworks, Sunbury, last year, the flash doing some damage to the capping before it arrived at the standpipe inside, which was a perfect earth in that it was in direct connection with the company's mains.

There is very little advantage in placing isolated rods on an ordinary building unless it has a high tower. A church, for instance, with a spire should have at least two conductors from top to earth. Even then, if any other part of the structure happens to be in the path of a discharge from a cloud to the ground, the stroke may disregard the protected towers or spire and fall on the building, choosing some lower point. If the suggestion put forward by Sir Oliver Lodge at the Bath meeting in 1888 were more closely followed, and the conductors so arranged that they form a protective network over all the roofs, a flash would in all probability be received by some portion of the system and pass without harm to the ground by one of the numerous earths to which the network would be connected. The insurance offices appear to disregard the question of adequate protection, and are quite content if the single conductor which has not prevented serious damage, for instance, to a church is replaced, and, moreover, take no steps to have the earth connection tested periodically; also the few unconnected lightning rods erected on our national museums, picture galleries, and other public buildings, contrast most unfavorably with the more scientific methods adopted on the Continent, more especially in Germany, where in some districts the local authorities have issued rules as to the erection and testing of lightning conductors, to which the various public bodies have to conform, and in some cities householders are subject to a penalty if the system is allowed to get out of order.

NOTES.

On the continent and especially in Germany it is the usual practice to introduce hinges or pivots at the springings and also at the crown of arches, whether built of stone or concrete, with the object of concentrating the pressures at certain well-defined points and enabling the arch to make small movements, so as to adapt itself readily to the influence of external forces without developing cracks and fissures. The chief causes of such movements are changes of temperature, operations of striking centres, unavoidable unsymmetrical distribution of rolling load.

It is sometimes desired to darken glass where the light falls too strongly. The following method is a good one for the purpose: Prepare as it for oil colours some sugar of lead with boiled linseed oil, and carefully lay this evenly over the glass with a hog's hair tool. This distribution is best accomplished by a dabbing movement, until the appearance of ground glass is produced. When dry this will be found to have the effect of obscuring the glass which still remains transparent.

The sixth International Art Exhibition of the municipal council of the city of Venice will open on April 22nd and close on October 31st, 1905. It will contain pictures, sculpture, drawings, engravings and objects of decorative art. The exhibition is founded by and under the administration of the municipality. The exhibition is divided into Italian, Foreign and International rooms. The works of artists not personally invited are subject to the verdict of an International Jury of Admission. Works already shown in Italy will not be accepted at the exhibition. The city of Venice will give some honorary diplomas to the best decorated rooms and some gold medals to the best works. Articles intended for exhibition must be notified not later than January 1st, 1905.

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