architect cannot always please himself, and a critic like Canon Farrar should not forget that there is such a person as a client whose wants must be satisfied.

CHIMNEYS.

We think we may venture the assertion that at least one-half of the chimneys in use to-day are altogether too small to economically serve the purpose for which they are used. There seems to be a very general misunderstanding in regard to their correct proportion among those most deeply interested in their efficient performance, viz., the owners of the chimneys themselves.

The object of a chimney is, of course, well known to be the means by which the draught necessary for the proper combustion of the fuel is produced, as well as to furnish a means of discharging the noxious products of combustion into the atmosphere at such a height from the ground that they may not be considered a nuisance to people in the vicinity of the chimney.

Regarding the second of the above purposes for which chimneys are built, we need only say that it is of secondary importance only, and that where due attention is given to the proper methods of setting boilers and proportionating great areas, furnaces, and rate of combustion, the smoke nuisance is comparatively unknown, and is of no practical importance whatever.

The main points then to be considered in designing chimneys are the right proportions, to insure, first, a good and sufficient draught, and second, stability.

Without entering into any demonstration of the velocity of the flow of the heated gases through the furnace and flues leading into and up the chimney, we will briefly state a few of the principles governing the dimensions of chimneys. The motive power or force which produces the draught is the action of gravity upon the difference in the specific gravities of the heated column of the gases of combustion inside the chimney, and the atmosphere at its normal temperature outside of the chimney, by which the former is forced up the flue; and the laws governing its velocity are the same as those governing the velocity of a falling body, and it can be proved that its velocity, and, consequently, the amount or volume of air drawn into the furnace and which constitutes the draught is in proportion to the square root of the height of the chimney. It is a common error that the force of the draught is in direct proportion to the height, so that, with two chimneys of the same area of flue, one being twice the height of the other, the higher one would produce a draught twice as strong as the other. The intensity of draught under these circumstances would be in the proportion of the square root of 1 to the square root of 2, or as 1 to 1·42. To double the draught power of any given chimney by adding to the height it would be necessary to build it to four times the original height. Practically there is a limit to the height of a chimney of any given area of flue beyond which it is found that the additional height increases the resistance due to the velocity and friction more rapidly than it increases the flow of cold air into the furnace. For chimneys not over 42 in. in diameter the maximum admissible height is about 300 ft.

From an investigation of the same laws we find that the velocity of the flow of cold air into the furnace is in proportion to the square root of the ratio between the density of the outside air, and the heated gases in the chimney, from which we may deduce the fact that very little increase of draught is obtained by increasing the temperature of the gases in the chimney above 500 or 600 degrees Fah. By raising the temperature of the flue from 600 to 1,200 degrees we would increase the draught less than 20 per cent., while the waste of heat would be very considerable. Conversely, we may reduce the temperature of the flue about one-half when the temperature is as high as 600 degrees by means of an economizer or otherwise, and the *reduction* of draught force would be only about 20 per cent., as before.

It is found that the principal causes which act to impair the draught of a chimney and which vary greatly with different types of boilers and settings, are the resistance to the passage of the air offered by the layer of fuel, bends, elbows, and changes in the dimensions of the flues, roughness of the masonry of brick flues, holes in the passages which allow the entrance of cold air, and generally any variation from a straight, air tight passage of uniform size from combustion chamber to chimney flue, and the resistance to draught is in direct proportion to the magnitude and number of such variations.

In designing a chimney, it is, therefore, always necessary to consider the type of boiler, method of setting, arrangement of boilers and flues, location of chimney, and everything which will be likely to in any way interfere with its efficient performance. Much, of course, depends upon the judgment and experience of the designer, and it would be impossible to give any general rule which would cover all cases. When only one boiler discharges into a chimney, for instance, the chimney requires a much larger area per pound of fuel burned than when several similar boilers discharge into a chimney of the same height, and taking all these varying circumstances into consideration, a great deal of judgment is in many cases required to determine the proper dimensions.

It is a common idea that a "chimney cannot be too large"—in other words, that the larger the area of the flues the better the draught will be, but this is not always the case. In many cases where a chimney has been built large enough to serve for future additions to the boiler power, the draught has been much improved as additional boilers have been set at work. The cause of this is to be found in the increased steadiness of draught where several boilers are at work and are fired successively, as well also as in the better maintenance of the temperature of the flue, as the velocity of the gases necessarily increases with the increased amount required to be discharged, and they do not have time to cool off to so great an extent as when they move more slowly.—*Building and Engineering Times.*

OPERATIONS IN RUBBER.

Within a short time the price of Para rubber has risen from 95 cents to $1.25 a pound, making the price the highest ever reached in this city, and nearly double what it was two years ago—the result, it is said, of a corner by a few great operators. Most of the supply is held in Europe, though two-thirds of the rubber produced is worked up by American factories.

A meeting of seventy rubber manufacturers, representing capital to the amount of $30,000,000, and over 60 firms employing from 15,000 to 25,000 hands, was held in this city, October, 19, to devise means for defeating the corner. One of the means proposed was a general stoppage of work; another the formation of a purchasing bureau at Para. With the exception of a single company all the rubber firms of the country have entered into an agreement by the terms of which the packing, hose, and belting makers were to reduce the production 25 per cent, after the first of this month, and the manufacturers of shoes and clothing are to shut down altogether after the 23rd of December, that condition to continue until such time as the price of rubber warrants resumption.

The corner is confined to the high grade Para rubber, and has nothing to do with the common grade of Central American, Bornean, and African rubber. The cheap grades have, however, advanced fully fifty per cent in price, through sympathy. The stock of rubber in this city and Boston, it is said, is practically exhausted, and none is expected until the arrival of three ships from Para about Nov. 1. Some of the manufacturers find themselves embarrassed by the situation, while others, who have large stocks of crude rubber on hand, find it very profitable. In Para there are about 150 receivers of rubber who control the negroes who gather the gum. These receivers sell their stock to eight shippers, and several of these shippers are controlled by the corner.

EVERY corpse that is taken to the Paris Morgue is now quickly converted into a block almost as hard as stone. This result is obtained by Carré's chemical refrigerator, which is capable of reducing the temperature of the conservatory, where each body is laid out on something closely resembling a camp bedstead in stone, to 15° below zero centigrade. At the back of this room is a row of stove like compartments, in which the corpses are boxed up and frozen hard before being exposed to public view. As an illustration of the intense cold thus artificially secured, a Paris journalist in describing a recent visit to the Morgue, says that in opening one of the compartments the attendent took the precaution to wear a glove, lest "his hand should be burnt by contact with the cold iron." The corpse which was taken out of its receptacle had been there nine hours. The doctor who accompanied the visitor struck the dead man on the breast with a stick, and the sound was just as if he had struck a stone.