The methods of extraction usually adopted consist of the employment of an induced current of air within a shaft, or extraction by means of fans. The former is the more common method of the two, and has often been applied with considerable success. As the velocity of a current of air in an extractor shaft is practically the same as the draft of a chimney, it is calculable by the same rules as are used for that purpose, and depends upon the difference of temperatures at the bottom and top. The formula for this is where H = height of chimney in feet, T = temperature of air entering chimney, t = temperature of air at top of chimney, and V = velocity in feet per second. $V = 36.5\sqrt{H(T-t)}$. Where the arrangements permit of the creation of a current of sufficient velocity the extraction of foul air can be effectively performed, but it is in all these cases desirable to see that the connecting flues are not too long, as otherwise the loss of suction by friction will be great. Thus in a smooth pipe 24 inches in diameter and 100 feet long, the loss of pressure by friction is, at a velocity of 1,000 feet per minute, 0.046 ounces per square inch. With a rough surface, such as a brick flue presents, the loss is greater. Given a sufficient velocity and proper connections without bends, a large volume of air can be moved. It only requires pointing out that the effective employment of ventilating extractor shafts can only take place when means are taken to insure, under all circumstances of atmospheric pressure, an effective current. It is often the case that an extractor shaft is deprived of its usefulness in the summer time because no means are forthcoming to create a current, which, owing to the balance in the atmosphere within and without the building, cannot be naturally created. The provision of some form of furnace or heater is therefore imperative if the full effect is to be obtained from an appliance of this nature. The same factor materially affects many of the so-called automatic ventilators, which are of no value in still air and equal temperatures. At the same time there is no doubt that the removal of air from a building by the mere power of an extraction shaft can be effectually performed, but it is very rarely that, when means of this character are used, the connections are carefully and thoroughly thought out. It is necessary to insure a connection with each room in such a way that it feels the full power of the extractive mechanism, and it is often the case that this portion of the work is very ineffectively carried out. The course and direction of the flues, the existence of sharp corners where bends should be found, the finish of the flue, and the number and position of the outlets, alike have their influence upon the subject. The most perfect examples of ventilation are those in which the area and position of the openings into the extractive flues are alike ample and well placed, as in this way drafts are avoided, while enabling a perfect extraction to take place.

THE date is announced of the Montreal and Toronto spring millinery openings (wholesale), which will take place on Tuesday, Wednesday and Thursday, Feb. 27th, 28th, and March 1st.

ATTRIBUTES OF A GOOD TURBINE.

BY J. HUMPHREY.

As a safe, desirable and cheap motor, good and properly developed water power is unequalled Its moderate cost, which in many instances is less even than the expense for attendance of a steam plant, has not led to economy usual in other things, but has tended to the neglect of systematic investigation requisite for the general understanding of the best means for its improvement. Yet in most places where power is in demand, its value equals the cost of its equivalent as obtained by other and more expensive methods, and its fullest development becomes a matter worthy of attention. While great advance has been made during the last half century in the improvement of turbines, until they have practically superseded other forms of water-wheels, yet there are certain essential principles pertaining to their construction which should be better understood by users, especially as they are apparently unappreciated, or sadly ignored by many builders. As a first, and by no means unimportant element of a good turbine, the water should be applied to the running wheel with the greatest attainable velocity and force, and with proper direction for its best action upon the floats. This requires chutes or induction channels with sufficient space and correct form for the natural contraction of the vein of water in accordance with the laws of accelerating motion, in which most turbines are manifestly deficient, thereby causing more or less waste of energy of the water before it reaches the wheel.

Another quite as essential and rather more difficult part of turbine designing is in making the floats or pressure vanes of the running wheel of proper form to take the maximum force from the water, and transfer it to the work. This requires length and curvature of floats corresponding to the varying conditions of velocity, as the water is reduced from its highest initial speed to a very low one at its departure from the wheel, as it must be if high efficiency is reached, and as such length and curvature of float is variable under different conditions of use, as for different heights of fall and variable work or water supply, it is hardly reasonable to suppose that one form of float will suit every condition, or that the proper forms are likely to be determined by mere tentative experiment, as by the "cut and try" plan, which has been the system generally pursued by most turbine designers. Although fairly good results may have been attained in that way, with perhaps occasional excellent chance hits, yet the method is far from reliable in general practice, especially with the uncertainties which have attended methods pursued by advertising the efficiency of wheels for which evidently extravagant claims are made, and which are by no means warranted by philosophical examination, or practical use. Very few indeed of the many wheels now in use show either chute or float construction indicative of scientific design, or capable of highest efficiency.

A third, and quite important, feature in the econ-