PREVENTION OF ACCIDENTS IN MILLS.

Under the above head Helmuth Hagemeister says in *Die Muehle*:

A statement of the causes which operate to the destruction of life or health in mills, and also of those arrangement and contrivances offering the greatest possible protection against the same, is well suited to the needs of the time and will be found in the manner following. The consideration of this topic will be confined to grain mills as those other establishments called mills, as saw mills, oil mills, etc., have nothing in common with grain mills save the name.

That such a treatise will lack much of completeness is in the very nature of the subject and the author should be held but partially blamable for such deficiencies. If devices for protection were alone to be considered, the matter would be comparatively simple. The difficulty lies in the fact that these safeguards must not retard, or at most but slightly retard, the driving mechanism. For this reason practical knowledge of milling is requisite in order to decide on the necessity and utility of any protecting contrivances. Pictures and descriptions of driving machinery are sufficient to indicate to those familiar with the subject, the danger existing in any outfit or any single part of the same, so that they can easily form an opinion as to the feasibility of using certain devices or means of safety. Theoretical knowledge alone, however, will not suffice. The construction of mills and the manner of their operation varies so much at present, that the entire time and ability of an individual are needed to obtain only superficial knowledge of the chief methods and modes of building. In addition to this milling now exhibits a certain agitation. The changes necessitated in the driving mechanism by the introduction of rollers, dismembrators and bolting machinery, are frequently not well understood. In many places work is done in an experimental fashion with uncertain tests of this and that method. Only after long experience has demonstrated the superiority of some particular system which is therefore brought into general use can a consideration of sources of danger in mills be made with any uniformity. In treating of the accidents in operating mills it seems proper to deal with the various machines or parts of machines, which are chiefly influential in producing the same. But first of all should be mentioned the clothing of operatives which ought always to be as smooth and close to the body as possible. Blouses, loose fluttering coat-skirts and cravats should be avoided. The floors of mills should be kept as clean as possible, flour dust makes them slippery and dangerous to those carrying heavy loads. Special attention must be given to the oil dropping from bearings. It should be caught in suitable receptacles, no spots of oil being allowed to reach the floor, where in the neighborhood of moving parts of the gear, they would greatly add to the likelihood of accidents.

In proceeding to consider the machinery in classes we may divide it into motors, transmission mechanism, working machines, auxiliary machines and tools.

MOTORS.

In most cases mills are operated by steam engines, water wheels or wind wheels. Therefore remarks upon this subject will extend only to these powers. All machinery of whichever class should have means provided for stopping it with the greatest possible certainty and speed. Large establishments require also a signal system throughout the mill, by which machine tenders can have the motor stopped in case of impending danger. To stop it immediately is however an impossibility, too much motion being retained by the transmission; therefore great mills need facilities for throwing single machines or group of machines out of gear. The greatest care should be taken that the motor when stopped is not again accidently set in motions, because in the idle interval workmen will be engaged in cleaning and oiling their machines and exceedingly disastrous results may ensue.

From the nature of their operation water wheels are mostly located apart from the mill. Steam engines also usually have special quarters as it is otherwise impossible to keep them free from flour dust which involves great wear of the machine, the use of large quantities of lubricants, and much waste of steam. When the engine is placed in the mill proper, its removal is absolutely necessary to secure immunity from accident. Special coverings should be provided for those parts of the engine most liable to be dangerous. Many disasters are occasioned by the breaking of the rim of the balance wheel. It is to be recommended in case the wheel is to run at very high speed that the rim be bound by a forged iron ring, and again at a short distance by a second rim formed of strong wood. Thus in case a wheel breaks the force of the flying fragments is diminished. Numerous casualties are occasioned by strangers or ignorant parties who enter the engine room. The place should be stringently forbidden to visitors and all workmen save the engineer and his assistants, and rules to that effect conspicuously posted up.

The flood gates of water wheels are seldom or never perfectly tight, a difficulty sometimes increased by wedging in of twigs, pieces of ice, etc. In that manner occasionally results an unexpected motion of the driving gear which is very apt to result disastrously to workmen cleaning or repairing machinery or the water wheel. Aside from danger mentioned this lack of tightness in the flood gates is disadvantageous in cold weather as it allows ice to form on the wheel and in the buckets, resulting when motion is resumed in great loss of power. On this account it is advisable that a trap or gate be constructed in the mill trench, in such a manner that when water escapes the flood gate it can not by any possibility reach the wheel. Such a contrivance also enables the stopping of the wheel much sooner thon by the flood gate alone.

Damp air in the wheel pit and the formation of ice in winter, makes access to the wheel slippery and difficult. Stairs and passages should therefore be kept in good condition, and suitable railings and barriers provided so that in oiling the bearing of the wheel, workmen will not be in danger of falling into the wheel or the pit.

LUNG DISEASE IN A LION.

Mr. Abraham recently exhibited before the Academy of Medicine in Ireland the left lung of a lion which had been born in the zoological gardens, had lived there twelve years, and recently died. The animal had good health until October 1st. when there was sudden cold weather. The lion refused food, seemed feverish and thirsty, and his respiration became exceedingly rapid. He appeared to have pleurisy, his chest being fixed and his breathing abdominal. An attempt to administer medicine failed. He took little food, except occasionally. He drank some niter in water, with diuretic effect. He had no cough, but two or three times he spat mucus, which toward the end became bloody. Ultimately, he became emaciated, and died. His viscera were healthy, except the lungs. There was no pleurisy, but the lungs were diseased, mottled in appearance, and hard and lumpy to the touch. On section, they presented a curious honey-combed aspect. The bronchial tubes were enormously enlarged. In the lower lobe of the left lung was a large cavity. The microscopic sections of various parts of the lung did not show the structure of tubercle, nor did any of the bronchial glands. He was not sure what the disease was. The father of the lion died in precisely the same way.

Mr. Baker remarked that lung disease was common among cats, which frequently suffered like the lion in question.

The President observed that monkeys were subject to consumption. In the lion's lungs exhibited, he had no doubt the cavity existed for years, and a small amount of cold sufficed to kill one of the large carnivora.

Mr. Abraham said that, long ago, Dr. Haughton discovered that tubercular phthisis was not so common in monkeys as was generally thought, and he showed it in a paper read many years ago before the old Pathological Society; and in a paper read before the Zoological Garden of London, Mr. Sutton recently came to the same conclusion.—*Ex.*

SEA-GOING RIVER STEAMERS.—The first practical step towards establishing direct steam navigation between Cologne and London has been taken by the Badische Schraubendampfschiff Farhts-Gesellschaft, Mannheim. The company has had constructed in a Dutch yards twin-screw-steamer, capable of being navigated on the open sea as well as on the Rhine. The new ship, constructed entirely of steel, is 200 feet long, with 28½ feet beam and 12½ feet depth of hold, and of 750 tons burthen. Her average draught of water at sea, with water ballast, is 11 feet; and on the river, after the water ballast, has been pumped out, only 8 feet, so that with a load of 500 tons she could go up to Cologne at an average depth of 10 feet of water. Should the new line of steamers answer the expectations formed of it, Cologne will be raised to the rank of seaport town.