

HYGIENE AND PUBLIC HEALTH.

UNDER THE CHARGE OF

VICTOR C. VAUGHAN, M.D.,

PROFESSOR OF HYGIENE IN THE UNIVERSITY OF MICHIGAN, ANN ARBOR.

The Bleaching of Flour.—Within a few years the bleaching of flour has become a process of extensive employment in this country and Great Britain, possibly in other parts of the world also. When flour stands for some six weeks to as many months, it gradually becomes whiter. This change is attributed to "aging." The seller takes his samples and on the appearance of these, which may be many months old, he contracts to deliver so many carloads of the same kind. Recently ground flour shipped to fill this order disappoints the buyer, because it is not so white as the sample upon which he made his purchase. This has led to artificial bleaching with peroxide of nitrogen. The machinery for this purpose is of varied construction, but the principle is the same in all. The oil of the flour is bleached, and nitrite is produced. The chemist distinguishes between bleached and unbleached flour by the detection and estimation of nitrite in the former. The question of the bleaching of flour has been for some months before the Secretary of Agriculture at Washington, and some scientific work, with the object of determining the effect of the bleaching process upon the health of the consumer, has been done. In Halliburton's work (*Journal of Hygiene*, 1909, ix, 170) attention is given to the influence of nitrite on the digestive enzymes. All experiments were made in vitro. Nitrite, when present in the very small proportion of 1 to 32,000, markedly retards the digestion of starch by saliva. The time necessary to reach the achromotic point when tested with iodine was taken as the standard of measurement. The time required to reach this point in the presence of nitrite (1 to 32,000) was thirty-three minutes, while digestion in the control tube was complete at eighteen minutes. In testing proteolytic ferments the protein was stained with carmine and the tint of the solution used as a comparative measure. In tubes containing potassium nitrite (1 to 8000) reckoned as nitrite, digestion was wholly prevented and when the nitrite was reduced to 1 to 32,000 the digestive activity was only one-seventh of that in the tube free from nitrite. The question arose as to whether previous treatment with nitrite, even when the nitrite was removed before subjecting the protein to the action of the ferment, would affect digestion. For the purpose of solving this question three sets of tubes were prepared as follows: (1) Those with nitrite, (2) those previously treated with nitrite, and (3) those to which no nitrite had been added. The results were: In (1), digestion was slight; in (2), slight but greater than in (1); in (3), complete. Halliburton states his conclusions as follows: (1) The presence of nitrous acid (even in the comparatively innocuous form of a salt) hinders enzyme action. (2) Previous treatment with nitrous acid alters a protein in such a way as to render it less readily susceptible to the solvent

action of digestive juices. He also found that the starch in bleached flour is less easily digested by the saliva than that in unbleached flour. A like result followed in his experiment on the peptic digestion of the gluten in the flours.

(Halliburton's finding that nitrite so markedly impedes the salivary digestion of starch is, to say the least, unexpected, since nitrite is a normal constituent of human saliva, or, at least, has been long regarded as such by physiological chemists.—V. C. V.)

Sulphite in Cider and Perry.—DURHAM (*Ibid.*, 17) thinks that the permissible limit of the addition of this preservative to these beverages should be expressed as "total sulphur dioxide" obtained by distillation with phosphoric acid, and that this should not exceed 100 mg. per liter. A trace should be defined as less than 10 (possibly 20) mg. per liter, and when this is exceeded, declaration of the presence of sulphite should be made on the label. All cider makers who desire to use or who do use preservatives should be registered and under official inspection.

Chronic Lead Poisoning.—Notwithstanding recent sanitary improvements in manufacturing establishments, chronic lead poisoning is by no means infrequent in large white lead factories. Animals about such factories vary greatly in susceptibility to the poison. Apparently it is without effect upon rats, which may infest the white lead factory in great numbers, but cats brought in to drive out these pests soon succumb to chronic lead poisoning. There has been more or less discussion as to whether or not poisoning may and does result from the inhalation of the dust that always permeates the atmosphere of white lead factories especially of those not adequately supplied with fan exhausts. GOADBY (*Jour. of Hygiene*, 1909, ix, 122) has investigated this question experimentally, using cats, and has answered the questions in the affirmative. The material used consisted of: (1) Flue dust, containing from 50 to 60 per cent. of lead oxide. In the process of desilverizing, zinc is added to molten lead containing gold and silver; the zinc holds the precious metals, and is then separated from the lead by differences in melting point. The lead from which the zinc has extracted the gold and silver, known as "poor lead," is run into a pot and there treated with air and steam under pressure, for the purpose of oxidizing any zinc that it may contain, but some of the lead also is oxidized, and in the form of a free dust finds its way to the workmen. (2) Litharge is broken into large lumps by hand, and then these are ground in a mill. Some finely divided litharge reaches the men who feed the mill. (3) More or less white lead in the form of a fine dust escapes from the ducts leading from the machines used in packing dry white lead in barrels.

The first effect noticed in the cats caused to inhale these dusts was an alteration in the face due to the absorption of the orbital and buccinator fat, and giving the animal a pinched appearance much like that shown by men poisoned in lead factories. Colic was the next symptom. The cats were obstinately constipated, and showed much abdominal distress. Then the animals developed muscular weakness, shown