THE
BOSTON MEDICAL AND SURGICAL JOURNAL.

VOL. LXIII.   THURSDAY, SEPTEMBER 27, 1860.

No. 9.

ON THE POISONS FOUND IN ALCOHOLIC SPIRITS.

BY A. A. HAYES, M.D., STATE ASSAYER.

[Communicated for the Boston Medical and Surgical Journal.]

FREQUENTLY within the past few years, the public journals have called attention to the existence of poisonous bodies, especially strychnine, in the spirits produced from grains, and no little excitement has grown out of such announcements.

A somewhat extended series of analytical observations on these spirits, from many sources, has convinced me that no good reason for such a statement could be found, and my conclusion has been supported by the testimony of those who are opposed to the manufacture, but who frankly admit that no case has ever fallen under their notice, at the places of manufacture, which would lead to even an inference, in regard to the adding of any deleterious body to the distilled spirits. The addition of non-volatile bodies to the fermented worts, if made, would not contaminate the spirits distilled from them, and it is probable that the supposition, in relation to the use of strychnine for the purpose of increasing the product of whiskey, arose from the *ruse* of a foreman, who wished to conceal the particular characteristics of his ferments in daily use. In low places where such spirits are retailed, drugs which produce narcotic effects, or temporary frenzy, are doubtless resorted to in special cases, while the infusing of pepper or salt is not a very rare occurrence.

Cases of sudden poisoning by the low-priced, common spirits frequently occur, which are not necessarily referable to poisons of foreign origin. Some of the so-called *fusel oils*, produced in the fermentation of mixed grains, either sound or after they have become injured from exposure, act as powerful poisons, and in some states of depressed action of the human system, fatal effects would doubtless follow from the introduction of such oils into the stomach.

Vol. LXIII.—No. 9

As a general statement, the spirits produced in this country to serve as beverages, are remarkable for their purity and freedom from any substances which careful rectification can remove. When, through age and suitable exposure, the oils contained in them have passed into ethereal bodies and thus ripened the spirits, they become equal, in soundness and purity, to any products imported from abroad, and far less deleterious than most of the so-called brandies of the present time.

There is, however, present in the newly-distilled, and, in most cases, in the older spirits, a source of danger, which, so far as I can learn, has been overlooked, or possibly attributed to criminal intention, which should be publicly known, and is of especial interest to the medical profession.

Newly-distilled spirits, of the most common kind, often contain *salts of copper, of lead, or tin*, derived from the condensers, in which the vapors are reduced to a fluid form. The quantity of copper salt contained in the bulk usually taken as a draught, is sufficient to produce the minor effects of metallic poisoning; the cumulative character of these poisons may even lead to fatal consequences. With a knowledge of the fact now stated, instead of resting on a supposition of the existence of an organic poison, in the spirits which have caused sickness, the physician may notice the symptoms of metallic poisoning, in persons addicted to the habit of consuming newly-distilled spirits, and interpose his aid in preventing the fatal termination of vicious indulgence.

Since I first demonstrated the fact of the frequent occurrence of these metallic salts in the more recently manufactured spirits, the investigation has taken a wider range, and the results have proved that as all spirits at one time were new, so with few exceptions—arising from peculiar rectifications—most spirits have been, or are, more or less contaminated by metallic compounds. Old, or more matured spirits have generally lost every particle of the salts once held in solution. Changes in the organic solvent have caused the deposition of the metallic compound, accompanied by the organic matter from obvious sources, and in such spirits the metallic oxide is always found—if it has been present—in the dark-colored matter which has been deposited at the bottom of a cask at rest. This dark deposit has the appearance of, has been mistaken for, charcoal, detached from the charred staves of the casks in which the spirits have been stored.

Of this dark deposit every sample has, on examination, afforded abundance of copper, copper and tin, or copper and lead, even when taken from the finer qualities of foreign spirits.

Observations have been made on the nature of this change from a soluble to an insoluble state. Samples of new spirits have been kept in glass vessels until the whole metallic salt has fallen in dark flocks, leaving the clear fluid free from any metallic compound and perfectly pure.

It appears, therefore, that matured spirits lose their poisonous impregnation during the time necessary to adapt them for use as beverages, and that while the clear, transparent fluid contains no metallic impregnation, a turbid though ripened spirit may prove deleterious through its *suspended* metallic compounds.

In order to avoid the poisonous effects of these salts, perfectly well-ripened and clear spirits only should be used in the preparation of medicines, and when ordered as restoratives, no new or turbid alcoholic fluids should be allowed to enter the room of the patient or hospital. As a further elucidation of this subject, the following more strictly chemical remarks are offered.

The origin of these salts is connected with the production of acids, as well as alcohol, in the fermenting vats. When the wort is subjected to heat in the still, acetic, butyric and other acids rise with the vapor of alcohol, and pass into the condenser, now most commonly made of copper, with masses of solder containing lead. At the instant of condensation, these acids exert a power of corrosion on the metals quite unsuspected, and the salts formed dissolve in the spirit. Where condensers of pure tin are used, no copper salt is found, and a little tin salt takes its place.

With the vapor of dilute alcohol some vesicular vapor of the wort is carried forward, and the dextrine which can be found in the spirit; another portion of soluble organic matter is abstracted from the wood of the cask, and this is often tannic acid. In the subsequent chemical changes, these organic compounds unite with the salts, and fall in the form of a sub-granular, dark matter, seen in colorless spirits of all kinds. In detecting the metals held in *solution*, the extract obtained, after evaporating the spirit, must be destroyed, as usual in toxicological testing, and an acid solution of the oxide obtained, or the extract may at once be mixed with carbonate of soda, and the metal reduced by the blowpipe flame. When the deposit is the subject of trial, the metal or metals appear on fluxing with carbonate of soda, in the inner flame produced by the blowpipe, on charcoal.

16 *Boylston St., Boston, Sept. 17th, 1860.*

SUPPOSED CASE OF ASTHENIA ADDISONII—DISEASED SUPRA-RENAL CAPSULES.

BY A. CHAPIN, M.D., OF WINCHESTER.

[Read before the Middlesex East District Medical Society, Aug. 29th, 1860, and communicated for the Boston Medical and Surgical Journal.]

IN February last, a man residing in Winchester called on me for professional advice. He was a printer by trade, and was on his way home from Boston, where he worked. On leaving the cars, he walked some forty or fifty rods, to my house, and on entering, threw himself, utterly exhausted, on the nearest seat. His counte-

VOL. LXIII.—No. 9*