5. Taste buds for detecting bitterness are located on the tip as well as on the base and sides of the tongue.

6. No relationship was found between acuity and speed of perception of the bitter taste of strychnine ($r = -0.03 \pm 0.11$).

7. The addition of sodium bicarbonate increases the bitterness of strychnine.

8. The addition of five per cent yerba santa extract increased the threshold of strychnine from its normal value of 5.4 micrograms to a value of 36.4, or approximately seven times the threshold concentration in distilled water. This was the most efficient masking action observed.

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LABORATORY NOTES ON ALCOHOL DETERMINATIONS.*

BY R. E. SCHOETZOW.

While, in general, the determination of alcohol in pharmaceutical preparations appears simple, yet difficulties do arise. At times, due to "bumping" and foaming on distillation, or to difficulties encountered in removing volatile substances, it appears that it is art, not science, that is required to make the determination. Some of our experiences may be of interest to others. Our methods, of course, are based on the method given in the tenth revision of the United States Pharmacopœia. This method is a general one. The Pharmacopœia gives appropriate steps to be taken, when some substances are present, but it seems to us that the next Pharmacopœia might with benefit give more detailed directions, perhaps a method for each class of products such as, spirits, liniments, tinctures, fluidextracts and collodions.

The first step in the Pharmacopœial Method is the distillation of the alcohol from the preparation, which has been diluted with an appropriate amount of water, but some mixtures such as Tincture Benzoin Compound, will "bump" violently on being distilled. They will "bump" so violently that the liquid may pass over into the condenser, or that the apparatus is broken.

We have tried all the ordinary remedies, such as glass beads, broken porcelain, etc., without much success. We do find, however, that if an alkali is added, not an excess since that would cause foaming, but an amount sufficient to combine with the resins present that, after allowing the mixture to stand for some time, the distillation will proceed quietly. We have found Milk of Magnesia with its low soluble alkalinity to be very suitable for use as an alkali.

Other preparations, like the Soap Liniments, or Fluidextract of Sarsaparilla, will foam to such an extent that the distillation cannot be performed. The addition of capryllic alcohol, will restrain the foaming, but not sufficiently. We have found, however, that calcium chloride added to slight excess will by precipitating or combining with the foam-producing constituents, enable the distillation to be carried out successfully.

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It may seem obvious that "bumping" and foaming are due to opposite conditions and that by bringing the mixture to an intermediate condition with alkali or acid or calcium chloride that the proper mixture for distillation may be obtained.

The Pharmacopœia directs in the case of Tincture of Iodine that the Iodine be decolorized by zinc dust or sodium thiosulphate; in the latter case, to add several drops of Sodium Hydroxide T.S. to prevent sulphur compounds from distilling over. We find sodium thiosulphate to be quicker in effect than zinc dust. For a considerable time, however, we were puzzled by the fact that our distillate was acid or contained sulphur even when we added several cubic centimeters of Sodium Hydroxide T.S. before distilling. Eventually, we found that this occurred only when we had used an excess of thiosulphate.

We were unable to satisfactorily determine the alcohol in Spirit of Nitrous Ether by following what one would assume to be the U. S. P. Method that is by distillation, shaking out the distillate with petroleum benzin and redistilling. But, if we destroyed the ethyl nitrite before distillation, as in the pharmacopœial assay with potassium iodide and sulphuric acid, decolorizing the iodine freed with sodium thiosulphate, using the above-mentioned precautions, a satisfactory result was obtained. It is, of course, necessary to calculate from the ethyl nitrite assay, the amount of alcohol produced in the reaction and subtract this from the amount of alcohol found.

The Pharmacopœia directs that after distillation volatile oils be removed by extraction with petroleum benzin. It seems necessary to be careful of the kind of petroleum benzin used. At one time, we found obviously high results coincided with the use of a petroleum benzin, whose distilling range exceeded that of the U. S. P. More accurate results were attained when we redistilled the petroleum benzin and used the fraction distilling within the U. S. P. X range, 35° C. to 80° C.

In simple mixtures of volatile oils and alcohol, it seems unnecessary to follow the U. S. P. in distilling, extracting the distillate with petroleum benzin and redistilling. Equally good or better results may be obtained by first extracting the volatile oils with petroleum benzin from the spirit, diluting with the proper amount of water and then redistilling. This saves one distillation.

On preparations like Camphorated Tincture of Opium, containing camphor, we are not able to obtain clear distillates by the official method of distilling, extracting with petroleum benzin and redistilling. If these distillates are used for specific gravity determinations, low alcohol percentages result, but by adding alkali to the distillation mixture and allowing it to stand over night before distilling, fairly clear distillates are obtained.

There are other preparations containing volatile principles with which we are not able to obtain clear distillates. Usually with these, we do not obtain clean and sharp separations during the petroleum benzin extraction, and hazy or cloudy distillates are obtained in the second distillation. It is now our custom to add magnesium carbonate to the alcoholic mixture after extracting it with petroleum benzin and, after thorough agitation and chilling, to filter and redistil. This is usually quite successful in producing clear distillates, which are suitable for specific gravity determinations.

The U. S. P. X states what the alcoholic strength of the collodions should be. But no method given therein seems applicable to an alcohol determination in

such a preparation, because of interference from the ether present. Someone has suggested that the ether be removed by warming the product or the distillate so that the ether will be driven off, but not high enough to lose any alcohol, but that does not seem to be a very sound analytical procedure. If the alcohol content of collodion is a subject of enough importance, I believe that considerable work will be necessary in order to develop an accurate method.

We present these few notes on alcohol determination not only because we hope they may be of interest to others but, also, because they may show that in preparing the next Pharmacopœia the alcohol determination methods should be given in greater detail.

REACTION OF BISMUTH MAGMA N. F. V.*

BY K. W. SMITH AND R. E. SCHOETZOW.

The Fifth Edition of the National Formulary, in the instructions for making this product, directs that it be washed with distilled water "until the washings cease to react with phenolphthalein T.S." The magma is then drained and made up to the correct volume with distilled water.

In describing the qualities of this product, the National Formulary states, "It is neutral to litmus paper and phenolphthalein T.S." This can only be interpreted as meaning that the Magma itself is neutral to litmus and phenolphthalein T.S.

We have long been of the opinion that this statement is wrong. We believed that a magma correctly made—its washings neutral to phenolphthalein—would, itself, still be alkaline to litmus and phenolphthalein T.S.; but that its supernatant liquor or a filtrate from the magma would be neutral.

To verify our opinion we prepared two small batches of bismuth magma, strictly following the N. F. V procedure, washing as directed, until the washings ceased to react with phenolphthalein T.S. The product, however, as we anticipated was alkaline to litmus and phenolphthalein while its supernatant liquor or a filtrate from it was neutral to both.

Since it might be thought that the National Formulary did not direct a sufficient amount of washing, we subjected these two magmas to further washing with a relatively large amount of water. But the result was still the same—the product was alkaline to litmus and phenolphthalein test solution.

We recommend then that, at the next revision of the National Formulary the neutrality statement be changed to read "When filtered bismuth magma should yield a filtrate neutral to litmus and phenolphthalein test solution."

ANALYTICAL LABORATORIES,
CHEMICAL & PHARMACEUTICAL DIVISION,
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"Mystery is the fundamental curse of medicine; evasion and secrecy are criminal. The best way to help any human being is to help him help himself. The man who is evasive in his dealings with his patient is either dishonest or ignorant, or both."—F. B. MOOREHEAD, M.D.

* Scientific Section, A. PH. A., Baltimore meeting, 1930.