rats, has shown that deficient diets produce a lowered resistance to poisons, like acetonitrile. While the mechanism of this lowered resistance remains unknown, it is nevertheless certain that the resistance to infection is actually diminished. These studies have a practical bearing, especially in tuberculosis, in which food has for some time past been recognized as one of the important factors.

Perhaps the most fascinating aspect of vitamine research lies in the possible relationship that exists between insulin and the blood-sugar reducing substance present in yeast and in various plants and vegetables. Working with pigeons, kept on a diet of polished rice only, Funk and Schonborn found that not only was there a lack of vitamine B, but also of a substance which metabolized sugar. In the above experiments, a semidiabetic condition developed with high blood sugar and the disappearance of glycogen. On the injection of a highly concentrated vitamine B, obtained from yeast, beriberi was cured and the blood-sugar returned to normal. Naturally, this is but a beginning and further work should be done in this direction.

As the research continues and the sum-total of our knowledge increases, other vitamines will undoubtedly be found to account for a number of disturbances in normal nutrition. It is in this field that we must look for the most fruitful developments.

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## A NEW METHOD FOR OBTAINING WATER-SOLUBLE GLUCOSIDES FROM PLANTS IN A PURE STATE.

BY SUDHAMOY GHOSH.

The author was working on the problem of isolating the glucoside present in the bark of *Terminalia Arjuna*, the extract of which is used widely as a cardiac tonic by the Ayurvedic physicians of India. The aqueous extract was highly colored.

The use of litharge, which required a rather prolonged heating, partly decomposed the glucoside.

The ordinary method of using neutral or basic lead acetate gave quite clear solutions, but the later operations, *viz.*, complete removal of lead by $H_2S$ (which took a long time) and the subsequent evaporation under reduced pressure, invariably led to a highly colored viscous residue. The presence of either Na- or $NH_4$-acetate in the residue, which decomposes to a certain extent, and its solubility in alcohol made it almost impossible to free the glucoside (which was highly soluble in water) from the above and allow it to crystallize. Further, the presence of acetates, which are cardiac depressants, somewhat vitiates the pharmacological experiments.

The method which was devised by the author was as follows: A finely powdered mixture of lead chloride (about 10% of the weight of the dry bark) and litharge (about one-third of the weight of $PbCl_2$) was put into the aqueous extract of the bark and steam passed for 5 to 10 minutes, while the solution was vigorously stirred

with a rod. The solution was next immediately neutralized with a 10% solution of sodium carbonate, and, on cooling, filtered with the aid of a water-pump.

Most of the lead is precipitated as carbonate and the little that remains in solution is easily removed by $H_2S$. The presence of PbO keeps down the acidity of $PbCl_2$ and thus lessens the chances of hydrolysis of the glucoside. The solution on evaporation gives a far purer product than with lead acetate, while the presence of the harmless NaCl does not interfere with the pharmacological action of the glucoside. The amount of NaCl can be easily estimated by standard $AgNO_3$ and the approximate amount of glucoside settled for clinical use on a large scale for which extra purification is not essential. The NaCl can also be easily eliminated by repeated recrystallizations from alcohol. The method will thus be very useful for pharmacological work in the case of highly water-soluble glucosides and, with the necessary modifications as to the quantities of $PbCl_2$ and PbO, it promises to be of great industrial importance.

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## ISOPROPANOL A NEW SOLVENT AND PRESERVATIVE FOR THE PHARMACIST.

BY HENRY C. FULLER.

Considerable interest had developed of late over isopropanol, owing to its sudden appearance in the commercial field, and to the possibilities for its use that have been featured in the scientific press. This had naturally brought about a great deal of discussion as to what the properties of isopropanol really are, and to what extent it may reasonably be considered a valuable commodity in the arts and industries. It is the purpose of this paper to set forth a few facts concerning its possibilities in the pharmaceutical field, the observations being based on intensive researches of some two years' standing.

Pure isopropanol is a colorless liquid with a mild but not unpleasant odor, boiling between 81 and 83° C., and miscible in all proportions with water. As it ordinarily occurs in commerce, it contains about 10 per cent. of water. It is destructive to microörganisms, but has no corrosive action on the skin. It dissolves volatile oils, resins and many different organic and inorganic substances. On account of its solvent and preservative actions, and because it mixes in all proportions with water, it early gave evidence of being a product of great importance to the pharmaceutical trade.

When it was suggested that it might prove to be a valuable commodity for the pharmacist and medicine maker, and that, because of its unrestricted use, it might solve many of the problems that now encumber the use of alcohol and other solvents, it was deemed expedient to see just to what extent it was a good dissolving and holding agent for drug extracts, tinctures, liniments, etc., to what extent it was a preservative and what might result from the ingestion or application of these preparations in so far as the isopropanol was concerned.

In the first place, a number of standard preparations of the Pharmacopœia and National Formulary were made with isopropanol as the solvent instead of