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on the brain that produces intoxication. This is of much medico-legal value, but unfortunately does not help solve the problem of when a beverage is intoxicating, for such a test could only be made post-mortem.

Investigators of this problem, Prof. A. O. Gettler of New York University and A. Tiber, found that when the brain contained from 0.25 to 0.4 per cent. alcohol, the individual lost his sense of equilibrium and could be considered intoxicated. This finding resulted from a five-year study of over 6,000 human brains examined in the Chief Medical Examiner's Office of New York City, analysis of the histories of these cases, and experimental work on dogs.

The degree to which any person is affected does not depend on the amount of alcohol consumed but on the amount present in the brain at the time, this study showed.

Among investigators using the amount of alcohol in the blood as a test of intoxication is the English biochemist, Prof. E. E. Mellanby, who observed that when the concentration of alcohol in the blood reached 0.2 per cent. by volume, the drinker showed signs of intoxication. This would require drinking about four "large whiskies." In general, a condition of marked drunkenness exists when the alcohol in the blood reaches a concentration of between 0.1 and 0.2 per cent. From 0.6 to 0.7 per cent. or less may prove fatal and more than this almost invariably does. A man dead-drunk is not very far from real death.

Prof. Gettler, however, does not consider the concentration in the blood so

reliable an indication of drunkenness as the concentration of alcohol in the brain, and for living persons he considers the concentration in the spinal fluid most reliable. When this reaches 0.265 per cent. the person is intoxicated.

But if scientists can thus determine by various tests when a man is intoxicated, they still cannot determine accurately what strength of beverage will produce the effect, since this depends on how much and how fast he drinks and how quickly he absorbs and burns up the alcohol in the beverage. People vary so greatly in their response or resistance to alcohol that what may be an excessive amount to one person may be a mere "snifter" to another.

"A Moderate Dose"

A pharmacologist, Dr. Harold T. Hyman, assistant professor at College of Physicians and Surgeons, Columbia University, has said that a moderate dose of alcohol may be from about two-thirds of an ounce to about one and one-third ounces. At that rate, from two to four glasses of 4 per cent. beer would be a moderate and presumably non-intoxicating dose. But Dr. Hyman admits that either of these amounts might be excessive or very slight, according to the individual drinker's tolerance for alcohol.

Earlier scientists seem to have allowed a slightly more generous amount for a moderate dose, however. In the last century, an English physician, Dr. Anstie, said that a "permissible amount" of alcohol would be about an ounce and a half of absolute alcohol per day. Since absolute alcohol is 100 per cent. alcohol, this would allow about four or five glasses of 4 per cent. beer.

Coming nearer to our own time, Prof. John J. Abel of Johns Hopkins University stated in 1903 that a permissible amount would be a pint of beer or half a pint of light wine a day. However, it is unlikely that either of these physicians were considering the permissible amount solely from the standpoint of permitting an amount just short of intoxication. Other considerations undoubtedly entered in.

"According to laboratory experience," stated Dr. Francis G. Benedict of the Carnegie Institution Nutrition Laboratory, "the equivalent of 20 to 30 cubic centimeters or one to one and one-half ounces of pure alcohol may be taken at one time by the average man, even on an empty stomach, without obvious signs of incipient intoxication. This is quite irrespective of whether the man is used to alcohol or not.

"If we consider the amount of liquid necessary to take into the stomach to furnish one and one-half ounces of pure alcohol in a diluted form, we find that it would require nearly two quarts of liquid. Although of course there are certain bacchanalian artists who can easily negotiate this volume, for the majority of individuals it would be physically impossible to hold enough liquid with a two per cent. content of alcohol to make a man a menace to society from the standpoint of obvious intoxication."

If the liquor were 4 per cent. instead of 2 per cent., only one quart need be consumed to reach the limit of one and one-half ounces of pure alcohol, and, presumably, intoxication. Since one quart of beer or other beverage is quite as much as the average person would take at one time, 4 per cent. would thus seem to be a safe, scientific limit of alcohol concentration in a non-intoxicant.

Science News Letter, December 17, 1932

MEDICINE

Typhus Investigator Recovering From Disease

DR. W. G. WORKMAN, of the U. S. National Institute of Health, Washington, is now well on the way to recovery from the attack of typhus fever which he contracted during the course of investigations on the disease. Dr. Workman, third of the Institute's staff to suffer from the disease, is reported to have had a much milder attack than that from which his chief on the typhus investigations, Dr. R. E. Dyer, suffered in October of this year.

Science News Letter, December 17, 1932

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