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Effect of Methyl and Ethyl Alcohol Mixtures on Behaviour of Rats in a Maze.

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The pharmacological action of 2 or more drugs given in combination with each other is assuming great importance in recent pharmacological and toxicological research. The authors have been engaged in studying the pharmacological and toxicological effects of ethyl and methyl alcohol mixtures in various biological experiments, and one phase of the work is reported here.

The narcotic effects of ethyl and methyl, individually and in combination with each other, were studied on the behavior of the white rat in the circular maze. A total of 10 adult rats were used in the investigation, in addition to 6 rats which were used as controls. The rats were trained to solve the maze problem so that they could find their way from the periphery of the maze to its center, where food was placed, in the shortest period of time and with the least number of errors.

After the animals were thus trained, injections of weak alcohol solutions, 2 to 4%, were given repeatedly in doses of 2 cc. intraperitoneally and the effect on the running time and the number of errors noted. Several hundred such experiments were performed and the results obtained were summarized and averaged. The subjoined table expresses succinctly the effects produced. In the column marked "Running Time," the ratio of the running time after the injections of the various drugs is expressed in terms of per cent of the normal running time of the animals before injecting the drugs. In the column giving the number of errors the same procedure is employed, namely, the number of errors after injections of the alcohol are expressed as percentages of the normal number of errors of the rats before injecting the drugs.

It will be noted that methyl alcohol (chemically pure) was less depressant than the ethyl alcohol and, indeed, showed a definite stimulating effect. Ethyl alcohol was definitely depressant, though not to a very great degree. The most interesting findings were those obtained with mixtures of ethanol and methanol in equal proportions. Injections of such mixtures, containing only half as much of either constituent as were used in the experiments with individual alcohols, produced a very marked depression. Another

TABLE I. *Effect on Rats in Circular Maze.*

Drug Used	Method of Administration	Running Time Expressed as % of Normal	No. of errors made as compared with Normal
	Intraperitoneal Inj.	%	%
Ethyl alcohol	2 cc. 4% sol.	108	105
Methyl alcohol	2 cc. 4% sol.	87	85
Ethanol-methanol mixture (1:1)	2 cc. 4% sol.	122	120

series of experiments in which the alcohols were studied in regard to their effect on *learning* the maze problem, also indicated that a mixture of ethanol and methanol in equal proportions was more toxic than a double dose of either one. A similar synergistic effect of ethanol-methanol mixtures was noted by the authors in other toxicological experiments, which will be reported elsewhere. The present findings are of obvious practical interest.

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Production of Monocytes and Epithelioid Cells in Subcutaneous Tissues by Injection of Various Irritants.*

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In the course of a study upon hepatic injury and the possible relationship of such injury to the white blood cells, Lawrence and Huffman[1, 2, 3] found that the subcutaneous injection of guinea pigs with yellow phosphorus (in oil) was followed by an elevation of the monocytes in the circulating blood. These findings suggested that the study of the subcutaneous tissues of animals injected with the

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[1] Huffman, M. M., Lawrence, John S., and Jones, Edgar. The effect on the white blood cells produced by the intraperitoneal injection of whole liver. In press.

[2] Lawrence, John S., and Huffman, M. M. An increase in monocytes in the blood following the subcutaneous administration of yellow phosphorus in oil. In press.

[3] Lawrence, John S., and Huffman, M. M. Fatty changes in the Kupffer cells of the liver of the guinea pig in phosphorus poisoning. In press.