Effect of Alkaloids of Ololiuqui in Man

By

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In 1941 SCHULTZES reported that Indians in Mexico ingested the seeds of a wild morning glory, called ololiuqui, either in religious rituals or in the therapy of disease. The plant was identified as Rivea Corymbosa (SCHULTZES 1941). MACDOUGALL (1960) reported that another variety of morning glory (Ipomea violacea, also known as Ipomea tricolor) was used in a similar fashion. According to WASSON (1963), the seeds of Ipomea violacea are more potent than those of Rivea Corymbosa. Because of SCHULTZES' report, OSMOND (1955) ingested 14 to 100 seeds (chewed or ground to a powder) in a number of self experiments. He developed apathy, irritability, lack of energy and hypnagogic phenomena that disappeared after several hours. KINROSS-WRIGHT (1959) fed up to 125 seeds to 8 human volunteers without obtaining any subjective effects. ISBELL gave former addicts finely ground seeds of Rivea Corymbosa in doses ranging up to 6 g (approximately 300 seeds) and observed only slight sedation and nausea.

In 1960 HOFMANN and TSCHERTE (1960) reported the isolation of d-lysergic acid amide, d-iso-lysergic acid amide, and chanoclavine from seeds of Rivea Corymbosa. These authors took 2 mg of the crude extract of ololiuqui alkaloids and developed dreamy states, with alterations in the perception of colors and objects. HOFMANN (1963) further reported that the seeds of Rivea Corymbosa contained 0.012 percent of indole alkaloids, whereas seeds of Ipomea violacea contained 0.06 percent. He also found that in addition to d-lysergic acid amide, d-iso-lysergic acid amide, and chanoclavine, the seeds of both plants contained elymoclavine. Lysergol was found in Rivea Corymbosa and ergometrine in Ipomea violacea.

Some information is available concerning the subjective effects of d-lysergic acid amide. HOFMANN (1963) took 0.5 mg of this drug hypodermically and reported fatigue, sedation, and sleep. SOLMS (1956a, b) likewise found that d-lysergic acid amide caused decreased psychomotor activity, sedation, and sleep. ISBELL obtained similar results with
d-lysergic acid amide in former morphine addicts. HOFMANN (1963) experienced tiredness, apathy, and "mental emptiness" after 2.0 mg of d-iso-lysergic acid amide. Elymoclavine elicits excitation and central stimulation in animals (Yui 1958), but ISBELL found that elymoclavine caused chiefly sedative effects in former addicts.

Law enforcement officers and garden seed companies in the United States have recently become concerned because of reports in the lay press that students, psychologists and maladapted persons of Bohemian habits ("beatniks") were ingesting seeds of cultivated morning glories sold in garden supply shops. Some of the persons who report they have used the seeds state they have also taken LSD-25, mescaline, psilocybin, or peyote. COHEN (1964) has reported one case of suicide following ingestion of morning glory seeds, and INGRAM (1964) has recently described a psychic reaction after eating 250 seeds that was sufficiently severe to require hospitalization. Thus fears have arisen that a new type of potentially dangerous psychoactive drug abuse might be arising in the United States.

Because of the varying reports concerning the efficacy of the whole seeds of ololiuqui in inducing subjective effects, it seemed of interest to study the effects of the crude extract of alkaloids of ololiuqui prepared by HOFMANN and coworkers, since use of the extracts would avoid differences in absorption and potency of different lots of the seeds. Such a study would also be valuable in assessing possible behavioral pathology arising from ololiuqui abuse. A comparison of the effects of the crude extract of ololiuqui seeds with those of a mixture of synthetic alkaloids compounded in the same proportions might also shed light on the question as to whether the alkaloids identified in ololiuqui account for all the effects of the seeds. The purpose of this paper is to describe the autonomic and subjective effects of a crude extract of the alkaloids of ololiuqui in man, and to compare the effects of the crude extract with those of a mixture of synthetic alkaloids containing the drugs in the same percentages as

1 We were indebted to Dr. A. HOFMANN and coworkers of Basel, Switzerland, and to Dr. R. BIRCHER, Sandoz, Hanover, New Jersey, for this material, which was an extract of the alkaloids of Ipomea violacea. The material contained (in terms of the percentage present in fresh seeds): d-lysergic acid amide, 0.035 percent; d-iso-lysergic acid amide, 0.005 percent; chanoclavine, 0.005 percent; elymoclavine, 0.005 percent; and ergometrine, 0.005 percent. Total alkaloids amounted to 0.06 percent. For details on the method of extraction and analysis, see the paper of HOFMANN (1963).

2 This mixture was supplied through the kindness of Dr. R. BIRCHER, Sandoz, Hanover, N. J. It consisted of 45 percent d-lysergic acid amide, 25 percent d-iso-lysergic acid, 10 percent ergonovine, 10 percent chanoclavine, 5 percent elymoclavine, and 5 percent lysergol. These percentages were calculated in terms of the bases and not the salts.