CELASTRUS PANICULATA IN MENTAL DEFICIENCY: A PILOT EXPERIMENT.

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Celastrus paniculata (*c. multiflora* and *c. mutans*) is a large climbing shrub found in the hilly districts of India, Burma and Ceylon. The seeds, leaves and an oil extracted by distillation are used in Ayurvedic medicine and are believed to increase intelligence. The Sanskrit name Jyotishmati or " light-bringer " is an allusion to this reputed property. Other members of the family Celastraceae, notably *Gymnosporia deflexa* Sprague and *Catha edulis* Forsk, are favoured by the natives of Africa as mental stimulants (Watt and Breyer-Brandwijck, 1932).

Recently Hakim (1951, 1952*a*) claimed very favourable results from the administration of *Celastrus paniculata* in cases of feeblemindedness and impaired memory, basing his suggestion on records extending over a hundred years in a family practice. Similar reports are those of Dymock *et al.* (1890) and Kirtikar and Basu (1918), who write " the seeds are supposed to have the property of stimulating the intellect and sharpening the memory. The oil is used in the courts and colleges by a great many pundits and munshis to increase the intelligence of their pupils."

In the present experiment the seeds were employed. These are cinnamon brown in colour, about one-third of an inch in diameter and completely enveloped in a scarlet fleshy aril. The presence of an alkaloid in the seeds is mentioned by Wehmer (1931), and Chopra (1933) noted the presence of a glucoside and colouring matter in addition. The brownish powder covering the seed is rich in carotene. Basu and Pabrai (1946) isolated two alkaloids from the seeds, celastrine and paniculatine, and detected the presence of a resinous body. The former alkaloid has been known for many years (Mosso, 1891) to have a stimulant action on the brain not followed by secondary depression, and was considered by Tschirch to be identical with the active principle of *Catha edulis*. Because of their natural oil content the seeds form a sticky mass when crushed. This was filled into gelatine capsules, each containing 3 grains. Dummy capsules identical in appearance, size and weight, of an inert substance were also prepared. Hakim (1952*a* and *b*) recommends a dosage of up to 20 grains extending over a period of twelve weeks. The actual dosage employed was 6 gr. daily for four weeks, 12 gr. daily for four weeks and 21 gr. daily for four weeks.

Thirty-two patients were divided into an experimental and a control group. The two groups were matched by the pairing of patients according to sex and I.Q. on the Terman Merrill Revision of the Binet Scale Form L. Only Intelligence Quotients between 50 and 65 were included, and the patients' ages were in the 18–34 year range. Epileptics and those with a hospital stay of under twelve months were excluded, the latter to avoid improvement due to environmental changes. The medical, nursing staff and patients concerned were unaware which capsules actually contained the drug.

The following test battery was applied. General intelligence was tested by the Terman Merrill Revision of the Binet Scale—Form L before and Form M after treatment—the Porteous Mazes, Healy Picture Completion No. 1, and the Wechsler-Bellevue Picture Completion Sub-test. Visual memory was tested by a series of bead-stringing tests and a modified Whipple Test was used for the visual apprehension of common objects. Auditory memory was assessed by a digit repetition test and memory and learning by Digit Symbol tests and the Rey-Davis Form Board. Capacity for

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sustained attention was measured by Digit and Letter Cancellation tests. Tests of addition, subtraction and mental arithmetic were given. A test of physical agility was employed. The Szondi personality rating was applied to all patients in both groups. The total number of tests both before and after treatment amounted to eighteen for each patient. The normal effect of practice was obviated by comparison of the control and experimental groups after treatment.

Preliminary scores on the Terman Merrill scale revealed that the groups were well matched in respect of general intelligence, the Mean I.Q. of Group A (control group) being 58·82, and of Group B (experimental group) 58·13. The Terman Merrill ratings after treatment showed a high correlation between the groups, with a Mean I.Q. of 59·44 in Group A and of 58·69 in Group B. The scores of the two groups on both the Porteous Maze and the Healy Picture Completion tests showed a similar degree of improvement attributable to practice effect. The alternative material in the Wechsler Picture Completion test proved somewhat harder than that of Scale 1 originally used, but there was a corresponding decrease in the scores of both groups.

In the auditory and visual memory tests normal fluctuations in the results were found. The digit span was relatively stable in both groups before and after treatment. Some practice effect was noted in the re-test of visual apprehension of common objects, but this was the same for the control and experimental groups. In the bead-stringing test there was also no marked change in the performance of either group. Tests measuring the capacity for sustained attention, including digit and letter cancellation, and the writing of X's in a minute, showed improvement in both groups owing to the normal effect of practice and familiarity with the test situation. In the arithmetic tests of addition and subtraction no real difference in the scores of the two groups was observed, but on the mental arithmetic test the re-test scores of the experimental group were significantly higher than those of the control group. This test was composed of only ten verbal items, and it would seem undesirable to place too much weight on this finding in view of the relatively superficial and limited nature of the test, wherein all scores were low. Since no corresponding improvement is evident in the more discriminating addition and subtraction sections, it appears reasonable to assume that the change is merely of a fortuitous nature. Neither the test of physical agility nor the Szondi personality rating revealed any marked changes in either group after treatment.

The differences between the scores before and after treatment of both the control and experimental groups were compared ; the re-test scores of both groups similarly dealt with, as were improvements in individual cases. For the purposes of statistical analysis the Students " t " test of improvement was applied to all these results, and no significant difference was found between the scores of the control and experimental groups apart from that found in the mental arithmetic test mentioned above. On twelve out of the seventeen tests the " t " scores showed a slight, though individually insignificant, improvement on the scores of the experimental group compared with those of the control group. This suggested that there is a minor, but hardly significant positive change in those treated. The number of variables to be considered is so large that in the investigation of small groups such minor changes should be classed as suspect.

Clinically, two patients in either group showed some general change in their behaviour pattern, being more co-operative and responding better to their social milieu. This was probably due to the extra care, attention and observation they enjoyed during treatment. No toxic effects were experienced, although insomnia and gastro-intestinal disturbances have been reported by others (Hakim, 1952*b*).

Conclusions.

Celastrus paniculata would appear to produce no significant improvement in the intelligence of feebleminded persons. Administration in recommended dosage effects no major change in memory as has been claimed. The slight trend towards improvement of the treated group, however, suggests that further study might be justified.

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Bibliography.

Basu, N. K., and Pabrai, P. R., *J. Amer. Pharm. Assoc.*, 1946, **35**, 272.
Chopra, R. N., *Indigenous Drugs of India*, 1933, p. 473. Calcutta: Art Press.
Dymock, W., Warden, C. J. H., and Hooper, D., *Pharmacographia Indica*, 1890, **1**, 343. London.
Hakim, S. A. E., *Brit. Med. J.*, 1951, ii, 852.
Idem, ibid., 1952*a*, i, 222.
Idem, 1952*b*, personal communication.
Kirtikar, R. R., and Basu, B. D., *Indian Medicinal Plants*, 1918, **1**, 327. Allahabad.
Mosso, U., *Arch. Ital. de Klin. Med.*, 1891, p. 64.
Watt, J. M., and Breyer-Brandwijck, M. G., *Medicinal and Poisonous Plants of S. Africa*, 1932, p. 110. Edinburgh.
Wehmer, K., *Die Pflanzenstoffe*, 1931, p. 717. Jena: Fischer.

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