frrquencies for the individual aggregating cultures are given below:—

TABLE I

Cult. No.	Frequencies: Normal green	Frequencies: Chlorophyll deficient	Total	Dev. / S.E.
1	65 (60·75)*	16 (20·25)	81	1·09
2	66 (61·50)	16 (20·50)	82	1·15
3	Bred true for the normal green condition			
4	49 (43·50)	9 (14·50)	58	1·65
5	48 (45·00)	12 (15·00)	60	0·89
6	44 (40·50)	10 (13·50)	54	1·10
Total	272 (251·25)	63 (83·75)	335	2·62

* The figures in brackets represent expected frequencies.

Although in each case the fit to a 3 : 1 ratio is good, the fit for the total of all the segregating cultures is bad. This is due to the fact that there is a deficiency in the recessive class in all the segregating families and this deficiency has an accumulated effect in the total.

In order to find out whether it was merely due to chance that all the segregating families were deficient in the recessive class or whether it was due to some genetical or other causes, sowings were repeated with a known number of seeds from each of the above cultures. The data which are reproduced here show that the deficiency of the recessive class in all the segregating families in the initial sowing was merely due to chance.

TABLE II

Cult. No.	Frequencies: Normal green	Frequencies: Chlorophyll dificient	Total	Dev. / S.E.
1	66 (55·50)	8 (18·50)	74	2·82
2	41 (39·00)	11 (13·00)	52	0·64
4	37 (34·50)	9 (11·50)	46	0·87
5	29 (30·00)	11 (10·00)	40	0·36
6	35 (36·00)	13 (12·00)	48	0·33

These results, therefore, indicate that this type of chlorophyll deficiency in safflower is inherited on a monofactorial basis, the chlorophyll-deficient condition being recessive. Further, this condition appears to have arisen as a result of gene mutation and is perpetuated through plants heterozygous for this character.

Imperial Agricultural Research Institute, New Delhi, R. B. DESHPANDE.
August 17, 1943.

FURTHER CHROMOSOME NUMBERS IN THE CÆSALPINIACEÆ

IN this note which is a continuation on the chromosome numbers of Cæsalpiniaceæ,[4,5] the author records the chromosome numbers of the following species as counted during meiosis in pollen mother-cells:—

Amherstia nobilis Wall..
Saraca indica Linn.
Brownea sp. (usually called *B. Hybrida* in the gardens) } $n = 12$

FIG. 1-4

FIG. 1. *Amherstia nobilis*, I metaphase. FIG. 2. The same, II metaphase. FIG. 3. *Brownea hybrida*, I metaphase. FIG. 4. *Saraca indica*, II metaphase.

This number agrees with that reported previously for the genus *Cæsalpinia*,[2,5,7] *Cersis canadensis*,[7] *Cassia fistula*,[8] *C. sophora*,[3] *C. alata*[7] and *C. tomentosa*.[1,6]

The material for this study was obtained from plants cultivated in the Royal Botanic Garden, Calcutta. The author is obliged to the authorities of this Garden for providing all facilities for collection, and to Dr. A. C. Joshi for his help.

Maharaja's College, Vizianagram, J. V. PANTULU.
September 1, 1943.

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BAICALEIN FROM THE SEEDS OF *OROXYLUM INDICUM* VENT.

DURING the investigation of the seed-oil of *O. indicum* Vent.,[1] one of us (C.R.M.) reported the isolation of a yellow crystalline substance (m.p. 274°) in a quantity which was too small for further investigation.

This work has been continued, and on careful examination of various extracts, we have obtained another yellow crystalline substance (m.p. 265-66°) from the alcohol, acetone and water extracts. Its carbon and hydrogen values, its specific colour reactions and the study of the properties of its demethylation, methylation and acetylation products, which agree closely with those recorded for them in literature,[2,3] indicate it to be a trihydroxy flavone, $C_{15}H_{10}O_5$, $[C_{15}H_7O_2(OH)_3]$, *viz.*, 5 : 6 : 7-trihydroxy flavone or 'Baicalein'. We have further confirmed our conclusion that this substance is baicalein by means of a mixed melting point determination with an authentic sample of baicalein kindly supplied by Prof. Keita Shibata.

Baicalein was isolated from the roots of *Scutellaria baicalensis* Georgi by Shibata, Iwata and Nakamura,[2] and was synthesised by

Bargellini.[3] It is interesting to mention here that baicalein occurs along with Oroxylin-A in the root bark of *O. indicum* Vent.[4]

A detailed account of this investigation will shortly be published elsewhere.

Central Excise Laboratory,
The Technological Institute,
Baroda, C. R. MEHTA.
September 20, 1943. T. P. MEHTA.

1. Mehta, *Proc. Ind. Acad. Sci.*, 1939, **9A**, 390. 2. *Acta Phytochim.*, 1923, **1**, 105. 3. *Gazzetta*, 1919, **49**, ii, 47. 4. Shah, Mehta and Wheeler, *J.C.S.*, 1938, 1555.

INDIAN RHUBARB AS SUBSTITUTE FOR 'OFFICIAL' RHUBARB

Rheum officinale Baillon, *Rheum palmatum* Linné and other species and hybrids of Rheum, grown in *China and Tibet* are the recognised varieties of rhubarb in the British and the U.S. Pharmacopœias. *Rheum emodi* Wall., which grows in the Himalayas at altitudes of 4,000 to 12,000 feet, is commonly believed to be of an inferior grade to the Chinese and Tibetan drug and is not acceptable as a substitute in 'official' medicine.

On the basis of available chemical and pharmacological evidence of earlier workers, Chopra[1] suggested in 1933 that Indian rhubarb, if properly cultivated, could be accepted as an efficient substitute for foreign rhubarb. No systematic work is traceable since to support this statement.

During last year presumably on account of the difficulty of securing Chinese rhubarb, possibilities of a profitable export trade in Indian rhubarb have developed and repeated enquiries have been referred to this department with a view to utilising Indian rhubarb in official pharmacopœial preparations. A pharmacognostic, chemical and pharmacological investigation was, therefore, started with seven different varieties of Indian rhubarb obtained from localities such as Sikkim, Assam, Nepal, Kashmir, etc., and though the enquiry is still progressing, the following observations may be recorded.

1. PHARMACOGNOSTIC EXAMINATION

(*a*) *Comparative Anatomical Structure.*—A study of the comparative anatomical structure of *R. palmatum* Linn., *R. officinale* Baill., and *R. emodi* Wall., shows that vascular bundles, xylem vessels, medullary rays and cell contents are more or less the same in all the three varieties except with minor variation. The distinguishing characters are total absence of star spots and presence of lignified xylem vessels in *R. emodi* Wall., *R. officinale* Baill., resembles more or less *R. palmatum* Linn. in botanical characteristics.

(*b*) *Comparative Characteristics of Rhubarb Powder.*—

Chinese Rhubarb	European Rhubarb	Indian Rhubarb
Colour—Brownish Yellow	Bright yellow	Brownish yellow
Odour—Faint	Very faint	Fragrant
Characteristic features—Numerous calcium oxalate crystals, starch abundant, vessels non-lignified	Same as in Chinese rhubarb	Numerous calcium oxalate crystals, starch abundant, vessels lignified

2. CHEMICAL EXAMINATION

Official Rhubarb—
(*a*) *Alcohol* (45 p.c.)—soluble extractive—not less than 35 p.c.
(*b*) Other organic matter—not more than 2 p.c.
(*c*) Acid-insoluble ash—not more than 1 p.c.
(*d*) Emodin and chrysophanic acid—present.

Indian Rhubarb—
(*a*) Average—35·5 p.c.
(*b*) Slightly more than 2 p.c.
(*c*) From 0·6 to 1 p.c.
(*d*) Present.

3. PHARMACOLOGICAL EXAMINATION

Equivalent weights of the dry powder of an official variety of rhubarb and an Indian variety of rhubarb (with more or less similar analytical data) were administered to cats by stomach tube and their purgative effects observed. The method employed was too crude to enable a comparative quantitative evaluation possible but in general it may be stated that the Indian variety showed a satisfactory purgative effect.

Further data are being gathered for a detailed report elsewhere but the evidence points to the fact that at least certain varieties of Indian rhubarb* (cultivated variety as distinguished from the wildly growing species) may also be recognised in the Pharmacopœias for medicinal use provided they conform to the specifications laid down in the B.P. and/or U.S.P. The darker colour, coarser texture and minor differences in pharmacognostic characteristics of the Indian rhubarb need not necessarily mean that it is inferior in its content of therapeutically-active principles.

In this combined study, help was received from Mr. A. B. Bose (Pharmacognostic study), Messrs. G. K. Roy and R. C. Guha (Chemical study) and Dr. N. K. Dutt (Pharmacological study).

Specimens of powedered rhubarb ('official' varieties) were obtained through the courtesy of Mr. J. K. Lahiri of the Department of Chemistry, School of Tropical Medicine.

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Laboratory, Govt. of India,
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August 16, 1943. B. MUKERJI.

* Two varieties of Indian Rhubarb have been found *not to conform to B.P.* specifications. Attempt is being made to identify these varieties.

1. Chopra, *Indigenous Drugs of India*, 1933, p. 235, Art Press, Calcutta.