

his assertions, which to my mind are incorrect. Dr. Rode argues that the Kosi coals are probably of Tertiary age on account of their low fuel ratios. In actuality the fuel ratio is no criterion of age in the case of the coals of the outer Himalayas, or of coals caught up by subsequent igneous activity, being an indication only of the metamorphism which the coals have undergone, either through shearing stress or by the thermal effects of intrusive rocks such as mica-peridotites. As stated in my letter of December 1946,¹ both the Eocene coals of Jammu and the Gondwana coals of the Darjeeling foothills have the same average fuel ratios. It may be remarked, however, that a further coal seam has recently been located by Mr. K. K. Dutta, Geological Survey of India in the Sunakhamba Khola, Nepal, which is less impure and has a fuel ratio of 3.22, so that the abnormality which I discussed in December is not characteristic of every seam in that neighbourhood. The analysis of this coal is given in Column 1 below:

	1 Sunakhamba Khola Left Bank, Kosi, Nepal	2 Bhitarka Khala, Left Bank, Giri River, Sirmur State, Punjab
	%	%
Moisture	2.38	0.72
Volatile Matter ..	11.92	7.50
Fixed Carbon ..	38.46	21.52
Ash	47.24	70.20
F.R.	3.22	2.98
Total Sulphur ..	0.33	1.26

(Analyses by Dr. R. K. Dutta Roy)

Of more value as an indication of age is the sulphur content. The average sulphur content of the peninsular Gondwana coals is 0.65 per cent., and of the Tertiary Assam coals about 5.0 per cent. The total sulphur content of the coaly matter of one of the Kokaha coals mentioned in my letter of December 1946 is 0.40 per cent. The total sulphur of the specimen in Column 1 above is 0.33 per cent., equivalent to 0.62 per cent., if all the sulphur is confined to the coaly matter and none of it occurs in the ash. It is highly probable, therefore, that the coals in the Kosi area are Gondwana and not Tertiary.

Dr. Rode states that Gondwana beds do not occur west of Darjeeling. This is incorrect because, aside from the recent finds in the neighbourhood of the Kosi river in Nepal, Gondwana coals have long been known, from the work of Sutton Bowman and others, to occur sporadically in Nepal as far west as longitude 82°. Moreover, it is possible that some of the carbonaceous rocks of the Mandhali series, closely associated with the Sataun limestone (30° 33' : 77° 39') in Sirmur State, Punjab, may represent altered impure Gondwana coals. One specimen collected by me in 1943 from the Bhitarka Khala has the analyses given in

Column 2 above. This suggests the possibility that Permian coal conditions may also have extended further west than has formerly been realised.

Dr. Rode also states that coal is a common constituent of the Tertiary Subathu formation between Solon and Lansdowne. So far as I know, Eocene coal does not occur in the western Himalayas east of about longitude 76°, being mainly confined to Jammu. An Eocene laterite, evidently equivalent to the bauxite of Jammu, is, however, known near Subathu and indicates a phase of sub-aerial oxidation.

Finally, Rode's interpretation of the Sirmur-Mussoorie area is so completely at variance with mine (and with that of W. D. West) that it is evident we are using given stratigraphic terms to describe quite different formations. No scale is given on Rode's section through Vincent Hill School, but the map shows that his section is about 3,000 yards in length. The nearest Blaini to Vincent Hill School along his line of section is 3,500 yards W.S.W., or some 1,300 yards beyond the end of his section. What Rode appears to have regarded as a Blaini breccia (according to him of Tertiary age) is in my view possibly either a penecontemporaneous limestone conglomerate belonging to the Krol D substage, or a lime-cemented scree deposit derived from the Krol series. Further, I know of no nummulitic limestone at the lower levels of the Vincent Hill School Ridges. According to my mapping, all the ricks exposed in Rode's section belong to the Upper Krol Stage.

So divergent, indeed, are our readings of the nomenclature, stratigraphy and structure that one is tempted to exclaim with the Voice out of the Whirlwind in the book of Job: "Who is this that darkeneth council by words ..."

Engineering Geology Section,
Geological Survey of India,
Calcutta,
March 18, 1947.

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1. Auden, *Curr. Sci.*, 1946, 15, 346.

SOMATIC CHROMOSOME NUMBERS IN SOME CULTIVATED CUCURBITS

CUCURBITACEÆ, a family of great economic importance, includes seventy genera and nearly seven hundred species. The somatic chromosome numbers have been studied in many a specie and genera elsewhere, but very little work has been done in India. Somatic chromosome numbers have been determined in seven of the varieties recorded in Table I along with the previous records on the subject. The authors are recording the somatic chromosome numbers in *Cucumis melo* Linn. var. ? "Sarda" *Cucumis melo* var. *utilissimus* Roxb. "Kakari"; *Cucumis melo* var. *momordica* Roxb. "Phunt"; and *Citrullus vulgaris* var. *fistulosus* Watt. "Tinda" for the first time. These findings agree with those of the earlier workers^{2, 8} on other

TABLE I
Somatic chromosome numbers in some cultivated Cucurbits

No.	Name	Local name	2n	No. of Sat-chromosomes in the complement	Whether previously recorded or not	Somatic chromosome number in other varieties of the species
1	<i>Luffa aegyptiaca</i> , Mill. (Fig. 1)	'Nimroa'	26	..	$n = 13$, (Sutaria, ²)	..
2	<i>Luffa acutangula</i> , Roxb. (Fig. 2)	'Taror'	26	..	$2n = 26$, (McKay ³ and Sutaria)	..
3	<i>Cucumis melo</i> , Linn. var ? (Fig. 3)	'Sarda'	24	2	New record	<i>Cucumis melo</i> Melon)
4	<i>Cucumis melo</i> var. <i>utilissimus</i> Roxb. (Fig. 4)	'Kakeri'	24	2	..	$2n = 24$. Ya maha and S. ¹
5	<i>Cucumis melo</i> var. <i>memordica</i> Roxb. (Fig. 5)	'Phunt'	24	2	..	and <i>C. melo</i> (Cantalaupe) $2n = 24$ Shiffriss. ⁵
6	<i>Cucumis sativus</i> , Linn. (Fig. 6)	'K'hira'	14	..	$n = 7, 2n = 14$ (Kozhukhow ⁶ Heimlich, ⁷ McKay ³ and Passmore, ⁸)	..
7	<i>Citrullus vulgaris</i> var. <i>histulosus</i> , (Watt., Fig. 7)	'Tinda'	22	2	New record	<i>Citrullus vulgaris</i> (Water melon); $2n = 22$, Kozhukhow, ⁶ 1925

varieties of the corresponding species. One



Fig. 1



Fig. 2



Fig. 3

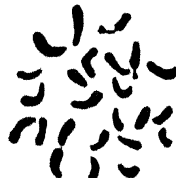


Fig. 4



Fig. 5



Fig. 6



Fig. 7

pair of satellited chromosomes have been found in the new records.

At Allahabad the root tips could be best fixed between 4-30 and 6-15 a.m. Maeda's modification of Navaschin's fixative was quite satisfactory. The results are given in the following table.

Prochromosomes were observed in the resting cells of the root tips of all the varieties investigated. A careful count of these from several nuclei showed that the number of prochromosomes corresponded with the number of somatic chromosomes in the plants.

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May 19, 1947.

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