

approximately the same height of base. In the fourth column of this table, are given the ratios of the apparent distances of the horizon and the zenith from the place of observation (CH-OZ), calculated on the assumption of a circular profile for the meridional section of the sky.

The half-arc angles reported by Miller and Neuberger for cloudy skies with average base at 1,200, 3,900 and 8,900 feet respectively are  $29^{\circ}\cdot 2$ ,  $28^{\circ}\cdot 0$  and  $27^{\circ}\cdot 2$ . These values fit in very well with those in the above table, which show a steady diminution with increasing cloud-height. The observed inverse relationship between the half-arc angle and the cloud-height cannot be explained on a geometrical basis, on which, there should indeed be a positive correlation between the two.

The true explanation for the observed anomaly appears to consist in the subjective perception of depth, which varies according to the kind and colour of the cloud. As the author has recently pointed out while discussing the apparent enlargement of the sun and the moon near the horizon,<sup>2</sup> a darker object tends to impress the eye as being more distant and bigger than a brighter one at the same distance, all other conditions remaining equal. The thicker and darker the cloud, the more convex would the overcast sky therefore appear. Amongst the cloudy skies referred to in the above table, the maximum convexity would seem to be associated with the thick and greyish altostratus cloud, which is practically impervious to direct sunlight; and the minimum convexity with the high and whitish cirrostratus cloud, through which the sunlight easily penetrates. In the case of low clouds, the thicker and darker the ceiling, the higher does it look.

One fact of practical interest that emerges from this investigation is that subjective impression considerably influences the visual estimation of the heights of base of clouds. There is a general tendency to under-estimate the heights of medium and high clouds. This tendency is more pronounced, the brighter and thinner the clouds are. The heights of low clouds are overestimated and this the more so, the thicker they appear. It may, therefore, be laid down as a safe rule to follow in utilising data of estimated cloud heights in meteorological work, that the actual heights are higher in the case of medium and high clouds and lower in the case of low clouds than the estimated ones.

In conclusion, the author wishes to express his grateful thanks to Mr. B. N. Sreenivasulu, Regional Director, Regional Meteorological Centre, Madras, for his kind encouragement during the course of this work.

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January 10, 1947.

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## ZARAFITE IN THE NUASAHU CHROME ORE

The presence of Zarafite, a carbonate of nickel, in chrome ore has not yet been recorded from any of the chrome deposits of India, viz., the Sargudam, the Babbar, the Mysore and the Madras deposits. The chrome deposit recently discovered at Nuasahu (21° 17' N, 86° 29' E, Kolar dist., Mad.) has revealed its presence.

It is a glassy green to colour and earthy in appearance. It is rather translucent, it is highly pleochroic from green to yellow and has a high refractive index and a high birefringence. It is uniaxial, negative.

The mineral occurs in the inter spaces between the chromite grains. Further it not only fills in the cracks in the chromite grains, but rarely shows some sort of a graphic texture with it. Occasionally it is entirely enclosed in chromite.

The chemical formula for the mineral, according to Dana, is  $\text{Ni}^{2+}\text{CO}_3 \cdot 2\text{Ni}^{3+}\text{OH} \cdot 4\text{H}_2\text{O}$ . The Indian mineral has not been individually analysed but chrome ore, containing this mineral alone analysed 0.3 per cent nickel and 0.6 per cent cobalt and 1.8 per cent water (including moisture). Nickel seems to have been partly replaced by cobalt in the present mineral.

Phillips had ascribed the presence of zarafite in the Shetland chrome ore to the washing of traces of nickel originally present in the chromite itself or in a nickeliferous olivine.

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## MALE FERNS OF KASHMIR

MALE-FERN is one of the oldest antihelmintic drugs known and was used by the ancient physicians, Pliny and Galen. It is administered in the form of extract filixmas for eradicating tape-worm infection in man and livestock.

The British Pharmacopoeial Drug is derived from the rhizomes and basal leaves of *Dryopteris filixmas* (Linn.) Schott., a fern indigenous to Great Britain. It should be used within one year of the date of its collection. In America *D. marginalis* A. Gray, which is found in Eastern and Central United States and North to Prince Edward Island forms the source of American Male-fern.

*D. filixmas* and *D. marginalis* are not indigenous to India but the other ferns belonging to the *Dryopteris* (*Clatrea*) *filixmas* complex grow wild in the Himalayas in general and in the mountainous ranges of Kashmir in particular. These ferns are *Dryopteris ruficornis* (Detr.) C. Chr.; *D. blanfordii* (Hook.) C. Chr.; *D. subrotundata* (Moore) C. Chr.; *D. ramosa* (Hook.) C. Chr.; and *D. integrata* (Wall.) Christ.

Considerable quantities of the male-fern extract are annually imported into India for medicinal purposes. In order to study if the

Analytical Data of Ferns *D. odontoloma* and *D. marginata*

Species	Locality	Calium oxalate crystals	Percentage of total ash	Percentage of a 1d in. soda le-ash	Percentage of Filicin in the thibomes	Percentage of Filicin	Percentage of Filicin in the extractive	Remarks
<i>D. ODONTOLOMA</i>	Gandher tal.	Absent.	3.6	0.51	2.8	10.9	25.6	Up to B. P. & U.S.P. standards.
	Pehlgam.	Do.	3.8	0.57	2.3	11.7	19.6	The fern is up to B.P. & U.S.P. standard but the extract falls short of the standard.
	Posiaet.	Do.	3.2	0.44	3.1	11.4	27.1	Up to B. P. & U.S.P. standard.
	Bhedi.	Do.	3.1	0.32	2.5	9.4	26.5	Do.
	Latot.	Do.	4.2	0.78	2.1	7.9	26.5	Do.
<i>D. MARGINATA</i>	Tanmarg	Do.	2.9	0.34	3.03	10.9	28.4	Up to B. P. & U.S.P. standard.
	B.P. 1932 Limits.	Do.	Not more than 6%	Not more than 2%	—	—	24-26% W/W	
	U.S.P. XII Limits	—	—	Not more than 3%	Not less than 1.5%	—	Not less than 24% W/W	

N.B.—The methods of B.P. 1932 have been used for the assay of the drug and all the calculations have been done on the basis of the drug dried at 100° C.

above-mentioned ferns growing wild here can be substituted in place of the official ferns and can be used in the manufacture of the expansive male-fern extract imported from abroad, samples of these ferns were collected for this study.

*D. odontoloma* occurs widely in the fir zones forests as an undergrowth throughout the Kashmir Valley. It is more common on the southern aspect of the forests retaining good moisture at altitudes of 5,000 to 8,500 feet above sea-level.

*D. marginata* is found at places with comparatively less moisture in the *Pinus excelsa* zone at altitude of 5,500 to 6,500 feet.

Five samples of *D. odontoloma* and one of *D. marginata* was collected from the various localities in Kashmir. All the tests given in the B.P. 1932, and the U.S.P. XII were conducted and the results are given in the table above.

From the perusal of the above results it is apparent that the local ferns are of B.P. and U.S.P. standard and can yield the male-fern extract of B.P. standard for medicinal purposes.

The other ferns of *D. filixmas* complex are under study and their results will be reported in due course.

We have much pleasure in acknowledging the help and advice we have received from Colonel Sir R. N. Chopra, Kt., C.I.E., I.M.S.(r.), during the course of this investigation.

The Drug Research Laboratory, K. L. HANDA.  
Jammu Tawi, L. D. KAPOOR.  
January 6, 1947. I. C. CHOPRA.

A NOTE ON THE CHEMICAL INVESTIGATION OF THE FRUITS OF *CELASTRUS PANICULATA*, WILLD.  
(N.O. CELASTRACEAE)

In view of a recent paper by Bhargava<sup>1</sup> on the chemical examination of the unsaponifiable matter of the fat from the fleshy arils of *Celastrus paniculata*, we are giving below our findings on the same investigation which was completed two years back.

Bhargava<sup>1</sup> reports the analysis of the fleshy arils of *Celastrus paniculata*. He has isolated a phytosterol (m.p. 142°) and states that it is quite different from the phytosterol isolated by Warsi.<sup>2</sup>

We have extracted the arils with acetone when an orange-red semi solid fat was obtained. The fat was analysed and the composition of the mixed acids of the fat has been found to be similar to the one reported by Gunde and Hilditch.<sup>3</sup>

The unsaponifiable matter was obtained as a sticky orange coloured mass. During purification the orange colour was bleached. The colouring matter appears to be unstable and could not be isolated. After several crystallisations from 95 per cent. alcohol and finally from petroleum ether a white crystalline material was obtained (m.p. 75° and molecular weight 352) (Rast's method). (Found: C, 81.3; H, 13.7; C<sub>31</sub>H<sub>50</sub>O requires C, 81.36; H, 41.1 per cent.) It gave an acetyl derivative (m.p. 57°). It is evidently tetracosanol (m.p. 76.5-77°-5), acetate (m.p. 57°; cf. Brigal and Fuchs<sup>4</sup>). The