

LETTERS TO THE EDITOR

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POSSIBLE USE OF FREQUENCY CURVES IN THE CLASSIFICATION OF GYROGONITES*

A SMALL collection of about 200 Gyrogonites separated out from the Intertrappean cherts collected by Prof. C. Mahadevan from Chittampalle near Vicarabad in Hyderabad State, was divided on the basis of general shape into 7 groups of which 4 had the following numbers:

- Group 1—33, Group 2—58, Group 3—28,
- Group 4—40.

The variation in length in each of the above groups was plotted against frequency and the curves yielded the following data:—

	Smallest length	Greatest length	Mode or modes
Group 1 ..	480 μ	720 μ	590 μ
Group 2 ..	420 μ	720 μ	565 μ
Group 3 ..	480 μ	960 μ	630 μ & 850 μ
Group 4 ..	540 μ	780 μ	540 μ (?) & 720 μ

Harris¹ has given the curve for variation in length of the fructifications of *Chara vulgaris*, it is a normal curve. The curves for the first two groups are normal and might reasonably be supposed to belong to one species each. Group 3 shows two maxima at 630 μ and 850 μ . It appears to be logical to infer that each mode stands for one species. In Group 4, however, there being no specimen shorter than 540 μ , 540 cannot be taken as a mode but 720 μ is a mode value and from the curve it is clear that if 540 μ does not represent the mode, there ought to be one, smaller than that. However, this remains to be applied to a large and varied collection of *Gyrogonites*, and the result studied.

My thanks are due to Professor C. Mahadevan of Andhra University under whose direction the

work was carried out, to Mr. Syed Kazim, Director of Mines and Geological Survey, Hyderabad (Deccan), for permission to work on the materials, and Dr. J. Venkateswarlu, Botany Department, Andhra University, for his suggestions.

Geological Survey Dept.,
Hyderabad (Dn.),
January 3, 1948.

S. R. SARMA.

1. Harris, T. M., *British Purbeck Charophyta*, 1939

* Contribution from the Geology Department of the Andhra University.

PRESENCE OF GALLIUM IN MICAS AND SCHISTS

It is generally known that gallium is present in very small amounts in certain minerals, chiefly zinc blende, which forms one of the richest sources for this element. It is also present in certain iron ores and in almost all the ores of aluminium. But in these ores it occurs more or less as a trace element and can be detected only by spectroscopic methods. Under these circumstances the following observations on the spectroscopic analysis of certain miccas and schists will be of some interest.

In the Nagpur district there are the Kandri and the Mansar mines well known for their rich manganese deposits. The manganese ores consist typically of "mixtures of bauxite and psilomelane, and occur as bands of considerable length intercalated between gneisses, schists, etc." These schists were examined spectroscopically for their composition, with special reference to the presence of trace elements. A five-foot concave grating was used for taking the spectra. The instrument gave a dispersion of about 11 A° per mm. at λ -4200, in the first order.

The following is the list of the very prominent lines in the spectrum taken with pure carbon electrodes. The lines due to impurities in the electrodes have been omitted.

Wave-length	Int.	Origin	Wave-length	Int.	Origin	Wave-length	Int.	Origin
5535.5	100	Ba I	4289.7	6		3968.5	8	Ca II
			4274.8	8	Cr I	3961.5	30	Al I
5183.6	20		4254.3	8		3944.0	30	Al I
5172.7	10	Mg				3933.7	8	Ca II
5167.3	10		4226.7	30	Ca I			
			4215.5	6	Sr II	3838.3	10	
5014.3	6					3832.3	8	Mg
5007.2	6		4172.1	6	Ga	3829.4	4	
4999.5	6	Ti						
4991.1	6		4077.7	6	Sr II	3653.5	4	
4981.7	6		4047.2	8	K	3642.7	4	Ti
			4044.2	8	K	3635.5	3	
4934.1	10	Ba II						
4607.3	10	Sr I	4034.4	6		3593.5	6	Cr I
4554.0	20	Ba II	4033.0	8	Mn	3578.7	6	Cr I
			4030.7	8				
4434.9	5					3273.9	10	Cu I
4318.6	4	Ca I	3998.6	6		3247.6	10	Cu I
4302.5	6		3989.8	6	Ti			
			3981.8	6		3096.9	2	Mg I
4301.1	3	i				3092.8	10	Al I
4300.6	3	Ti				3082.2	10	Al I

It will be seen from the above table of wave-lengths that, besides the common elements known to be present in the basic rocks and schists, the specimen under investigation shows the strong line, characteristic of gallium. The prominent lines of gallium as given in the wave-length tables published by the Massachusetts Institute are as follows:—

4172.056 Int. (Arc) 2000 R 2943.637 Int. (Arc) 10
4032.982 „ „ 1000 R 2874.244 „ „ 10

Kayser's wavelength tables give the following sensitive lines for gallium:

4172.05 10 R 2943.64 2
4033.01 10 R 2874.24 2

The pair in the ultra-violet is too faint to be obtained on the plate. The line at 4033 coincides almost with the central line in the Mn triplet which is one of the "Raies Ultimes" of manganese.

Several specimens of mica, including one obtained from Korhadi (a few miles from Nagpur) were examined. They all showed the unmistakable presence of the gallium line, the intensity of which depended on the specimen studied. But amongst the specimens investigated, by far the greatest intensity of the line was observed in the bauxite ores of the Central Provinces. It is very doubtful if the extraction of the element from these ores will be a possibility. At least it will be possible to ex-

tract a greater concentration for spectroscopic study and confirmation.

As the identification of the element depended practically on the single line at 4172, the experiments were repeated using spectroscopically pure copper electrodes and specimens of very clear mica, assumed free from Mn. Though the Mn triplet was considerably reduced in intensity, yet it could not altogether be eliminated. However, it was significant that in some plates the intensity of the middle component was more than that of the outer components of the triplet.

As a result of a large number of measurements on different plates the mean wavelength of the gallium line was found to be $4172.07 \pm .03 \text{ \AA}^\circ$.

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February 4, 1948.

THE USE OF SODIUM CHLORIDE IN THE DETERMINATION OF ACID VALUES OF CELLULOSIC MATERIALS

NEALE and Stringfellow¹ suggested the use of aqueous sodium chloride in the determination of acid values of cellulosic fibres; they added an excess of N/50 caustic soda and titrated back the alkali with N/50 sulphuric acid in presence of bromocresol purple. Hiller and Pacsu² consider the presence of sodium chloride unnecessary when phenolphthalein is used as indicator. In the case of jute fibre, however, it has been observed that the amount of excess alkali must be very small, abnormally high values being otherwise obtained.³ It was found that direct titration of the fibre (previously freed from cationic ash) suspended in sodium chloride solution with caustic soda in presence of bromothymol blue was the best procedure. Sodium chloride of analytical reagent quality in boiled-out distilled water gives a solution neutral to B.D.H. universal indicator. This was employed in all of our experiments. Direct titration of jute fibre in carbon dioxide-free distilled water with dilute caustic soda in presence of phenolphthalein (no excess alkali being added) is rather tedious; the acid is neutralised very slowly towards the end. With sodium chloride, no such difficulty arises; the best indicator being bromothymol blue (or phenol red), for we are in this case actually titrating a strong acid (HCl) with very dilute (N/50) caustic soda. Due to its higher pH range for colour change, phenolphthalein is unsuitable, a higher value being obtained in its presence. The following table will show that there is fairly close agreement between the results with and without sodium chloride in presence of bromothymol blue and phenolphthalein respectively. The former is unsuitable as indicator for weak acids like cellulosic or uronic acids (due to its lower pH range for change of colour); lower acid values are thus obtained.