pyroxene and the coexisting clinopyroxene (diallage) exhibits (100) lamellæ of orthopyroxene; the orientation and composition of these exsolution lamellæ were determined by single crystal X-ray work[1] and by use of the electron probe X-ray microanalyzer.

The pyroxenes were separated from their host rocks by repeatedly using an isodynamic separator and centrifuging in Clerici's solution, until all the samples were not less than 99·5% pure as judged under the petrological microscope. The data obtained from the chemical analyses of the four pyroxenes are summarized in Table I. The problem of the partition of

TABLE I

	OPX (48)	OPX (323)	CPX (323)	CPX (472)
Fe^{+2}/Mg ..	0·08	0·22	0·12	0·20
$100\ Mg/Mg + Fe^{+3} + Fe^{+2} + Mn$	91·57	81·28	84·59	81·31
Atomic % Ca ..	0·36	0·98	43·15	48·49
Mg ..	91·24	80·48	48·09	41·88
$Fe^{+3} + Fe^{+2} + Mn$ ..	8·40	18·54	8·76	9·63

OPX = Orthopyroxene, CPX = Clinopyroxene

48 Orthopyroxenite from south of the hill 3¾ miles NNW of Kondapalli R.S. 323-Websterite from top of Nakka) Banda, 1½ miles SW of Kondapalli R.S. 472-Clinopyroxenite from the hillock, ¼ mile north of Kotta Ibrahimpatnam Village.

Fe^{+2} and Mg in coexisting pyroxenes is of interest[2] and the partition coefficient Kp $[= (Fe^{+2}/Mg)OPX \div (Fe^{+2}/Mg)CPX]$ is equal to 1·9 for the pyroxene pair 323 and this Kp value is characteristic of the granulite facies rocks. When the data in Table I are represented on a Ca-Mg-ΣFe trilinear compositional plot (Fig. 1, slightly modifiel, after Poldervaart and Hess[3]) it is observed that the analyzed pyroxenes fall in the fields of enstatite (48), bronzite (323), endiopside (323) and diopside (472). These pyroxenes are more magnesian than those reported for the Madras charnockitic region.[4,5] As far as the author is aware, the orthopyroxene 48 (En_{92}) is more magnesian than any analyzed orthopyroxenes reported from other charnockitic terrains of the world. Recently an orthopyroxene (En_{97}, determined from optical data) from Kondapalli more magnesian than the orthopyroxene (48) is reported by Fuchs.[6]

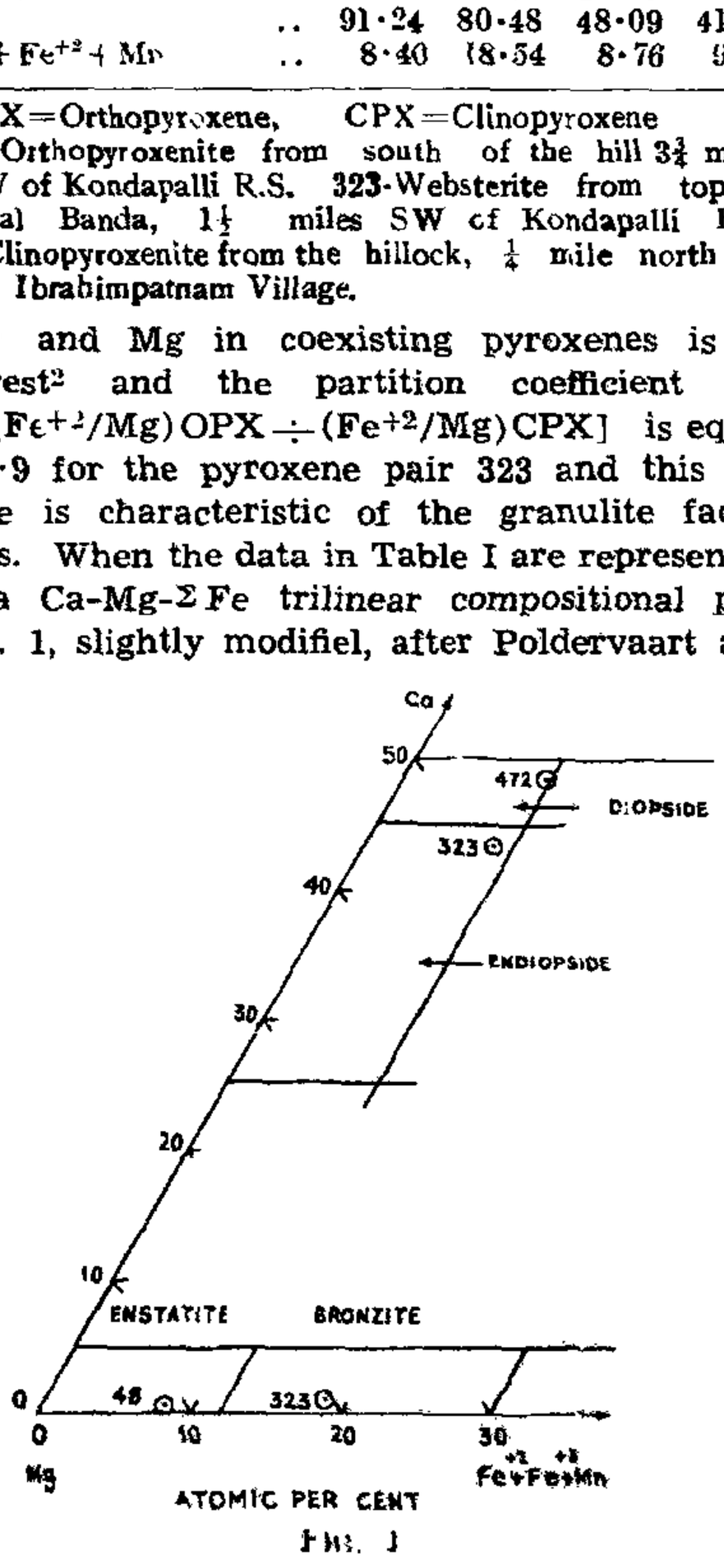

FIG. 1

This work was carried out in the Department of Mineralogy and Petrology, Cambridge (England), under the supervision of Prof. W. A. Deer, F.R.S.

Geology Department, C. LEELANANDAM.
Osmania University,
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WARKALA BEDS AT KOLATTUR

THE Warkala beds of Tertiary age, best developed along the coastal belt, are also seen in some places inland as detached patches which have not been studied previously. One such occurrence, underlain by the crystalline rocks, was reported early by Chacko[1] at Kolattur (58 $H/_{14}$), 1·6 kilometres north of Veli R.S., near Trivandrum, but further details are not available. Some features on the lithology and succession, recently observed, are mentioned in this note.

Though the beds do not outcrop, a number of well sections reveal four lithologic units which are, in descending order, variegated clay, carbonaceous clay, sandstone and carbonaceous sandy clay. Animal fossils are absent but leaf impressions are common in the carbonaceous clay.

Variegated Clay.—Slightly gritty, about 6 metres thick, grey, plastic, indistinctly laminated. Yellow and reddish-brown patches and streaks of ferruginous matter occur near the top but disappear downward. Small fragments of brown woody matter and resin are scattered all over.

Carbonaceous Clay.—The bed is about 8 metres thick, brownish-grey, crudely laminated, plastic and somewhat gritty caused by quartz grains mostly angular but including a few sub-rounded frosted grains. Small fragments of lignite and resin and pseudomorphs of marcasite are also present. Specks of sulphur-like powder identified to be natrojarosite[2] were also observed in hand specimens.

Sandstone.—The bed is 1 metre thick, grey, medium-grained and composed of quartz with small amounts of partly weathered felspar and opaque minerals in a clay matrix. Pieces of brown woody matter and resin also embedded.

Carbonaceous Sandy Clay.—The contact with the overlying sandstone is marked by springs of sour taste and a strong sulphurous smell. The exposed part of the bed is about 2 metres thick. It is brownish-black, arenaceous and contains small logs of lignite with resin and marcasite. Minute yellow patches of natrojarosite are present. The lignite is black with a fibrous columnar structure which is retained by the marcasite. The quartz grains are unsorted, angular to subrounded; some of the latter being frosted.

The difference in colour between the woody matter in the carbonaceous clays and the other beds is striking. This may be due to incomplete transformation resulting from unusual environmental factors.

Conclusion.—The strata do not represent the complete series as exposed at Warkala,[3] the type area. Close resemblance between the lignite-bearing carbonaceous sandy clay and the lower lignite seam at Warkala strongly suggests equivalence. Such a relation was suggested for the carbonaceous clay at Chathanur[4] with the Warkala lignite bed. Correlation of strata in different sections remains unsatisfactory owing to lateral variations, irregularity in the order of succession and absence of certain beds in some sections.

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ON THE SUCCINIC DEHYDROGENASE ACTIVITY OF THE FAIRY SHRIMP *BRANCHINELLA KUGENUMAENSIS* (ISHIKAWA)

EVEN though there have been a few reports on the systematics and morphology of the fairy shrimp *Branchinella kugenumæensis* (Ishikawa)[1] which occurs invariably in astatic pools of Madurai, very little is known of their physiology including their respiratory activity. As a measure of their respiratory potential the succinic dehydrogenase activity of this animal was determined after Kun and Abood.[2]

Branchinella used for the experiments were collected from temporary ponds in Madurai. As the eyes and tail of these animals and the brood pouches of the females contain pigments which are soluble in acetone, they were carefully removed and the remaining parts of the body weighed. The tissue was ground with a glass rod and incubated in a constant temperature water-bath for one hour at the respective temperatures. The optical density of the acetone extract was measured in a Lumetron colorimeter at 420 $m\mu$ and the quantity of formazan calculated from a standard graph. As the bodies of these animals have a pinkish tinge, a control experiment of a male and female without the addition of triphenyl tetrazolium chloride was run for each set of experiments and a correction factor applied for the reading.

The succinic dehydrogenase activity was estimated at four temperatures, namely 15°, 25°, 30° and 40° C. Further, this activity was also measured using the tissues of the head, thorax and abdomen at the laboratory temperature (34° C).

A perusal of Table I will show that with increase in temperature from 15° to 30° C the succinic dehydrogenase activity also

TABLE I

Effect of temperature of the succinic dehydrogenase activity of Branchinella

Temperature (°C)	Sex	Wet weight (mg.)*	µg. of dye reduced/ mg./hr.*	Average µg. of dye reduced/ mg./ hr.
15	♂	79·68	0·19	0·18
	♀	76·2	0·16	
25	♂	53·3	0·38	0·33
	♀	75·52	0·28	
30	♂	59·2	0·43	0·48
	♀	27·7	0·52	
40	♂	81·66	0·48	0·48
	♀	93·1	0·48	

* Each value is the mean of 4 to 6 estimations.