SAVAGE RIVER IRON

by P. Tetlow.

Abstract

In the Savage River area Precambrian quartzites, schists, and phyllites were intruded during late Precambrian or early Cambrian times by basic rocks which extend as a belt one mile wide for many miles north of the Savage River and south of Paradise River. Large magnetite bodies segregated about the time of intrusion, and later, probably during the Devonian period, shearing and alteration of the parent rock occurred. These bodies show up clearly from aerial magnetometer work as isolated concentrations strung out in a northerly direction within the parent amphibolite with which they are genetically associated.

Introduction

Extensive aerial magnetometer coverage of north-west Tasmania carried out by the Bureau of Mineral Resources in 1956 revealed pronounced anomalies in the Savage River district (Rio Tinto District). The larger part of this area was subsequently covered by a ground-magnetometer survey by the Bureau under Dr. O. Keunecke, at the request of the Department of Mines, Tasmania. Both this work and the mapping carried out by Senior Geologist T. D. Hughes in 1957 proved the presence of considerable accumulations of magnetite ore. At this stage diamond drilling at the recommended sites was essential to estimate ore reserves, i.e., width, depth, and grade of the ore. Furthermore, a mapping programme was necessary to determine the southernmost delimitation of the ore. This work was carried out by the author while D.D.H. No. 3 was drilled on traverse B8.

This report summarizes the results of D.D.H. No. 3 and of the geological mapping south of traverse A., i.e., Tr. 0 ft. south to Tr. 3500 ft. south, and is in continuity to the report of T. D. Hughes (Technical Reports No. 2, 1957).

Location and Access

At the position of the trig. station on the Waratah-Corinna road, 21 miles from Waratah the Specimen Reef track once trended westerly. However, since numerous drill sites were located to the south of Savage River a new four mile road was built for the Department of Mines early this year. Initially it follows the Specimen Reef track, and diverges further north of west after approximately three miles, cutting traverses A, B, B8, and ending on a steep slope at traverse C. The road provides easy access for four-wheel drive vehicles during the summer season. Normal vehicles could not compete with the slippery surface and steep grades. The iron is covered by a typical open rain forest assemblage, i.e., myrtle, sassafras, a few celery top and blackwood, with a little horizontal and man fern. Thick stands of leatherwood and candlewood occur in patches.

Seven 1500 feet traverses at intervals of 500 ft. were cleared approximately parallel to, and south of traverse A. The road and the main south traverse were surveyed using a director.

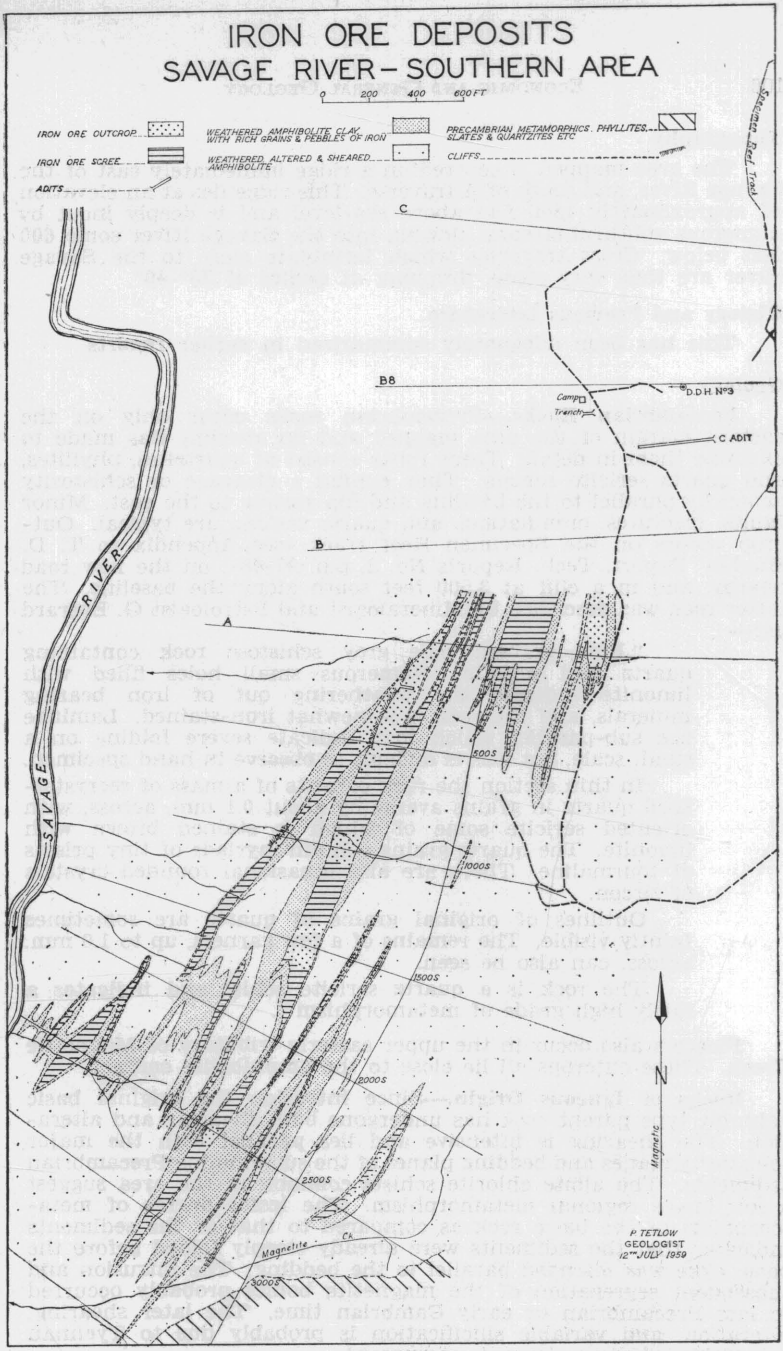

FIGURE 18.

5 cm

Topography

The area mapped is centred on a ridge immediately east of the Savage River, and south of A traverse. This ridge lies at an elevation of approximately 1300 feet above sea-level and is deeply incut by numerous youthful streams flowing into the Savage River some 600 feet below. Cross traverses which terminate close to the Savage River are thus very steep, dropping at angles of 30°-40°.

History and Previous Literature

This has been adequately summarized in earlier reports.

Geology

Precambrian Rocks.—Precambrian rocks occur only on the eastern margin of the area mapped and no attempt was made to examine them in detail. These rocks consist of quartzites, phyllites, and quartz sericite schists. They exhibit a cleavage or schistosity generally parallel to the bedding and dip steeply to the east. Minor faults, fractures, crenulations and quartz veining are typical. Outcrop occurs on the Specimen Reef track (see Appendix to T. D. Hughes' Report, Tech. Reports No. 2, p.p. 97-98), on the new road nearby, and in a cliff at 3,500 feet south along the baseline. The latter rock was described by Mineralogist and Petrologist G. Everard as:—

> "Fine grained pale grey schistose rock containing quartz and sericite. Numerous small holes filled with limonite indicate the weathering out of iron bearing minerals, and the rock is somewhat iron-stained. Laminae are sub-parallel which may indicate severe folding on a small scale, but this is difficult to observe in hand specimen.
>
> In thin section the rock consists of a mass of recrystallised quartz in grains averaging about 0.1 mm. across, with oriented sericite some of which is stained brown with limonite. The quartz grains contain myriads of tiny prisms of tourmaline. There are also occasional rounded crystals of zircon.
>
> Outlines of original grains of quartz are sometimes faintly visible. The remains of a few garnets, up to 1.0 mm. across, can also be seen.
>
> The rock is a quartz sericite schist and indicates a fairly high grade of metamorphism".

Floaters also occur in the upper easterly tributary of Magnetite Creek. These outcrops all lie close to the amphibolite contact.

Rocks of Igneous Origin.—Since intrusion the original basic gabbroic type parent rock has undergone both shearing and alteration. The shearing is intensive and lies parallel with the major schistosity planes and bedding planes of the surrounding Precambrian sediments. The albite chlorite schists common in the area suggest a low grade regional metamorphism. The lesser degree of metamorphism of the basic rock as compared to that of the sediments indicates that the sediments were already steeply folded before the basic dyke was intruded parallel to the bedding. The intrusion and subsequent segregation of the magnetite bodies probably occurred in late Precambrian or early Cambrian time. The later shearing, alteration, and variable silicification is probably due to Tyennan and Tabberabberan orogenic movement.

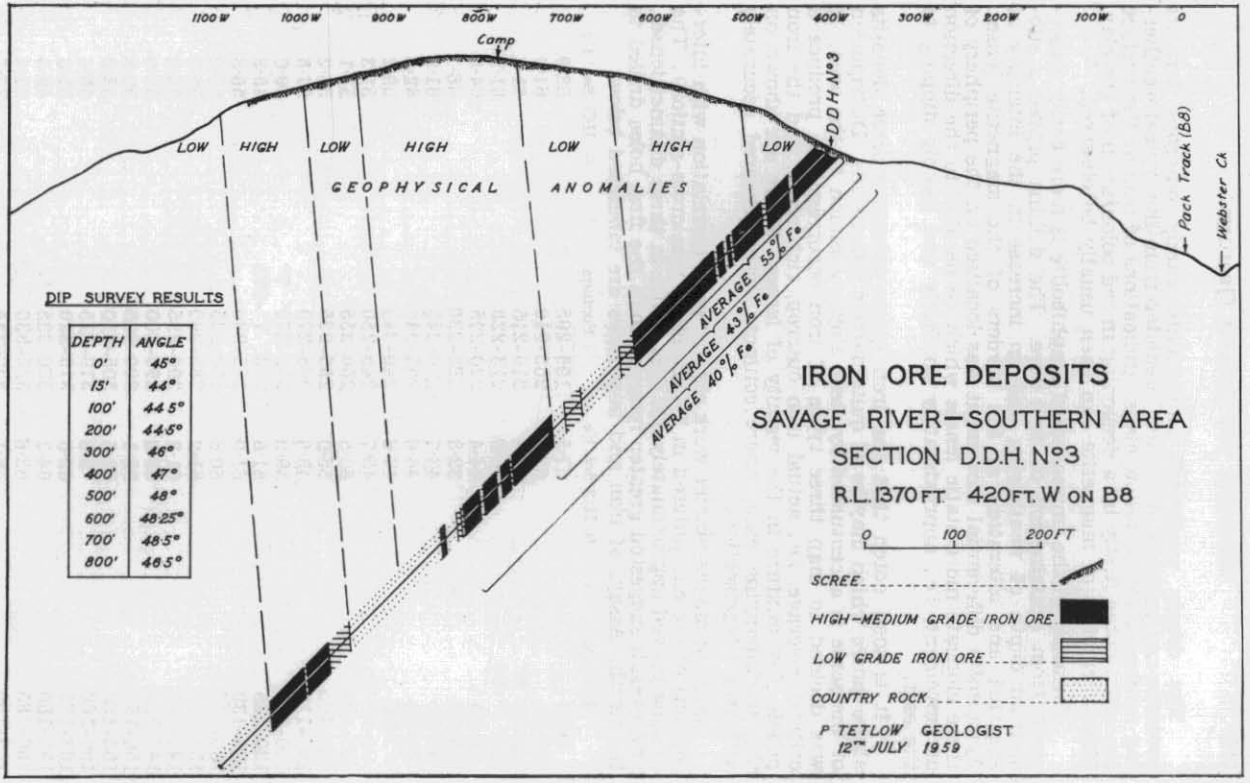

FIGURE 19.

5 cm

The deeply weathered amphibolite rarely outcrops but its presence can be fairly accurately predicted from the typical weathering residue of red to yellow clays. Indications of iron at the surface are often noted firstly by a deepening in red colouration of the clay. Minute crystals of magnetite can then usually be observed.

Variation in the unweathered amphibolite is more easily understood from examination of drill core. The drilling proved a substantial depth of weathering and an increase in the intensity of shearing and alteration at the borders of the magnetite lenses. Apparently differential movement was localised on the periphery of these elongate more static lenses which lie parallel to the direction of movement, i.e., approximately northerly and steeply dipping to the east.

It is soon noted that the iron forms extensive scree deposits above lenses which may be of quite narrow dimensions. Distribution of the scree is accentuated by steep slopes common to the area. It was decided to map three types of iron occurrence to produce a critical coverage, i.e., actual iron outcrop, rich scree, and the iron pebble-clay mixture in the vicinity of lenses. These are shown on the accompanying map, where contacts were measured accurately at traverse intersections.

Ground magnetometer work showed good correlation with intersections of ore encountered in D.D.H. No. 3 (see cross-section). The drilling proved approximately 400 feet of ore in three distinct lenses, and overall suggested greater reserves than the first holes drilled to the north. Assays of iron and impurities are tabulated below:

Footage	% HCl Sol. Fe	Footage	% HCl Sol. Fe
0-28	67·5	195-205	53·9
28-31	67·0	205-210	61·0
49-51′ 5″	46·4	210-215	61·3
51′ 5″-60	56·0	213-220	61·5
60-65	44·4	220-225	64·5
65-70	32·3	225-230	66·1
70-80	43·7	230-235	61·9
80-85	46·6	235-240	62·8
85-90	47·6	240-245	59·2
90-95	45·7	245-250	51·3
95-100	60·5	250-255	51·1
100-105	56·9	255-265	54·2
105-110	45·5	265-270	57·6
110-120	59·0	270-273′ 7″	50·0
120-125	61·6	273′ 7″-275	45·8
125-130	61·0	275-280	56·3
130-135	60·6	280-285	52·9
135-140	61·2	285-290	55·8
140-145	61·2	290-295	56·2
145-150	63·8	295-300	57·0
150-155	58·1	300-305	50·3
155-160	58·5	305-310	53·8
160-168	2·8	310-315	46·4
168-175	62·0	315-320	51·8
175-180	64·3	320-325	49·5
180-185	63·6	325-330	24·4
185-190	56·1	330-334	37·7
190-195	47·3	335-340	35·8

Footage	% HCl Sol. Fe	Footage	% HCl Sol. Fe
340-345	33·5	555-560	56·5
345-350	18·7	560-565	45·4
350-355	25·2	565-571	2·9
355-360	15·8	571-575	48·7
360-365	9·4	575-580	54·8
365-370	9·5	580-585	55·8
370-375	7·6	585-588	53·1
375-380	7·2	588-595	3·6
380-385	6·2	595-601	4·4
385-390	8·2	601-609	48·5
390-395	11·4	609-615	4·8
395-400	7·7	615-620	4·0
400-405	10·2	620-630	4·1
405-410	13·3	630-636	51·9
410-415	18·4	636-645	4·1
415-420	12·7		
420-425	15·5	785-790	26·7
425-430	11·4	790-795	21·6
430-435	15·7	795-805	22·6
435-440	11·6	805-810	23·4
440-445	12·9	810-815	15·8
445-450	19·0	815-820	14·3
450-455	41·2	820-823	19·1
455-460	41·5	823-830	44·1
460-465	27·5	830-835	51·2
465-470	25·3	835-840	38·3
470-475	13·6	840-845	48·3
475-480	18·6	845-850	46·9
480-485	29·4	850-855	28·1
485-490	13·0	855-860	17·1
490-495	20·5	860-865	49·4
495-500	13·6	865-870	58·5
500-505	12·8	870-875	55·9
505-510	6·4	875-880	50·5
510-515	17·9	880-885	57·5
515-520	16·2	885-893′ 3″	55·9
520-525	17·6	893′ 3″-895′ 6″	11·3
525-530	31·0	895′ 6″-900	59·2
530-535	42·6	900-905	56·2
535-539	44·2	905-910	59·2
539-544′ 6″	3·4	910-918	55·5
544′ 6″-550	51·1	918-930	7·6
550-555	55·2		

Assays for Impurities

Footage	SiO_2	Al_2O_3	TiO_2	Mn	P_2O_5	S
0-28	0·17	0·68	0·35	0·09	0·04	0·06
28-51′ 5″	2·74	0·28	0·20	0·10	0·04	5·70
51′ 5″-70	11·37	0·43	0·29	0·09	0·11	3·6
70-90	9·65	0·38	0·37	0·10	0·06	6·7
90-110	8·02	0·65	0·36	0·12	0·08	3·4
110-130	4·50	0·76	0·37	0·14	0·03	2·0
130-150	3·68	1·45	0·35	0·12	0·14	2·0
150-160	3·88	1·04	0·30	0·11	0·09	4·1
160-168	42·8	12·68	1·13	0·24	0·17	0·82

Footage	SiO_2	Al_2O_3	TiO_2	Mn	P_2O_5	S
168-190	2·45	0·70	0·26	0·10	0·04	3·8
190-210	6·00	1·00	0·36	0·13	0·04	4·3
210-230	1·37	0·99	0·33	0·15	0·03	2·9
250-250	3·10	0·55	0·29	0·14	0·18	3·9
250-270	6·83	0·63	0·22	0·14	0·61	4·2
273′ 7″-290	6·15	0·23	0·16	0·14	0·50	4·0
290-310	6·04	0·24	0·15	0·15	0·82	3·7
310-330	10·38	0·67	0·33	1·13	1·17	5·9
330-350	....	....	0·61	....	....	8·1
350-370	....	....	0·92	....	....	6·1
370-390	....	....	1·20	....	....	4·0
390-410	....	....	1·14	....	....	4·3
410-430	....	....	0·10	....	....	4·9
430-450	....	....	0·07	....	....	3·7
450-470	....	....	0·18	....	....	6·2
470-490	....	....	0·32	....	....	5·9
490-510	....	....	0·33	....	....	7·5
510-525	....	....	0·28	....	....	8·7
525-539	13·94	1·70	0·78	0·13	0·80	5·0
539-544′ 6″	....	....	1·06	....	....	1·2
544′ 6″-565	6·05	2·05	1·14	0·17	0·17	5·9
565-588	15·35	4·44	1·23	0·13	0·82	4·2
588-609	....	....	1·04	....	....	1·8
609-630	....	....	0·92	....	....	0·32
630-645	....	....	1·01	....	....	3·0
785-805	....	....	1·02	....	....	4·0
805-823	....	....	1·04	....	....	3·8
823-840	12·36	1·05	0·76	0·06	0·07	4·7
840-860	14·58	1·99	0·32	0·05	0·09	9·0
860-875	5·58	2·00	1·57	0·04	0·05	4·8
875-893′ 3″	6·31	0·30	0·89	0·05	0·03	4·1
893′ 3″-895′ 6″	....	....	1·58	....	....	0·85
895′ 6″-918	7·20	1·47	0·09	0·04	0·01	1·7
918-940	....	....	0·18	....	....	0·81

Except for a general steep dip to the east it would be difficult indeed to predict the variations of the three lenses intersected. Apparently they are present to a depth of 700 feet and surface mapping indicates the termination of the two easterly lenses a few feet south of the A traverse. The westerly lens continues to the 1500 feet south traverse after which it narrows quickly to the south. Surface mapping has proved a number of narrow steeply dipping lenses ramifying through the amphibolite in a subparallel fashion as far as Magnetite Creek.

Conclusions

The area mapped carries indications of iron ore as far south as Magnetite Creek, i.e., 3000 feet south of A traverse. The ore south of traverse 1500 feet south is in the form of narrow (5-15 feet) subparallel lenses separated by great thicknesses of barren amphibolite. The wider bodies may assume later importance as possible reserves.

Recommendations

The ground magnetometer survey should be continued to cover the area as far south as Magnetite Creek. Suitable traverses are already present.

Inclined diamond drill holes located on traverses 500 feet south, 1500 feet south, and 2500 feet south would give an accurate indication of the reserve potentialities. Correlation of the six narrow surface outcrops on traverse 2500 feet south with iron at depth should provide interesting data as to the variation of width of ore with depth.