of its type[1], is undersaturated in character. Development of such amphibole at the expense of the plagioclase constituents was favoured by high water pressure[11]. The crystallization of such undersaturated amphibole in profusion played a significant part in moulding the composition of the residual liquid in a closed system. Because of the increasing degree of substitution of Si by Al in the structures of the mafic phases there was an accumulation of the former element and depletion of the latter in the residual liquid. Thus ultimately a peralkaline acidic liquid of moderately high temperature was formed interstitially and it developed local irregular pockets of quartz-poor hypersolvus granite within the alkali gabbro.

It should be pointed out that the trend of differentiation of alkaline basic magma will be greatly influenced by the relative distribution of Al and Si in the crystals and the liquid. If Si/Al ratio in the mafic crystals is higher than that in the magma, the liquid becomes depleted in Si relative to Al. A reversed relation favoured by high water pressure will cause the development of a slightly oversaturated liquid. Fractional crystallization of alkali feldspar in the two cases will respectively lead to further undersaturation and oversaturation of the residual magma. It is stressed that the distribution factor in a large measure controls the trend of differentiation of alkali basaltic magma and this in its turn is influenced by the prevelant water pressure. Fluctuations of water pressure may cause further complexity in the evolution of the magmas.

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Isotopic Composition of Strontium in a Variety of Rocks from Réunion Island

The island of Réunion is situated some 375 miles to the east of Madagascar in the Indian Ocean. The isotopic composition of strontium (Table 1) has been determined in a suite of rocks ranging from basalts to quartz-bearing syenites. The investigation was undertaken to see whether or not variations in the isotopic composition of strontium were present in a wide range of rock types situated in an oceanic environment.

In the samples analysed no significant differences were observed although the rocks had differing Rb/Sr ratios. This is in general agreement with results obtained from Hawaii[1] and suggests that all the Réunion rocks could be derived from an area in the mantle below Réunion having a constant Rb/Sr ratio. The lack of any significant variation in the isotopic composition of strontium is of particular interest in the case of the potassium rich (5·12 per cent K_2O) quartz syenite and indicates that this quartz-rich rock has been formed from an environment having an Rb/Sr ratio similar to that of the basic and ultra-basic rocks present on Réunion.

Table 1. Isotopic Composition of Strontium in Rocks from Réunion

Sample No.	Rock type	Sample type	$^{87}Sr/^{86}Sr$*	$^{86}Sr/^{88}Sr$
RE. 282	Olivine eucrite	Whole rock	0·7037	0·1201
RE. 114	Oceanite	Whole rock	0·7038	0·1189
		Olivine	0·7037	0·1196
RE. 108	Mugearite	Whole rock	0·7035	0·1203
		Plagioclase	0·7029	0·1200
RE. 263	Mugearite	Whole rock	0·7031	0·1193
RE. 87	Feldsparphyric basalt	Whole rock	0·7035	0·1206
		Feldspar	0·7038	0·1225
RE. 16	Quartz syenite	Whole rock	0·7050	0·1206
		Feldspar	0·7040	0·1190
		Average	0·7037	0·1201

* Normalized to 0·1194.

Four analyses of the Massachusetts Institute of Technology Eimer Amend shelf strontium standard circulated by Prof. Hurley gave an $^{87}Sr/^{86}Sr$ ratio of $0·7075 \pm 0·002$, which is slightly lower than that obtained by other laboratories. In order to compare these results with those obtained by other laboratories they should be increased by between 0·001 and 0·002. An error of $\pm 0·002$ is placed on the measured $^{87}Sr/^{86}Sr$ ratios and is a combination of instrument error and other errors, the major one of which is considered to be a function of the chemical purity of the strontium when placed on the filament. If the full value of inter-laboratory comparison is to be obtained by comparison with a strontium standard, this should consist of a rock powder rather than a pure strontium salt.

The results recorded here form part of a general survey of strontium isotopes, Rb/Sr, and K/Rb ratios of oceanic rocks, the full details of which will be published shortly. I thank Dr. B. G. Upton for providing the Réunion specimens.

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METALLURGY

A Strengthening Effect of High Hydrostatic Pressure on Grain Boundary Walls of a Polycrystalline Zinc

During investigations of dislocation behaviour in a polycrystalline zinc a number of interesting facts were found. (All experiments were performed at room temperature and specimens 6 mm² × 12 mm were machined from a commercially pure zinc cast of the composition shown in Table 1. Specimens were annealed at 350° C for 5 h and furnace-cooled to a grain size of American Society for Testing Materials micro-grain size No. 00 (except for one shown in Fig. 1 which was not annealed). The polishing and etching reagents for revealing grain boundaries and dislocations were similar to those used by J. J. Gilman[1]):

(1) Twin formation and the movement of grain and twin boundaries besides crystallographic glide are responsible for a large plastic flow of this metal during uniaxial stressing, creep, relaxation and fatigue testings, as is shown in Fig. 1.

(2) By the application of high hydrostatic pressure of the order of thousands of atmospheres, dislocations line up along grain boundaries. Twin formation is suppressed to a great extent and grain boundary movement is completely blocked. However, multiplication and movement of dislocations are still persistent and cause a plastic strain of the order of one ten-thousandth. Fig. 2 shows the build-up of dislocation walls along grain boundaries and dislocation line-ups in crystals with the application of hydrostatic pressure.

(3) Once the aforementioned structure of dislocations is formed the zinc specimen is greatly strengthened: the result of uniaxial compression tests showed that the stiffness was increased by 20 per cent when a specimen was pressure-treated at 3,000 atm. for 1 h. When an initial

Table 1. Composition

Lead	Cadmium	Iron	Tin	Zinc
0·0008%	0·098%	10 p.p.m.	<1 p.p.m.	Balance