—40 km depth under alternatively by the ic lower crust at siminditions. In both ill consist dominantly clinopyroxene and cic plagioclase and of fractional crystalli-

PH2O conditions may t 30-40 km depth in s and island arcs. It imate source of the that it was introduced b of a convection cell , as in the hypothesis is, in turn, might exline rocks with a The basalt magma melting of the mantle ise a high-alumina or it may have been sequently rose to a g contaminated with crystallization under the parent basalt may li basalt type [19]). alc-alkaline suite retallization will vary e parent basaltic comich the process takes

be comparatively alkali-poor olivine Γ conditions subseation, the residuum wer a long period of 10]. The work of onstrated that such logite more readily rmation takes place ently sink into the $y \sim 3.6 \text{ g/cm}^3$. In ses regarding the cryshe derivation of the tional crystallization

ged that the calc-

Table 5

Calculated compositions of liquid fractionates and crystalline residua derived from the high-alumina quartz tholeiite at 9-10 kb under wet conditions *.

Pressure	9 kb	10 kb	10 kb
Temperature	1040°C	960°C	920°C
Nature and estimated % of crystals extracted Initial	18% cpx 5% amph 2% opx 1% ilm	18% cpx 25% amph 2% opx 1% ilm	18% cpx 32% ampl 3% plag 2% opx 1% ilm
Liquid fractionate			
SiO ₂ 5:	2.9 55.9	59.7	64.5
TiO ₂	1.5 0.8	0.4	0.1
Al ₂ O ₃	6.9 19.4	20.2	19.9
	0.3	0.5	0.7
	7.9 7.2	5.8	3.7
	0.2	0.3	0.4
	7.0 4.4	2.1	2.0
	0.0 7.8	6.7	3.9
	2.7 3.3	3.4	3.6
K ₂ O	0.6	0.9	1.0
100		100.0	99.8
Mol. Prop.			
100 MgO	24 500	27.5	
$MgO + FeO_{tot}$	0.4 50.9	37.5	45.3
CIPW norm			
Qz	5.5	14.4	25.3
Or	4.8	5.4	5.9
Ab	27.9	28.8	30.5
An	35.7	33.2	19.3
Cor	_	1.4	5.8
Diop	2.4	_	_
Нур	21.9	15.3	12.1
Mt	0.6	0.7	1.0
Ilm	1.5	0.8	0.2
Crystal residuum			
SiO ₂	44.8	43.0	42.7
TiO ₂	2.5	2.7	2.7
Al ₂ O ₃	9.7	12.3	14.2
FeO	9.1	10.1	11.2
MgO	14.6	12.9	11.0
CaO	16.6	13.8	14.8
Na2O	1.0	1.8	1.9
K ₂ O	0.04	0.2	0.2
	98.34	96.8	98.7
Mol. Prop.			
100 MgO	74.2	60.5	70 B
MgO + FeO	14.2	69.5	63.7

^{*} The orthopyroxene analysis obtained at 1040°C, 9 kb has been used in calculations for other experimental runs since it could not be analyzed in these runs. Since only 2% of orthopyroxene is extracted, any variations in its composition will not seriously affect the compositions of the liquid fractionates or crystalline residua. Also 1% of ilmenite is extracted as part of the crystalline residua. This is because an accessory iron-titanium rich opaque mineral phase occurred in the experimental runs in graphite capsules where no iron loss took place. This phase could not be analyzed quantitatively and as a first approximation for these calculations was taken as ilmenite.