



feet, this leaves a thickness of 14 feet 4 inches of diatomite. Future bores will no doubt show that the diatomite has a greater thickness than 18 feet, and this is rendered very probable by the uniform steepness of the sides of this basin. The flat ground beyond the circular basin and between the two burns was only bored to the depth of 12 feet, and nowhere was the bottom reached. The average thickness of peat cover was found to be 3 feet 10 inches, leaving 8 feet 2 inches of diatomite.

The purity of the diatomite at Cuithir is very remarkable, as none of the bores show any intercalated bands of salt or silt, and the material itself contained no trace of grit. The small streams that drain into the swamp are fed by springs which rise at the foot of the basaltic cliffs that form the walls of the "corrie." None of those streams run over peaty ground, so that the water during the period of deposition must have reached the lake in a state of great purity. The climatic conditions that prevailed during the time when the diatom forming plants flourished must have been peculiarly favourable to their growth, and in addition to the situation of the lake, sheltered on every side, must have contributed in no small degree to the accumulation of so large a deposit.

The streams all originating in springs, a constant amount of water would flow along them, and they would not be liable to sudden floods. It is probable that a large proportion of the diatoms did not live in the loch, but existed in the springs and burns, and were only swept into the loch afterwards. The "corrie" being almost destitute of any drift-deposit, the only foreign matter carried down by the burns consists of rock detritus, and this has been precipitated at once in the form of cones when they entered the basin before the present partial drainage of the loch. The diatoms, from their minute size and consequent lightness, would be much longer held in suspension, and thus distributed equally over the rock basin. The diatomite of Loch Cuithir was also found to contain fewer species of diatoms than similar deposits in Skye, where there is a considerable admixture of foreign matter. The fewer number of species obtained from Cuithir is doubtless due to the more equable conditions kept up by the springs which fed the loch.

II. LOCH MONKSTADT.—To the north-west of Cuithir and in close proximity to the western seaboard lies the site of what was once the Loch of Monkstadt. A good many years ago the loch was drained by a large ditch which was cut from sea-level at Camas More to the northern edge of the loch, a distance very little short of a mile. The former site of the loch, about 70 feet above sea-level, is now a large flat of fairly well drained ground, all under pasture, and about half a square mile in extent.

The deposit of diatomite is very irregular. At the south end it is almost entirely wanting, and when present is very much mixed with sand and mud. In a drain to the north of the old ruins of the monastery, about 1 foot 6 inches is seen immediately below the surface, and from this point to the north-west corner of the loch its position was proved by boring. The cover of mud, turf, and peat varies in thickness from 1 to 5 feet, with a corresponding range in the thickness of the diatomite. The deposit is sometimes mixed with fine mud and silt, and in one instance a bed of sand occurs in the centre of 3 feet of diatomite.

### III. OTHER LOCALITIES WHERE DIATOMITE HAS BEEN FOUND.—

*Loch Mealt.*—Very good diatomite has been found under the marsh ground that fringes the western margin of the loch. It is covered with 10 feet of peat close to the edge of the water, and between this point and the landward side of the marsh a thin covering is spread over the rocky bottom as it rises shorewards.

*Sartil.*—The locality is situated two miles to the west of Staffin, on the Uig Road, and the deposit is a very irregular one. The diatomite is found in rough, hillocky ground, very similar to that surrounding a portion of the swamp at Loch Cuithir.

*Loch Cleat.*—Is a small loch lying to the east of Duntulm Bay. Diatomite of very good quality has been got below the swamp that borders the lake.

*Loch Snuisdale.*—This loch lies midway between Monkstadt and Cuithir, and diatomite has been found below a peat-moss a little to the west of the loch, and about 500 feet above sea-level.

*Glen Uig.*—A small deposit on the right hand of the glen. The diatomite lies on a slope and is of no extent.

### PART II.—CHEMICAL.

The annexed table of analyses shows the chemical composition and absorptive value of the samples obtained from the various deposits.

## DIATOMITE—SKYE.

## I. Analysis of Samples as Received :—

	"Quire," No. 1.	"Quire," Edge.	"Quire," Centre.	"Sartil."	"Loch Snisdale."	"Monk- stadt," No. 2.	"Uig."
Moisture.	6·921	8·240	6·405	8·466	7·417	8·602	8·164
Organic Matter	4·246	9·690	4·149	7·134	4·291	10·402	10·463
Ferric Oxide	2·679	1·271	0·673	3·079	7·189	4·367	3·511
Lime, &c.	0·521	0·805	0·041	0·685	3·525	0·854	0·501
Silica (diatoms)	85·633	79·994	88·732	80·636	77·578	75·775	77·361
	100·000	100·000	100·000	100·000	100·000	100·000	100·000

## II. Calculated free from Moisture :—

Organic Matter	4·561	10·560	4·432	7·794	4·634	11·381	11·393
Ferric Oxide	2·878	1·385	0·719	3·363	7·753	4·778	3·823
Lime, &c.	0·559	0·877	0·043	0·748	3·807	0·934	0·545
Silica (diatoms)	92·000	78·177	94·804	88·094	83·792	82·906	84·238
	99·998	99·999	99·998	99·999	99·986	99·999	99·999

## III. Results after Calcination :—

Ferric Oxide	3·015	1·548	0·752	3·647	8·142	5·391	4·314
Lime, &c.	0·585	0·980	0·045	0·811	3·992	1·054	0·615
Silica (diatoms)	96·397	97·469	99·200	95·540	87·865	98·554	95·069
	99·997	99·997	99·997	99·998	99·999	99·999	99·998

## IV. Absorptive Value :—

100 parts of Calcined Ma- terial become when sat- urated with water	369	356	397	284	327	266	301
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With the single exception of the No. 1 Monkstadt sample, the proportion of organic matter is small, being only  $4\frac{1}{2}$  per cent. of the dried material, as obtained from Quire and Loch Snuisdale,  $7\frac{1}{2}$  per cent. in Sartil, and from 10 to 11 per cent. in the Monkstadt No. 2, in Uig, and at the side of Quire deposit.

Ferruginous impurity is practically absent in the central part of the Quire deposit (0·71 per cent.), but at other parts of the same basin the quantity was found to be from 1·3 to 2·8 per cent. In the remaining deposits we find 3·3 per cent. in Sartil, 3·8 per cent. in Uig, 7·7 per cent. in Loch Snuisdale, and from 4·7 to 9·1 per cent. in Monkstadt.

The value of the material for absorbing fluids such as nitro-glycerine is also high. 100 parts of the calcined substance take up of water from 166 parts to 297 parts, or from  $1\frac{1}{2}$  to 3 times its weight.

The Quire central zone will be found to be very valuable for the manufacture of ultramarine, and other uses, where iron is objectionable, whilst the freedom from sharp sand renders the remaining deposits valuable for the various manufactures where a small proportion of iron is not objectionable.

The following is a list of the Diatoms which have been found to be present in these deposits :—

*Fossil Deposit from Quire, Skye.* 12th January 1886.

- Epithemia Hyndmanii. W. Sm.
- „ Zebra. Grun.
- „ „ var. proboscidea. Grun.
- „ gibba, and var. ventricosa. Grun.
- „ sorex. Kütz.
- Surirella robusta. W. Sm.
- „ elegans. Ehr.
- Amphora gracilis. Ehr.
- Navicula major. Kütz.
- „ elliptica. Breb.
- „ radiosa var. acuta. Kütz.
- „ vulpina. Kütz.
- „ nobilis. Ehr.
- „ limosa var. gibberula. Grun.
- Cyclotella Comti var. Grun.
- „ antiqua. W. Sm.
- Cocconeis placentula. Ehr.
- Stauroneis Phoenicenteron. Ehr.
- Gomphonema constrictum. Ehr.
- Fragilaria Lapponica var. Kütz.
- „ brevistriata var. subcapitata. Grun.
- Encyonema cæspitosum v. Kütz.
- „ ventricosum. Kütz.

*Synedra ulna* var. *longispina*. W. Sm.  
*Cymbella cistula*. Hemphr.  
     "    *lanceolata*. Ehr.  
*Nitzschia*. Ehr.  
*Melosira arenaria*. Moore.  
*Cymatopleura solea*. W. Sm.  
*Campylodiscus costatus*. W. Sm.

No. 2. *Sartil, Skye*. 12th January 1886.

*Navicula radiosa*. Kg.  
     "    *vulpina*. Kg.  
     "    *elliptica*. Kg.  
     "    *pseudo-bacillaris*. Grun.  
     "    *peregrina*. Ehr.  
     "    *limosa*. Kg.  
     "    *rhincocephala*. Kg.  
     "    *nobilis*. Kg.  
     "    *major*. Kg.  
     "    *mesolepta*. Ehr.  
*Amphora gracilis*. Ehr.  
*Cymbella naviculæ formis*. Auerswald var.  
     "    *amphicephala*. Naegeli.  
     "    *lanceolata*. Ehr.  
     "    *cistula*. Hemphr.  
*Encyonema cæspitosum*. Kg. Var.  
     "    *ventricosum*. Kg.  
*Stauroneis phœnicenteron*.  
*Pleurosigma acuminatum*. Grun.  
     "    *Kützurghii*. Grun.  
*Rhoicosphenia curvata*. Kg.  
*Achmanthes lanceolata*, var. *dubia*. Grun.  
*Gomphonema constrictum*. Ehr.  
     "                    "    var. *laticeps*. Grun.  
     "    *commutatum*. Grun.  
*Cocconeis placentula*. Ehr.  
*Epithemia Hyndmanii*. W. Sm.  
     "    *Zebra*. Grun.  
     "    "    v. *proboscidea*. Grun.  
     "    *gibba*. Ehr.  
     "    "    var. *ventricosa*. Grun.  
     "    *sorex*. Kg.  
*Synedra capitata*. Ehr.  
     "    *ulna*. W. Sm.  
*Fragilaria undata*. W. Sm.  
     "    *capucina*. Moore.  
     "    *mesolepta*. Rahsu.  
     "    *Lapponica*. Grun.

- Fragilaria parasitica.* W. Sm.  
     "                    var. *subconstricta.* Grun.  
     "          *Harrisonii.* Grun.  
     "          *capucina*, v. *lanceolata.* Grun.  
     "          *intermedia.* Grun.  
*Diatoma hyemate.* Kg.  
*Cymatopleura elliptica.* W. Sm.  
     "          *solea.* W. Sm.  
*Surirella elegans.* Ehr.  
     "          *robusta.* Ehr.  
     "          *linearis.* W. Sm.  
*Campylodiscus cortatus.* W. Sm.  
*Cyclotella antiqua.* W. Sm.  
     "          *Comti.* Grun.

No. 3. *From Loch Snuisdale, Skye.* 12th January 1886.

- Amphora ovalis.* Kütz.  
     "          *gracilis.* Ehr.  
*Stauroneis phœnicenteron.* Ehr.  
*Cymbella lanceolata.* Ehr.  
     "          *parva.* W. Sm.  
     "          *cuspidata.* Kg.  
     "          *cistula.* Hempr.  
     "          *æqualis.* W. Sm.  
*Navicula vulpina.* Kg.  
     "          *major.* Kg.  
     "          *elliptica.* Kg.  
     "          *radiosa*, var. *acuta.* Kg.  
     "          *limosa*, var. *gibberula.* Grun.  
     "          *viridis.* Kg.  
     "          *Budensis.* Grun.  
*Encyonema caespitosum.* Kg. Var.  
     "          *ventricosum.* Kg.  
     "          *gracilis.* Ehr.  
*Pleurosigma acuminatum.* Grun.  
*Gomphonema acuminatum*, var. *laticeps.* Ehr.  
     "          *sp.*  
     "          *geminatum.* Ag.  
     "          *dichotomum.* W. Sm.  
     "          *acuminatum*, var. *Breboponii.* Kg.  
     "          *constrictum.* Ehr.  
*Cocconeis placentula.* Ehr.  
*Cymatopleura solea.* W. Sm.  
     "          *elliptica.* W. Sm.  
*Epithemia gibba.* Kg.  
     "          *zebra*, Kg. ; and var. *proboscidea*, Grun.  
     "          *Hyndmanii.* W. Sm.

- Epithemia sorex*. Kütz.  
*Campylodiscus costatus*. W. Sm.  
*Surirella biseriata*. Bréb.  
     " *elegans*. Ehr.  
     " *robusta*. Ehr.  
     " *linearis*. W. Sm.  
*Nitzschia Liebetruithii*. Rub.  
     " *Sigmoidea*. W. Sm.  
*Hartzschia amphioxys*, var. *major*. Grun.  
*Synedra ulna*. Ehr.  
     " *capitata*. Ehr.  
*Melosira arenaria*. Moore.  
*Cyclotella Comti*. Kg.  
     " *antiqua*. W. Sm.  
*Fragilaria parasitica*; and var. *subconstricta*. Grun.  
     " *virescens*, var. *exigua*. Grun.  
     " *Laponica*. Grun.  
     " *intermedia*. Grun.  
*Denticula subtilis*. Grun.  
*Achnanthes lanceolata*. Grun.  
*Eunotia gracilis*. Ruben.

No. 4. *Uig, Skye*. 12th January 1886.

- Amphora gracilis*. Ehr.  
*Cymbella gastroides*. Kg.  
     " *lanceolatum*. Ehr.  
     " *cistula*. Hempr.  
     " *pavia*. W. Sm.  
*Encyonema cæspitosum*. Kg.  
*Navicula vulpina*. Kg.  
     " *radiosa*. Kg.  
     " *major*. Kg.  
*Gomphonema montanum*, forma *minor*.  
     " *acuminatum*. Ehr.  
     " *geminatum*. Ag.  
     " *constrictum*. Ehr.  
*Epithemia sorex*. Kg.  
     " *gibba*. Grun.  
     " *zebra*. Ehr.  
     " *turgida*. Kg.  
*Eunoea prærupta*, forma *minor*. Ehr.  
*Fragilaria parasitica*. W. Sm.  
     " " var. *subconstricta*. Grun.  
     " *Laponica*. Grun.  
     " *elliptica*, forma *minor*. Schum.  
     " *construens*, var. Grun.  
     " *brevistriata*, var. *pusilla*. Grun.



- Fragilaria construens*, var. *binoides*. Grun.  
*Synedra ulna*. Kg.  
„ *Danica*. Ehr.  
*Fragilaria brevistriata*, var. *pusilla*. Grun.  
*Hantzschia amphioxys*, var. *major*. Grun.  
*Nitzschia Gopilis*. Grun.  
*Cyclotella antiqua*. W. Sm.  
„ *Comti*. Kütz.  
*Cocconeis placentula*. Ehr.