XI.—*On the Composition of the Ashes of the Cactus.**By* FREDERICK FIELD, Esq.

The great abundance of various species of *Cacti* upon all the hills and mountains of Chili, even upon the most barren spots, and in the most arid seasons, led me to investigate the inorganic constituents of this tribe of plants, more especially as in England and most parts of Europe, the Cactus is only known in the conservatories of a few individuals.

Several branches from a plant more than 16 feet in height were carefully cut from the parent stem, and after having been redivided, were exposed to the temperature of 212° Fahr. for the space of fourteen days. 185·00 grs. lost 157·42, leaving 27·58 solid matter, which numbers correspond to :

Water . . .	85·09
Solid matter . . .	14·91
	<hr/>
	100·00

29·80 grs. of this solid matter incinerated with every precaution in a platinum crucible, gave 5·00 grs. of ash, equal to 16·79 per cent.

185·00 grs. of recently cut branches (with the thorns or spines attached), gave, on incineration, 2·50 grs. of ash corresponding to 1·35 grs. per cent.

In the following analyses, the soluble and insoluble portions were examined separately, the proportions, for the sake of perspicuity, being reduced to percentage numbers.

Determination of matter soluble in water :

I.	100 grs. gave	.	.	57·010
II.	100 „ „	.	.	57·300

Mean 57·155

The composition of this soluble matter is as follows, in 100 parts :

Sulphuric acid	.	.	.	6·232
Chloride of sodium	.	.	.	18·767
Potash	.	.	.	9·873
Soda	.	.	.	35·585
Phosphoric acid	.	.	.	2·265
Carbonic acid	.	.	.	26·046
				<hr/>
				98·768
Loss in analysis	.	.	.	1·232
				<hr/>
				100·000

Determination of matter insoluble in water :

I.	100 grains gave	.	.	42·842
II.	100 „ „	.	.	42·620

Mean 42·730

The composition of this insoluble matter in 100 parts :

Sand and charcoal	.	.	.	2·300
Silicic acid	.	.	.	27·830
Sulphuric acid	.	.	.	1·952
Carbonic acid	.	.	.	25·562
Phosphoric acid	.	.	.	7·806
Phosphate of iron	.	.	.	2·338
Lime	.	.	.	17·925
Magnesia	.	.	.	13·162
Oxide of manganese	.	.	.	0·558
Loss	.	.	.	0·567
				<hr/>
				100·000

Upon adding the soluble and insoluble portions together, and calculating the general composition of the ash, we find in every 100 parts :

ASHES OF THE CACTUS.

59

SOLUBLE PORTION :

Sulphuric acid	3·561
Chloride of sodium	10·726
Potash	5·642
Soda	20·338
Phosphoric acid	1·294
Carbonic acid	14·836

INSOLUBLE PORTION :

Sand and charcoal	0·982
Silicic acid	11·891
Sulphuric acid	0·834
Phosphoric acid	3·325
Carbonic acid	10·927
Phosphate of iron	0·999
Lime	7·659
Magnesia	5·624
Oxide of manganese	0·238
Loss in analysis	1·124

 100·000

As the carbonic acid is doubtless derived from the decomposition of organic acids, and the sand and charcoal may be regarded as accidental, and of no value in the analysis, they may be deducted: we then have the following numbers :

Sulphuric acid	6·094
Chloride of sodium	14·869
Potash	7·832
Soda	28·196
Phosphoric acid	6·404
Silicic acid	16·486
Phosphate of iron	1·384
Lime	10·649
Magnesia	7·747
Oxide of manganese	0·339

 100·000

From this it appears that the cactus belongs to the first class, that is to say, to that in which the carbonates of the alkalis and alkaline earths predominate.