ART. XXII.—*On some points in Lithology*; by JAMES D. DANA.

II. ON THE COMPOSITION OF THE CAPILLARY VOLCANIC GLASS OF KILAUEA, HAWAII, CALLED PÉLÉ'S HAIR.

THE capillary volcanic glass of Kilauea collected by the writer at the volcano in the year 1840 was analyzed for the writer's Geological Report of the Exploring Expedition (1849) by Prof. B. Silliman (B. Silliman, Jr.), and the results are published in it on page 200. The large discrepancies between the two analyses there reported—one of a dark and the other of a pale variety—and especially the difference as to soda, one being stated to contain 21.62 per cent, and the other none, left the question of composition in great doubt.* I have now to report two new satisfactory analyses of the glass. For these, science is indebted to Mr. F. J. Allen of the Sheffield Scientific School of Yale College, excepting the determination of the state of oxidation of the iron, which is by Prof. O. D. Allen. The results were as follows:

	I.	II.	Mean.
Silica	50.76	50.74	50.75
Alumina	16.68	16.39	16.54
Iron sesquioxide	2.15	2.05	2.10
Iron protoxide ..	7.90	7.87	7.88
Manganese protoxide	trace	trace	trace
Magnesia	7.65	7.65	7.65
Lime	11.95	11.97	11.96
Soda	2.11	2.16	2.13
Potash	0.55	0.57	0.56
Ignition	0.35	0.35	0.35
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	100.10	99.75	99.92

* The analyses also of volcanic scoria and lava, given on the same page of my Report, are evidently too uncertain to be longer quoted, unless the results shall be confirmed by other analysts.

The composition obtained has great interest, since it shows that this most fusible part of the Kilauea lavas has almost precisely the composition of ordinary doleryte (=basalt=diabase, essentially). I cite for comparison an analysis by G. W. Hawes of the "trap" of West Rock (New Haven, Conn.), which agrees closely with the average composition of this basic rock.

	SiO ₂	AlO ₃	FeO ₃	FeO	MnO	MgO	CaO	Na ₂ O	K ₂ O	ign
Pél��s Hair	50.75	16.54	2.10	7.88	tr.	7.65	11.96	2.13	0.56	0.35=99.92
West Rock "trap"	51.80	14.21	3.55	8.26	0.42	7.63	10.68	2.15	0.39	0.63=99.72
										[+ phosphoric acid 0.14

The "trap" consists of labradorite and augite with some magnetite. It is hence identical with the most abundant kind of igneous rocks. The fusibility of such a compound is thus well indicated by the facts at Kilauea. Moreover it is not surprising, since the fusibility of both labradorite and ordinary black augite are each marked down as low as 3 by von Kobell. There is hence no question as to the complete fusion of such ingredients in a volcano, even where moisture is not present.

The analyses add another to the many examples already known, proving that there was no difference in constitution between a large part of the material in fusion and ejected in Mesozoic time and that thrown out by modern volcanos; and it illustrates the fact that Geology has no good basis for the distinction of "older" and "younger" among igneous rocks.

An important paper on the microscopic characters of Pls Hair has been published at Tbingen (in 1877) by C. Fr. W. Krukenberg, in a pamphlet giving also the results of the author's investigations on Tachylite and Hyalomelan, Basalt glass, Porous and Spherulitic Basalt, and Obsidian. He states, and illustrates by figures, the following facts respecting Pls Hair. The fibers are sometimes bent and coalesced into loops; often are tubular; frequently contain air bubbles, and occasionally microlites. There is usually an enlargement of the diameter whenever a crystal (or microlite) exists within, and also about many of the air-cavities. The crystals are mostly rhombic, but as to their kinds the author makes no suggestion.