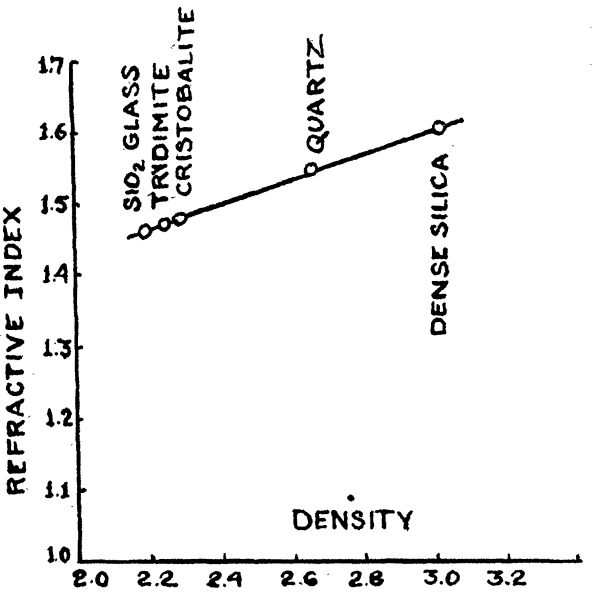

FIG. 1.

500° C but is too slow to be observed experimentally.

Below 35,000 atmospheres in the above temperature range, normal quartz is produced by the same chemical reactions. Occasionally, near 35,000 atmospheres, mixtures of dense and normal quartz have been produced though it is not clear whether the formation was simultaneous or was the result of pressure variation in the system. Above 800° C, at 35,000 atmospheres, only normal quartz is produced.

The dense silica crystallizes in hexagonal plates with unsymmetrical extinction. It is biaxial and optically positive with an optic axial angle of 54°.

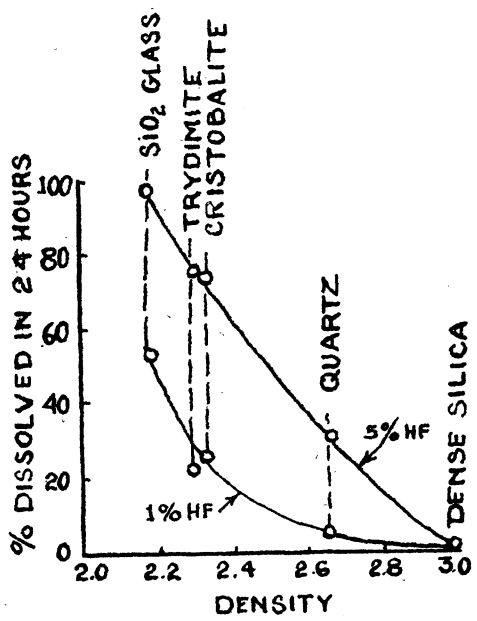

FIG. 2.

The refractive indices are: $\alpha = 1.599$, $\gamma = 1.604$, $\gamma - \alpha = 0.005$. The crystals probably belong to the triclinic system and the following x-ray data have been obtained.

K_x	I	K_x	I	K_x	I
6.20	W	2.03	W	1.501	VW
4.38	VW	1.84	VW	1.418	VW
3.43	M	1.79	W	1.409	VW
3.09	VS	1.71	W	1.345	W
2.76	W	1.70	W	1.321	VW
2.69	W	1.66	VW	1.285	W
2.33	W	1.58	VW	1.236	VW
2.29	W	1.545	W	1.171	VW
2.18	W				

The density is 3.01. The density–refractive index relation correlates well with other forms of silica as is shown in Fig. 1.

The hardness (Knoop, K_{100}) is 1200 and stands in the following relation to other substances of similar hardness (*3*)

α-Quartz	820[1]
Dense silica	1200
Linde spinel	1270[1]
Thomas Range topaz	1340[1]
Barton Mine garnet	1360[1]

Chemically the dense silica is very inert and shows less chemical reactivity than normal quartz. It is not attacked by long heating in hydrofluoric acid. In view of its density this fact correlates well with the data collected by Schwarz (*4*) on the rates of solution of other forms of silica in hydrofluoric acid of various concentrations. Figure 2 shows solution rates for the different forms plotted against the density.

The dense silica is rapidly dissolved by fused ammonium bifluoride.

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Tryptophan Synthesis in *Claviceps purpurea*[1]

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The reaction, indole + serine → tryptophan was demonstrated to occur in a mutant strain of *Neurospora crassa* (*1, 2*) and in a cell-free extract of *Neurospora sitophila* (*3*). A similar pathway has been reported to exist in *Salmonella typhosa, Escherichia coli* (*4*),

[1] This work was aided by a grant from the Eli Lilly Company, Indianapolis, Indiana.

and *Lactobacillus arabinosus* (*5*), but more recent work has cast doubt upon the occurrence of this reaction in the latter organism (*6*). It was postulated that tryptophan was formed by the condensation of indole and serine in spinach leaves, but no experimental evidence has been presented (*7*).

Studies in this laboratory, devoted to the biogenetic relationship between tryptophan and lysergic acid, revealed that the mycelium of *Claviceps purpurea* (Fries) Tulasne possessed considerable tryptophan desmolase activity. The strain of *Claviceps* used was isolated from a sclerotium of barley ergot and subjected to a process of physiological adaptation until it was capable of prolific mycelial development in submerged culture. The medium used consisted of a basic mineral nutrient solution (*8*) containing 2% mannitol and 0.1% each of *dl*-alanine, *l*(−)-asparagine, *l*(+)-aspartic acid, *l*(+)-glutamic acid, *l*(−)-leucine, and *dl*-valine.

Mature mycelium (7–10 days growth) was collected, washed with distilled water, and portions (ca. 50 mg dry weight) were transferred to test tubes containing approximately 100 γ of indole and 2 mg of *dl*-serine in 2 ml of water. *M*/15 phosphate buffer was then added to produce a total volume of 5 ml in each tube. The tubes were agitated on a reciprocal shaking machine at room temperature for periods up to 8 hr. Ten milliliters of toluene was pipetted into each tube and shaken vigorously in order to stop the reaction by removal of unutilized indole. The tubes were then centrifuged, filtered, aliquots of the toluene layer assayed for indole by the process of Wood *et al.* (*9*), and aliquots of the aqueous layer for tryptophan by the method of Nason *et al.* (*10*). Control tubes containing washed *Claviceps* mycelium and water failed to show any accumulation of indole or tryptophan. The results of a series of analyses are reported in Table 1. Tryptophan formation correlated with indole disappearance, and yields of nearly 90% of theory were obtained. The product was further characterized by spotting quantities of the aqueous layer of tubes showing considerable tryptophan accumulation on strips of Whatman No. 1 filter paper and chromatographing with butanol-acetic acid-water (*11*) and methanol-butanol-benzene-water (*12*). From the qualitative data obtained it was concluded that *Claviceps* has ability to utilize indole and serine to produce tryptophan under the conditions described.

The study of *Claviceps* metabolism is being continued, with special emphasis upon other possible tryptophan precursors, as well as upon products formed by tryptophan utilization.

TABLE 1

INDOLE UTILIZATION AND TRYPTOPHAN FORMATION
(Indole added = 96 γ/tube)

Reaction time (hr)	1	2	4	8
		Indole utilized (γ)		
Tube 1	19	39	91	96
2	14	35	91	96
3	15	38	90	96
Av	16	37	91	96
		Tryptophan formed (γ)		
Tube 1	24	51	81	154
2	18	51	90	146
3	20	48	95	138
Av	21	50	89	146

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Oxygen Consumption of Adrenal Slices from Normal and Scorbutic Guinea Pigs and the Influence of Added ACTH[1, 2]

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Oxygen consumption by slices of adrenal cortex has been used as a criterion of cortical cellular metabolism by several groups of workers (*1–3*). Carpenter *et al.* (*1*) observed an increase in oxygen utilization and of aerobic lactic acid production by the adrenal cortices of rats treated with large doses of ACTH. Tepperman (*2*) found when purified ACTH was added *in vitro* to slices of dog adrenal cortex that the oxygen consumption of the tissue was increased and its ascorbic acid content depressed. Hecter *et al.* (*4*), working with whole perfused cow and hog adrenal glands and Haynes and co-workers (*5*), utilizing slices of adrenals have demonstrated an accelerated synthesis of 17-hydroxycorticosterone and of formaldehydogenic substances by the *in vitro* addition of purified ACTH.

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