tion was accomplished most conveniently by oxidizing the crude product with chromium trioxide to 22-isoallospirostan-3,11-dione (m.p. 236–237°, $[\alpha]^{20}\mathrm{D}$ $-17°$; found: C, 75.16; H, 9.22), followed by Raney nickel hydrogenation (room temperature) to 22-isoallospirostan-3β-ol-11-one (V)[13] (m.p. 223–226°, $[\alpha]^{20}\mathrm{D}$ $-29°$; found: C, 75.28; H, 9.93. The acetate[14] showed m.p. 222–224°, $[\alpha]^{20}\mathrm{D}$ $-31°$; found: C, 73.92; H, 9.60). Alternately, the mixture of III and IVa was converted with ethanedithiol in the presence of zinc chloride to 22-isoallospirostan-3β-ol-11,12-dione 12-cycloethylenemercaptol (m.p. 289–291°; found: S, 11.98), which upon Raney nickel desulfurization led directly to the 11-ketone V. This substance (V) has already been transformed[14] into allopregnan-3β-ol-11,20-dione *and thence*[3] *to cortisone.*

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(13) The 3,11-dione as well as V proved to be identical with specimens prepared from diosgenin by the performic acid method (*cf.* G. Stork, J. Romo, G. Rosenkranz and C. Djerassi, *ibid.*, **73**, 3546 (1951)).

(14) E. M. Chamberlin, W. V. Ruyle, A. E. Erickson, J. M. Chemerda, L. M. Aliminosa, R. L. Erickson, G. E. Sita, and M. Tishler, *ibid.*, **73**, 2396 (1951), reported m.p. 224–229°, $[\alpha]^{21}\mathrm{D}$ $-39.4°$ for a sample prepared from diosgenin.

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THE TEMPERATURE OF THE HYDROGEN-FLUORINE FLAME

Sir:

The reaction $H_2(g) + F_2(g) \rightarrow 2HF(g)$ is highly exothermic and in addition gives rise to a reaction product possessed of exceptional thermal stability. These factors combine to produce a very high flame temperature which heretofore has not been measured.

Theoretical calculations based on the method described in Wenner[1] have produced the following flame temperature–composition relationships:

Feed composition Mole % F_2	% H_2	Theoretical flame temperature at 1 atm. total pressure, °K.
10.0	90.0	1920
33.3	66.7	3550
50.0	50.0	4300
66.7	33.3	3800

In these calculations the latest thermodynamic data were employed.[2,3,4,5]

The construction and operation of the hydrogen-fluorine torch has already been described by Priest and Grosse.[6] This torch produces a diffusion-type flame due to the present inability to premix hydrogen and fluorine.

The flame temperature was measured by means of the line-reversal technique.[7] The tungsten ribbon-filament lamp, ordinarily used as the comparison radiator for measurements of this type, could not be employed due to the fact that the flame temperature is above the melting point of tungsten (3640° K.); the same is true of the ordinary carbon arc (sublimation point of carbon 3810°K. at atm. pressure). Since no simple man-made radiator seemed to be available which had the desired characteristics the optical train was modified to use the *sun* as the comparison source. A two-mirror heliostat was used in keeping the sun's image focused on the spectroscope slit. A neutral, variable absorbing agent of good optical quality was used in adjusting the brightness of the sun so that line-reversal could be readily obtained and easily reproduced. An optical pyrometer reading of the sun *through the same filter then gave the flame temperature.* The maximum flame temperature was measured at 4300°K. using stoichiometric quantities of hydrogen and fluorine. The agreement between this value and the theoretical temperature is admittedly fortuitous, the accuracy of our measurements being approximately ±150°.

In this particular line-reversal application it is not possible to employ the sodium lines for reversal due to the occurrence of sodium in the solar spectrum. Lithium was used in the present work since, for all practical purposes, it does not appear in the solar spectrum.

Complete details of our theoretical calculation and experimental work will be published elsewhere.

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THE SYNTHESIS OF THE BLOOD SERUM VASOCONSTRICTOR PRINCIPLE SEROTONIN CREATININE SULFATE

Sir:

The existence of a potent vasoconstrictor agent in the sera of mammals was reported as early as 1868 by Ludwig and Schmidt[1] and since that time has been the subject of over eighty publications.[2] Experiments with sera obtained under various conditions and allowed to stand for variable periods before use have produced a maze of conflicting biological data. This problem has been clarified only recently by Rapport[3,4] who isolated from beef serum a very active vasoconstrictor substance in crystalline form. Rapport was able to show that the crystalline material was a complex, or mixed salt, composed of equimolecular proportions of sulfuric acid, creatinine and an indole base.[5] On the basis of chemical tests as well as analytical and spectral data Rapport has proposed that the indole base is 5-hydroxy-3-beta-aminoethylindole (I) (5-hydroxytryp-

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