sively responsible for the remarkable orbital changes exhibited in Table I. From earlier long range computations for a fictitious case of such a critical Hecuba planet (Wilkins 1930) we know already that the longitude perturbations by Jupiter are of zero order and are not limited to any maximum amplitude. The purpose of this note is to point out that in the case of Griqua such rapidly increasing perturbations can be observed under most favorable conditions, and that apparently Griqua is a most suitable asteroid for the determination of Jupiter's mass.

The size of the total perturbational displacements $\Delta\alpha \cos \delta$ and $\Delta\delta$, observable in the next three perihelion oppositions 1959, 1965 and 1971, has been computed for two dates 20 days apart in each of these most favorable oppositions. These values are listed in Table II, together with

TABLE II. PERTURBATIONAL DISPLACEMENT OF GRIQUA IN COMING PERIHELION OPPOSITIONS

Date UT	ρ	r	$\Delta\alpha \cos \delta$	$\Delta\delta$	Δs
1959 Sep. 29.0	1.270	2.118	+24.89	+ 6.12	+25.63
Oct. 19.0	1.267	2.109	+24.34	+ 4.60	+24.77
1965 Oct. 27.0	1.293	2.123	+40.73	+12.83	+42.70
Nov. 16.0	1.300	2.148	+38.26	+10.51	+39.68
1971 Nov. 25.0	1.384	2.259	+57.33	+20.70	+60.96
Dec. 15.0	1.406	2.313	+51.97	+18.18	+55.06

the total displacement Δs , the geocentric distance ρ , and the heliocentric distance r . The zero epoch of these perturbations is 1935 July 31.903, corresponding to the first observation known for this planet. In 1971, or 35 years later, the observable effect of Jupiter's mass amounts to 61° .

Observers are urged to observe Griqua as extensively as possible, not only in these perihelion oppositions but in regular oppositions as well. Extended ephemerides will be published in the MPC. The author intends to utilize all suitable observations later on for a determination of the mass of Jupiter.

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Schwartz, Sanford B. Ionization cross-section of *Fexiv* by electron collision and the electron coronal temperature.

A new calculation for the ionization cross-section of the $3p$ electron of *Fexiv* by electron collision is given, where a hydrogen-like model is used for the atom. The continuum functions are made to approach Coulomb functions at large

distances from the atom. Only the S-partial waves of the incoming particle are here included, and the resulting cross-section is more than a factor of 10 smaller than the semi-classical values previously used (e.g., Elwert, G., *Z. Naturforschung* 7a, 342, 1952) by others to deduce coronal temperature from optical spectra. The use of this new calculation for estimating coronal temperatures indicates that the electron temperature is around 2×10^6 K.

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now at Physics Dept., U. of Nevada, Reno, Nev.

Sterne, Theodore E. The effect of the rotation of a planetary atmosphere upon the orbit of a close satellite.

Drag in the stationary atmosphere of a planet causes the mean distance, a , and eccentricity, e , of a satellite to decrease secularly, but causes no secular changes in the argument ω of pericenter, the inclination i , or the longitude Ω of the node. The decreasing period, caused by the decreasing a , has been used to infer the density of the earth's atmosphere at great altitudes from the decreasing periods of artificial earth satellites. Rotational flattening of the planet leaves a , e , and i secularly unchanged but causes secular changes in Ω and ω , varying inversely as $a^{7/2}$. Combined effects of drag and flattening thus cause secular accelerations of the node and pericenter.

Wildhack, of the National Bureau of Standards, has considered the effect of atmospheric rotation upon i , and the author has more recently derived formulae for all the secular effects of general atmospheric rotation. Atmospheric rotation in the same sense as a satellite, by decreasing drag, decreases the rate of diminution of a . Neglect of this effect has led to a slight underestimation of the earth's atmospheric density. The rate of decrease of e is also diminished. The inclination is caused to decrease, at a rate dependent upon $(1 + \cos 2\omega) \sin i$ whose secular value is $\sin i$. For the artificial earth satellite 1957 $\alpha 2$, i should have decreased by about a second of arc a day. The node is caused to regress at a rate proportional to $\sin 2\omega$ and ω to increase at a rate $\cos i$ times as great. Since the planet's rotational flattening changes ω secularly, atmospheric rotation does not change Ω and ω secularly.

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