principles, that it must itself be circulating around the Sun with nearly equal rotational velocity. And then the result would *not* be what is observed in the case of Encke's comet. Its orbit would depend on the relation between the original velocity of the comet on the one hand, and that of the layers of the solar atmosphere on the other. At first no doubt acceleration would be produced, until the comet's orbital eccentricity became zero. Then it can be mathematically demonstrated that its major axis would no longer be diminished, that its path would never become spiral, and hence its tendency would *not* be to fall into the Sun. Whatever then may be the true explanation of this "resisting force," which makes a comet describe a diminishing orbit, and hence accelerate its velocity—and this force I am convinced most certainly exists—it must be conceived of in any case as a compound of two forces, the radial force acting from the Sun, and a tangential force opposite to its motion. If this latter force then be not due to the solar atmosphere, it may possibly be due to a comet's "jets," which it belches forth towards the Sun in the neighbourhood of perihelion, exercising upon its centre of gravity a repulsive action, which would be sufficient to change and diminish its orbital path when in the Sun's neighbourhood. And certain researches of Argelander on the comet of 1811 undoubtedly support this latter theory.

# The Bengali and Semitic Seasons.

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The seasons legitimately come within our jurisdiction; they are astronomical phenomena in the sense that they depend on the Sun's apparent annual motion in declination, due to the Earth's axis being tilted in relation to the plane of the Earth's orbit. I must assume that you are all familiar with the diagram given in such books as Heath's 20th Century "Atlas of Astronomy," and in passing will merely remind you that our word season comes to us through the French language, from the Latin verb Sero, I plant, or sow; Séréro, to plant or sow. The seasons are everywhere associated with changes on the Earth's surface, with conditions of temperature, moisture, and necessarily of vegetation. The word (season) itself is obviously related to the sowing period of the year, or spring time, as if that were emphatically the season of seasons. These periods occur in different parts

of the Earth at different times of the year; and their demarcations are conventionally adjusted. In Great Britain, Spring begins in February, Summer with May, Autumn with August-September, and Winter with November-December. In America and Canada Spring begins on the 1st March, Summer on the 1st June, Autumn on the 1st September, and Winter on the 1st December. It would almost seem as if the year ought to be divided into four seasons, which should begin when the Sun reaches the four cardinal points that mark his career along the ecliptic. Spring from this point of view should begin on the 21st-22nd March, the Vernal Equinox; Summer on the 21st-22nd June, the Summer Solstice; Autumn on the 21st-22nd September, the Autumnal Equinox; and Winter on the 21st-22nd December, the Winter Solstice. But, at the outset, I must observe that this four-point rule does not apply to the whole Earth. At the Poles there are only two seasons, a long and dreary Winter and a short-lived Summer. In tropical regions there are practically three seasons, the hot season, the rainy season and the cold weather. It is here that for the purposes of this Note the conventional adjustment of these annual periods comes in. In Bengal, as amongst the ancient Hebrews, there are six seasons. First, Summer or *Grishmo*, which includes the Bengali months of Bysack and Joistho (middle of April to the middle of June); second, the Rains or *Barsa*, which includes the Bengali months of Ashar and Sraban (middle of June to middle of August); third, Autumn or *Sharat*, corresponding to the Bengali months Bhadra and Aswin (middle of August to middle of October); fourth, *Heemunto* or the period of heavy dews, including Kartic and Aughrayan (middle of October to middle of December); fifth, Winter or *Sheet*, including Pous and Magh (middle of December to middle of February); and sixth, the Spring, or *Basunto*, including Falgun and Choitra, the small-pox season (middle of February to middle of April). This division into six seasons occurs we are told by Romesh Chunder Dutt in his History of Civilization in Ancient India (Book II, Chapter VII); in the Vedas themselves, a work which carries us back to B.C. 1400 to 1000 B.C. The six seasons of the year were then called respectively *Madhu*, *Madhava*, *Sukra*, *Sachi*, *Nabha*, *Nabhasya*. I have referred (unsuccessfully, I regret to say) to Wilson's Translation of the Rig Veda, and have not been able to trace the passage on which Romesh Chunder Dutt relies for this archaic six-fold division of the year. With the ancient Hebrews the

year was also divided into six seasons. Those familiar with the most widely known portion of ancient Hebrew literature preserved to us in the Old Testament, will remember it is therein recorded that after Noah came forth from the Ark, Yahveh said, not to Noah, but in His own heart, "while the Earth remaineth seed time and harvest, and cold and heat, and summer and winter, and day and night, shall not cease." It is curious that day and night should be included as a kind of Appendix to the category of the seasons; but if regard be had to the changes in temperature, &c., which day and night bring with them, one can perhaps understand how these diurnal phenomena might, amongst early peoples, come to be regarded as seasons. The Arabs, another Semitic people, to this day retain the same six-fold division of the early Hebrews.

The first of the Hebrew seasons was "Harvest" (for they do not seem to have begun with the Spring time). It ran from the middle of April to the middle of June, and corresponded to the Summer season or *Grishmo* of the Indians in this Province. The air was warm, and even hot, and in the plains of Palestine severe at this period. The second season, or "the heat," ran from the middle of June to the middle of August. The heat was then intense. The Arabs call this season "the Vernal Summer," and you will recognize that it corresponds with our rainy season or *Barsa* in Bengal. The third Hebrew season or "Season of Fruits" corresponded to the Autumn or *Sharat* of Bengal. During these first three seasons there are no showers, rain being as scarce in Summer as snow. Hence the Hebrew proverb as "Snow in Summer, and as rain in harvest, so honour is not seemly for a fool" (Prov. XXXI-1). This was the Hebrew season of heavy dews, which in their literature are an emblem of Divine grace and goodness. The fourth of the Hebrew seasons was "seed-time"; it included the period from early October to early December, and corresponded to the Bengali *Heemunto*. The former, or early rain, referred to in the Jewish Scriptures fell during this period. The fifth season was "Winter" and like the Bengali *Sheet* ran from the middle of December until the middle of February. The sixth, and last season was "the cold," and corresponded to the Bengali "*Basunto*." It began in the middle of February and ended in the middle of April. The rains were then taking off, and the latest falls which occurred in early April were called the "latter rain." Those familiar with

the Hebrew Scriptures will remember the former and the latter rain are referred to in passages occurring in some of the books attributed to the Prophets of Israel (Jer. V-24; Jo. II-23). Our Indian friends, who are necessarily familiar with the Sanskrit literature, only accessible to us, as is the case with the Hebrew literature, in translations should, if I may venture to say so, be able to follow up the line of investigation, which I have only briefly suggested.

In my enumeration of the Hebrew seasons, which as I have already observed still obtains in Arabia, you will not fail to be struck with the fact that the six-fold division of the year, into periods of two months each corresponds notably with the six-fold division of the Bengali year. But you also cannot fail to be impressed by the marked differences which obtain between the seasons as they prevail in a Mediterranean country, and as we know them in Bengal. The Hebrew harvest was contemporaneous with our spring time in Bengal; and again they had hail and severe thunderstorms, the torrent brooks of hallowed Israel, were in spate and the streams filled their channels in the Palestinian winter, which fell during our Bengali *Sheet*, that enjoyable period when we have the unclouded skies and the bracing weather that make Calcutta so great an attraction to our cold weather visitors. The Hebrews as was also the case according to Romesh Chunder Dutt with the early Aryans in the Vedic period associated their seasons with gods and religious festivals. I venture to suggest that all of us, whether Christian, Hindu or Jew, do the same to this hour. The Christian Easter and Christmas are merely survivals, with altered meanings attached to them of archaic seasonal festivals. But here we approach barbed wire entanglements, which lie outside the scope of our Society and of this Note; the object of which will have been attained if I have succeeded in drawing your attention to an interesting subject which I commend to you for further study.