planetary, and planetary. Each of these will vary in density, the first according to the distances of the stars, the second according to the mass of the particular system as a whole, and the third according to the mass of the attracting planet. In support of this view, the molecular theory of gases is brought in, the evidence afforded by the analysis of gases occluded by meteorolites, which have fallen upon the earth, and the teachings of spectrum anaylsis. Each of these is in itself a perfectly sound and practically unanswerable argument in favor of the existence of a universal atmosphere.

In regard to the idea that if such atmospheres did exist, the central body of each system would attract to itself the heavier gases, whereas the revelations of spectrum analysis shows a prevalence of Hydrogen, Dr. Siemens remarks that it can be shown that at such a temperature as the sun possesses, no Carbon Dioxide or Carbon Monoxide could exist, and, in fact, supposes with Lockyer, that the metalloids can also have no existence. But he says that "outside the photosphere, there must be regions where these gases would accumulate, were it not for a certain counter-balancing action."

This counter-balancing action is provided for by the high rotative velocity of the sun, which is equal to about 125 miles per second, or, at the sun's equator, nearly 4½ times that of the earth. Such a movement must cause an equatorial rise of the solar atmosphere. La Place has, however, calculated that owing to this cause, the height of the solar equatorial atmosphere could not possibly exceed $\frac{9}{20}$ths of the distance of Mercury. This calculation is, however, vitiated by his assumption of the emptiness of stellar space. If we suppose this action to go on in an unlimited medium, then a fan-like effect is exercised upon that medium, resulting in a movement outwards at the the equator, and a drawing in towards the poles.

The sun, therefore, upon this hypothesis is supposed to have around his equator, a disc of matter rapidly leaving him, and at the poles matter approaching him.

In this way, Dr. Siemens says enormous quantities of hydrogen, hydro-carbon, and oxygens are supposed to be drawn towards the polar surfaces of the sun. During their gradual approach, they will pass from their condition of extreme attenuation and extreme cold, to that of compression accompanied with rise of temperature, until on approaching the photosphere, they burst into flame, giving rise to a great development of heat, and a temperature commensurate with their point of dissociation at the solar density. The result of their combustion will be aqueous-vapor and carbonic anhydride or oxide, according to the sufficiency or insufficiency of oxygen present. These products of combustion will come under the influence of centrifugal force, and move towards the equator, where they will be projected into space. As they recede from the sun, they gradually lose their heat, and become more and more rarefied, until they obtain the extreme state of rarefaction, which they possess in interplanetary space. Here, it is supposed the inverse action to that which occurs in the sun, takes place. The now highly rarefied aqueous-vapor and carbonic anhydride absorbs some of the radiations which the sun is constantly pouring out, and it is supposed that at the extremely low pressure to which they are subjected, they are disscciated—oxygen, hydrogen and hydro-carbons being produced. These are in turn again drawn into the polar surfaces by the fan-like action produced by the solar rotation. Thus, we see that a continuous circulation of matter occurs, the same element alternately forming a portion of the coldest portion of interplanetary space, and the hottest portion of the central luminary.

Such in outline are the chief points of this latest theory of solar action. There are some other secondary points, which are rendered necessary in consequence of the known constitution of the sun. For example, we know that the solar atmosphere contains large quantities of the vapor of certain metallic bodies. These are supposed to constitute an inner atmospheric shell which is not affected, in consequence of its density by the centrifugal force caused by rotation. This force, in fact, only affects the higher materials, chiefly hydrogen constituting the circulating atmosphere. At the surface of contact between the two, however, "intermixture induced by friction may sometimes occur, giving rise to those vortices and explosive effects which are revealed to us by the telescope.... Some of the denser vapors would probably get intermixed and carried away mechanically by the lighter gases, and give rise to that cosmic dust, which is observed to fall upon our earth in not inappreciable quantities." Then again solar observation has revealed to us the undoubted fact that the quantity of solar heat varies from time to time, and that the condition of the photosphere, as indicated to us by the sun-spots, also varies. These are supposed to be accounted for by the circumstance that as the whole solar system is moving through space at a velocity of 150,000,000 annually. It appears possible that the condition of the gaseous fuel supplying the sun, may vary according to its state of previous decomposition, in which other heavenly bodies may have taken part.

Since its first publication, this theory has been subjected to a considerable amount of criticism, chiefly by French philosophers. Some of this may be considered as favorable, while some is decidedly hostile.

Most, however, of the notices which I have seen, agree with Dr. Siemens on some points, and disagree on others. To this class, the present writer feels compelled to ally himself. The idea of a universal atmosphere dating, as Dr. Sterry Hunt has shown, as far back as Newton, seems perfectly reasonable and probable, and there are other considerations than those Dr. Siemens has brought forward, which strongly support it. Moreover the constitution of such an atmosphere would be such as we require for the purposes of this theory. It is in the subsequent portions of the arguments that we are inclined to differ.

Firstly, there is the question of dissociation. The hydrogen and carbon compounds, combine, we are told, with oxygen, producing intense heat, and the products of combustion move towards the solar equator and are projected into space. The point here is, is it not at variance with all terrestrial teaching, that such compounds can exist at such temperatures? Assuming that combination such as supposed really does take place, it seems to me, that subsequent dissociation must occur. This, it will be noticed, is just what Dr. Siemens requires, but he supposes it to occur far out in space, and if instead of this, it occurs close up to the