THE MOON AS CAUSE OF THE FORMATION OF EARTH'S CONTINENTS.COMPLEMENTARY ELEMENTS

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In 1980 T.Grjebine suggested that the Earth's continents accumulated under the influence of the Moon during a phase of geosynchronous rotatiàn(1). In addition to considerations examined in previous publications, data on Pre-Cambrian sedimentology and considerations on Earth and Venus athmosheres also support this theory.

The Earth continents present a series of characteristics that have not yet been explained.Why,for example are the continents located only on one-third of the globe's surface instead of being spread in a regular layer with water covering the entire surface? Why is it thatthe continents seem to originally have been clustered in a single mass? Why are the oldest rocks on earth of sedimentary origin? Why does the renewal of continents seem very limited or even non existant whereas the renewal of ocean floor is constant? Why is that the surface of the continentsmatches sea level almost every where with a precision of 1% Whys that the ocean has periodically invaded large parts of the continents's surface . Previous theories of continents's formation have been far from satisfactory, onetheory states that continents were due to an expansion of the Earth!

T.Grjebine and C.Marchal have shown that an early formation of the proto-earth could have contributed to an acceleration of the rotation of the earth and could therefore have produced a deformation that ended in partition (2),in a similar process as suggested by D.Wise (3).The pre-mordial athmosphere could then have been lost at the small end of the systeme,the Moon, since attraction there was not sufficient to maintain The gases.

Different autors have suggested that mechanical considerations exclude a geosynchronous rotation of the Moon. Unfortunatly, no special hypothesis has been made for the Earth. If we take into account that the Earth was not rotating as a whole body but with differential rotation of the various layers,mechnical considerations show that geosynchronous rotation of the Moon was possible (2).The Earth must have had a differential rotation of the core and the mantel,since radial segregation produces a faster rotation of the core.In a similar vein,Alfen and Arrhenius suggested in 1972 the possibility of "resonnance" rotation (4). The possibility of differential rotation for the various layers of the Earth's core and mantel, means that, whatever the origine of the Moon was, it can and will rotate synchronously with the outer crust of the Earth. Grjebine and Marchal (2) have suggested a fission origin for the Moon by a process similar to the one proposed by D.U.Wise (3) but other mechanisms are possible. The only obligatory assumption is that the Moon should be very close to the Earth. As many considerations suggest that was so, therefore it is reasonable to say that there is no reason to question the geosynchronous rotation of the Moon.

If the Moon rotated around the Earth as a geosynchronous satellite, the surface of the Earth was swept by the shadow of the Moon during solar eclipses every 5 or 6 hours. the Moon being at 2.3 or 2.6 earth radius.

The primordial atmoshere, as many autors have concluded was lost, and, according to the succession of events we propose, this occured during the partition of the Proto-Earth, since the attraction of the small side of the systeme, of the Moon, was not sufficient to keep the gases which were escaping into space.

Meanwhile radial segregation continued to bring water as well as CO_2 to the surface. When water is not kept under pressure, it becomes vapour. The second atmoshere was therefore composed of water vapour, as Ingersoll has suggested (5). As such an atmoshere is very sensitive to the thermal effects of solar radiations it was sensitive to the effect of solar eclipses.The atmoshere was heated less in the region swept by the shadow of the Moon than elsewhere. Strong eclipse winds were thus generated every 5 - 6 hours in the eggplant shaped region facing the Moon.

The eclipse winds generated waves and spray, creating stronger evaporation in the area swept by the shadow of the Moon. The absence of heating during these eclipses created an anti-cyclone, downward winds were pushing the newly formed vapouraway, which later condensed and fell over the rest of the ocean. This mecanisme was obviously depleting the ocean of water in the region swept by the shadow and therefore was creating an oceanic current moving towards this region, in order to compensat the water lost as vapour.

This current brought minerals in solution to this region, where they became over concentrated since the ocean depleted there in water. When over-concentration is reached minerals in solution precipited and a lithophile sedimentary crust was deposited there.

The study of the Dead sea has shown that the mineralisation of hot water can produce an inversion of temperature and the lower, more mineralized layers are hotter than the surface layers, which are cooled by evaporation. As radial segregation introduces volcanic water with CO_2 and lithophile minerals in the bottom layers of the ocean the solving pover of this water was large since it was acid, acidity due to the presence of CO_2. As this water flowed toward the region swept by the shadow of the Moon in order to remplace the water evaporated or pushed away by the winds, it was cooled by contact with the surface and the CO_2 was released as pressur was decreasing when the water was arriving toward the surface. The acidity was decreasing as was decreasing the solving power due to temperature. The solubility of silicium and of almost all minerals decreases when water is cooled; therefore minerals of the bottom currents were precipitating even before depletion in water. The third process depending on the solubility-acidity was creating precipitation in even lower layer since any ascending movement of bottom currents produce a release of CO_2.We have therefore three mecanisme simultaneously at work and depending on on the predominance of one of them variety in deposits will be produced. In the paper quated we noted that as minerals were deposited and forming the sedimentary crust it was slowly sinking in the mantel. Nevertheless there was a permanent equilibrium between the amont of material deposited in the center and the level of the ocean. When there were two many deposits, the area was no longer covered with water and deposits occurred only on the peripheral. As the central area was sinking more and more it was covered again and more minerals were deposited. Since we have three mecanisme working simultanously it is logical than during this process there could be a succesion of very different deposits such as evaporits over green rocks.

We noted previously that the bulding process of the continent worked with a precision of 1%, since the majority of the plains are less than300 meters above sea level when the thickness of the continents exceeds 30 000 meters.Even a small tilting in the axe of rotation enlarge the banana shape of continent into an egg plant shape which indeed fits very well the former shape of the continent as magnetic data suggest that it was.

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It is logical that the synchronism between the Earth's crust and the Moon was broken when the Earth lost part of its heat, since the viscosity of the earth is very temperature-sensitive(6). As the differential rotation decreased, the crust had a tendency to spin faster than the Moon. Whenthe Moon had greater kinetic energy, it went into a more distant orbit and its angular velocity decreased so that synchronism could not be maintained. Once the Moon was no longer a geostationary satellite, periodical tides appeared and more energy was transferred to the Moon. The chronology we proposed (6) fits will with that suggested by Wasserburg et al (7) for the early history of the Moon.

Once synchronism was broken, there was no reason for the Earth's continent to remain in the equatorial region of the globe. On the contrary, mechanical considerations show that a body tends to decrease its momentum; the continent was pushed towards one of the awes of rotation, exactly as a marble egg spins on one of its ends. As the curvature of the geoid is not the same at the pole as on the equator, the newly-built crust did not have the right curvature and had to break. This period corresponds to the oldest continental volcanism at -2.7, which must be differentiated from the ocean volcanism that was responsible for radial segregation. Nevertheless, this continental volcanism was different from that of today, since it did not result from sea-bottom material being pulled under a continent but rather from the adjustment of levels between the continental crust and the mantel.

Any gas exhaust through a fracture may have created a convection cell in the mantel. The former convection cell therefore came to be replaced by several, and the mantel currents tended to separate the different parts of the continent. As we know, this mechanism started very slowly and only became important in a very recent period.

This theory is not invalidated by magnetic data, especially since the mechanism proposed to explain the Earth's magnetism is still not completely satisfactory. On the other hand, if we consider that the Earth's magnetism could have resulted from a thermocoupling effect, we find a coherent explanation not only for the Earth's magnetism but also for the magnetism of the Moon.

We know that at a certain depth all silicates, like metal, become electricity-conductive. We also know that the temperature is not the same in regions where there is an upward current of the mantel and in regions with a downward current. This difference in temperature must, of course, be connected with the last layer of the mantel which means that the temperature was not the same under the continent and under the ocean. A thermocoupling effect should therefore exist, and as the metallic conductivity level connected these different areas, these currents generated a magnetic field depending upon the continent's position. Although we know that the magnetic field of the Earth is located in the core, this is not in contradiction with the proposal of a field generated by a thermal effect. The core field is not ferromagnetic since the temperature is too high, but it may simply be a triggered field induced by the thermo-field. When a weak field orients a large amount of magnetic dipoles, a strong field is produced. Some calculations suggest that the thermo-field was not strong enough to directly explain the Earth's field, but it is strong enough to orient the field produced in this fashion. In such circumstances, the Earth's field may very well have magnetized the Moon during the early phase of synchronous rotation. It thus becomes understandable why there were more possibilities as the number of continents increased for the resultant vector to determine the final field: the number of inversions of the field is therefore related to the number of pieces of continents.

The drift of the continents shows that the magnetic pole was often very different from the climatic pole. The theory we propose provides a good explanation for this discrepancy. Continental drift shows that one piece of the continent may have been pulled into another, as India was pushed into Northern Asia, for example. The spreading of the ocean floor also shows that the ocean can really disappear under a continent; although we cannot conclude from this that an entire continent can disappear under another. Of course, some lithophyl material could have been pulled by the mantel current under another continent, and mountains such as the Himalayas would thus have appeared. However, the piling up of one continent over another would have produced mountains even higher than the Himalayas. This suggests that we may have been too quick to transform continental drift and the spreading of the ocean floors into the concept of plate tectonics. Of course, in some regions, part of the ocean floor travels with the continent but this does not mean that the two are bound together; they are merely travelling together along the same mantel convection current. Their ages and composition are too different to authorize any assimilation. This means that the theory we propose is not contrary to the facts that gave rise to the theory of plate tectonics, but it does suggest a more subtle picture of continental drift as well as of the spreading of the ocean floor.

The loss of the primordial atmosphere of the Earth was explained as having been produced by a special phase of the sun with particularly abundant U.V. rays or very strong solar wind. This explanation contradicts what we know about Venus (8). Why would the Earth have lost its primordial atmosphere while Venus kept its own, even though it was closer to the Sun? Explaining the loss of the Earth's primordial atmosphere because of solar influence thus becomes inacceptable. On the contrary, the proposal we put forward is coherent: Venus did not have a fission satellite that could produce an escape of primordial gases. The new elements presented since our original proposal three years ago go to strengthen this theory.

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