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**Vježba 2.**

Hitherto, the Universe of stars has always been considered as coincident with the Universe proper, as I have defined it in the commencement of this Discourse. It has been always either directly or indirectly assumed -–at least since the dawn of intelligible Astronomy -–that, were it possible for us to attain any given point in space, we should still find, on all sides of us, an interminable succession of stars. This was the untenable idea of Pascal when making perhaps the most successful attempt ever made, at periphrasing the conception for which we struggle in the word "Universe." "It is a sphere," he says, "of which the centre is everywhere, the circumference, nowhere." But although this intended definition is, in fact, no definition of the Universe of stars, we may accept it, with some mental reservation, as a definition (rigorous enough for all practical purposes) of the Universe proper -–that is to say, of the Universe of space. This latter, then, let us regard as "a sphere of which the centre is everywhere, the circumference nowhere." In fact, while we find it impossible to fancy an end to space, we have no difficulty in picturing to ourselves any one of an infinity of beginnings.

Objasnite ukratko Pascalov model Svemira.

Objasnite pojmove Svemir prostora i Svemira zvijezda (nebeskih tjela).

**Vježba 3.**

For example: at the distance B, from the luminous centre A, a certain number of particles are so diffused as to occupy the surface B. Then at double the distance—that is to say at C—they will be so much farther diffused as to occupy four such surfaces:—at treble the distance, or at D, they will be so much farther separated as to occupy nine such surfaces:—while, at quadruple the distance, or at E, they will have become so scattered as to spread themselves over sixteen such surfaces—and so on forever

Through what we know of the propagation of light, we have direct proof that the more remote of the stars have existed, under the forms in which we now see them, for an inconceivable number of years. So far back at least, then, as the period when these stars underwent condensation, must have been the epoch at which the mass-constitutive processes began. That we may conceive these processes, then, as still going on in the case of certain “nebulæ,” while in all other cases we find them thoroughly at an end, we are forced into assumptions for which we have really no basis whatever—we have to thrust in, again, upon the revolting Reason, the blasphemous idea of special interposition—we have to suppose that, in the particular instances of these “nebulæ,” an unerring God found it necessary to introduce certain supplementary regulations—certain improvements of the general law—certain retouchings and emendations, in a word, which had the effect of deferring the completion of these individual stars for centuries of centuries beyond the æra during which all the other stellar bodies had time, not only to be fully constituted, but to grow hoary with an unspeakable old age.

Of course, it will be immediately objected that since the light by which we recognize the nebulæ now, must be merely that which left their surfaces a vast number of years ago, the processes at present observed, or supposed to be observed, are, in fact, not processes now actually going on, but the phantoms of processes completed long in the Past—just as I maintain all these mass-constitutive processes must have been.

Opišite navedeni proces!

**Vježba 4.**

To this I reply that neither is the now-observed condition of the condensed stars their actual condition, but a condition completed long in the Past; so that my argument drawn from the relative condition of the stars and the “nebulæ,” is in no manner disturbed. Moreover, those who maintain the existence of nebulæ, do not refer the nebulosity to extreme distance; they declare it a real and not merely a perspective nebulosity. That we may conceive, indeed, a nebular mass as visible at all, we must conceive it as very near us in comparison with the condensed stars brought into view by the modern telescopes. In maintaining the appearances in question, then, to be really nebulous, we maintain their comparative vicinity to our point of view. Thus, their condition, as we see them now, must be referred to an epoch far less remote than that to which we may refer the now-observed condition of at least the majority of the stars.—In a word, should Astronomy ever demonstrate a “nebula,” in the sense at present intended, I should consider the Nebular Cosmogony—not, indeed, as corroborated by the demonstration—but as thereby irretrievably overthrown.

Ukratko objasnite navedeni tekst.

**Vježba 5.**

We comprehend, then, the insulation of our Universe. We perceive the isolation of that—of all that which we grasp with the senses. We know that there exists one cluster of clusters—a collection around which, on all sides, extend the immeasurable wildernesses of a Space to all human perception untenanted. But because upon the confines of this Universe of Stars we are compelled to pause, through want of farther evidence from the senses, is it right to conclude that, in fact, there is no material point beyond that which we have thus been permitted to attain? Have we, or have we not, an analogical right to the inference that this perceptible Universe—that this cluster of clusters—is but one of a series of clusters of clusters, the rest of which are invisible through distance—through the diffusion of their light being so excessive, ere it reaches us, as not to produce upon our retinas a light-impression—or from there being no such emanation as light at all, in these unspeakably distant worlds—or, lastly, from the mere interval being so vast, that the electric tidings of their presence in Space, have not yet—through the lapsing myriads of years—been enabled to traverse that interval?

Shvaćamo, dakle, izolaciju našeg Svemira. Uočavamo izoliranost toga – svega onoga što shvaćamo osjetilima. Znamo da postoji jedan skup grozdova - zbirka (klastera) oko koje se sa svih strana protežu neizmjerne divljine Prostora neograničeno svakoj pojedinačnoj ljudskoj percepciji. Ali budući da smo na granicama ovog Svemira zvijezda prisiljeni zastati, zbog nedostatka daljnjih osjetilnih dokaza, je li ispravno zaključiti da, zapravo, ne postoji materijalna točka izvan one koju smo na taj način mogli percipirati? Imamo li, ili nemamo, pravo na analogijski zaključak da je ovaj perceptibilni Univerzum – da je ova nakupina nakupina – samo jedna od niza nakupina nakupina, od kojih su ostale nevidljive?! Je li na toj daljini – difuzija svjetlosti zvijezda toliko intenzivna, a da ipak prije nego što dođe do nas, ne proizvede na našoj mrežnici svjetlosni dojam - ili iz nje uopće nema takve emanacije poput svjetlosti, u ovim neizrecivo udaljenim svjetovima - ili, na kraju, budući da je taj interval toliko velik da električne vijesti o njihovoj prisutnosti u Svemiru još nisu – kroz mirijade godina koje prolaze – bile osposobljene da premoste taj period?

Tumačenje teksta!