

in the proportion of Squares, and the Space to contain them will be increased in the same proportion; so that in each Spherical Surface the number of Stars it might contain, will be as the Biquadrate of their distances. Put then the distances immensely great, as we are well assured they cannot but be, and from thence by an obvious *calculus*, it will be found, that as the Light of the Fix'd Stars diminishes, the intervals between them decrease in a less proportion, the one being as the Distances, and the other as the Squares thereof, reciprocally. Add to this, that the more remote Stars, and those far short of the remotest, vanish even in the nicest Telescopes, by reason of their extream minuteness; so that, tho' it were true, that some such Stars are in such a place, yet their Beams, aided by any help yet known, are not sufficient to move our Sense; after the same manner as a small Telescopical fixt Star is by no means perceivable to the naked Eye.

VI. *Of the Number, Order, and Light of the Fix'd Stars. By the same.*

AT the last meeting of the Society, I adventured to propose some Arguments, that seemed to me to evince the Infinity of the Sphere of Fixt Stars, as occupying the whole Abyss of Space, or the $\tau\omicron\ \pi\alpha\iota\upsilon$, which at present is generally understood to be necessarily Infinite; and thence I laid before you what may seem a very *Metaphysical Paradox*, viz. That the number of Fixt Stars must then be more than any finite Number, and some of them more than at a finite distance from others. This seems to involve a Contradiction, but it is not the only one that occurs to those who have undertaken freely to consider

sider the nature of Infinite, which perhaps the very narrow limits of humane Capacity cannot attain to.

Since then, I have attentively examined what might be the consequence of an Hypothesis, that the Sun being one of the Fixt Stars, all the rest were as far distant from one another, as they are from us; and by a due calculation I find, that there cannot, upon that Supposition, be more than 13 Points in the Surface of a Sphere, as far distant from the Center of it, as they are from one another: and I believe it would be hard to find how to place thirteen Globes of equal magnitude, so as to touch one in the Center: for the twelve Angles of the *Icosaedron* are from one another very little more distant than from its center; that is, the side of the Triangular Base of that Solid, is very little more than the Semidiameter of the circumscribed Sphere, it being to it nearly as 21 to 20; so that it is plain that somewhat more than twelve equal Spheres may be posited about a middle one; but the Spherical Angles or Inclinations of the planes of these Figures being incommensurable with the 360 degrees of the Circle, there will be several interstices left, between some of the Twelve, but not such as to receive in any part the thirteenth Sphere.

Hence it is no very improbable Conjecture, that the number of the Fixt Stars of the first magnitude is so small, because this superior appearance of Light arises from their nearness; those that are less shewing themselves so small by reason of their greater distance. Now there are in all but sixteen Fixt Stars, in the whole number of them, that can indisputably be accounted of the first magnitude; whereof four are *extra Zodiacum*; viz. *Capella*, *Arcturus*, *Lucida Lyra*, and *Lucida Aquila*, to the North; four in the way of the Moon and Planets, to wit, *Palilicium*, *Cor Leonis*, *Spica*, and *Cor Scorpii*; and five to the Southward, that are seen in England, viz. The

Foot

Foot and *Right Shoulder* of *Orion*, *Sirius*, *Procyon*, and *Fomalhaut*; and there are three more that never rise in our *Horizon*, viz. *Canopus*, *Achernâr*, and the *Foot* of the *Centaur*. But that they exceed the number *Thirteen*, may easily be accounted for from the different magnitudes that may be in the Stars themselves; and perhaps some of them may be much nearer to one another, than they are to us; this excess of Number being found singly in the Signs of *Gemini* and *Cancer*. And indeed within 45 degrees of Longitude, or one 8th of the whole, there are no less than *five* of these *sixteen* to be seen. If therefore the Number of them be supposed *Thirteen*, omitting *Niceties* in a Matter of such Irregularity, at twice the distance from the Sun there may be placed four times as many, or 52; which, with the same allowance, would nearly represent the number of the Stars we find to be of the 2d magnitude: so 9×13 , or 117, for those at three times the distance: and at ten times the distance 100×13 or 1300 Stars; which distance may perhaps diminish the light of any of the Stars of the first magnitude to that of the sixth, it being but the hundredth part of what, at their present distance, they appear with. But if, since we have room enough for it, we should suppose the Sphere continued to 10 times the last, or 100 times the first distance, the number of Stars would be 130 000, and they would appear but with the 10 000th part of the Light of a first magnitude Star, as we now see it. This is so small a pulse of Light, that it may well be questioned, whether the Eye, assisted with any artificial help, can be made sensible thereof. But 100 times the distance of a Star we see, is still Finite: from whence I leave those that please to consider it attentively, to draw the Conclusion.