THE DALLY BY SANDER THY MURLIPH - PRINT, LURIN, FRIDAY, JUNE 11, 1870

LIFE IN MARS.

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The London Spectator gives the following interesting review of a chapter in a new work entitled "Other Worlds Than Ours," by Richard A. Proctor, F. R. A. S., just published in London:-

In a book far more entertaining than any modern novel Mr. Proctor has given us, amongst a number of other studies of worlds in physical condition widely different from that of our own, a chapter of the highest in-terest on "Mars the Miniature of our Earth" -the specific interest of the essay being the very close analogy it proves in the physical condition of Mars to that of our own earth, so that we have a far larger basis of similarities from which to draw our inferences to other singurities which we can, as yet, only conjecture, then we have in the case of the Moon, or even the planet Jupiter, or Venus, or Mercury-worlds in all of which there is some vast fundamental differences of condition which must affect the whole course of nature there. In the moon there is the fatal difference of no atmosphere, and none, therefore, of the enormous variety of phenomena-evaporation, clouds, colors, vegetables, lungs, etc.dependent thereon. In Mercury and Venus, if there is not, as we should suppose on the first look, an amount of heat which would make those planets quite intolerable to the various races of creatures inhabiting our oarth, we have at least no right as yet to assume that there is not, and no evidence at all really demonstrating the existence of those general physical conditions on which alone we can base an argument from analogy. In Jupiter there is pretty clear positive evidence that the conditions of existence are quite inconsistent with life as we know it. In all probability, the body of the planet is still a glowing uncondensed mass of molten matter, with an atmosphere heavily charged with boiling vapor; and if there be life at all of our kind in the Jovian system, it must in all probability be on the satellites, and not on the planet itself; and even they are composed of so light a material, as compared with the earth or the moon, as to suggest a very different general physical condition. Of course, there is nothing to prove that intellectual beings, like ourselves in reasoning powers, may not exist in the fiery furnace of the sun or on the cinder which we call the moon, or, indeed, in empty space itself; but there we come into the region of pure conjecture, and the argument from analogy wholly fails. Nothing is beyond pure conjecture. A hundred thousand intellectual beings like myself may be dancing on the paper on which I am writing, for anything I know; but I have no reason to think so, and I have very little more reason to think that such beings exist either on the sun or on the moon, for the only circumstance which favorably distinguishes these positions from empty space, for the abode of beings like ourselves, is the existence of a force of gravity there, more cr less resembling the force of gravity which keeps us rooted to the earth; and even that circumstance as regards the sun can hardly be said to furnish an analogy, for at the surface of the sun, to say nothing of the difficulty of living in a furnace, the force of gravity itself would be so enormous as to crush any one with the body of a man. While, therefore, there is nothing to prevent our conjecturing inhabitants for all the suns in space, there is precisely as little reason for doing so as for conjecturing inhabitants for the intervening celestial vacuum. The more attraction of our attention to these particular points in space by the lights sus-pended there ought no more to suggest living beings in any degree like ourselves than the shining of a candle should suggest to a moth that in the flame of that candle living beings like itself exist. In point of fact, the moth would be much nearer the mark if it peopled the dark intervening spaces with moths, and excluded them from the various luminous points visible to it; and so as regards solar worlds, not only have we no reason to single them out for conjectural inhabitants, but as far as we can reason from analogy at all, we have special reason to single them out as localities in which creatures like ourselves are even more unlikely to exist than, in the empty celestial spaces themselves. No doubt it is perfectly reasonable to suppose that there may be planetary systems for most or all of the solar worlds like that to which we belong, and there, if beings more or less like ourselves do not already exist, preparation may be making for them. But what we want to insist on is, that so far as we can reason at all in this matter, we can reason only by analogy; and that argument, as distinguished from mere conjecture, fails us, just so far as we have no tangible analogies of physical condition on which to build. Now, in the case of the planet Mars, and in the case of the planet Mars alone, our astronomers have really established the existence of a similarity of physical condition, which gives us the strongest positive grounds for inferring that even such creatures as we now are could somehow make shift to live there, though, of course, not without a cer-tain amount of preliminary discomfort while we were trying to acclimatize ourselves. Mr. Proctor's graphic account of these similarities, and his delightful chart of the planet's continents and waters, suggest to us to discuss one or two of the known differences of condition, in their relation to the probable results upon the history and civilization of the Martialists. First, let us briefly say that the Martialists have a world less in area than one of our hemispheres to explore-that, in spite of this it has not very much less land than the earth, a much less propor-tion of its surface being occupied with water than of our globe—that its seas are of the general type of the Baltic and the Mediterranean, for the most part narrow, straggling, inland seas-that the greatest seas are in the neighborhood of the cold South pole of Mars, which has a climate far severer than the North pole; that there is a world of perpetual snow at each Martial pole, which can be seen to diminish as the summer returns to each hemisphere, and to increase again as winter comes back: that in spite of the preponderance of land, a vast deal of rain falls on Mars, especially in winter, clouds often hiding the configuration of the continents from our astronomers, and then suddenly dispersing, and leaving the continents clear again-a clearing-up which usually happens about the hour of noon in Mars, just as our weather so often changes as the sun passes the meridian; that the length of the Martial year is nearly twice as long as ours; and the that force of gravity on Mars is much less than half what it is with us, so that as, Mr. Proctor expresses it, "a Daniel Lambert on Mars would be able to leap easily to a height of five or six feet, and he could run faster than the best of our terrestrial athletes. The general result, then, of the telescopic observations on Mars, and the deduced calculations may be said to be -(1) with certainty, that the weight of objects of the same mass in Mars is much less than half what it is here, d that consequenty there would be a far

same size; that falls would be less dangerous, that the strain on walls, or columns or any other supports would be much less, and that therefore roofs, arches, and structures of that kind might be easily set up on a much larger scale by creatures of equal skill with ourselves: but, on the other hand, that *friction*, which is more or less proportioned to pressure, and therefore, in the case of piles of stones, etc., to weight, would be far less than on the surface of the earth, so that any violent lateral disturbances, such as hurricanes, would exert a still greater effect than on our earth in destroying such structures, since there would be less solidity, and therefore less frictional resistance to overcome in overturning them. Again, the vastly diminished weight of given masses would give a very great advantage to all kinds of engines of draught. Carriages, carts, and railways would attain a vastly greater speed than on our earth, and the sledging on the snowfields of Mars might be as swift as the wind. All these inferences are matter of certainty, so far as they go. But (2), there seems a very great probability that the atmosphere of Mars is relatively considerably denser than ours, since at a distance from the sun so much greater that the planet probably receives, directly, less than half the light and heat we receive, there seems no sign of any arctic severity, and clear evidence that the atmosphere holds vast quantities of watery vapor even in winter, which points to a general temperature considerably higher than our world would have if removed to the same distance from the sun, especially when one considers how much less water to supply vapor, and how much greater a proportion of land than the earth, Mars contains. Again, the rapidity with which storms clear off from a big continent and leave the outline clearly marked after being all enveloped in mist before, seems to show the existence of very rapid currents of air; and this, no doubt, the greater inclination of the axis of Mars, giving a greater range to the northward and southward journeys of the sun, would promote. Putting these facts together, then, we should infer that the atmosphere of Mars is, in proportion, heavier than that of the earth, and therefore a warmer envelope for the planet, that its winds are more violent, and that the great difficulty of the architects of the planets is more likely to be the strengthening of their structures against lateral forces-hurricanes, for instance-than against the strain of gravity. Their outer walls would have to be comparatively much more solid, their difficulty in raising broad arches and spacious roofs would be much less less; and locomotion on Mars must be much more easy and speedy, cateris paribus, than locomotion on earth. If this be so, we may see a fitness in the much larger proportion of land in the planet and the comparative narrowness and small-

ness of the seas. Probably life in Mars is faster than it is here. It is very improbable that the civilization of the different continents there is divided by periods extending over thousands of years. There is probably no one of the great continental tracts of Mars known there as "the New World." If great migrations of conquering races have taken place on Mars as on the earth, they have probably succeeded each other faster, having a less surface to move over, less obstacles perhaps in the way, and greater advantages in locomotion. We should not be surprised, too, if the Martialists had got greatly ahead of us in respect of navigating the air. We know that the density of the planet as a whole is less than three-fourths of that of our earth, so that it seems likely that the tissues of the body of a Martialist which must be fed from the substance of the planet are on the whole intrinsically lighter than those of man's body. But if the Martialists' bodies are intrinsically lighter, and their atmosphere a good deal heavier than ours, aerial transit may be a very easy matter to them, and it is quite conceivable that their normal mode of locomotion may be through the air. Again, if we are right in supposing the currents of air in Mars to be of more than usual violence, while the solidifying force of friction which resists them is much smaller than here, it may be a reasonable inference that "natural selection" has already weeded out the loftier-growing trees, which would stand less chance in encounters with hurricanes than our own, and it is not improbable that the tendency of the greater facilities for motion, and the greater velocity of life in Mars altogether, would be that all its animal inhabitants range wider for their food, and obtain less on a given area than on our earth. We should be disposed to conjecture that it is a world in which speed is greater and of more importance than even on the earth, and if so, it seems likely enough that the difficulty we have supposed as to the solidity of walls exposed to the atmospheric currents of Mars, is got over as the difficulty of building durable structures is generally got over in our own tropics, where earthquakes are so common-by not building durable structures at all, but only very light and fragile ones—a process which would, of course, be much easier where all the materials were lighter and all motion swifter than with us. In a word, it seems likely that the distinctive feature of life on Mars is velocity, that the creatures there live faster, move oftener, undergo more change, just as the planet itself passes through a far vaster orbit (though its orbital velocity is not quite so great as ours) in one of the Martial years. But that such a characteristic would tend to quicken the progress of the mind and of discovery is doubtful. With us civilization has never advanced rapidly till it had become tame and, so to say, plodding, and the excitements of local change at least had become few. But the great seasonal changes on Mars, especially in the Southern hemisphere, where the winter and summer are aggravated by the enormously increased distance of the sun at that period when his rays are most direct-contribute to confirm the impression we have drawn from other considerations, that physically, at least, the life there has far more of rapid change in it than we can easily conceive; but whether that has developed or arrested the mental and moral progress of the Martialists is a question of which the elements are altogether too conjectural for serious discussion.



