

COSMIC MAGNITUDES.

By HENRY HAMILTON HARWOOD.

In his interesting, though incomplete and rather disparaging and depressing than exalting and inspiring article—"Man's Place in Nature," Professor Edgar L. Larkin says, truly enough, "Search all languages for a word to all the smallness of the earth, and not one can be found so accurate as the word nothing."

Modern exact science here merely corroborates the conclusion of ancient and mediaeval contemplation. Lucrèce two thousand years ago wrote in metrical philosophy that was not poetry, "In fine cum celo, terra, que marique, Nil sunt ad summum s'mul totius omnium—The earth, the sea, and sky, from pole to pole, Are small, nay nothing, to the mighty whole."

Copernicus repeated the observation: "The magnitude of the universe is so great that the distance of the earth from the sun has no apparent extent when compared with the distance of the fixed stars." Mostellin and Babelius and Pascal expressed themselves similarly, Pascal sublimely.

"There were brilliant minds in antiquity," says a French savant, "whose guesses about the world modern science can only confirm." Lucrèce was one of them. An intuition of his was that "a single atom may constitute a world." Twentieth century mathematical science procures Democritus's intuition possibly correct, because an atom and a world—when taken together and compared with the infinite universe become indistinguishable one from the other, each shrinking to imperceptible, immeasurable, incalculable smallness.

Now this world, the earth, although vanishingly minute, pan-cosmometrically regarded, is the abode of beings of peculiar organization and potency. It is a world in itself, a microcosm. The earth is vanishingly small, each individual of that species must be inconceivably smaller. True, if we turn our mental regard in one direction only, it is sometimes enlightening, though, to look in two or in all directions, the "heaven-born genius" Pascal swept over both the large and the small in the cosmos with his measuring, calculating gaze and formulated this "Thought" from the survey, "Whatever motion, whatever number, whatever space, whatever time, there may be, there is always a larger and a smaller one; so that they all hover between zero and infinity, being always at an infinite distance from both extremes."

Thus, man is either infinitely large or infinitely small, accordingly as he is regarded. From hazy antiquity onward to the present day, philosopher after philosopher has made the discovery afresh that man is more than an animated, talking, reasoning speck or part, etc.—that he is a complete world in himself, a microcosm. Man, the mysterious teacher, apostrophized him: "Universe in little, thou, man!" Ages afterwards, Sir Thomas Browne announced his finding of a microcosm in himself and his fellowmen. Recent Dr. Darwin pronounced every organic being a microcosm. Now, we know that every organic being consists mainly of cells. Well, the German cytologist Reilke informs us that every cell is a microcosm. And every cell is composed of molecules, atoms, and possibly, corpuscles—every molecule, atom, or corpuscle being, pan-cosmometrically regarded, indistinguishable from either a cell, an organism of whatever size, the earth, the sun, the solar system, or the entire visible universe.

Herbert Spencer writes: "In each molecule of an oxide or an acid the chemist sees one of these systems (of units) united with one, two, three, or more systems of another kind that are similarly involved. According to orders of compounds successively more heterogeneous, he finds himself obliged to recognize molecular complexities unrepresentable in thought; until, on reaching organic matter, he comes to molecules each of which (taking into account the compound system of its so-called elements) contains literally more atoms than the visible heavens contain stars—atoms combined, system within system, in such ways that each atom, each system, each compound system, each doubly compound system, has its motion in relation to the rest, and is capable of perturbing the rest and of being perturbed by them."

I said something above about peculiar organization. Dr. Woods Hutchinson, in "The Republic of the Body," says more: "The body is conceived of as a cell-state or cell-republic, composed of in-



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numerable plastic citizens, and its government, both in health and disease, is emphatically a government of the cells, by the cells, for the cells. There is a perpetual struggle for survival going on between the different tissues and organs of the body. Like all other free agents of the body, it labors enormously to the benefit of the body whole. Out of the varying chances of its warfare is born that incessant ebb and flow of change, that inability to reach an equilibrium which we term vitality. This internal warfare and the warfare of the body-whole against its environment—cause waste or wear of cells, so that vacuoles or hollows lessen or weaken each cell. Even during the wakeful activity of the organism the process of repairing the cells goes on. When the organism is at rest the rebuilding is more rapid and thorough. From C. Lloyd Morgan's Animal Life and Intelligence some apposite paragraphs may be borrowed. "We have seen that the cell-substance around the nucleus is composed of a network of protoplasm, the plasmasome, enclosing within its meshes a more fluid material, the plasma. It is probable that this more fluid material is an explosion elaborated through the vital activity of the protoplasmic network. During the period of repose which intervenes between periods of activity, the protoplasmic network is busy in construction, taking from the blood-dissolved oxygen, and from the blood-fluid carbonaceous and nitrogenous materials and knitting these together into relatively unstable explosive compounds. These explosive com-

pounds are like the mixed air and gas of the gas-engine. A rested muscle may be likened to a complex and well-organized battery of gas-engines. On the stimulus supplied through a nerve channel, a series of co-ordinated explosions takes place: the products of the explosions (one of which is carbonic acid gas) are taken up and hurried away by the stream; and the protoplasm sets to work to form a fresh supply of explosive material. Long before the invention of the gas-engine, long before gunpowder or dynamite were dreamt of, long before some Chinese or other inventor first mixed the ingredients of gunpowder, organic nature had utilized the principle of controlled explosives in the protoplasmic cell. The cells on or near the external surface of the body—those, that is to say, which constitute the end organs, knots—ganglionic cells—contain explosive material which may be fired by a touch, a sound, or an odor, the contact with a liquid, or a ray of light. The effects of the explosions in these delicate cells, reinforced in certain neighboring nerve knots—ganglionic cells—transmitted down the nerves as along a fired train of gunpowder, and thus reach that wonderful aggregation of organized and co-ordinated explosive cells, the brain. And in the brain, somehow associated with the explosion of its cells, consciousness and the mind-element emerges. Looking, then, into the molecular and atomic physics of cell life or activity, we behold by mental vision in processes that seem simple and uneventful to superficial observation, a complex and intricate display of tendencies of molecules and atoms, more rapid and violent, more magnificent and wonderful, than even the most extraordinary, most sublime, more awe-inspiring exhibition of self-transforming energy that celestial atelier universe has at any time presented to the gaze of human eyes. Innumerable millions of cosmic bodies, which we aggregate of those bodies, call molecules and atoms, acting from some impulse, the nature of which is at present inscrutable to the very physical organ of thought which those bodies, with all their impulses and characteristics, constitute, go to work with rarely-failing readiness to fill up with themselves or with parts of themselves cavities that form in the cells of the brain and other parts of the organism. Should we see, on some cloudless, moonless night, thousands of the stars of the milky way move in orderly manner towards the great vacuoles of the heavens, called Constellations, and after arriving at their destinations, arrange themselves there so skillfully as to make the appearance of the heavens at those points uniform with the appearance in the more thickly starred regions, we should behold a phenomenon, a display of cosmic purpose, that would be no more noteworthy, no more immense, pan-cosmometrically regarded, than any one of countless similar exercises of prodigious deterministic activity patent to the mental observation of the mathematical biologist in the building or the repair of any cell of his own body. And it is estimated that there are 500,000,000 cells in the average human brain alone. Man and the world are large or small accordingly as they are regarded macroscopically or microscopically.

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Nowadays there isn't any place on earth for the man who loves a farm, or who follows the predatory movements of potato bugs and weevil with interest.

It didn't use to be so. When I was young, and that hasn't been so monstrous long ago, either, let me tell you—a Virginian who ran a plantation was "some pumpkins" and when he opened his mouth and spoke, people had time to listen. But they don't do it now. Say "mer" to a man these days and it gives him the fidgets. If he'll listen at all, the best he'll do is to inquire how the "grangers" are going to vote or whether they're buying their merchandise from Richmond or at the exposition.

But as I have said—and as I am going to keep on saying—it didn't use to be so. And what's more we aren't going to forget. They can't keep on fooling us and baiting us with these here horse shows, where bob-tail nags cavort around in behalf of matrimonial bureaus, and chestnut fillies kick up a lot of saw dust and tan bark in the hope of attracting the town tailors and the city mantuamakers.

When I was a boy—a hanging around the stable and a-juggling a pincfork folks thought horses was made to keep the business end of a row busy, and the old spavined hack-rack on our place didn't command any more respect than the Dominicker rooster in the barn-yard, but my! It's different now. Say horse to a city man to-day and he gallops off to a jump into a spick-and-span and sends his wife rushing over to Broad street for a Parisian creation, with hat and gloves to match. Well do I remember that when I was a little shaver, the best and most fastidious of us didn't hesitate to go into the presence of a horse even though we wore blue jeans breeches and had our pants "histed" with a pair of galluses made of shoe string. Now the biggest man in the country is proud to rake his whiskers with a currycomb and will cheerfully sell his family tree for a pedigree for his steed.

There was a gay, too, when horses had to hoof it, but that time has passed. They come to us in private cars now, and carry life insurance, and have valets and imbutants and wild onions and retines to keep off flies. As to the fly-fighting attendants I ain't kicking so much, being as the equine aristocracy don't have any more tails than a Jack rabbit, but it does seem hard on me, I want to say, in the "social column," for the editor to tell me invariably that he hasn't got space—that he's running a page of personal-remembrances about Mrs. So-and-So's "stylish, well-mannered" "sorrel hackney, and is giving the public some interesting facts about the four-legged critter's grandpa's.

Ain't I as good as a horse and didn't I have a grandpa and a grandma, too? And ain't I stylish and well-mannered—leastwise ain't I well-mannered? Maybe so, but I couldn't get any editor to see it that way last week. The most satisfaction I got was the confession from one editor that he, too, felt somewhat embarrassed by the situation, as he wanted to go to the horse show, but didn't have anything fit to wear except a coat of arms. He said he'd like to have a coat made from the same block that produced the ample headgear of Henry Clay. This editor said that no horse at the show would stand for such an outfit, the "best mannered" of the exhibition would shy at him unless he at least appeared in a Tuxedo.

In the name of gracious, how long we farmers go to put up with all these monkey-shines? It's time for us to shake the hay-seed out of our hair and the sheep-burs out of our whiskers, and get down to business.

Already Professor William B. Alwood—than whom no man ever made a braver fight against the grass and wild onions—capt a new name in the "social column," he inherited from his father and a beaver-hat made from the same block that produced the ample headgear of Henry Clay. This editor said that no horse at the show would stand for such an outfit, the "best mannered" of the exhibition would shy at him unless he at least appeared in a Tuxedo.

But one looks in vain for such a contribution to the exhibit. The way the Professor assesses fancy stock breeders in the next thirteen lines is awful—but delicious. Observe the following: "But opportunities for doing good are allowed to go unutilized at our recent fairs. For instance at Roanoke the exhibit of Herefords was exceptionally fine, but I did not find a single cross-bred Hereford steer. What are these magnificent animals showing for? Why shouldn't we have classes for grade steers sired by pure bred bulls of the best breeds? This would interest practically everybody. The city man, the consumer of beef, the butcher, and the farmer could all appreciate and discuss their merits."

And before we freckle-necked, one gallus citizens get through chuckling and guffawing over the way the Professor has got 'em a-going, he adds: "Why shouldn't we have classes for grade steers sired by pure bred bulls of the best breeds? This would interest practically everybody. The city man, the consumer of beef, the butcher, and the farmer could all appreciate and discuss their merits."

Propose of Professor Alwood's scheme, think how the bon-ton would flock to the show when Mrs. Thims-um-bob of the West End, in blue plughast with bone ornaments, tackled the bob-tailed brindle cow, in the hope of snatching the blue ribbon from her envious neighbor, Mrs. What-you-call-'em!

Editor dear, Professor Alwood in his "The grand old-fashioned agricultural fair" article, ever quotes that paragraph of yours wherein you say, "The grand old-fashioned agricultural fair and things has too many family reunions and too few

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