

THE CHARLOTTETOWN GUARDIAN

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FRIDAY, FEBRUARY 22, 1929

PAARDEBERG DAY.

The story of the South African war and shadowy beyond that of Great War, but it will figure in history as one of the stirring events...

the quiet of his own home, a reasonable debate in which his opponents as well as his own leaders, will state their case.

BENNETT SAVES MONEY

Ever since Confederation has Parliament acted with such dispatch and efficiency as in the debate on the Finance Bill...

According to statistics compiled at Ottawa for the Financial Post, the Maritime Provinces made a gain of 15 per cent in business during 1928 over the preceding year...

RADIO AND POLITICS

The psychological results of introducing the mechanism of broadcast into elections are discussed in the Manchester Guardian...

There is to be a full dress debate in the House of Commons over a C. P. R. branch line programme of 1,200 miles and a C. N. R. one of almost equal proportions...

Note: By The Way

The two hundredth anniversary of the birth of Oliver Goldsmith has recently been noted in literary circles...



That Body of Ours

By James W. Barton, M.D.

NATIVES FREE FROM ABDOMINAL AILMENTS

When we read that in nine years practice in the Himalaya Mountains, a British army surgeon, McCarrison performed 2600 major operations...

Why are these natives free from stomach and intestinal ailments whilst our "enlightened" folks are so sadly afflicted? There is only one answer. Too many of us are eating the wrong kinds of food.

We are eating foods which are deficient in valuable vitamins. As Dr. Seale Harris says "Even casual observations of the eating habits of people in cafes, hotels, dining cars, and their homes, will reveal the fact that the starches and sugars and lean meats, which are devoid of vitamins, make up a large proportion of the diet of all classes of people...

Insurance for airmen has been brought to the consideration of the Ontario Legislature. Both the Dominion and several of the Provinces have considerable numbers of aviators employed officially...

THE LAND WE LOVE

By FRANK LEIGH

THE BATTLE OF STE. FOYE

Q. When and where was the battle of Ste. Foye fought? A. The battle of Ste. Foye was fought on the outskirts of the city of Quebec, on the road that still carries the name...

THE POET'S CORNER

REQUIESCAT

Strew on her roses, roses, And never a spray of yew. In quiet she reposes: Ah! would that I did too.

Einstein And Relativity

(Specially written for The Guardian)

(This is the concluding article of a series of three dealing with the Einstein Theories of Relativity.)

THE UNIVERSE

Einstein has pointed out that the picture of the universe, according to the laws of Newtonian mechanics, is a somewhat unsatisfactory one. One would suppose a priori, that "As regards space (and time) the universe is infinite. There are stars everywhere, so that the density of matter although very variable in detail, is nevertheless on the average everywhere the same...

Now, the Newtonian theory cannot admit this conception, and according to it we must suppose "that the universe should have a kind of centre in which the density of the stars is a maximum and that, as we proceed outwards from this centre, the group density of the stars should diminish, until finally, at great distances, it is succeeded by an infinite region of emptiness."

This conception is, on general principles not very satisfactory, and becomes less so when we reflect that, according to it, the light emitted by the stars, and also individual stars of the stellar system would be passing off into infinite space never to return. "Such a finite material universe" says Einstein, "would be destined to become gradually, but systematically impoverished."

A Two-Dimensional Universe.

"In the first place we imagine an existence in two dimensional spaces. Flat beings with flat implements, and in particular flat rigid measuring rods are free to move in a plane. For them nothing exists outside of this plane; that which they observe to happen to themselves and their flat 'things' is the all inclusive reality of their plane. In particular the construction of Euclidean geometry can be carried out by means of their measuring rods. In contrast to ours, the universe of these beings is two dimensional; but, like ours, it extends to infinity."

"Let us consider now a second two dimensional existence, but this time on a spherical surface instead of on a plane. The flat beings with their measuring rods and other objects fit exactly on this surface, and they are unable to leave it. Their whole universe of observation extends exclusively over the surface of the sphere. Are these beings able to regard the geometry of their universe as being plane geometry, and their rods withal as the realisation of "distance"?

"They cannot do this. For, if they attempt to realise a straight line, they will obtain a curve, which we "three dimensional beings" designate as a great circle, i.e. a self contained line of definite finite length, which can be measured up by means of a measuring-rod. Similarly, this universe has a finite area that can be compared with the area of a square constructed with rods. The great charm resulting from this consideration lies in the recognition of the fact that the universe of these beings is finite and yet has no limits.

"But the spherical surface beings do not need to go on a world-tour in order to perceive that they are not living in a Euclidean Universe. They can convince themselves of this on every part of their "world," provided they do not use too small a part of it. Starting from a point, they draw "straight lines" (arcs of circles as judged in three-dimensional space) of equal length in all directions. They will call the line joining the free ends of these lines a "circle." For a plane surface, the ratio of the circumference of a circle to its diameter, both lengths being measured with the same rod, is, according to Euclidean geometry of the plane equal to a constant value "pi" which is independent of the diameter of the circle. On their spherical surface our flat beings would find this ratio to come out to a smaller value than "pi" the difference being the more considerable the greater the radius of the circle they take in comparison with the radius of their "world-sphere." By means of this relation the spherical beings can determine the radius of their universe, even when only a relatively small part of their world sphere is available for their measurements. But if this part is very small indeed, they will no longer be able to demonstrate that they are on a spherical "world," and not on a Euclidean plane, for a small part of a spherical surface dif-

fers only slightly from a piece of a plane if the same size. . . . Finite Not Unfounded

"To this two dimensional sphere-universe there is a three-dimensional analogy, namely, the three dimensional spherical space which was discovered by Riemann. It possesses a finite volume which is determined by its "radius." Is it possible to imagine a spherical space? To imagine a space means nothing else than that we imagine an epitome of our "space" experience, i. e. of experience that we can have in the movement of rigid bodies. In this sense we can imagine a spherical space."

"Suppose we draw lines or stretch strings in all directions from a point, and mark off from each of these the distance with a measuring rod. All the free endpoints of these lengths lie on a spherical surface. We can measure up the area of this surface by means of a measuring rod. The universe is Euclidean, then, this surface will be equal to four pi times the square of the radius; if it is spherical, then this surface will come out to somewhat lesser value, the discrepancy becoming more noticeable as we take a greater radius. With increasing values of the surface increases from zero up to a maximum value which is determined by the "world radius," but for still further increasing values of pi the area gradually diminishes to zero. At first the straight lines which radiate from the starting point diverge farther and farther from one another, but later they approach each other, and finally they run together again at a "counter point to the starting point. Under such conditions they have traversed the whole spherical space. It is easily seen that the three dimensional spherical space is quite analogous to the two dimensional spherical surface. It is finite (i.e. of finite volume) and has no bounds.

"It follows from what has been said, that closed spaces without limits are conceivable. . . . As a result of this discussion, a most interesting question arises for astronomers and physicists, and that is whether the universe in which we live is infinite or whether it is finite in the manner of the spherical universe. Our experience is far from being sufficient to enable us to answer this question. But the General Theory of Relativity permits us to answer it with a moderate degree of certainty. And the answer given by Einstein is that the universe is finite and of quasi spherical form.

CONSIDERATIONS

The theories of Einstein, treating as they do of the fundamental nature of things, so far as these things are able to be perceived by us, provide the starting point of innumerable meta physical and philosophical speculations. These theories, indeed together with the latest researches into the construction of the atom have done much to divorce science from the Lockian materialism of the 19th century. And this divorce is not greatly to be regretted.

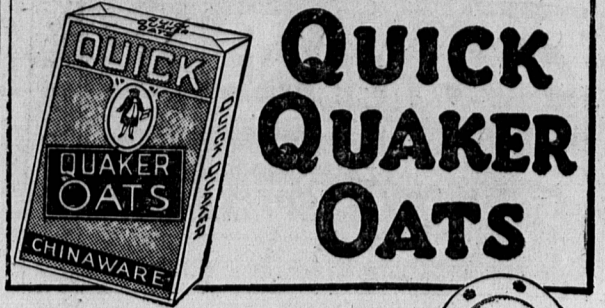
We view the phenomena of Nature, and we form certain concepts about them. In our own minds we construct models of the universe—a universe which works properly according to the theory which, for the moment holds the floor. Further perfection of the means of observation discloses flaws; the theory falls any longer to account for all the observations; its partisans for a time manage to patch and buttress it, but at last it falls into ruins and a new one takes its place. Theory succeeds theory. The solid atoms of the 19th century physicists are replaced by the complex but uncrucial electrical structures of Rutherford and Bohr and the even more ghostly conceptions of Schrodinger and Heisenberg. These latter, incidentally, according to Bertrand Russell reduce matter to emanations from a locality—the sort of influences that characterise haunted rooms in ghost stories."

So likewise, the theories of Newton are now displaced by the conceptions of Einstein, by which, in its last analysis, matter is reduced to a condition of space-time.

Phenomena and Mind

Casting aside, then, the intellectual arrogance of the materialist, all that we can say is this: There are phenomena and there are the minds of men which perceive these phenomena. And these minds are so constituted that they wish to formulate laws, which so far as possible, will embrace and "account for" the phenomena, and incidentally be satisfactory in that by their aid the motions of the heavenly bodies can be predicted and apparatus constructed which will minister to the use and convenience—and when thought by the nations to be necessary, the mutual destruction of mankind.

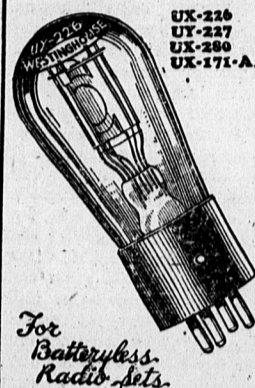
So, like children playing in the sand we build conceptual models of



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HARRINGTON. Meeting opened with community singing. Sick committee was reappointed, and plans made for a Welcome Party for Mr. and Mrs. McIntyre. It was decided to have a play in a few months, to help raise funds. Next meeting will be at home of Mrs. Benj. Newson.

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RECORD PRICE FOR PELT

NEW YORK, Feb. 20.—A new world's record price for mink pelts in the raw state was set here today when \$117 was paid for prime "extra" dark New England skins at the annual winter sale of the New York Auction Company. Fresh and good colored mink advanced twenty percent over the company's fall sale levels but "stales and pales" were unchanged. Japanese mink sold to \$4.15.

C. M. Lampson & Co., LIMITED. 64 Queen Street, London, E. C. 4, England. Public Auction Sales OF Raw Furs. Shipping bags will be furnished without charge by applying to R. T. Holman, Ltd., Summerdale, P. E. I. Represented by Alfred Fraser, Inc., 212 Fifth Avenue, New York, N. Y.

DODD'S KIDNEY PILLS. BAYVIEW. Meeting opened with singing of Ode, followed by Minutes and Roll Call. Preparations are being made for a Valentine social to be held February 14th. One member enrolled at this meeting. Place of next meeting is home of Mrs. Wm. A. Graham.