It is not 100% that Smith wrote the following article published in the Fall 1961 edition of the Ottawa Flying Saucer Newsletter "Topside." It, however, is his writing style and was typed on the same typewriter Smith used to produce his later articles and letters.

Gravitational Speculations

When some of the ancient Greeks deduced that the earth was round their ideas proved unacceptable because they were quite unorthodox in relation to the thinking of that time. It was not until two millennia later that those early ideas proved correct and are now generally acceptable.

The ancient Greeks and many others must have wondered about gravity or why things had weight. In the last three centuries, Newton and many others have considered the problem. Yet, though the laws are well known, no modern textbook explains the "why" of gravity in simple terms.

If an explanation of gravity had been produced which fitted the general ideas on the subject, it is fairly certain that the reason for the pull of gravity would now be described so clearly in the text books that every schoolboy would understand it perfectly.

Many, many scientifically minded persons must have given the subject considerable thought. From the fact that none seem to have been successful except at the super mathematical level, we can hazard a guess that the true answer is not to be found in the direction of orthodox thinking and may therefore prove to be quite incompatible with ordinary orthodox ideas on the subject.

If the real answer contains unorthodox features, will not history repeat itself, and as in the case of the "round" earth, the "wise men" of the day reject the suggested explanation? George Louis LeSage (1724-1803) sees to have bumped into that kind of trouble with an unorthodox explanation of gravity. A newer one developed in 1950 (about two centuries later) by P.G.A.H. Voigt, which has recently come to our notice, seemed to have faired no better. Is it possible then that promising explanations of gravity already exist but have not gained general

acceptance because of their unorthodox features? Is history repeating itself once again?

We did hear about these possible explanations of gravity until a copy of GAUSS for May 1960 was brought to our notice. In this, an article entitled "Gravitational Theory from England" discusses Mr. Voigt's hypothesis and compares it with earlier suggestions of LeSage etc.. The following extracts from that article are printed with permission:-

"Those who were at the gravity Research Foundation's meeting last August will remember that Mr. P.G.A.H. Voigt, spoke for a few minutes debunking Sir George H. Darwin's 1905 refutation of the LeSage theory of gravity. For over 10 years now, Mr. Voigt, who is an Electrical Engineer, has made a side-line study of the unknowns of science, including the structures of gravitational, magnetic and electrical fields, the mechanism "behind" the Law of Gravity etc. He was a pioneer in the development of British Electrical (Electronic) sound recording systems in the 1920s and was invited to address the British Sound Recording Association on the occasion of their 21st anniversary in September 1957. In the course of that address, he mentioned those sideline studies.

He has sent us the full text of the address to the B.S.R.A and has given us permission to quote the mid-part, which relates to gravity. This reads: "In 1946-7 as you may remember my health broke down and I was nearly paralyzed. Except for the fact that I still have to rest a great deal, things are not normal…….. Had it not been for the rest periods necessitated by my health, that scientific work would never have started.

This 'intrusion' into my life began on the 7th of January 1950, when, during one of my rest periods…….. I started to think about the unknowns of science…….

"When I started to explore the unknowns of science, I found myself in a wonderland of strange and unexpected things, a region where nothing made sense unless you first abandoned most of what you had learned, and started all over again.

"Take gravity for instance. When Newton considered the subject he described gravity as a 'pull.' When Einstein reviewed the subject, he abandoned the idea of a pull and described gravity as 'a by product of the curvature of the 4-dimensional time-space continuum.'

"I don't know what those words mean to you at this moment, but in 1950 they meant nothing to me. So I began afresh, or as they say, 'from the ground up.'"

"Like Einstein before me, I found that I too had to abandon the idea that gravity was a pull. An alternative explanation which is easily understood was arrived at during that fateful January."

Imagine a primitive gas. A gas with particle much smaller than electrons. Particles which I shall call 'microls,' so fine that the can pass or bounce their way freely through the atoms. These microls move at an incredible speed and this sub-atomic gas occupies all space, from the vast distance between the galaxies down to the small ones between parts of each atom."

"If an object is located out in space midway between the galaxies, as many microls will bounce off its molecules or pass through them from one direction as from any other. The impact forces will therefore be equal or average, and so balance out."

"But near a body such as earth, things are different. In the millions cubic miles of earth, microls are bouncing about too. If some of these get a little 'tired' by the time they bounce out there, there will be a region around the earth with a percentage of tired microls."

"The impacts affecting an apple, such as Newton's, will then be unequal vertically, with the down coming impacts more powerful than those due to the tired upcoming microls. Thus there is a state of unbalance, a differential force, with a resultant whose direction is toward the body causing the tiredness. And this force can easily be called the force of gravity."

"What I have told you, is of course, a streamlined and simplified version of the subject but you will see now what I meant when I spoke of a wonderland of strange and unexpected things, a place where gravity does not pull, but is a consequence of an unbalance of opush forces instead!"

"Such an unbalance is mechanically and mathematically exactly equivalent to a pull. Therefore

no direct experiment can be devised to decide whether gravity pulls or pushes, certainly an amusing thought."

"At first, I thought that I had done something spectacular and that I had invented a new explanation of gravity. It was not until about four years later, when I compared this sub-atomic gas idea with Einstein's concept that I woke up."

"In any rectangular volume, this gas-like medium has the usual three dimensions. In addition, the microls of which it consists, have speed, and speed is measured in distance per second. The whole medium thus has more than three dimensions, and one of those extra dimensions is TIME. Further, it is not continuous throughout all space. Einstein's words, '4-dimensional time-space continuum' not only began to make sense, but they fit remarkably well."

"Suppose that we plot tiredness contours around the earth. These would have the shape of spherical shells concentric with the earth. At great distances, the radius would be great, the local curvature will therefore be slight. Also, out there, the percentage of tired microls in a given volume will be low. Nearer the earth, the curvature of the contours is greater, so is the percentage of tired microls. Does the concept, which Einstein described as a 'by-Product' of the curvature fit? Well, to me something resembling a relationship is now very obvious indeed."

"The sub-atomic gas concept I had deduced, thus seemed to be only a physical model of what Einstein had deduced mathematically some 35 years earlier. Einstein's 'continuum'

could well be such an sub-atomic gas; the 'curvature' could be the curvature of the contour line; and the 'by-product' the force acting in a direction towards the center of the curvature, could be caused by unbalanced impacts. Simple, isn't it?"

"Since starting out on these explorations, I have found that the gas is important in many other ways. It is involved in magnetic fields and in electro-static fields. Also it is the stuff out of which nature makes electrons."

"The structure of magnetic and electrical fields are simple, but the mechanisms by which the

magnetic and electro-staic forces act are such that gravity is elementary by comparison. There is no time now, and this is not the occasion for discussing these matters. The details were communicated by installments, over the years, to the proper place, but science has been progressing along the mathematical route now for so long that anything else is not taken too seriously."

Mr. Voigt has asked us to add that when preparing the text of that address, he knew that time should be short and that non-technical guests would be present. I was therefore not practical to go too much into detail and ideas would have to be kept simple. When he spoke of "tired" microls therefore, what he meant was they had lost some of their translational velocity. Spin has no gravitational action. If their spin has increased, this can take care of the Law of Conservation of Energy.

He is also apologetic for having suggested that Newton was responsible for the word "pull" in connection with gravity. Recently he learned that Newton avoided the word "pull" and deliberately used the word "attraction" instead. Furthermore, Newton made it abundantly clear that he was leaving quite unspecified the nature of this "attraction" i.e. how the particles were "impelled" (Newton's own word) toward one another.

Mr. Voigt points out, that since, with the mechanism described, the only forces occurring are those due to microl impact (or drag—which also involves contact) gravitational force is the consequence of a change in microl velocity. An increase of velocity involves acceleration in the direction of the motion. A decrease of velocity on the other hand, (deceleration), involves the mathematical equivalent of an acceleration in the opposite direction. Einstein in his famous Principle of Equivalence, made it clear long ago, that gravity and acceleration were mathematically equivalent. This model shows why.

Mr. Voigt has advised us that in 1958-9 he learned from the Gravity Foundation of New Boston, N.H., that the ideas he had in 1950 while still in England, were in large part anticipated by LeSage about 200 years or so earlier. He also thanks the Canadian National Library, Ottawa, for helpful references to the Swiss born LeSage (1724-1803) who became a Professor of mathematics in France and whose very important pare was read in Berlin. It was entitled "Lucrece Newtonien." An excellent translation, entitled "Newtonian Lucretius" has been published in the U.S.A.

The GAUSS article goes on to discuss the ideas of LeSage and of the ancient Greeks. It seems

that LeSage in 1747, on the basis of gravitational arguments alone and because gravity is no surface effect, deduced that the atomic structure was practically empty and wide open. Certainly an unorthodox idea in his day. Rutherford's work in 1911 confirmed the accuracy of that early idea and it is now generally accepted.

LeSage also visualized as the agent of gravity "ultra mundane" particles shooting about in space in all directions "so thinly sown that mutual collisions rarely occurred." They were so fine that only a small proportion would be intercepted when passing through a body such as the earth. Again an unorthodox idea in his day, and again an anticipation, for the modern scientist credits the Neutrino with powers of penetration at least as great as what LeSage suggested, viz: that "if 10,000 particles presented themselves to transverse the earth, only one would be intercepted."

According to LeSage, by such interceptions a gravity producing body such as the earth upsets the perfect balance existing in gravity free regions of space, and by that unbalance produces on other bodies near the earth differential force acting toward the earth.

For simplicity, the subsequent history of intercepted particles could be ignored. However, in more detailed work, LeSage made it clear that he regarded them as leaving with reduced velocity. Thus, LeSage also anticipated Voigt's idea of "tired" particles.

The GAUSS article continues:

In LeSage's time, the Law of Conservation of Energy had not been formulated. Consequently the problem of what happens to the energy lost by such particles as are slowed down did not receive his attention. However, the subject was discussed in 1871-72 by Sir William Thompson (who later became Lord Kelvin). The answer he suggested agrees approximately with that suggested by Mr. Voigt for his microls.

Mr. Voigt, as a 20th century engineer, is of course, familiar with the modern kinetic theory of gases. According to this, individual gas molecules move randomly, each borne along by its momentum till it collides with another, when it rebounds, so that they are bouncing about continuously. Therefore, when he suggested at the beginning of his discourse on gravity that a "primitive gas" capable of "occupying" the small spaces "between the parts of each atom" be

visualized, this automatically included the concept of an extremely short mean free path. Later, where he referred to contours and the percentage of affected particles, this seems to involve long distance paths, but since momentum is passed on through collisions, that simplification was appropriate to the occasion.

Thus, while LeSage's and Voigt's concepts have much in common, there seems to be between them a major difference in the length of the mean path visualized and the associated difference in the numerical quantity of the particles involved. With the short free mean path inherent in Voigt's "sub-atomic gas" a vastly greater number of particles are required. Any unbalance in the overall resultant force produced is then the combined effect of many relatively weak impacts. This will make the action of the differential force smoother than if a few particles, each more effective, are involved as visualized by LeSage.

The future will no doubt show if the real explanation of gravitational force belongs to the impact category at all, and if so, which is nearer to the facts, Voigt's British idea involving an all-pervading sub-atomic gas with an appropriately short mean free path, or the Swiss/French LeSage's earlier idea involving "thinly sown" particles with free paths so long that they tend towards the infinite."

That ends our extracts from GAUSS, and it leaves unanswered the question "is history repeating itself by rejecting unorthodox ideas? Will impact explanations of gravity eventually prove to be correct, and become generally acceptable, or is there some totally different explanation?