SOME THOUGHTS ON THE URANTIA PAPER 42, SECTION 6, PARAGRAPH 8

Tigran Aivazian, 18th March 2018

I. Radius of Electron

Let us verify the first sentence of 42:6.8:

"If the mass of matter should be magnified until that of an electron equaled one tenth of an ounce, then were size to be proportionately magnified, the volume of such an electron would become as large as that of the earth."

```
(* the mass of the electron in kg *)
mₑ = ParticleData["Electron", "Mass"] //
    UnitConvert[#, "kg"] & // QuantityMagnitude
```
9.109383×10^{-31}

```
(* the mass of 1/10th of an ounce in kg *)
m = 2.8 * 10⁻³
```
0.0028

```
(* the ratio of masses denoted by r *)
r = m / mₑ
```
3.07375×10^{27}

```
(* The radius of the Earth in meters *)
R_Earth =
 AstronomicalData["Earth", "Radius"] // QuantityMagnitude
```
6.3674447×10^6

Now let us solve the equation which is apparently implied by the statement in the text:

```
NSolve[r == (R_Earth / Rₑ)³, Rₑ, Reals]
```
$\{\{R_e \rightarrow 0.00437934\}\}$

So, the radius of the electron turns out to be about 4.4 mm! This apparent contradiction was first noticed by Alexander Alyuev on 17th March 2018.

However, we can interpret the text in a different manner and avoid this contradiction. Namely, the text says "... were size to be proportionately magnified..." and so we

do just that: magnify the linear size of the electron (viz. the radius) r times and demand that the corresponding volume equals to the volume of the Earth:

$$\texttt{NSolve}\left[4*\pi*(R_e*r)^3/3 == 4*\pi*R_{Earth}^3/3, R_e, \texttt{Reals}\right]$$

$$\left\{\left\{R_e \to 2.07155 \times 10^{-21}\right\}\right\}$$

Now, this is very interesting as the radius turns out to be a million times smaller than that of an atomic nucleus!

Let us now turn to the source text, i.e. page 44 of the book by W.F.G. Swann called "The Architecture of the Universe":

"The mass of the electron is so small that if you should magnify all masses so that the electron attains a mass of one tenth of an ounce, that one tenth of an ounce would, on the same scale of magnification, become as heavy as the earth."

All that is stated here is that the ratio of $1/10^{\text{th}}$ of an ounce to the mass of the electron is the same as the ratio of the mass of the Earth to $1/10^{\text{th}}$ of an ounce. Let us check if this is so:

```
(* mass of the Earth in kg *)
MEarth =
  AstronomicalData["Earth", "Mass"] // QuantityMagnitude
```

$$5.9721986 \times 10^{24}$$

```
MEarth / m
```

$$2.13293 \times 10^{27}$$

Indeed, we see that this number is very close to r, so the statement in Swann's book is correct, but unlike its modified form in the Urantia Papers, it does not allow us to calculate the radius of the electron.

II. Radius of Proton

Let us now consider the second sentence of 42:6.8: "If the volume of a proton — eighteen hundred times as heavy as an electron — should be magnified to the size of the head of a pin, then, in comparison, a pin's head would attain a diameter equal to that of the earth's orbit around the sun."

We take (with Wayne's Word) the diameter of the head of a pin to be 1.5 mm:

```
Dpin = 1.5 * 10^-3
```

$$0.0015$$

$$V_{pin} = 4*\pi*(D_{pin}/2)^3/3$$

$$1.76715 \times 10^{-9}$$

$$D_{orbit} = 2*AstronomicalData["Earth", "SemimajorAxis"] //$$
$$QuantityMagnitude$$

$$2.99195774 \times 10^{11}$$

$$V_p = 4*\pi*R_p{}^3/3 \ (* \ \text{volume of the proton} \ *)$$

$$\frac{4 \pi R_p^3}{3}$$

Now let us solve the equation in the exact form that is contained in the text:

$$NSolve[V_{pin}/V_p == D_{orbit}/D_{pin}, R_p, Reals]$$

$$\{\{R_p \to 1.28363 \times 10^{-8}\}\}$$

We obtain the impossible (not to say absurd) value for the proton radius 10^{-8} *m*, i.e. fourteen million times greater than the size proposed by the modern science $(0.87 \times 10^{-15} \ m)$:

$$1.2836300179035603`*^-8 / (0.87*10^{-15})$$

$$1.47544 \times 10^7$$

As it turns out, this problem is solved by going to the source text again (pp. 44-45 of Swann):

"Then, we have the proton – the fundamental unit of positive charge – a thing 1800 times as heavy as the electron, but 1800 times smaller in size, so that if you should magnify it to the size of a pin's head, that pin's head would, on the same scale of magnification, attain a diameter equal to the diameter of the earth's orbit around the sun."

The above text suggests a completely different equation, namely containing not the volumes but the linear sizes of the proton and the pinhead:

$$NSolve[D_{pin}/(2*R_p) == D_{orbit}/D_{pin}, R_p, Reals]$$

$$\{\{R_p \to 3.76008 \times 10^{-18}\}\}$$

This result is much more plausible, albeit rather small, compared to the "guess" of the modern science.

And now the interesting "coincidence" – the ratio of the radii of proton and electron is the same as the ratio of their masses:

```
3.76008 * 10⁻¹⁸ / (2.07155 * 10⁻²¹)
```

$$3.76008 * 10^{-18} / (2.07155 * 10^{-21})$$

```
1815.1

ParticleData["Proton", "Mass"] /
  ParticleData["Electron", "Mass"]

1836.1527
```

According to Swann, the proton is 1800 times smaller in size than electron, but this phrase "but 1800 times smaller in size" is omitted in the Urantia Papers. And, instead, we are led to the following two important results, namely:

a) We are given enough information to calculate the actual values of the radius of electron (2.07155×10^{-21}m) and proton (3.76008×10^{-18}m).

b) Their ratio is not the inverse (as would be suggested by the Larmor-Lorentz theory of electromagnetic nature of mass prevalent in those days) but the direct ratio of their masses, hinting at a different nature of mass than the one assumed by Swann.

III. Further Considerations

Let us now consider if it is possible to reconcile the results obtained in the previous two sections with the text of the previous paragraph, 42:6.7:

"Each atom is a trifle over 2.54×10^{-8} cm in diameter, while an electron weighs a little less than $1/2000^{\text{th}}$ of the smallest atom, hydrogen. The positive proton, characteristic of the atomic nucleus, while it may be no larger than a negative electron, weighs from 2000 to 3000 times more."

Here we are citing the text from the British Study Edition of the Urantia Papers, because the SRT text has modified the original so as to avoid at least one of the two problems we are about to discuss. The two problems before us are:

a) Of the size of proton it is said that "it may be no larger than a negative electron" whereas in the previous section we have obtained the value 1815 times larger than that of an electron.

b) Of the proton's mass (or, more properly, weight!) it is said that it is between 2000 and 3000 times greater than that of an electron, but in the following paragraph (42:6.8) it is stated that it is 1800 times greater, thus creating a contradiction.

As always, we must turn to the source text, namely the book by Sir James Jeans called "The Universe Around Us". We quote the edition of 1929 which was probably used by Dr Sadler when editing the text of the Urantia Papers:

"The atom, with a radius of about 2×10^{-8} cms., has about 100,000 times the diameter, and so about a thousand million million times the volume, of a single electron, which has a radius of only about 2×10^{-13} cms. The nucleus, although it generally weighs 3000 or 4000 times as much as all the electrons in the atom together, is a at most comparable in size with, and may be even smaller than, a single electron."

Here the Revelation preserves the size of an atom, but replaces the estimate of the weight of a typical nucleus with that of the smallest nucleus --- that of the hydrogen atom, also shifting it from "3000 or 4000 times" down to "from 2000 to 3000 times". And, by the way, which of these two estimates is more accurate? Consulting the Periodic Table of Mendeleev we notice that even for the lighter elements the number of nucleons is about twice the number of electrons, which means that Jeans' estimate is more accurate than (presumably) Sadler's.

What we have in the text of the Revelation is the attempt by Dr Sadler (I postulate it was he, being the most qualified for this job, if not so much in the domain of physics, yet most eminently qualified in the domains of psychology and philosophy of religion to which much of the material of the Urantia Papers is devoted) to gather together information from the best human sources then in existence and harmonise it into a single text that can be rightly called "the epochal revelation", *epochal* in the sense that the human who created it worked "in partnership with God" and we know from 132:7.9 that under such circumstances "great things may, and do, happen". On the other hand, no matter how great and noble were the intentions of Dr Sadler and even despite the fact that he worked as one with God, still the human imperfections remained very much the part of his mortal nature and these mistakes and contradictions were unavoidable, as we now see as a matter of fact. They have gone unnoticed for more than half a century since the first publication because no serious and unbiased attempt to study the Fifth Epochal Revelation was ever made. The "studies" by the ungodly materialists had the unworthy goal of "disproving the existence of God" and making Dr Sadler appear as a charlatan and plagiarist, whereas the shy attempts by the sincere believers always fell short of that fearless boldness and directness, which is always the hallmark of the work of those who, having fused with the Father's fragment, no longer have anything "to prove to the world" and are remaining here only as the light of the world and the salt thereof. Furthermore, from 101:4.2 we learn that "within a few short years many of our statements regarding the physical sciences will stand in need of revision in consequence of additional scientific developments

and new discoveries". It may well be, that the time here spoken of has now come and it devolves upon us to make the revision here predicted.