

little to be concerned about. I doubt that an obscure book by a little known author about an obscure (in the eyes of the public) book will sell many copies. It may be that Urantia students will be his best customers. Wouldn't that be ironic!

It has been said that God loves an honest skeptic. It wouldn't seem wise to disparage someone God loves. Wouldn't it be nice if Martin gained the impression he was dealing with rational, reasonable people? I believe we should welcome skeptics with open arms. After all, some of us were once also skeptical about The Urantia Book.

FANDOR FLIGHT: FEASIBLE OR FANTASTIC?
by Paul W. Herrick, P.E.

INTRODUCTION

The Urantia Book mentions man-carrying and/or transport birds on six different pages. Page 521, in discussing our system capital, Jerusem, states, "The transport birds fly at about one hundred miles per hour." Page 590 indicates that many inhabited planets enjoy the services of "enormous" passenger birds capable of carrying "one or two average sized men for a non-stop flight of over five hundred miles." Page 694 describes an ostrich-like ancestor of the "gigantic" passenger birds. This bird lived on Urantia [earth] forty five million years ago.

The first mention of "fandors" is on page 746 where Bon [one of the planetary prince's corporeal staff] was successful in training them for manned flight some half million years ago. This reference also states that "they became extinct more than thirty thousand years ago." Lastly, the references to Adam and Eve flying on fandors occur on pages 831 and 832. This was about 37,000 years ago.

HISTORICAL PERSPECTIVE

It is not the intent of this paper to debate the possibility of man-carrying birds. Their existence in our distant past will be assumed. As their extinction predated recorded history, only three areas of human endeavor are available to shed some non-revelatory light on the subject. These are paleontology [the study of fossils], archaeology [the study of man's ancient artifacts], and mythology [a collection of stories about the origin and history of man].

As we observe the physical world it is obvious that there are no existing birds that even approach the size required to carry humans in flight. The andean condor, with its ten foot wing span, is typical of the largest living birds. Until the 1970's the largest flying animal that ever existed was thought to be the pteranodon [a pterosaur with a twenty four foot wing span], and the largest flying bird ever was thought to be a twelve foot span teratorn. Many scientists thought that these were the upper limits of possibility for flying animals.

In addition to the ostrich, at least two other very large flightless birds were known to have existed. They are the moa of New Zealand [twelve feet tall, 660 pounds] and the elephant bird of Madagascar

[ten feet tall, 1460 pounds].

In the 1970's two paleontological discoveries dramatically increased the upper limits of known flying animal size. The bones of a 36 foot wing span pterosaur [Quetzalcoatlus Northropi] were discovered in Texas, and, more relevant to fandors, the bones of a 25 foot span flying bird [Argentavis Magnificens] were unearthed in Argentina. Although both of these animals probably were extinct by the time man appeared, and neither was likely capable of carrying a man anyway, the fact remains that scientists had severely underestimated the upper limits of size of a flying animal.

Archaeologists have recovered several man-made artifacts which depict very large and/or man carrying birds. A hammered copper depiction of a lion headed bird was found at the temple at Al-Ubaid [near Ur] from the early second millennium B.C.. The bird dwarfs the two stags it is depicted with. At least two bird related Akkadian seal impressions from about 2300 B.C. were found. One purportedly shows a large "Zu" bird from Mesopotamian mythology, while the other clearly depicts a human form riding on the back of a bird in flight. The famous huge drawings on the Plain of Nazca in South America may also be related to man/bird flight rather than "ancient astronauts" ala Von Daniken.



Mythology from all over the world shares stories of man-carrying birds. Garuda, the king of birds from Indian mythology, is often portrayed carrying two Indian god-man deities. A wood carving of a human figure riding a peacock was found in southern India. According to Maori legend the God Pourangahua flew from his legendary dwelling Hawaiki to New Zealand, seated on a magic bird.

FANDOR DESCRIPTION

The "specifications" for a fador, as given by The Urantia Book, are:

Type: bird [i.e., not pterosaur, bat, or insect]

Range: 500 miles

Speed: 100 mph

Payload: one or two average-sized men [or one eight foot Material Son]

Size: "large", "great", "enormous", "gigantic"

Other characteristics: "intelligent", "obedient", "affectionate"

To convert the qualitative size descriptors to quantitative values

such as weight, wing area, wing span, etc. we are forced to use judgement based on known relationships of these parameters for existing, though much smaller, birds. For example, birds of prey, such as ospreys, are known to be able to carry prey weighing up to one half their own weight. Since the fador can fly a long distance with men aboard [500 miles] a payload of one third their weight will be assumed to be more realistic. Using two "averaged-sized" men or one eight foot pro-basketball player as a typical payload, 300 pounds seems like a reasonable payload weight. As 300 is a third of 900, our hypothetical fador will be assumed to weigh 900 pounds [1200 with the full payload aboard].

Wing loading [weight divided by wing area] for birds varies with take off requirements. Birds that normally take off vertically from level ground have low wing loadings [relatively large wings], birds that normally run along the ground [or water] to take off have higher wing loadings, while birds that normally jump off limbs or cliffs to take off have the highest wing loadings. For the sake of this discussion [and because "fador" may be related to "condor"] the fador will be assumed to be at the high end of the low wing loading range for large land birds [like condors and vultures] which normally take off vertically from level ground. This gives a wing loading of about 1.78 pounds per square foot [8.7 kilograms per square meter]. This translates to a wing area of 505 square feet for a 900 pound bird.

Aspect ratio for a wing is defined as span squared divided by area. Large land birds have aspect ratios ranging from about six to about eleven [the albatross, a sea bird, has an aspect ratio of seventeen]. The corresponding wing spans [distance from one wingtip to the other] for a 505 square foot wing are 55 feet [aspect ratio equals 6] to 75 feet [aspect ratio equals 11]. Wings of this size would require nearly six seconds to complete one flapping cycle. A sketch of what a fador may have looked like is shown in the figure. (As an aside, the author hereby suggests the scientific name "Ornithopteryx Fadori" for this bird in the event that paleontological evidence of its existence is someday found.)

The power required for a bird to take off and fly is generated by its large pectoral [flight] muscle. Typically, this muscle makes up about a quarter of the weight of a bird. A 900 pound bird would therefore have a 225 pound flight muscle. At a typical value of 0.156 horsepower per pound of flight muscle the fador could generate 35 H.P. for short periods of time. As early light planes in the same weight, speed, payload, and range category used engines in the 85 to 90 H.P. class we can see that our fador must have some special technologies to allow it to get by on less than half that amount of power. The fact that light, two place helicopters [which can also take off and land vertically] require about 180 H.P. makes a bird's capability even more remarkable. This will be addressed in the section entitled "Bird Technology".

AIRCRAFT DEVELOPMENT

The first sketches of heavier-than-air flying machines were of man-powered ornithopters [wing-flapping airplanes] by Leonardo da Vinci in the late 1400's. However, the first successful flying

machine had to await the development of the controllable, fixed wing glider, the gasoline engine, and the airscrew [air propeller]. The flapping wing concept had to give way to the simpler, more understandable, and more predictable flight schemes of a fixed wing for lift and control, and a rotating propeller for propulsion. The integration of lift, propulsion, stability, and control into a flapping wing aircraft was, and still may be, too complex for practical manned flight.

BIRD TECHNOLOGY

"My observations of the flight of buzzards leads me to believe that they regain their lateral balance, when partly overturned by a gust of wind, by a torsion of the tips of the wings..." so said Wilbur Wright in a letter to Octave Chanute on 13 May 1900. This idea of twisting a wing around its spanwise axis to provide lateral control was probably the single most significant technology contribution to the Wright brother's success where so many others had failed. Numerous other aeronautical secrets have since been discovered through the study of birds, and with almost 9000 species, there is surely much more to be learned.

CONCLUDING REMARKS

Mankind would really benefit from having a "fandor in every garage [hangar, barn]". It would be somewhat like having a horse only infinitely better [interestingly, horses also weigh about 900 pounds]. It would not only fly but fly fast [100 mph] for long distances non-stop [500 miles] carrying one to two people. It wouldn't require petroleum products, runways, mechanics, or air traffic control. Inflight fires and structural failures would be non-existent while mid-air collisions would be rare and often survivable [bird's bones and feathers are so flexible that birds sometimes collide in flight without even losing control]. "Engine" failure would be both rare and, except in the case of a fandor heart attack, with sufficient warning to be able to land. The rider wouldn't have to be a licensed pilot. He would just have to indicate to these intelligent, obedient, affectionate birds when he wants to take off, where he wants to go, and where he wants to land. The bird would do the rest. He could even have the bird come to get him [ala page 832 in The Urantia Book].

All of this is pleasant to dream about but since fandors have been extinct for over 30,000 years, that's all it is--a dream. OR IS IT? There are two remote possibilities for fandors again to appear on earth in the distant future. The UB tells us that they exist on many inhabited planets--maybe they could be brought here. Slightly more feasible--maybe we could genetically engineer one and reverse the extinction process.

In all likelihood we'll have to settle for a FANDOR [Flapping Aerial Navigation Designed Ornithological Replical], a man made, highly sophisticated ornithopter. But even this will be no small feat. Tremendous breakthroughs will be required in the areas of wing-flapping propulsion, unsteady aerodynamics, laminar flow control, active flight structures, totally integrated

There is another idea about major sectors that the MWGS fits, namely the concept that a major sector is visible as an astronomical entity. The MWGS certainly fits that criteria. On the other hand, the book does not indicate whether a minor sector is a visible astronomical unit or not. So, while I may have shown that the MWGS comes closest to fitting several criteria given in the book for a major sector, like Dr. Ken Glasziou, I must add the caveat that other information has to be wrong in order for my hypothesis to be right. Where does that leave us? There at least five different reactions that students of the book might have:

1. The whole thing is baloney; I'm going to give it up and go back to collecting beer cans.

2. I know that the book is a divine revelation and is therefore infallible. If things don't seem to fit, it's because of our lack of knowledge or we're not interpreting it properly. Someday when we're wiser, it'll all fall into place.

3. No big deal; I never understood the science stuff anyhow. I just like the spiritual parts; I believe they're true and don't depend on the cosmology part to be validated.

4. Maybe the authors have given us a menu. One of the pictures of Orvonton is true and the others are in error. As science progresses, we'll be able to pick the true picture from the menu of choices.

5. Perhaps the authors have given us a model of Orvonton. Perhaps none of the numbers in the science/cosmology section of the book is correct but the qualitative description is. Orvonton is divided into seven superuniverses which are divided into ten major sectors, etc.

Answers one and two don't need any comment. Answer number is no doubt true, but it begs the question of the validity of the cosmology in The Urantia Book. Answer four has some appeal, but raises the question of why the authors would give answers that are clearly wrong along with those that are correct.

Answer five does not totally clear up the question of incorrect numbers, but it is less restrictive than answer four. The key to the wrong answer question may be that the authors were prohibited from giving us unearned information, yet they did desire to tell us that the universe has structure and purpose. Astronomy is just beginning to map the large scale structure of the universe, and the astronomers are surprised at the amount and size of structures that they are finding. It will no doubt take most of them much longer to discover that the universe has not only structure, but purpose as well.

If the authors of The Urantia Book only wanted to give us a model of the master universe, why didn't they just omit numbers? In a previous article, "Time Bombs," I put forth the hypothesis that the authors included a few flaws to discourage us from making the book a fetish item. This does seem a little sneaky of them, but are there better explanations for these problems? Transcription errors? Someone would have had to be very careless to have caused the

authors were just being totally honest and unbiased in their comments and that perhaps we are overly sentimental regarding the less fortunate mortals on our planet.

My questions in the last edition regarding the statement on 554D/555A did not get much response. The questions may not be fair. After all, how can we know what we are totally in error about? An example of such error from the past might be that of Jesus accepting the title of Messiah after his best efforts failed to dissuade the apostles of this concept. Today, many people understand and are willing to accept that Jesus did not fit the Messiah concept, but this could only happen after we outgrew the old ideas.

No doubt our unseen friends can see our erroneous ideas quite clearly but are not at liberty to tell us what they are. It certainly would be interesting to see ourselves as the midwayers and angels do. I wonder if we would be amused or disgusted?

THE TOMB OF CAIAPHAS

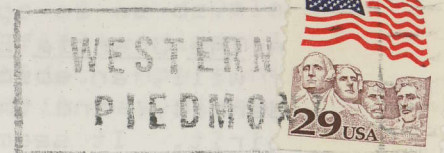
Archaeologists have recently discovered what they feel is the tomb of Caiaphas, the high priest who presided over the trial of Jesus. Caiaphas was high priest in Jerusalem from 18 to 36 A.D. He is mentioned in the writings of the Jewish historian Josephus. Josephus also mentions the stoning of "James, who was the brother of Christ." According to the Bible, Caiaphas also participated in the trial of the Apostles Peter and John.

LAST RITES

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Cosmic Reflections is printed twice per year. Articles up to four pages concerning science and cosmology as related to The Urantia Book are welcome and will be used on a space available basis.

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