

SKYWATCH

SKYWATCH

THE

PUBLICATION

OF

THE

MANCHESTER

AERIAL

PHENOMENA

INVESTIGATION

TEAM

SEPTEMBER/OCTOBER

NO.21

1976

EDITORIAL ADDRESS:

92, HILLCREST ROAD,

TEL: 061-483-4210

OFFERTON,

STOCKPORT,

CHESHIRE

SK2 5SE

ENGLAND.



U@@@@@@@@@@@@@@@@@@@@@@@@@GROUP-----NEWS@@@@@@@@@@@@@@@@@@@@@@@@@

The following was recently received from the Nottingham UFO Investigation Society: "The UFO Research Review is to publish in a forthcoming issue a directory of British UFO Societies and Clubs. As we feel that it is essential to have accurate information, I am writing to you to request that you complete the questionnaire below. As you will note, the information wanted is the type which is available to the General Public, and not of a confidential nature. However, if there is any question which you object to, please feel free to omit answering it". Needless to say, MAPIT has returned this form and look forward to receiving the Review. Let's all hope all the British UFO Groups who were sent the same return it promptly. A directory of this sort will be a very good reference source for contacting other Groups. Perhaps they will up-date this list each year so as to keep Groups' existence known and Secretaries' addresses correct.

MAPIT sent details of the Group to the Glossop Centre, for inclusion in their publication "CONTACT" which lists full details and addresses of Local Groups and Societies dealing with all subjects. The general public have access to this publication. I am glad to say that a number of people have written to us for details and membership. I believe at the same time the article about MAPIT appeared in the Glossop Chronicle; recently a similar item appeared in the North Cheshire Herald. If any member saw this, I would be interested to see the clipping.

After promising to keep you in touch with future developments regarding the Group's Public Relations - since the last issue of SKYWATCH there are some NEW countries to add to the distribution of our publication throughout the World: 1) AUSTRALIA; 2) DENMARK; 3) THE WEST INDIES, which takes the total countries to FOURTEEN!!!

Don't forget - if you know anyone interested in UFO's, let us know their address and we will send to them a copy of SKYWATCH and details of MAPIT.

ESSEX UFO STUDY GROUP: Formed in 1970, now produce a bi-monthly Journal. Recent and interesting UFO sightings, exclusive articles, Group activities etc., etc. 25p each plus postage required for a 90 gram package. Write to: MR.D.J.GORING, 5, CARLTON TERRACE, GT. CAMBRIDGE RD. LONDON N18 1LB.

FORESIGHT: A bi-monthly magazine concerned with the spiritual aspect of man's being; seeking to bring about a greater awareness of life and its meaning; dealing in Mysticism, Philosophy, Psychic Development, UFO's and World events. Single copies: 15p plus postage; Subscription: 50p plus postage. Write to: FORESIGHT ORGANISATION, 29, BEAUFORT AVENUE, HODGE HILL, BIRMINGHAM B 34 6AD. ENGLAND.  
WHEN ANSWERING ADVERTISEMENTS PLEASE MENTION SKYWATCH AS THE SOURCE....

On Tuesday, 17th February, the BBC featured an item on the programme Pebble Mill. On it we were told that plant-life has presented us with a drug that combats a deficiency in the growth of the human body.

A 22-year-old girl was shown, who has had injections of this drug for the past 9 years. She was 5'3" tall, but without the drug she would only be 3'10".

When she was 7 years old she had her picture taken with her 2½-year-old brother - she was exactly the same size and weight as him!

At the age of 13 another picture shows her as being ¼ the size of her smallest classmates at school!

Apparently there are/were many other people like her. I wondered that if we were invaded by dwarf-like spacemen, long ago, who inter-bred with us, whether we could now be so obviously bigger, due to this drug!!

.....

### WINDOW INTO THE UNIVERSE

From the Byurakan Observatory.

"Astronomical Observation Sites were built on this ancient land as far back as the 5th-3rd millennia before our era; that was when the first Astronomic Angular Instrument was made".

"It's just the time to talk about Babylonian Astronomers!" said one of the Group, with a laugh.

"You'd rather discuss the effect of temperature drops on our telescope", another voice out in.

The terrace of the Byurakan Observatory in the Armenian Republic is an arena of unending debates. About the operating schedule of a new telescope; about the age of the universe; about the possible relations with beings from other planets. At night Byurakan Astronomers watch stars or pore over logic -mathematical deductions - in the daytime they argue.

The Byurakan Observatory is one of the large centres of world science. There are several huge telescopes here, among them is a one-metre Schmidt Telescope. Now the construction of a 2.6 metre one is being completed. The main lines of current research are the structure of the Galaxy, non-stable stars and nebulae, radioastronomy, stellar cosmogony, the theory of superdense configurations of matter, the theory of radiative transfer.

In 1947 Physical Systems of Young Stars, stellar associations, were discovered in Byurakan. That was followed: Three Supernovae, hundreds of variable and white dwarf stars, more than 20 nebulae, over 300 galaxies, more than 20 blue satellites of elliptic galaxies and a host of other astronomical objects.

Scientists who come to Byurakan soon become used to its restless schedule. They also get accustomed to the wonderful multilingual speech.

News is discussed in Russian; jokes and witty parables are told in Armenian; foreigners listen to lectures and explanations in English, German, French. Besides, there is one language common to all - the Language of Formulas.

It is not easy to drag out of an astronomer grandelquent words about his science. Yet there is perhaps no more mysterious and attractive science. Astrophysicists have succeeded in demonstrating the evolution of the Universe. Byurakan Researchers have arrived at the conclusion that at one time there were no stars or galaxies. Only one "primitive" plasma was in existence. Some puzzling mechanism exploded it, scattering it in high clots. Later, in millions of light years, they developed into what are now galaxies.

Looking still deeper into the past, explorers strive to trace the history of the universe back to the time when, as some of them assume, its average density equalled that of the atomic nucleus and its radius was a little larger than the distance between the earth and the sun, some papers coming up with staggering hypotheses: In the very first moments of existence of the universe, its radius equalled that of the electron.

Astronomers say that "Primitive Plasma", the initial state of the Universe, consisted of Hydrogen and Helium. The other elements of the Mendeleev Table were "baked" later in stars, these giant nuclear cauldrons, at stellar temperatures and stellar pressures.

The evolution of life on Earth, the extinction of Mesozoic Saurians and their replacement by mammals were due to cosmic factors, according to one hypothesis.

There is the history of yet another fascinating hypothesis. In 1958 Academician Victor Ambartsumyan suggested that the initial nuclei of individual galaxies divide into parts which in turn give rise to other galaxies. At first this idea appeared to be absolutely fantastic. Now it is a working hypothesis that has been indirectly confirmed by many astronomers of the world.

(from the Soviet magazine "SPUTNIK" - May 1976)

- Bryan Hartly.

MMMM    AAAA    PPPP    IIII    TTTT    ----    MMMM    AAAA    PPPP

NEWSCLIPPING SECTION

"SEATTLE POST-INTELLIGENCER" JANUARY 26th 1976 (U.S.A.) Two views on  
 UFO's Representatives of two organisations studying reports of Unident-  
 ified Flying Objects disagreed yesterday on whether residents of eastern  
 New Mexico have been seeing UFO's or refracted starlight on recent nights.  
 James Eppes, 42, Valley Center, Calif, a member of the UFO Education Centre  
 said he had <sup>not</sup> had time to develop any "final conclusions", but "it is  
 quite obvious there have been quite a lot of valid sightings by many  
 different people". Tommy Blann, 29 Waco, Tex, the Director of the Texas  
 UFO Study Group, said most of the reports apparently involved "an optical  
 refraction of the light from stars", created by a temperature inversion.

"BUENOS AIRES HERALD" FEBRUARY 20th 1976 (ARGENTINA). Strange objects  
 were seen hovering over several parts of this city (Bahia Blanca) and  
 Claromeco on Thursday night. They sped at great speed across the sky  
 leaving streaks of multi-coloured lights in their wake. Many people  
 watched the antics of the Unidentified Flying Objects through prismatic.  
 Similar reports of UFO sighting came from nearby Tres Arroyos. Both the  
 above donated by D.J.PARRY.....

"DAILY MIRROR" JUNE 7th 1976 (GB). Light in the sky mystery.  
 Police were swamped last night with calls about a mysterious flashing  
 object in the sky. It was seen across a wide area of the North from  
 Cheshire to Cumbria. Callers told the police it was Green, Blue and White.  
 And some of them reported that it appeared to explode. The police  
 checked with the Meteorological Office at Preston, where a spokesman said  
 early today: "Its a mystery to us, but what ever it was it must have  
 been very high in the sky to have been seen over such a wide area".  
 The spokesman added: "It could be a perfectly natural Phenomenon".

"MANCHESTER EVENING NEWS" June 7th 1976 (GB) UFO riddle solved  
 A mysterious flashing object in the sky which prompted thousands of phone  
 calls to the police was probably "an extraordinary bright planet"  
 experts said at Manchester Airport today. It was spotted across a wide  
 area of the North from Cheshire to Cumbria. Callers described it as  
 Green, Blue and White, and some said that it appeared to explode.

"MANCHESTER EVENING NEWS" JUNE 11th 1976 (GB) Did you see the UFO?  
 After reading all the reports of the UFO seen in the sky the other  
 evening, may I say that it was definitely not an object from Outer Space.  
 But was a ball of fire which "fizzled out" almost in front of my face. I  
 was on a balcony 13 floors up when I saw the bluey/green brilliant ball  
 about the size of a large football coming along from Old Trafford/White  
 City direction towards town - very fast. Then it began to slow up and  
 drop <sup>and</sup> a red "tail" just like a single string of brilliant coal fire embers  
 trailed behind it, but went out almost immediately. As it reached the  
 playground of St.Lawrence's School, City Road, it just simply went out

like a match does when it is burnt up - a quiet drop and fizzle out. We came to the conclusion that we had witnessed a Meteorite but never expected to be so close to one.

Mrs.W.Daly, Old Trafford.

"FENLAND ADVERTISER" July 21st, 1976 (GB) UFO over Fenland? - John's in the dark over mystery lights.

STAR-GAZER John Prewer is puzzled by mysterious lights he has seen in the night sky, and he is asking readers to come forward and tell him whether they have seen them, too. Eighteen-year-old John, of Wisbech, was driving home through Doddington with three friends when he saw two red lights in the sky. A closer look through binoculars revealed a large formation of about 14 lights, with two red lights in the middle in the shape of a triangle. John, a keen astronomer, who tried to form a Club in the town but failed because of lack of support, says the formation was above Elm and Friday Bridge. "It threw a beam of light like shining a torch through steam", he added, "and was then engulfed in mist!" "It was not an aircraft or anything that could have been built on this Earth. There is a possibility that it could be an aircraft from another star".

Dorated by D.J.PARRY, who is investigating this case and will let MAPIT have full details when available.

"MANCHESTER EVENING NEWS" AUGUST 13th, 1976 (GB) Life on Mars

Our planet has around 900,000 species of creatures, most of which live, unlike western man, in balance with others. Has our quality of live improved by communication with, or even observation of, any of them? Apparently not. We still run headlong into hell like the gararene swine. Or is the world a better place now, thanks to Ulster, Lebanon, Vietnam, Uganda, Soweto.....? Any now we learn of the possibility of life on Mars. So what? If its there based on our experience with our closer neighbours on Earth, we won't be able to communicate with it, less still be able to learn any serious lesson's from it. So why bother? Because its there? Its better off that way and if its intelligent it probably knows it! If only we could learn to talk with the animals! Dear Lord, what tales we could tell! Imagine an Ant lecturing in Government or a Bee teaching Social Organisation, or perhaps a plunge into the secrets of that mysterious two-thirds of our planet, the Sea with a Dolphân. Wouldn't it be funny if we turned out to be rather dimmer than our neighbours after all? Then perhaps we would begin to see a new Heaven and a new Earth - like the man said.

Tony Stanley.

"THE SUN" AUGUST 17th 1976 (GB) Happy Landings.

Technician Robert Cotton has built a "UFO PORT" in Bordeaux, France, with lights and windsocks to welcome visitors from other planets.

"SUNDAY PEOPLE" August 29th 1976 (GB) A rival for Nessie.

NESSIE, the Loch Ness monster, has a rival. A dragon-like monster has been spotted snatching its way across Lake Uri in Central Switzerland. Witnesses say it surfaced 300 yards from the shore and a newspaper has published a picture pointing out its likeness to the Scottish beast.

.....

Two-days' UFO Congress in Poitiers (France)

An international ufological congress has been held in Poitiers France on June 16 and 17 1976. It was headed by the well-known French journalist Jeane-Claude Bourret, who made the now renowned interview with the French Minister of Defence, Robert Galley, on February 21, 1974 (see e.g. Flying Saucer Review vol 20 No 2) and who has just published a new book titled "Le nouveau defi de l' OVNI".

An impressive group of scientists attended this meeting:

Patrick Aumedieu, investigator at the Centre National de Recherches Scientifiques  
Jean Goupil, electronics engineer  
Pierre Guerin, astrophysicist from Paris  
Pierre Kohler, astronomer at the Neudon observatory  
Auguste Meesson, prof. Theoretical Physics at the Leuvan (Belgium) Univ.  
Jean-Pierre Petit and Claude Poher, from the CNRS  
Jacques Vallee, well-know Ufologist.

The captains Bernard Cochereau and Kervendal represented the direction of the Gendarmerie Nationale (i.e. the French police).

Claude Poher commented upon the statistical studies he had carried out during the last seven years. He came to the conclusion that UFO's exist and cannot be identified as any known natural phenomenon. He also dealt with the matter of implanting automatic observation stations all over the French territory. Unfortunately, the necessary funds are not available. So they are now fabricating at the CNES a small apparatus that could be distributed on a large scale. This device would bear great resemblance to a slide and one would be able to fit it onto any spectrum of the photographed object. This would certainly supply us with a mass of important (and "impersonal"! ) measurements.

Captain Cochereau pointed out that all brigades of the Gendarmerie had received orders to check out any UFO sightings they might hear about and to draw up a full report which is then sent to Claude Poher and his colleague for further study. The Gendarmerie is very well placed to do this as they have people all over the country and are objective by nature. In 1975, for example, 240 records of observations were drawn up; 72 concerned landings!

The captain also believed that their presence would prevent eventual hoaxers from carrying out their wicked plans....

The leading thread running through this entire congress was that UFO's certainly are a real phenomenon. One of the most fervent defenders of this statement was Dr. Pierre Guerin, who founded his opinion on three "evidences":

- the fact that the observations made by different credible and independent witnesses cannot be identified as known phenomena.
- the similarity in the reported details, which could not be known to the witnesses
- the comparison of carefully sifted sightings proves the phenomenon to show a great coherence.

Pierre Guerin also tried to invalidate the statements made by those who deny the existence of the UFO phenomenon. He admitted however, that our present-day physics are not yet able to explain all the observed characteristics (e.g. the sudden changes of direction) but "we are by no means permitted to neglect a problem because we do not know how it functions".

In the meantime, Jean-Pierre Petit has constructed a scale model of a "flying saucer", based upon a new type of magnetohydrodynamic transformers and powered by a plasma laser-fusion engine (for further details of his work see for example the June 1976 issue of our bulletin UFO INFO).

So it becomes clear that the study of the UFO phenomenon begins to reach all layers of science and the most specialized laboratories. Let us also recall the report published early in April 1976 by the French Ministry of Defence and admitting that 20% of all sightings remained unexplained (some details can be found in Flying Saucer Review VOL 22 No. 1).

This does not mean, however, that the solution is now at hand! We can better agree with Jacques Vallee when he concludes: "But whatever their physical reality may be, the most exciting point is that the UFOs have put our concept of reality back in question again".

Rudy de Groote.

.....

SOVIET WEEKLY 10th JULY 1976. A Moon for Pluto

Observation of Pluto, remotest planet of the Solar System, has led astrophysicist Rolan Kiladze to postulate the existence of a moon not yet detected owing to the difficulty of observation at so great a distance.

Pluto's characteristics distinguish it from Mercury and Venus, the two moonless planets of the system.

Donated by B. Hartley.

SKYWATCH UFO DETECTOR -- Join the UFO news detector network with a SKYWATCH UFO DETECTOR Mark 3. A magnetic-needle type detector incorporating a solid state latching for the audio alarm. High impact plastic case. Dimension: 4½" - 3" - 1½". Weight with battery: 8 ozs. Needle size: 3" (75mm) price, inclusive of battery, post and packing - £7.80. THE SKYWATCH UFO DETECTOR MK 3 is obtainable from: Malcolm Jay, 102, Nelson Road, Chingford, London. E.4.

.....

.....RECENT U.F.O. SIGHTING INFORMATION.....

UFO over Bramhall April 7th 1976: As promised from the last issue the conclusion to this most interesting case involving two cigar-shaped UFO's. As stated in issue No.20 the Manchester Airport Authority had no record of any aerial activity over the area at the time. The MET office stated that "Noctilucent clouds could have been observed if they had been present but they are very rare. The "MET" had no reports of these clouds on that evening and should add that reports of this nature are usually received between May and September". The old brick-works nearby was recently taken over by a Swedish Company with many redundancies resulting from this changeover. So consequently less brick work smoking and less firing of kilns, etc. It was not smoke he saw. As for the whole incident being a hoax, I (ed) interviewed Mr. Simpson for over one hour; he was sincere, and, more than anybody, wanted to know of what he had seen. When the Stockport Advertiser wanted to publish the details they asked Mr. Simpson

if they could take his photograph, but he refused this, stating that a photo of himself would not help the -- to understand the incident. He asked for a small diagram of the UFO's or a plan of the area to be published which would benefit all who read the item. MAPIT also approached the paper on this matter, but to date the incident has not been published. People may ask, if the UFO's were black how did the witness observe them? Let Mr. Simpson explain: "I noticed the front black object initially because of the definitive U at the base. It seemed so clear and so similar to the shape used in lombardic lettering". "Definitely the objects were much darker than the blue/grey of the sky outline". A final word from the witness: "My mind is open as to what I observed, but I was absolutely sober, having taken no drink; there were no spots in front of my eyes; my spectacles were clean; it was not hallucinations; they were not birds; not smoke; no reflections from high wires. It was clearly a moonlight night with few clouds". If what Mr. Simpson saw were UFO's, were the telephone wires responsible for him saying "He got the feeling that the lower object was being re-charged by the other". We must not forget that the MET had indications of a very slight low level inversion up to about 100 metres above the ground, then a major inversion at 1200 metres or 1500 metres from their observation at 2050 hrs. (actual time of sighting 20.58). At the present time this case has been filed as Unidentified possible inversion.

#### UFO WITNESSED BY THREE GIRLS OVER CHURCH

Date: April 14th 1976, a Wednesday.

Time: 21.20 hrs.

Location: Oldham Town Centre, over the Parish Church, Lancs.

Witness(s): Tina Dronsfield aged 15, Carol Longdale aged 16 and Natalie Inglis aged 16.

This sighting came to MAPIT's attention via MAPIT member Ken Stanley who carried out the investigation of the witness(s). The details of the incident appeared in the Oldham Evening Chronicle on the 19th April. The three girls were walking down Ammon Wrigley Close when all of a sudden Carol stopped and pointed up to the sky; They saw a red oval-shaped object in the sky which became brighter and glowed with a yellow centre. They started running but could see it disappearing at a slanting angle over the baths. At the same time the girls say they saw the object, a group of people at Sholver also saw a bright red light over Oldham. When reading the forms they have filled in one is struck by the fact that they are all nearly word for word the same, as if pre-planned. Out of nineteen questions, seventeen were answered the same. All agree that what they saw was a UFO. The MET report for that day had 8/8 cloud cover all day with rain most of the time. The observation at 21.00 hrs. showed 4/8 stratus cloud at 1000 ft and 8/8 stratocumulus at 1500 ft. The girls said the weather was fine and clear with the stars visible. The Civil Aviation Authority supplied with the following aircraft



FLURRY OF AERIAL ACTIVITY OVER BELGIUM

There have been a lot of sightings over Belgium during the first half of 1976, most of them in the vicinity of Antwerpen. However, many of these reports could be due to an extensive press coverage being given by one of the major newspapers, the "Gazet van Antwerpen".

Beneath you will find a list of preliminary reports. It is not claimed these are all UFO sightings! Necessary investigations are being carried out.

1976 (exact date unknown) 18.00 between KORTESSEM AND BORGLOON

M. Ghislain Struys observed from his car a red light, slowly travelling from W to E. It was fairly low and the light faded out after 3 minutes. A woman should also have seen the object, while a dog started to bark.

o O o

23 JANUARY 1976 19.30 HEUSDEN

A married couple watched for about five minutes three lights hovering at a height of about 15 meters over a floriculture. The middle one was red, the outer two white. They soundlessly drifted away, horizontally.

o O o

7 APRIL 1976 21.15 KONTICH

A couple driving in their car observed a Zeppelin-like object crossing the road at fairly low altitude. Red and white lightspots (emanating from portholes ?) were seen around the perimeter.

o O o

15 APRIL 1976 21.15 WALLERODE near ST VITH

Eddy Valee and 3 friends watched a red-orange light moving erratically in the starlit sky for about two minutes.

o O o

24 APRIL 1976 - WILRIJK

Observation of an object over the university campus. No other details.

o O o

25 APRIL 1976 22.30 TERVOBEN

Miss Yvette Vandebroek, her fiancé and parents were driving home in their car when they saw an object cross the road in front of them. It stopped about 20 meters from the road at a height of about 100 meters. Its diameter was about 12 meters and suddenly four searchlights were directed towards the ground. No sound at all. After five minutes the object tilted and moved slowly away. Mister Duchateau, his wife and parents also noticed the object while passing in their car at about the same time.

o O o

END OF APRIL 1976 22.00 WILRIJK

M. Van der Schueren observed two yellow-red lights with a bright white one underneath going from SE to NW. The following evening he saw the same phenomenon, this time going from NW to SE.

o O o

2 MAY 1976 21.20 STEENDORP

Roelof Troubleyn and Luc van Hul saw an object with the white rays in the S sky. After a while it moved westwards and climbed higher. It faded out after 3 minutes

o O o

- 2 MAY 1976 23.15 BEGIJNENDIJK  
 Three girls were cycling home when they saw two bright white lights descending and turning away towards Betekom. They then saw green and red lights on its side.
- 3 MAY 1976 09.00 SCHOTEN  
 Karin Verstraete (15 year old girl) saw an oval white object amongst the trees in the SW. When she came back with her father the phenomenon had vanished.
- 4 MAY 1976 22.45 WILRIJK  
 a 74 year old widow and her 2 grandchildren saw a round object with a dome on top slowly passing in the air. Small lights were "burning" around the rim of the object.
- 6 MAY 1976 20.33 MECHELEN  
 Several persons claimed they saw an object descent in a zigzag motion until it was about 100 meters from the ground, when portholes were visible. This certainly is a hoax as an investigation by our co-worker Mrs. Lutgarde Torfs has shown that names and addresses of the witnessed were false.
- 9 MAY 1976 22.30 BRAINE - le - COMTE  
 Mr M.P. (22) and Miss V.C. (21) saw a rectangular object in the Nw sky. In the middle of the rectangle stood something that looked like a funnel. The strange object disappeared towards the N. describing a large circle.
- 16 MAY 1976 23.25 KONTICH  
 Maes Marc (22) followed a strange light with his car. The light was at a height of some hundreds of meters and made various motions, including several stops in midair. It had a green light at the front and a red one that seemed to move over the entire underside of the object. Finally it moved off towards Mechelen.
- 18 MAY 1976 10.45 ST JOB - in - 't GOOR  
 Two girls (19 and 21) saw an oval aluminium-like object disappear behind some trees. Duration: two minutes.
- 1 JULY 1976 22.00 vicinity of ANTWERPEN  
 Two different sightings of an orange-red bell in the sky  
 A similar phenomenon has been observed over THUIN at 22.00 the next day (2 July).

RUDY DE GROOTE

WALLOPS FLIGHT CENTER N.A.S.A.

## SPACE Probe to test Einstein's 'Space-time Warp' Theory

A clock-carrying space probe will be launched by NASA in late June to test an important part of Einstein's general theory of relativity.

Known as Gravity Probe-A (GP-A) or the Red Shift Experiment, the probe will test Einstein's "Equivalence Principle", which is the foundation of almost every theory of relativity.

The experiment will be a significant step towards a better understanding of gravitational effects, since GP-A is expected to be about 500 times more accurate than any previous measurement using ground-based instruments.

Einstein's 7-year old relativity theory is of particular interest currently because of its significance to scientists studying astronomical concepts such as "Black Holes" which have to do with gravitational phenomena. ("Black Holes" are believed to be bodies of such tremendous gravitational magnitude that even light cannot escape them).

According to the "Equivalence Principle", within a limited region of space, every form of acceleration is indistinguishable from a gravitational field. Newton showed that, in the absence of an acceleration, every object moves in a straight line at a constant speed. The theory of relativity generalizes this by stating that every body which is affected only by a gravitational field moves along a path in four-dimensional space-time which is analogous to the motion along a straight line with constant speed in the absence of the field. Because (as viewed in three-dimensions) the path of a body in the neighborhood of a large mass is not a straight line but is deviated towards this mass, physicists say that space-time is "Warped" in the presence of a massive body.

In the GP-A experiment, managed by NASA's Marshall Space Flight Center in Huntsville, Alabama, a scientific payload, which includes an extremely accurate clock, will be launched by a four-stage Scout D Rocket into a two-hour elliptical flight trajectory over the Atlantic Ocean. Launch will be from NASA's Wallops Flight Center in Virginia.

During the flight, the Probe Clock will always be in a weaker gravitational field than an identical clock on earth. Hence, the frequency of the clock in the probe, as observed by telemetry, will always appear to be greater than that of the clock on the ground. Moreover, as the clock rises from the earth through the increasingly weaker field to its maximum altitude of 10,000 kilometers (6,200 miles), it will appear to run increasingly faster.

Its rate will then progressively decrease as it returns to the stronger field at lower altitudes. During the flight, the difference between the clock rate in the probe as indicated by the telemetry signal and that on the ground will be compared with the difference predicted by Einstein's theory.

At GP-A's maximum altitude, Einstein's theory predicts that the Red Shift effect should be about seven parts in 10 billion ( $7 \times 10^{-10}$ )

To measure this small - but significant- effect the Smithsonian Astrophysical Observatory (SAO), Cambridge, Massachusetts, has developed atomic hydrogen MASERS that function as clocks of extraordinary stability, or, accuracy. MASER is an acronym for Microwave Amplification by Stimulated Emission of Radiation). The interaction of the electron and proton in the hydrogen atom generates a microwave signal (1.42 billion cycles per second) stable to one part in a quadrillion ( $1 \times 10^{-15}$ ) - or the equivalent of a clock that loses less than two seconds every 100 million years.

For the GP-A Mission, the reference clock on the ground will be located at the Merritt Island Launch Area (MILA), Kennedy Space Center, Florida.

Comparison of the relative rates of the probe and ground clocks will be made by telemetry for the duration of the flight. The rocket-borne clock

(13)

will return to earth and impact somewhere between the South American Continent and Africa. The clock will not be recovered.

The clocks are expected to provide a measurement accuracy within five thousandths of one per cent ( $5 \times 10^{-5}$ ) of the predicted effect.

In addition to the experiment design and the construction of the two prime clocks, SAO provided the control and signal processing equipment. The Marshall Centre built the payload support system and had responsibility for payload integration and testing.

The GP-A experiment payload is 114 centimeters (45 inches) long, 96 centimeters (38 inches) in diameter and weighs 102 kilograms (225 pounds).

With the NSAS office of Space Science, the GP-A program is assigned to the Astrophysics Program Office for overall program management. Program management is assigned to MSFC.

The Scout-D launch vehicle, launch operations personnel and equipment including range safety, radar and telemetry tracking will be provided by NASA's Langley Research Center and Wallops Flight Center.

The Experiment Package will be launched from Wallops Island located off Virginia's eastern shore, using existing NASA equipment and facilities.

The launch will be in an easterly direction from Launch Area No.3.

- Tracking and Data acquisition will be accomplished by existing US Ground Stations provided and operated by NASA's Goddard Space Flight Center, Greenbelt, Maryland. The primary ground station at MILA will be supplemented with experience-peculiar equipment and ground-based comparator MASERS. Three other stations will be used in receiving only - Bermuda, Wallops and Network Test and Training at Goddard.

BRYAN HARTLEY

- M A P I T -