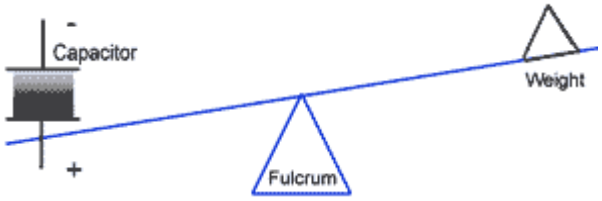
The B2 Electrogravitic Technology

The Biefield-Brown Effect

Thomas Townsend Brown

Working in conjunction with Dr.P.A.Biefield, Brown found that highly charged capacitors when properly suspended showed a tendency to move relative to the gravitational force.

When the poles of a freely suspended charged capacitor (even in vacuum) were placed on a horizontal axis,a forward thrust would be produced which would move the capacitor in the direction of the positive pole. The direction of thrust would reverse in conjunction with a polarity change. This is the phenomenon known as the Biefield-Brown Effect.



Anti-gravity was demonstrated by placing the capacitor on a beam balance and charging it. When the positive pole pointed upwards, the condenser would move to a point of equilibrium, when the positive pole was pointed down wards, the balance would show a downward deflection. Experiments show the intensity of the effect to be dependent on several factors :

1) the surface area of the plates
2) the voltage differential between the plates
3) the proximity of the plates to each other
4) the material mass between the plates
5) the dielectric capacity of the material between the plates

Beginning in the mid 1920's,Townsend Brown specially built a capacitors which utilized a heavy, high charge-accumulating (high K-factor) dielectric material between its plates and found that when charges with between 70,000 to 300,000 volts, it would move in the direction of its positive pole. When oriented with its positive side up, it would proceed to lose about 1 percent of it's weight.

Brown attributed this motion to an electrostatically-induced gravity field acting between the capacitor's oppositely charged plates. By 1958, he had succeeded in developing a 15 inch diameter model saucer that could lift over 110% of its weight. Brown's experiments had launched a new

field of investigation which came to be known as electrogravitics, the technology of controlling gravity through the use of high-voltage electric charge.

"Theoretically speaking, Brown attempted to explain his results in terms of Unified Field Physics. The point of departure between Brown and most orthodox science is that Brown firmly believed in the existence of an observable coupling effect between gravity and electricity and that this coupling effect is precisely what is being demonstrated by his devices. In other words, he contends that the [Biefeld-Brown] effect not only represents a proved and demonstrable link between electricity and gravitation, but represents one which can actually be harnessed and utilized for propulsion purposes both within and outside of the earth's atmosphere.

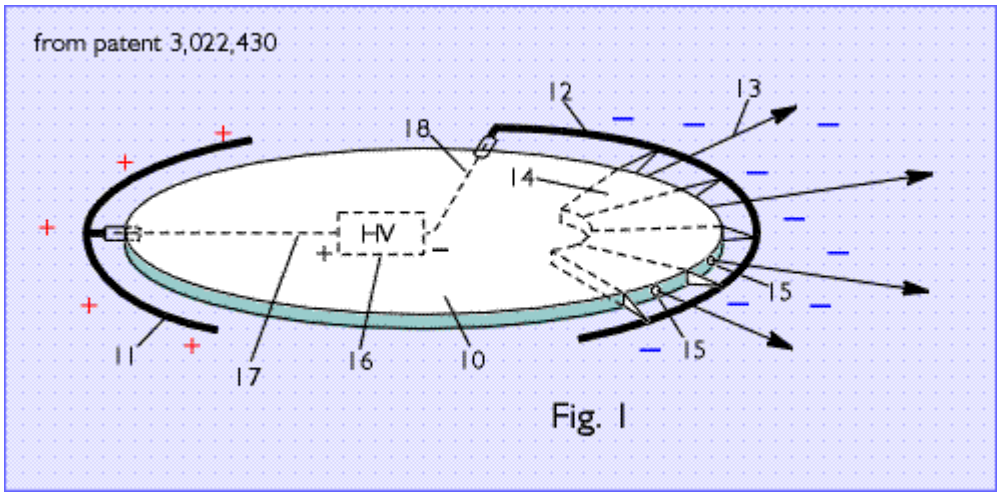
A 'DIELECTRIC' is defined as a material which has the unique ability of absorbing electrical energy and 'charge' without ordinarily passing this energy on to neighbouring materials. Some dielectrics are able to absorb enormous quantities of electrical energy (also referred to as 'ELECTRIC STRESS') without discharging, provided that the energy is fed into the dielectric slowly and at low potential. Still others can be charged and discharged at extremely high potential at a rate of several thousand times each second. Townsend Brown concerned himself principally with this latter type. Using just such a dielectric, Brown constructed disc-shaped (or saucer-shaped) condensers, and, by applying various amounts of high-voltage direct current, witnessed the [Biefeld-Brown] effect in action. With the proper construction and electrical potential (in the kilovolt range) the disc-shaped 'airfoils' were made to fly under their own power, emitting a slight hum and a bluish electrical glow as they did so. More scientifically, perhaps, this process of 'flight' might best be described as 'motion under the influence of interaction between electrical and gravitational fields in the direction of the positive electrode'.

In 1953, Brown succeeded in demonstrating in a laboratory setting the flight of disc-shaped airfoils 2 feet in diameter around a 20-foot-diameter circular course. The process involved tethering these saucer-shaped craft to a central pole by means of a wire through which the necessary direct-current potential was supplied at a rate of 50,000 volts with continuous input of 50 watts. The test produced an observable top speed of an amazing 17 feet per second (about 12 miles per hour).

Working with almost superhuman determination and at great cost to his personal finances, Brown soon succeeded in surpassing even this accomplishment. At his next display, he exhibited a set of discs 3 feet across flying a 50-foot-diameter course with results so spectacular that they were immediately classified. Even so, most of the scientists who witnessed the demonstrations remained sceptical and generally tended to attribute Brown's motive force to what they called an 'electrical wind' - this in spite of the fact that it would have required a veritable 'ELECTRIC HURRICANE' to produce the lift potential observed ! Nonetheless, pitifully few gave any credence whatsoever to ideas that the [Biefeld-Brown] effect might represent anything at all new to the world of physics. Government funding was sought to enable the work to continue, but in 1955, realizing that the money would not be forthcoming, a disgruntled Brown went to Europe in hopes that perhaps he might be able to generate a little more enthusiasm there.

Although demonstrations were given first in England, it was on the Continent, under the auspices of a French corporation, La Societe Nationale de Construction Aeronautique Sud Ouest (SNCASO), that things really began to look promising. During a set of tests performed confidentially within the company's research laboratory, Brown succeeded in flying some of his discs in a **high vacuum** with amazing results. Brown was ecstatic, for not only had he succeeded in proving that his discs flew more efficiently *without* air, but he had also shown that the speed

and efficiency of his craft could be increased by providing greater voltage to the dielectric plates.



Contemporary accounts easily visualized speeds of several hundred miles per hour using voltages in the range of 100,000 to 200,000; and at least one writer spoke of a 'FLAME JET GENERATOR' then in the planning stages which supposedly would be able to provide power potential up to 15 million volts ! (See his US Patent 3,022,430). In fact, plans had been laid for the immediate construction of a large vacuum chamber and a 500,000 Volt power supply when disaster struck the project in the form of a corporate merger. SNCASO had agreed to combine with a larger company, Sud Est. The president of the emerging company proceeded to demonstrate an appalling lack of interest in 'these far-out propulsion research efforts' and favoured instead an increased interest in air frame manufacture. Consequently, all facilities ordered by the former president to carry forward the electrogravitic research work were summarily cancelled and a thoroughly disappointed Brown was forced to return home to the US in 1956."

The National Institute for Discovery Science (NIDS), based in Nevada, say that mysterious U.S.

military craft using this kind of technology have been skirting the skies since the 1980s. Here

This concept has been raised before with this article in the Sydney Morning Herald, a paper not inclined to wowserism itself.

This item is going to sound like a bad reject from conspiracy publications like Nexus or New Dawn, or an X-Files fanzine. It isn't. The indisputable fact is that both the US and the UK are putting serious money into anti-gravity research with military aerospace

Electrogravitic (antigravity) technology is under development in U.S. Air Force black R&D programs since late 1954.

In a March 1992 issue of Aviation Week & Space Technology, entitled "Black world engineers, scientists, encourage using highly classified technology for civil applications" is explained how the B-2's sharp leading edge is charged to "many millions of volts", while the corresponding negative charge is blown out in the jets from the four engines.

Ever since the B-2 was officially declassified many odd things were noticed about the plane and it's program.

- Many people are amazed how quiet the B-2 is during take-off.
- It's official operating speed is not declassified.
- First the USAF said Chemicals are added to the exhaust to cool the exhaust, but later they admitted, it is to prevent the forming of contrails.
- Both its wing leading edge and jet exhaust stream are charged to an incredibly high

voltage.

- A few USAF publications by Wright Aeronautical Laboratory and Air Force Systems Command's Astronautics Laboratory about the B-2, are about topics as 'electric-field propulsion', and 'electrogravitics' (or anti-gravity), the transient alteration of not only thrust but also a body's weight.

Military Power

From: AirInternational Jan 2000 By: Bill Gunston

Stealth

Eliminating the pilot, as well as any fins, will do much to enhance stealth qualities. This will focus increased pressure on the need to devise truly stealthy propulsion systems. For many years, designers have made it impossible for hostile radars to 'see' the face of the engine, by suitably kinking the inlet duct (or, as noted, putting it above the fuselage).
The propulsive nozzle is harder, and here there is a need to minimise thermal, visual and even acoustic signatures.
The Lockheed Martin F-117 Nighthawk nozzles are flattened slits in the trailing edge of the wing, while those of the B-2 are tucked inside deep channels above the rear part of the wing, upstream of movable trailing edges.

The literature goes back to Faraday, but the idea of electrogravitics really took off in 1920s when an American physicist, Townsend T Brown, carried out extensive experiments. He may have been the first to recognise that a capacitor (a dielectric material sandwiched between positive and negative plates) experiences a force tending to move it in the direction of the positive face. He found that the electrostatic charge induced a gravity field between the two plates. Soon he was

making capacitors rotate on whirling arms, and measuring the loss in weight of the capacitor with positive face turned uppermost.

In 1953, Brown demonstrated to the USAF a whirling rig of 50ft (15.2m) diameter, which at 150,000 volts (150kv) became a mere blur. The subject was immediately classified, and for the next 40 years, while 'black' research in this field made astonishing progress, it was not reported. Though private individuals continued to experiment, and to take out unclassified patents, not much surfaced. Exceptions were *Electrogravitics Systems* (Feb. 1956) and *The Gravitics Situation* (Dec. 1956), published for subscribers only by Aviation Studies (International). **This paper is included below this article**.This was London-based 'think tank' run by two very bright young men, R G 'Dickt' Worcester and John Longhurst. Unlike the established journals, they published reports and informed comment without the slightest regard for questions of 'security'. The only time they were taken to court, they won their case and collected heavy damages.

I was fascinated to read those reports, but had no wish to reside in The Tower , so I refrained from discussing clever aeroplanes with leading edges charged to millions of volts positive and the trailing edges at millions of volts negative. In any case, it all seemed a bit far-fetched, especially as it appeared that the gravity field could not only propel aircraft to supersonic speed with propulsive efficiency *greater than 1* but could also lift them *independently to the atmosphere*.

According to a former WW2 pilot, it is rumored that up to 20 ground crew may have been fatally zapped by touching the B-2 too soon after it landed. Also the tires were reportedly built with external stainless steel casings to permit charge bleed off at touchdown.

Wondrous things

Various snippets appeared suggesting that electrostatic fiels could not only do wonderous things in the field of propulsion but could also reuse aerodynamic turbulence (at any mach number), reduce radar cross-section and even virtually eliminate sonic boom. Indeed, back in 1952, Dr M Rose had

noted in unclassified literature: "The positive field. travelling in front acts as a buffer which starts moving the air out of the way. This field acts as an entering wedge which softens the supersonic barrier" From 1985, the name P A LaViolette emerges as author of a shoal of interesting electrogravitics articles in professional literature.

The first Northrop Grumman B-2 Spirit stealth bomber was rolled out on Nov. 22, 1988, and anyone with the slightest interest in the aircraft could not fail to have noticed the unbelievable leading edge, with deep profile coming to a knife-edge almost in line with the upper surface. In 1990, a NASA 'boffin' retired and perhaps foolishly talked to *The Arkansas Democrat* who did not understand his story and ran it under the headline "Ex-NASA expert says Stealth uses parts from UFO".

What really put the cat among the proverbial pigeons was a feature published in a March 1992 issue of *Aviation Week & Space Technology*, entitled "Black world engineers, scientists, encourage using highly classified technology for civil applications". For the first time in open literature, this article explained how the B-2s sharp leading edge is charged to "many millions of volts", while the corresponding negative charge is blown out in the jets from the four engines. There is more: though the General Electric F118 engines can operate as ordinary turbofans, in flight they act as flame-jet generators, pumping out gas greatly diluted by fresh air, all at millions of volts negative. The word 'flame' gives a rather false picture, because in fact the jet comes out not very much hotter than the surrounding atmosphere.

Unclassified articles have described in some detail how the leading edge is divided into eight sections, each individually ionised. The section on each wing immediately upstream of the engines cannot be thus ionised, because the air would then enter the engines and cancel out the negative charge in the jets. accordingly, this is where the Hughes covert strike radars are installed. They would not be able to 'see' forwards if they were anywhere else.

Take-off trust of the F118-100 at sea level is given as '19,000lb (84.5kN) class' by Northrop Grumman and as '17,300lb (77.0kN)' by the USAF. These are startlingly low figures for and aircraft whose take-off weight is said
to be 336,000lb (152,635kg) and which was until recently said to weight 376,000lb (170,550kg). Aircraft usually get heavier over the years, not 20 tonnes lighter. Even at the supposed reduced weight, the ratio of thrust to weight
is a mere of 0.2, an extraordinarily low value for a combat aircraft.

The USAF has never said anything about B-2s speed. It has been tacitly assumed to be in the Mach 0.8 class, but according to extensive open literature, the four F118 engines equate to about 25 MW (megawatts) of electrical power at the take-off, but under the influence of the electrogravitic field the speed could soon become supersonic, the output of the air-diluted exhaust then rising to t least 100 MW.

Everyone who has heard a B-2 take off has been astonished at the quietness. Obviously the noise would not be in the same class as the F101 engines of the B-1B in full afterburner, but writers have used the words 'shocking',
'uncanny' and 'incredible' in describing B-2 departures. As for elimination of the contrails (condensation trails) (normaly a giveaway even for a stealth aircraft), the USAF said chlorofluorosulphonic acid was injected into
to the jets to eliminate contrails. Later it said this was done by 'regulating exhaust temperatures'. Such an explanation is nonsense: contrails are ice crystals from water vapour left when hydrocarbon fuel is burned, and can

never be eliminated by 'regulating exhaust temperatures'. Another point to note is that the channels downstream of the jet pipes appear to be carbon-fibre composite, which is incompatible with normal jet temperatures (not because of the fibre, but because of the adhesive sticking them together).

Other writers have commented on the size of the B-2 wing and noted that its stealth depends on the huge black skin being made of RAM (radar-absorbent material). This, say the physicists, is 'a high-k, high-density dielectric ceramic, capable of generating an enormous electrogravitic lift force when charged'. I could go on and on. We have come some way from the Lancaster and B-17, and I seem to have strayed some way from the traditional jet engines. (end)

A hint into the technology

At: http://www.sacred-texts.com/ufo/b2bomber.htm I found: And with all all those variable wing surfaces, could it be that that the B2 has the ability to fly very slowly? Stall-speed data is not available.

Now ask yourself, why would the stall-speed be a secret?

At http://www.etheric.com/LaVioletteBooks/Book-ES.html I found: According to a former WW2 pilot, it is rumored that up to 20 ground crew may have been fatally zapped by touching the B-2 too soon after it landed. Also the tires were reportedly built with external stainless steel casings to permit charge bleed off at touchdown.

Why is the plane electriclly charged in flight? Most planes are grounded, because a build up of electrical charge can cause a fire or an explosion. Secondly electrical charge or discharge can mess up electronics(this is the reason that lightening strikes are usually so dangerous to an aircraft!) But the B-2 was Design to hold an electrical charge while in flight!

ELECTROKINETIC GRAVITATORS
TT BROWN

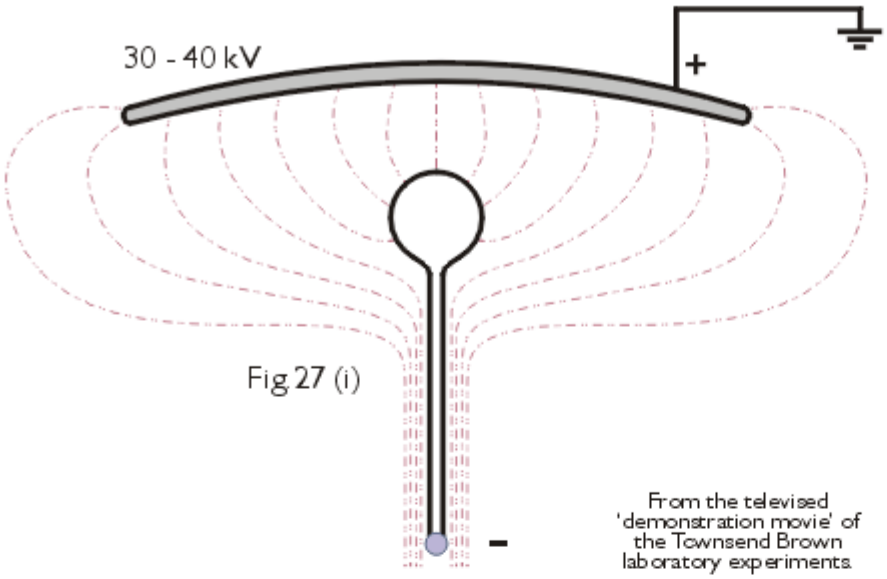


Fig 27 (i)

From the televised 'demonstration movie' of the Townsend Brown laboratory experiments

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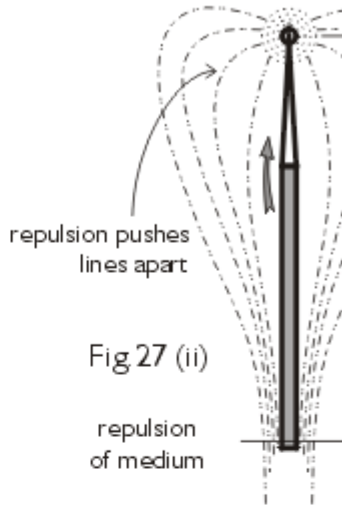


Fig 27 (ii)

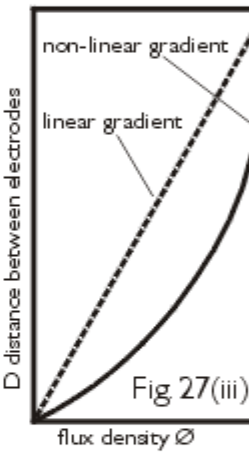
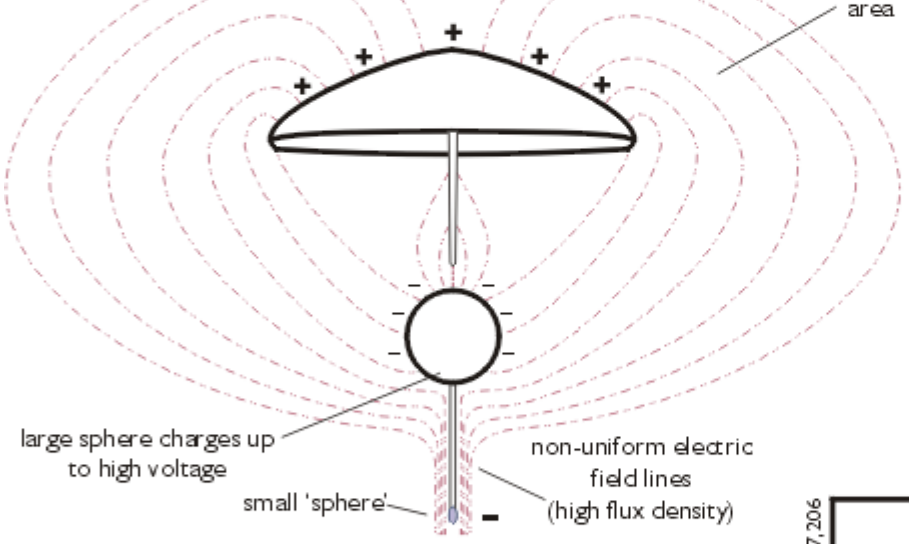


Fig 27(iii)

"Thrust will be related t degree of non-linearity of th gradient."

Fig 27 (iv)



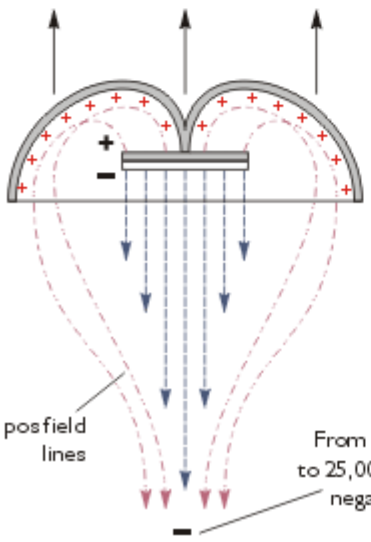


Fig 27 (vi)

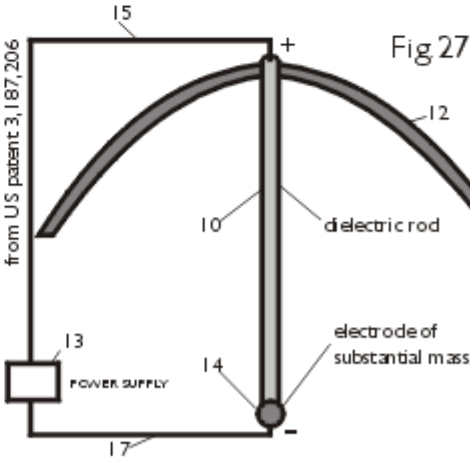


Fig 27

The dielectric rod's electrical conductivity va from a low value in the region of electrode 14 high value in the region of electrode 12. But, in conical or wedge-shaped insulators se conducting granules (such as lead oxide) are do into the non-conductive material concentrated near the tip.

"THE GRAVITICS SITUATION"

Gravity Rand Ltd.
December 1956

INTERAVIA
Volume XI - No. 5, 1956, pages 373-374

Theme of the science for 1956-1970: SERENDIPITY

Einstein's view:-
"It may not be an unattainable hope that some day a clearer knowledge of the processes of gravitation may be reached; and the extreme generality and detachment of the relativity theory may be illuminated by the particular study of a precise mechanism".

CONTENTS

I - Engineering note on present frontiers of knowledge

Gravitics is likely to follow a number of separate lines of development: the best known short term proposition is Townsend Brown's electrostatic propulsion by gravitators (details of which are to be

found in the Appendix I). An extreme extrapolation of Brown's later rigs appears to suggest a Mach 3 interceptor type aircraft. Brown called this basically force and motion, but it does not appear to be the road to a gravitational shield or reflector. His is the brute force approach of concentrating high electrostatic charges along the leading edge of the periphery of a disk which yields propulsive effect. Brown originally maintained that his gravitators operate independently of all frames of reference and it is motion in the absolute sense - relative to the universe as a whole. There is however no evidence to support this. In the absence of any such evidence, it is perhaps more convenient to think of Brown's disks as electrostatic propulsion which has its own niche in aviation. Electrostatic disks can provide lift without speed over a flat surface. This could be an important advance over all forms of airfoil which require induced flow; and lift without air flow is a development that deserves to be followed up in its own right, and one that for military purposes is already envisaged by the users as applicable to all three services. This point has been appreciated in the United States and a program in hand may now ensure that development of large sized disks will be continued. This is backed by the U.S. Government but it is something that will be pursued on a small scale. This acceptance follows Brown's original suggestion embodied in Project Winterhaven. Winterhaven recommended that a major effort be concentrated on electrogravitics based on the principle of his disks. The U.S. Government evaluated the disks wrongly, and misinterpreted the nature of the energy. This incorrect report was filed as an official assessment, and it took some three years to correct the earlier misconception. That brings developments up to the fairly recent past. and by that time it was realized that no effort on the lines of Winterhaven was practical, and that more modest aims should be substituted. These were re-written around a new report which is apparently based on newer thoughts and with some later patents not yet published which form the basis of current U.S. policy. It is a matter of some controversy whether this research could be accelerated by more money but the impression in Gravity Rand is that the base of industry is perhaps more than adequately wide. Already companies are specializing in evolution of particular components of an electrogravitics disk. This implies that the science is in the same state as the ICBM - namely that no new breakthroughs are needed, only intensive development engineering. This may be an optimistic reading of the situation: it is true that materials are now available for the condensers giving higher k figures than were postulated in Winterhaven as necessary, and all the ingredients necessary for the disks appear to be available. But industry is still some way from having an adequate power sources and possessing any practical experience of running such equipment.

The long term development of gravity shields, absorbers, and 'magic metals' appears at the moment however to be a basically different problem, and work on this is not being sponsored* so far as is known. The absorber or shield could be intrinsically a weapon of a great power, the limits of which are difficult to foresee. The power of the device to undermine the electrostatic forces holding the atom together is a destructive by-product of military significance. In unpublished work Gravity Rand has indicated the possible effect of such a device for demolition. The likelihood of such work being sponsored in small countries outside the U.S. is slight, since there is general lack of money and resources and in all such countries quick returns are essential. Many people hold that little or no progress can be made until the link in the Einstein unified field theory has been found. This is surely a somewhat defeatist view, because although no all embracing explanation of the relationship between the extraordinary variety of high energy particles continually being uncovered is yet available much can be done to pin down the general nature of anti-gravity devices.

There are several promising approaches one of them is the search for negative mass, a second is to find a relationship between gravity and heat, and a third is to find the link between gravitation and the coupled particles. Taking the first of these: negative mass, the initial task is to prove the existence of negative mass, and Appendix II outlines how it might be done. This is Mozer's

approach which is based on the Schroedinger time independent equation with the center of mass motion removed. As the paper shows, this requires some 100 bev - which is beyond the power of existing particle accelerators: however the present Russian and American nuclear programs envisage 50 bev bevatrons within a few years and at the present rate of progress in the nuclear sciences it seems possible that the existence of negamass will be proved by this method of a Bragg analysis of the crystal structure - or disproved.

If negamass is established, the precise part played by the subnuclear particles could be quickly determined. Working theories have been built up to explain how negative masses would be repelled by positive masses and pairs would accelerate gaining kinetic energy until they reach the speed of light and then assume the role of the high energy particles. It has been suggested by Ferrell that this might explain the role of neutrino, but this seems unlikely without some explanation of the spin ascribed to the neutrino. Yet the absence of rest mass or charge of the neutrino makes it especially intriguing. Certainly, further study of the neutrino would be relevant to gravitational problems. If, therefore, the aircraft industry regards anti-gravity as part of its responsibilities it cannot escape the necessity of monitoring high energy physics or the neutrino. There are two aircraft companies definitely doing this; but little or no evidence that most of the others know even what a neutrino is.

The relationship between electrical charges and gravitational forces however will depend on the right deductions being drawn from excessively small anomalies.* First clues to such small and hitherto unnoticed effects will come by study of the unified field theory. such effects may be observed in work on the gravithermals, and interacting effect of heat and gravity. Here, at least, there is firmer evidence materials are capable of temperature changes depending on gravity. This, as Beams says, (see Appendix III) is due to results from the alignment of the atoms. Gravity tensions applied across the ends of a tube filled with electrolyte can produce heat or be used to furnish power. The logical extension of this is an absorber of gravity in the form of a flat plate and the gravitative flux acting on it (its atomic and molecular structure, its weight density and form are not, at this stage, clear) would lead to an increase in heat of the mass of its surface and subsurface particles.

The third approach is to aim at discovering a connection between nuclear particles and the gravitational field. This also returns to the need for interpreting macroscopic relativistic phenomena at one extreme in terms of microscopic quantum mechanical phenomena at the other. Beaumont in suggesting a solution recalls how early theory established rough and ready assumptions of the characteristics of electron spin before the whole science of the atomic orbital was worked out. These were based on observation and they were used with some effect at a time when data was needed. Similar assumptions of complex spin might be used to link the microscopic to the macroscopic. At any rate, there are some loose ends in complex spin to be tied up, and these could logically he sponsored with some expectation of results by companies wondering how to make a contribution.

* See Appendix VI

If a real spin or rotation is applied to a planar geoid the gravitational equipotentials can be made less convex, plane or concave. These have the effect of adjusting the intensity of the gravitational field at will which is a requirement for the gravity absorber. Beaumont seemed doubtful whether external power would have to be applied to achieve this. but it seems reasonable to suppose that power could be fed into the system to achieve a beneficial adjustment to the gravitational field, and conventional engineering methods could ensure that the weight of power input services would

be more than offset by weightlessness from the spin inducer. The engineering details of this are naturally still in the realms of conjecture; but, at least, it is something that could be worked out with laboratory rigs; and, again, the starting point is to make more accurate observations of small effects. The technique would be to accept any anomalies in nature and from them to establish what would be needed to induce a spin artificially.

* * *

It has been argued that the scientific community faces a seemingly impossible task in attempting to alter gravity when the force is set up by a body as large as this planet and that to change it might demand a comparable force of similar planetary dimensions. It was scarcely surprising therefore that experience had shown that while it has been possible to observe the effects of gravity it resisted any form of control or manipulation. But the time is fast approaching when for the first time it will be within the capability of engineers with bevatrons to work directly with particles that it, is increasingly accepted, contribute to the source of gravitation; and whilst that in itself may not lead to an absorber of gravity, it will at least throw some light on the sources of the power.

Another task is solution* of outstanding equations to convert gravitational phenomena to nuclear energy. The problem, still not yet solved may support the Bondi-Hoyle theory that expansion of the universe represents energy continually annihilated instead of being carried to the boundaries of the universe. This energy loss manifests itself in the behaviour of the hyperon and K-particles which would, or might, form the link between the microcosm and macrocosm. Indeed Deser and Arnowitt propose that the new particles are a direct link between gravitationally produced energy and nuclear energy. If this were so it would be the place to begin in the search for practical methods of gravity manipulation. It would be realistic to assume that the K-particles are such a link. Then a possible approach might be to disregard objections which cannot be explained at this juncture until further unified field links are established. As in the case of the spin and orbital theories, which were naive in the beginning, the technique might have to accept the apparent forces and make theory fit observation until more is known.

Some people feel that the chances of finding such a unified field theory to link gravity and electrodynamics are high; yet think that the finding of a gravity shield is slight because of the size of the energy source, and because the chances of seeing unnoticed effects seem slender. Others feel the opposite and believe that a link between nuclear energy and gravitational energy may precede the link between the Einstein general relativistic and Quantum Theory disciplines. Some hope that both discoveries may come together; while a few believe that a partial explanation of both may come about the same time,, which will afford sufficient knowledge of gravitational fields to perfect an interim type of absorber using field links that are available.

* See Appendix IV

This latter seems the more likely since it is already beginning to happen. There is not likely to be any sudden full explanation of the microcosm and macrocosm; but one strand after another joining them will be fashioned, as progress is made towards quantizing the Einstein theory.

II - Management note on the Gravitics Situation

The present anti-gravity situation as one of watching and waiting by the large aircraft prime contractors for lofting inventions or technological breakthroughs. Clarence Birdseye in one of his last utterances thought that an insulator might be discovered by accident by someone working on a quite different problem; and in 500 years gravity insulators would be commonplace. One might go further than Birdseye and say that principles of the insulator would, by then, be fundamental to human affairs; it would be as basic to the society as the difference today between the weight of one metal and another. But at the same time it would be wrong to infer from Birdseye's remark that a sudden isolated discovery will be the key to the science. The hardware will come at a time when the industry is ready and waiting for it. It will arrive after a long period of getting accustomed to thinking in terms of weightlessness, and naturally it will appear after the feasibility of achieving it in one form or another has been established in theory.*

The aim of companies at this stage must therefore surely be to monitor the areas of progress in the world of high energy physics which seem likely to lead to establishment of the foundations of anti-gravity. This means keeping a watchful eye on electrogravitics, magnetogravitics gravitics isotopes; and electrostatics in various forms for propulsion or levitation. This is not at the present stage a very expensive business, and

* But this does not mean that harnessed forces will be necessarily fully understood at the outset.investment in laboratory man-hours is necessary only when a certain line of reasoning which may look promising comes to a dead-end for lack of experimental data, or only when it might be worth running some laboratory tests to bridge a chasm between one part of a theory and another or in connecting two or more theories together. If this is right, anti-gravity is in a state similar to nuclear propulsion after the NEPA findings, yet before the ANP project got under way. It will be remembered that was the period when the Atomic Energy Commission sponsored odd things here and there that needed doing. But it would be misleading to imply that hardware progress on electrostatic disks is presently so far along as nuclear propulsion was in that state represented by ANP. True the NEPA men came to the conclusion that a nuclear-propelled aircraft of a kind could be built, but it would be only a curiosity. Even at the time of the Lexington and Whitman reports it was still some way from fruition: the aircraft would have been more than a curiosity but not competitive enough to be seriously considered.

It is not in doubt that work on anti-gravity is in the realm of the longer term future. One of the tests of virility of an industry is the extent to which it is so self confident of its position that it can afford to sponsor R&D which cannot promise a quick return. A closing of minds to anything except lines of development that will provide a quick return is a sign of either a strait-laced economy or of a pure lack of prescience, (or both).

Another consideration that will play its part in managerial decision is that major turning points in anti-gravity work are likely to prove far removed from the tools of the aircraft engineer. A key instrument for example that may determine the existence of negamass and establish posimass-negamass interaction is the super bevatron. It needs some 100 bev gammas on hydrogen to perform a Bragg analysis of the elementary particle structure by selective reflection to prove the existence of negamass. This value is double as much the new Russian bevatron under construction and it is 15 times as powerful as the highest particle accelerations in the Berkeley bevatron so far attained. Many people think that nothing much can be done until negamass has been observed. If industry were to adopt this approach it would have a long wait and a quick answer at the end. But the negamass-posimass theory can be further developed; and, in anticipation of its existence,

means of using it in a gravitationally neutralized body could be worked out. This, moreover, is certainly not the only possible approach: a breakthrough may well come in the interaction between gravitative action and heat theory at the moment suggests that if gravity could produce heat the effect is limited at the moment to a narrow range.* But the significant thing would be establishment of a principle.

History may repeat itself thirty years ago, and even as recently as the German attempts to produce nuclear energy in the war, nobody would have guessed that power would be unlocked by an accident at the high end of the atomic table. All prophecies of atomic energy were concerned with how quickly means of fusion could be applied at the low end. In anti-gravity work, and this goes back to Birdseye, it may be an unrelated accident that will be the means of getting into the gravitational age. It is a prime responsibility of management to be aware of possible ways of using theory to accelerate such a process. In other words serendipity.

It is a common thought in industry to look upon the nuclear experience as a precedent for gravity, and to argue that gravitics will similarly depend on the use of giant tools, beyond the capabilities of the air industry and that companies will edge into the gravitational age on the coat-tails of the Government as industry has done, or is doing, in nuclear physics. But this over looks the point that the two sciences are likely to be different in their investment. Itwill not need a place like Hanford or Savannah River to produce a gravity shield or insulator once the knowhow has been established. As a piece of conceptual engineering the project is probably likely to be much more like a repetition of the turbine engine. It will be simple in its essence, but the detailed componentry will become progressively more complex to interpret in the form of a stable flying platform and even more intricate when it comes to applying the underlying principles to a flexibility of operating altitude ranging from low present flight speeds at one extreme to flight in a vacuum at the other. This latter will be the extreme test of its powers. Again the principle itself will function equally in a vacuum - Townsend Brown's saucers could move in a vacuum readily enough - but the supporting parts must also work in a vacuum. In practice, they tend to give trouble, just as gas turbine bits and pieces start giving trouble in proportion to the altitude gained in flight.

But one has to see this rise in complexity with performance and with altitude attainment in perspective: eventually the most advanced capability may be attained with the most extremely simple configurations. As is usual however in physics developments the shortest line of progress is a geodesic, which may in turn lead the propulsion trade into many roundabout paths as being the shortest distance between aims and achievement.

But aviation business is understandably interested in knowing precisely how to recognize early discoveries of significance and this Gravity Rand report is intended to try and outline some of the more promising lines. One suggestion frequently made is that propulsion and levitation may be only the last - though most important - of a series of others, some of which will have varying degrees of gravitic element in their constitution. It may be that the first practical application will be in the greater freedom of communications offered by the change in wave technique that it implies. A second application is to use the wave technique for anti-submarine detection, either airborne or seaborne. This would combine the width of horizon in search radar with the underwater precision of Magnetic Airborne Detection, and indeed it may have the range of scatter transmissions. Chance discoveries in the development of this equipment may lead to the formulation of new laws which would define the relationship of gravity in terms of usable propulsion symbols. Exactly how this would happen nobody yet knows and what industry and government can do at this stage is to explore all the possible applications simultaneously, putting

pressure where results seem to warrant it.

In a paper of this kind it is not easy to discuss the details of the wave technique in communications, and the following are some of theories, briefly stated which require no mathematical training to understand, which it would be worth management keeping an eye on. In particular, watch should be made of quantitative tests on lofting, and beneficiation of material. Even quite small beneficiation ratios are likely to be significant. There are some lofting claims being made of 20% and more, and the validity of these will have to be weighed carefully. Needless to say much higher ratios than this will have to be attained. New high-k techniques and extreme-k materials are significant. High speeds in electrostatic propulsion of small discs will be worth keeping track of (by high speed one means hundreds of m.p.h.) and some of these results are beginning to filter through for general evaluation. Weight mass anomalies, new oil-cooled cables, interesting megavolt gimmicks, novel forms of electrostatic augmentation with, hydrocarbon and non-hydrocarbon fuels are indicative, new patents under the broadest headings of force and motion may have value, new electrostatic generator inventions could tip the scales and unusual ways of turning condensers inside-out, new angular propulsion ideas for barycentric control; and generally certain types of saucer configuration are valuable pointers to ways minds are working.

Then there is the personnel reaction to such developments. Managements are in the hands of their technical men, and they should beware of technical teams who are dogmatic at this state. To assert electrogravitics is nonsense; is as unreal as to say it is practically extant. Management should be careful of men in their employ with a closed mind - or even partially closed mind - on the subject.

This is a dangerous age: when not only is anything possible, but it is possible quickly. A wise Frenchman once said you have only to live long enough to see everything 'and the reverse of everything;' and that is true in dealing with very advanced high energy physics of this kind.

Scientists are not politicians: they can reverse themselves once with acclaim - twice even with impunity. They may have to do so in the long road to attainment of this virtually perfect air vehicle. It is so easy to get bogged down with problems of the present; and whilst policy has to be made essentially with the present in mind - and in aviation a conservative policy always pays - it is management's task and duty to itself to look as far ahead as the best of its technicians in assessing the posture of the industry.

Gravithermals: alloys which may be heated or cooled by gravity waves. (Lover's definition)

Thermisters: materials capable of being influenced by gravity.

Electrads: materials capable of being influenced by gravity.

Gravitator: a plurality of cell units connected in series: negative and positive electrodes with an interposed insulating member (Townsend Brown's definition).

Lofting: the action of levitation where gravity's force is more than overcome by electrostatic or other propulsion.

Beneficiation: the treatment of an alloy or substance to leave it with an improved mass-weight ratio.

Counterbary: this, apparently, is another name for lofting.

Barycentric control: the environment for regulation of lofting processes in a vehicle.

Modulation: the contribution to lofting conferred on a vehicle by, treatment of the substance of its construction as distinct from that added to it by outside forces. Lofting is a synthesis of intrinsic and extrinsic agencies.

Absorber; insulator: these terms - there is no formal distinction between them as yet - are based on an analogy with electromagnetism. This is a questionable assumption since the similarity between electromagnetic and gravitational fields is valid only in some respects such as both having electric and magnetic elements. But the difference in coupling strengths, noted by many experimenters, is fundamental to the science. Gravity moreover may turn out to be the only non-quantized field in nature, which would make it, basically, unique. The borrowing of terms from the field of electromagnetism is therefore only a temporary convenience. Lack of Cartesian representation makes this a baffling science for many people.

Negamass: proposed mass that inherently has a negative charge.

Posimass: mass the observed quantity - positively charged.

Shield: a device which not only opposes gravity (such as an absorber) but also furnishes an essential path along which or through which, gravity can act. Thus whereas absorbers reflectors and insulators can provide a gravitationally neutralized body, a shield would enable a vehicle or sphere to 'fall away' in proportion to the quantity of shielding material.

Screening: gravity screening was implied by Lanczos. It is the result of any combination of electric or magnetic fields in which one or both elements are not subject to varying permeability in matter.

Reflector: a device consisting of material capable of generating buoyant forces which balance the force of attraction. The denser the material, the greater the buoyancy force. When the density of the material equals the density of the medium the result will be gravitationally neutralized. A greater density of material assumes a lofting role.

Electrogravitics: the application of modulating influences in an electrostatic propulsion system.

Magnetogravitics: the influence of electromagnetic and meson fields in a reflector.

Bosun fields: these are defined as gravitational electromagnetic, and r meson fields (Metric tensor).

Fermion fields: these are electrons neutrinos muons nucleons and V-particles (Spinors).

Gravitator cellular body: two or more gravitator cells connected in series within a body (Townsend Brown's definition).

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