

# Practical **MECHANICS**

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OCT · 1961

**POWER FROM  
THE WAVES**



*Make-*

An  
**ENPRINTER**  
For Your Snaps

A Transistor  
**RECORD  
PLAYER**

Forced Air Blast  
**CONVECTOR  
HEATER**

# Practical MECHANICS

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## Editorial and Advertisement Offices

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## CONTRIBUTIONS

The Editor will be pleased to consider articles of a practical nature suitable for publication in "Practical Mechanics." Such articles should be written on one side of the paper only, and should include the name and address of the sender. Whilst the Editor does not hold himself responsible for manuscripts, every effort will be made to return them if a stamped and addressed envelope is enclosed. All correspondence intended for the Editor, should be addressed: The Editor, "Practical Mechanics," George Newnes, Ltd., Tower House, Southampton Street, Strand, London, W.C.2.

## FAIR COMMENT

### TO THE MOON

THAT the first man to visit the moon will be a Russian seems almost inevitable, but the American plans for a Moon rocket are steadily forging ahead. The rocket has been named Nova and it will be some 275ft. tall. Fifty times more powerful than the Atlas Booster scheduled to orbit an American astronaut sometime this year, Nova will use a cluster of engines, each developing a thrust of  $1\frac{1}{2}$  million pounds. It will be a three-stage rocket surmounted by an Apollo space capsule, which although still in the early design stage, is envisaged as being very much more complex than the Mercury capsule used by Commander Alan Shepard. It will include a "command centre module" from which the crew of three will control their flight and where they will position themselves for take-off and re-entry.

There will be a propulsion unit which will be used for taking off from the moon on the return trip. This unit will also be used in earlier flights which are planned to circle the moon, when its job will be to power any manoeuvres required during the journey. It can also return the capsule to earth from any point along the flight path.

There will be a further propulsion unit which will be used to slow the capsule down and allow it to land gently on the moon and also a laboratory for use in earth-orbiting flights. Of all these units, however, only the command centre can return to earth.

### ELECTRO-GRAVITICS

All the information so far released relating to future plans for interplanetary travel envisages the use of solid or liquid fuelled rockets but there is another possibility. This is the science of Electro-gravitics. Research into the use of this type of propulsion is being carried on in all the major countries of the world, including Canada, Russia and the U.S.A. PRACTICAL MECHANICS first described the possibilities of electro-gravitic lift in February 1942 in a well-informed article by the late W. D. Verschoyle who as early as 1936 gave a practical demonstration of the principle, using a model which "flew" to his laboratory ceiling. Basically, electro-gravitic lift does not seek to overcome the force of gravity as do other sources of power, but instead turns this very force to its own advantage. Fantastic? Well turn to page 30 and read more about this dream of the future.

### LIFE ON OTHER PLANETS?

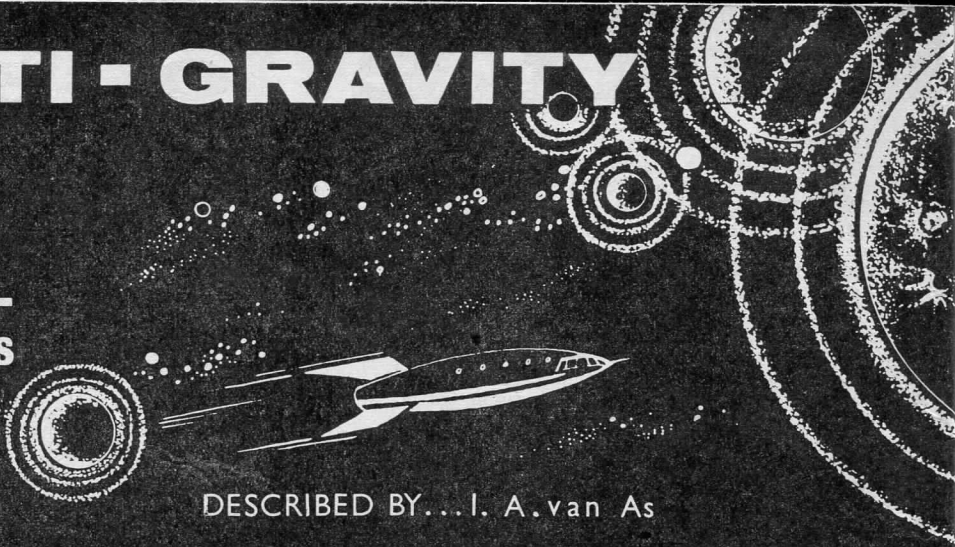
Whatever type of propulsion is used, there seems little doubt now that man will travel at least as far as the moon and probably to the other planets of our own solar system. Many of man's speculations as to their history, composition and surrounding atmosphere will either be verified or discounted. Most interesting of all, he may discover finally whether the planet Earth and life as we know it is unique in the Universe. This is a long way in the future, however, and in the meantime some important work is being carried out on meteorite fragments which have hit the earth, to find out whether they have brought any evidence of life with them. Some scientists in America say that the answer to this question is a definite affirmative. They claim to have discovered microbes in the centre of meteor fragments and also to have isolated complex hydrocarbons that, on earth, are only made by living plants and animals.

This provides one more link in the chain of discovery for man to ponder over, but the day when his doubts will be ended is approaching. It may even be during our lifetime.

The November 1961, issue will be published on Oct. 31st, 1961. Order it now!

# ANTI - GRAVITY

## The Science of Electro - Gravitics



DESCRIBED BY... I. A. van As

**H**OW near are we to actual space travel? I doubt, personally if we will get to Mars with the limited power of our present rockets. Aviation and astronautics, however, stand on the threshold of a wonderful new concept—Electro-Gravitics.

### New Type of Lift

Electro-gravitics is a vertical lift which is not accomplished by means of rocket thrust or propulsion by airscrews and airfoil and is not dependent on any type of atmosphere, air or a vacuum as would be found in outer space. All these methods seek to overcome gravity, but we approach a new era where man no longer seeks to leave our Earth by overcoming gravity, but instead by utilizing it to his own advantage.

An anti-gravity machine is not impossible and many countries including Russia are at present investigating this new approach to aviation. Canada has its "Project Magnet" which is the production of an anti-gravity machine using the electro-gravitic principle. Many American aircraft manufacturers are spending millions of dollars on the use of gravity as applied to their industry. A number of universities are also going into the problem, which, incidentally, is not a new one. An actual flying model using this principle was made in England before the war.

### Gravitational Irregularities

Before we go into how electro-gravitics work let us just consider gravitation for a few moments. The theory of gravitation as laid down by Newton in 1687 was accepted even with the discrepancies in the planetary motions which worried scientist and astronomer until this century, when Einstein proposed his new theory of equivalence and relativity. Even the new theories cannot account for gravity-defying irregularities which are noticed within the atom. Certain electrons are able to leap from one orbit to another, which results in light being emitted. (The gravitational theory applies to all bodies irrespective of their size and to account for this irregularity a new theory by Plank has been devised, called the quantum theory).

Also liquids do not conform, as is noticed by the flow of water against gravity in capillary tubes. Water will leap to a glass rod held just above it. Helium in liquid form acts even more strangely, as it will climb up the wall of its container and flow down the other

side. These have been classed as oddities in molecular arrangement, but above all they do illustrate that gravity is not altogether a force of attraction.

### Relationship of Gravity and Electro-magnetism

Let us get back to Einstein who informs us that the attraction between atoms, molecules, planets and even sub-atomic particles is the same as the force of electro-magnetic attraction. Any body, if it be sub-atomic or as large as the greatest star has a magnetic field.

Einstein predicted and later proved that light when passing close to large bodies, such as our sun, is bent. The stream of electrons in a TV tube is also bent in the same fashion by a magnetic field. Here we see our first glimpse of the relation between electrified bodies and gravity.

Faraday, who found the relationship between magnetism and electricity, gave us the dynamo and electric motor. He also investigated the action of magnetism on light and his experiments proved successful. He then looked for the relationship between gravity and electro-magnetism, but failed to find it. This work was carried on by James Maxwell who showed the mathematical relationship between gravity and magnetism and found they obey the same laws. Einstein in his Unified Field Theory, put forward in 1950, also attempted to unify the laws of gravity and the laws of electro-magnetism. Up to the time of his death, he was perfecting this theory.

Under electro-magnetic forces we must include radio waves, heat, light, ultra violet rays, infra-red rays, X-rays and a host of others. Furthermore, the relationship with gravity *must* hold good for all of these.

### Magnetic and Gravitational Fields

Let me now show how all this is connected with our anti-gravity machine. It is well known that if two fields of a magnet which are similar in character, that is to say two south or north poles, are brought face to face the magnets will be repelled. Similarly, two sub-nuclear particles which are the same, repel each other because they have the same electro-magnetic field.

If we can give our machine an electro-magnetic field which is similar in character to the gravitational field of our planet, we will leave this Earth at the possible speed of light. We would then travel along the lines of force of the gravitational field of our planet

as well as the lines of the fields of every body in the Universe. Einstein maintains that these fields which are ever present, have no end and spread out in all directions, intertwine with each other in the most complex fashion, but the strength decreases as the square of the distance from where they originated.

The problem is how do we switch our fields on and off? It has been found that there are sub-atomic particles being generated in the powerful nuclear accelerators which have the capacity to change the orbital motion of electrons and consequently the magnetic field (as will be explained later) of the substance they are bombarding. The exact nature of these rays is not yet fully understood, but they are easily generated; furthermore, it does not take much to change the orbital motion of electrons within the atom. It can be done in any physics laboratory.

### Magnetism and Atomic Structure

Assuming that the reader has a knowledge of the electron theory, I would briefly like to explain how normal magnetism is brought about within the atomic structure by changes rendered in the orbital motion of the electrons.

About our positive nucleus we have the electrons spinning on different energy levels of which there are seven in number known as the K, L, M, N, O, P and Q levels. The electrons not only spin around the nucleus, but also about their own axis. Since our electron is flowing in a definite orbit, it is generating a flow of electric current which would produce a field, as current would which flowed in a wire. The electrons do not rotate in coplanar orbits, but if they did, each atom would be a minute magnet with a definite north and south pole. It would arrange itself with the neighbouring atoms so that they would align themselves in parallel directions which would give us a magnetic substance with a powerful field around it. This is known not to happen.

There are, however, certain substances which have definite orbits of rotation, but the electrons in the same atom neutralise the magnetic fields of the others because the electron spin on the axis for one electron is in an opposite direction with respect to the spin of an electron on the same energy level.

The element iron for example has an atomic number of 26. The electrons in the K, L, M and N shells are 2, 8, 14, and 2, respectively. The K level orbit, which is nearest the nucleus, contains two electrons the axial spin of which is considered to be in opposite directions, hence the magnetic fields of each are neutralised. In the L shell are eight electrons, four spinning in one direction, four spinning in the opposite direction. In the M shell a difference arises. Nine electrons are thought to be spinning in one direction and five in the other. In the N shell the two electrons spin in opposing directions.

Why then does the unbalanced effect in the M shell result in the alignment of all the atoms in the substance and self magnetisation being produced, as was explained for atoms having supposed co-planar orbits? This is due to the thermal disturbances of the atoms and molecules at normal temperatures. It has been found that in ferromagnetic substances there is a certain amount of alignment of atoms, but it does not result in magnetism because the atoms are aligned in groups within the crystal lattices of the metal and are oriented in six different directions. Each group is strongly magnetic, but is neutralised by the other groups which are oriented in five different directions.

This results in the substance being entirely non-magnetic.

The piece of iron is now placed in a magnetic field, such as a current carrying coil. The orientation in one particular direction is increased, which results in a change of direction of all the groups and brings about a powerful magnet. When the current is turned off the groups rearrange themselves and the metal is no longer a magnet. In steel there is a tendency for the groups to remain oriented in one direction after the current is switched off, hence forming a permanent magnet. Heat the metal and the magnetisation is lost due to the thermal agitation of the atoms. A constant change in the external field, as that of an alternating current, will also demagnetise the substance.

### Diamagnetism

I have explained what happens in ferro and paramagnetic substances; there is a further class of substances which are said to be diamagnetic, all the non-conductors belong to this group as well as a few metals and alloys. A diamagnetic substance is one which has a small magnetic susceptibility and is weakly magnetised by a magnetic field in such a way that it moves towards the weakest part of the field and at right angles to the lines of force.

It will now be seen that this type of substance is repelled by the field in which it is placed, hence the field set up in the diamagnetic substance must be characteristically the same as the field in which it is placed. This type of magnetism is also due to orbital changes in axial moment of the electrons. This phenomenon occurs in all substances to some extent although the effects of ferromagnetism are greater and so more noticeable. The most diamagnetic substance known is bismuth.

### Experiment in Diamagnetism

We can perform with suitable apparatus an experiment to demonstrate diamagnetism. This experiment is the basis on which an anti-gravity craft would operate and is also the starting point of the investigations on anti-gravity.

Our apparatus is simple. We need a powerful electro-magnet and a circular aluminium disc. This disc is placed on the solenoid and the current is switched on. A magnetic field is set up and aluminium being strongly diamagnetic is repelled with considerable force and speed. By shaping the disc so as to obtain an airfoil, amazing results can be obtained.

This then is the principle of our anti-gravity craft. We make our space-ship diamagnetic and travel along the lines of force of the planets. The machines would be constructed of such metals as aluminium and bismuth. This opens a new field for research to find alloys even more diamagnetic than bismuth.

We have seen that changes in orbital motion are easily brought about although it might be many years before we see machines utilising this principle in the sky. Perhaps the flying saucers are gravity ships manned by intelligences from space and using the gravitational fields of the universe as their tradewinds! We have yet to establish a really sound theory to relate gravity and electromagnetism. These problems are the ones that vex the scientists and we must patiently wait for our weightless anti-gravity machines of tomorrow. In spite of the new race to conquer space by rocket power, I am convinced that the exploration of our solar system will not come until we have our anti-gravity space ships.