

SECRET

MAR 10 1950

PRELIMINARY REPORT ON INITIAL EXPERIMENT GEO-MAGNETIC RELEASE

OBJECT

The object of the experiment was to check qualitatively certain theoretical points concerning the possibility of converting geo-magnetic energy into electrical energy.

THEORY

It was reasoned that if a core of ferro-magnetic material such as silicon steel is placed in the earth's magnetic field the flux through the core will be equal to μ times H. If a coil is wound around this core in such a manner that the maximum flux passes through the coil we have a condition under which any change in flux through the coil will result in an e.m.f. being induced in the coil. If the μ of the core can be changed by some means, then the flux passing through the coil will also be changed. If a valve circuit (rectifier) is incorporated in the secondary winding then energy will be withdrawn from the collapsing magnetic field during 1/2 of the cycle only. If the μ of the core varies sinusoidally the flux will be established by virtue of the MFF of the earth's field and will collapse as the μ of the core decreases and in the course of collapse will give up a portion of its energy to the secondary circuit.

APPARATUS

The equipment for checking the foregoing qualitatively consists of a small choke coil such as is used in power supply filters having an inductance of approximately 7 henries with zero magnetizing current and a core of silicon steel. A shield was wound around the

core in such a manner as to effectively separate the winding already on the core from the secondary winding which was to be wound thereon. The shield was insulated so that it did not comprise a closed circuit. A secondary winding consisting of 25 turns of magnet~~ed~~ wire was wound ^{around} through the insulated shield in such a manner that the mutual inductance between the coil and the core of this winding was zero.

OPERATION

The existing coil which was an integral part of the choke was connected in series with the plate circuit of a 6L6 radio tube, the grid of which was driven from a 15 Kc. oscillator. The 6L6 tube was selected because its plate current of 50 milliamperes practically saturated the core thus reducing its permeability μ to a low value and the excitation on the grid of the type allowed a plate current excursion such that the current reached almost zero so that the μ of the core should increase to a higher value. The secondary winding was connected to a voltmeter having an ^{AV} external resistance of 2000 ohms.

OBSERVATIONS

It was observed that when operating with the core oriented in line with the earth's magnetic field the secondary voltmeter gave a reading of approximately .3 volts. When the core was turned at right angles to the earth's field the voltage dropped to zero. No measurable change occurred in the excitation circuit for the various orientations of the core.

CONCLUSIONS:

It was therefore concluded that the energy which operated the voltmeter came through the collapse of the earth's field which was induced in the core.

In view of the fact that the apparatus was extremely crude and very difficult of precise measurement it was concluded that the observations were purely qualitative in nature and that more suitable equipment should be built upon which adequate measurements may be made to ascertain whether or not the energy in the secondary circuit actually came from the collapse of the earth's field.