think that he is unaware of the qualifications and detailed side arguments that he has discarded in the quest for simplicity. The broadcasting organizations are themselves responsible partly for the lack of enthusiasm among scientists to take trouble and time over the preparation of programmes. One of the main reasons is that the fees paid to eminent scientists to appear in programmes are often small, much lower than those of light entertainment artists. There is little honour in taking part in a programme that values one's services and skills at 10 guineas.

The relationship between scientists and the broadcasting organizations is important. It is essential that scientists should realize that improvements are needed on both sides. The scientific bodies which preach loudest about the need for scientific popularization could make their biggest contribution by trying to convince their members that an appearance on television is no shameful thing and that a man who gets asked more than once is not necessarily a charlatan.

[1] Presented in *J. Roy. Soc. Arts*, **104**, No. 5064 (November 1961).

NEW SCIENTIFIC INSTALLATIONS IN FRANCE

AMONG new technological installations described in the July–Sept. 1961 issue of *French Science News* is one developed by J. Gasnier at the Centre d'Études Nucléaires de Grenoble, Section d'Électronique. This is a device for high-precision temperature regulation below ambient temperature. In order to study the magnetic drag between ambient temperature and $-50°$ C., the temperature of an enclosed space is regulated to within 2/1,000° C. This regulation is obtained by adding an additional drift-correction loop to the standard regulation loop. The equipment, which is entirely automatic and independent of the mains, is designed to operate for a 48-hr. regulation period.

L. Malnar, Compagnie Générale de Télégraphie sans Fil, and J.-P. Mosnier, École Normale Supérieure, Paris, have developed an optical pump magnetometer for studying the spatial field: its operation is based on the magnetic resonance of cæsium vapour. Resonance transitions are produced by a high-frequency field created by Helmholtz-positioned coils supplied by a generator. The latter is frequency modulated at 80 Hz. in order to cover the resonance ray on both sides of its mean value. The measurement is carried on the $F=4$ transition group, which is assimilated to a single ray of approximately 80 Hz. in width. Prototype sensitivity is at present 1γ; it is to be increased to $0{\cdot}1\gamma$.

A rapid neutron critical assembly was brought to divergence on March 8 in a military centre of the Commissariat à l'Énergie Atomique. This unit, which has been named *Rachel*, is the first of its kind in France. It consists of a metallic plutonium core surrounded by the associated control, measurement and safety instruments. It is to be used for investigating the physics of non-decelerated neutrons; it has not been possible to carry out such work with the reactors in service up to the present time, since their moderating substances slow the neutrons down.

L'Office National d'Études et de Recherches Aéronautiques has put two hypersonic wind-tunnels into service, in which the speed of the fluid content is more than five times that of sound. In the first wind-tunnel, long blasts (10–20 sec.) occur at Mach 7 in a 30-cm. diameter jet, and simulate pressures in an altitude range of 25–40 km. The second tunnel gives short blasts at approximately Mach 20 in a 50-cm. diameter jet. The flow-generating temperature, of approximately 5,000°, is obtained by an electric arc. Blast time, limited to 20 msec., none the less allows the measurement of pressure, heat flux and stress on models. The altitude simulated ranges between 30 and 70 km., according to the vehicle under consideration.

MEASUREMENT OF THE THICKNESS OF VACUUM DEPOSITS USING THE ELECTRON MICROSCOPE

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BRADLEY[1] has shown that the condensation of hydrocarbon molecules on surfaces exposed in demountable vacuum systems provides a means for measuring the thickness of vacuum-deposited films when they are afterwards examined in the electron microscope. The results now to be described show that the accuracy of the new technique is only limited by the resolution of the electron microscope and by real variations in the thickness of each deposit, these being independent of the specimen material. The minimum and maximum limits of film thicknesses that can be measured have also been investigated.

Specimen Preparation

For all but the very thinnest specimens, the method of preparing the specimens is similar to but rather simpler and easier to manage than that described by Bradley[1]. A carbon film about 500 Å. thick was deposited[2] on freshly cleaved mica, and then a narrow strip, 1–2 mm. wide, of the film was removed by dry-stripping with 'Sellotape'. The specimen was then deposited at a known angle, θ, on to the exposed mica strip and at right angles to the edges of the carbon film. Afterwards the combined carbon and specimen film was floated off the mica on to a distilled-