above (about 100° C.), although with the advent of guided missiles and supersonic aircraft a number of components have been developed capable of operation at 500°–600° F. (about 300° C.). If high-speed flight is to make considerable advances in the future, bulky power-consuming equipment for cooling will have to be eliminated, and components must be capable of working at very much higher temperatures. By suitable choice of such metals as titanium and special ceramics, General Electric has developed—so far only at the laboratory-level—electronic components that function at temperatures up to 1,500° F. (about 800° C.) and also at a high temperature in the neutron flux of the graphite reactor of the Oak Ridge National Laboratory. Among the equipment shown at the demonstration were a radiogram and valve amplifier operating in an oven at 1,500° F., and an electric motor in the flame of a blow-lamp. In some respects, the new 'heaterless' valves are an improvement on the more conventional pattern in that the power supply normally required for heating the filament is eliminated, and it is thought that this new type of valve, if operating under constant high-temperature conditions, may have a superior performance.

The French Atomic Energy Programme

ISSUE No. 16 of *Laboratoires*, the quarterly review in French and English of French scientific and technical developments, is devoted to the French atomic energy programme, and in particular, to the peaceful applications of atomic energy and to France's participation in the International Conference on the Peaceful Uses of Atomic Energy held in Geneva last year. J. Guéron, director of the French Atomic Energy Commission, contributes a brief foreword in which he stresses the rapid expansion of the French atomic energy programme since the adoption in 1952 of a five-year plan for atomic equipment. Prof. Y. Rocard reports briefly on the Geneva conference and the associated industrial exhibition, and Prof. P. Auger follows with a most interesting article on the training of research workers in the field of atomic energy, in which he maintains that care should be taken to avoid the introduction of specialization directed towards the new fields of science and technology at too early a stage. It will be necessary to modify the university curriculum so that student engineers and scientists are made familiar with the new domains of physics, chemistry and biology which are now assuming major importance; but the practical aspects of particular applications should not be given excessive importance. They should form part of a training programme to be given later at specialized centres probably attached to the larger establishments where the technique is being employed. Future research workers and engineers should be encouraged to extend their basic knowledge to fields outside their own professional spheres; for example, the chemist to radioactivity, and the mathematician to nuclear physics. In addition, Prof. Auger emphasizes the importance to the atomic scientist and engineer of ancillary services, the provision of an adequate number of trained technical assistants, a good information service and library, and the time and facilities to attend scientific meetings and conferences and for visits to other research establishments. Other articles in the issue are on automatic instruments for recording radioactivity, by Prof. P. Bonet-Maury, and on analogue computor simulation of the kinetic performance of nuclear reactors, by J. Girerd. Finally, there is a detailed illustrated technical review of the various exhibits of French instruments and equipment displayed by the forty-six French firms which took part in the international exhibition at Geneva last August.

Studies of the Upper Atmosphere

ONE of the classic works of meteorology is W. H. Dines's discovery (M.O. Geophys. Mem. No. 13; 1919), using his balloon-sonde observations, of the positive correlation between temperature in the troposphere, pressure in the upper troposphere, and the height of the tropopause and the negative correlation between these quantities and temperature in the stratosphere. Thus low pressure in the upper troposphere goes with a cold troposphere and a low tropopause. This discovery was the death-blow to the convective theory of temperate-zone depressions, which required depressions to be relatively warm. Using recent radiosonde observations, J. K. Bannon and A. Gilchrist (*Quart. J. Roy. Met. Soc.*, **82**, 58; 1956) have repeated and much extended Dines's work. Bannon and Gilchrist used radiosonde observations at Arctic Bay (North Canada, lat. 73° N.), Lerwick, Larkhill, Malta, Aden and some equatorial Pacific stations for heights up to the level where pressure is 60 mb. (about 63,000 ft.). They confirmed Dines's results for the Lerwick and Larkhill observations and found the same result for Malta in winter and Arctic Bay in summer and autumn. At Aden and the equatorial stations and at Malta in summer no correlation could be found, and at Arctic Bay in winter and spring the correlation was less marked than at the British stations. Malta in winter and Arctic Bay in summer and autumn have a similar meteorological regime of travelling depressions and anticyclones and changing types of air-mass to that of the British Isles throughout the year. In summer, however, Malta is mostly in the area of the subtropical anticyclone, and Arctic Bay in winter and spring is in the area of a fairly constant low-pressure area with little change of air-mass. The conclusion is that the Dines correlations are characteristic of travelling depressions and anticyclones with frequent changes of air-mass. Dines evaluated correlations between tropospheric temperatures and pressure up to 9 km. (30,000 ft.). Bannon and Gilchrist found the correlation decreased rapidly at greater heights, so that the influence of travelling depressions and anticyclones was only half at 60 mb. what it was at 150 mb. (about 45,000 ft.).

Photometry of Telescopes and Binoculars

THE booklet "Photometry of Telescopes and Binoculars", which is No. 14 in the series of "Notes on Applied Science" produced by the National Physical Laboratory, Teddington (pp. 18+2 plates. London: H.M.S.O., 1955; 2*s*. net), explains the objects and methods of some of the test work performed for industry by the Laboratory. The quality of a telescope is judged by its definition, that is, its power of producing a sharply defined image of a distant, often inaccessible, object; but this quality is extremely difficult to express quantitatively and is not dealt with in the booklet. However, closely connected with definition is the question of contrast. If there is little difference in contrast between an object and its surroundings and the contrast-rendering properties of the telescope are poor, the image may be undetected. Veiling glare is a measure of the light scattered or reflected in the instrument which, falling

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