

New Hawker 'Hurricane' Aircraft

INFORMATION recently released upon the Mark II type of this aeroplane is of a certain technical interest. It has become a general fighter in use, and, as such, has now been fitted with a new series Rolls-Royce engine with a two-speed supercharger. This gives improved speed and climb at greater altitudes, while maintaining its good performance at lower heights. The principal change is in its armament, which is now four 20-mm. cannon or twelve machine guns, in the place of the original eight machine guns. The twelve machine gun type with improved performance is intended for dealing with enemy fighters when 'in-fighting', at short range. For this a maximum deluge of bullets for a short period is needed, while the enemy machine is in range. The cannon type is better for attacking the comparatively slow-moving bomber, shipping, or ground targets. The small individual shells are more effective against this type of target when a hit is scored, and the chances of hitting are sufficiently good as the target is comparatively slow in manoeuvre, and can be kept in range more easily. Cannon fire is able to destroy enemy aircraft on the ground, armoured vehicles, and even small ships, against which machine-gun fire has been found to be not very effective. In the United States the opinion is held that even larger cannon, 37-mm. type, should be used. The heavier ammunition needed means that a smaller number of shells can be carried, and that the rate of fire is slower, but it is considered that the greater and more widespread damage from the larger shell, when it does score a hit, more than compensates for this.

Wind and Tide

To the layman, the exploitation of natural resources that are now going to waste may appear a good opportunity of getting power cheaply. To the engineer the obstacles in the way of their economic application often appear well-nigh insuperable. Thus the proverbially fickle wind has rarely been regarded seriously for the generation of electricity on any appreciable scale. This is not the opinion of the Central Vermont Public Service Corporation which, according to the *Electrical Review* of August 22, is connecting to its 44-kv. system a 1,000 kw. 2.3 kv. wind-driven alternator, said to be the first of its kind. In describing the equipment *Power* states that the plant, which is installed at a height of 2,000 ft., is expected to run for about 4,000 hours in the year, nearly three-quarters of the time on full load. Possibly the most important feature of the station is its association with a wind-power research laboratory, in which fundamental and engineering knowledge can be gained for the economic design and construction of wind-driven generating units in the future. In contrast to the erratic behaviour of the wind is the exactly predictable ebb and flow of the tide, which in this respect has an advantage over waterfalls that depend upon seasonable and weather vagaries. Its punctuality is not enough, however, to compensate for its intermittent action, and so a

purely tidal scheme would have to be debited with the standing charges on steam plant required for filling in the valleys.

It was estimated to be much less expensive in overall costs to provide 550,000 kw. by steam plant than to harness the River Severn for the purpose. Only by virtually changing the scheme to a more ordinary hydro-electric lay-out could power from the tide compete with coal for generating electricity; that is, by using a large proportion of the tidal energy to pump water to a reservoir for driving other turbines in the slack periods. A similar idea was behind the Passamaquoddy project for producing 80,000 kw. from the River Maine. Even then production cost has been estimated at nearly twice that obtainable with a modern steam plant. As an addendum to his report to the United States Federal Power Commission, the chief engineer, Mr. R. B. McWhorter, envisages an elaborate seventeen-project programme, of which Passamaquoddy would form a part, in which case the cost per kwh. would be substantially less than that obtainable with steam. A great handicap to the development of tidal power is the length of time involved in construction—in the case of the Severn Barrage the capital expended would be unremunerative for about fifteen years. Moreover, contingencies are less easily covered by a reasonable percentage than they are with thermal stations. The favourable margin shown by the British scheme in comparison with steam will have increased materially since the report was published eight years ago. Much would depend on the value of improved road connexions between England and South Wales with which the proposals were associated, but unless some improvement is to be anticipated in the coal position after the War, the report might well be re-examined in the light of more recent developments.

Technical Bibliographies

DURING the past ten years the staff of the Sheffield City Libraries have compiled a number of bibliographies on technical subjects of special interest to research workers and technical staffs of local firms. In the compilation of these bibliographies expert help has been enlisted where necessary, and the collaboration between trained bibliographers and technical specialists has resulted in the production of a very useful series of reference lists, each relating to one specific subject and including papers and articles from technical periodicals as well as books fully or in part concerned with the subject. The fact that all the references can be consulted in the Sheffield City Libraries is a great convenience to local students and workers, although it naturally robs the bibliographies to some extent of completeness. Perusal of typical lists shows, however, that this lack of completeness does not detract substantially from the value of the compilations, a testimony to the thoroughness with which the City Librarian has catered for the needs of local industries in his acquisition of books and periodicals.

Since the outbreak of the War this bibliographic work has found and met an increased demand; an extensive annotated bibliography on steel sheet and strip issued in three parts has been in particularly heavy request from other parts of Great Britain and from overseas. Encouraged by this demand from a wider area, the City Librarian has prepared a list of recently compiled bibliographies; the subjects at present available include: acid tanks; austenitic steels; auto-frettage process; bending, straightening and reeling of steel; bonus systems; cold drawing of steel; cold heading of steel; cold pressing: colloidal metals; colouring of metals; decarburization of metals by hydrogen; electrolytic pickling and polishing; extrusion of steel; fatigue of metals; fluorspar-froth flotation; ingots: segregation and crystallization; patents on rock drill bits; manufacture of steel tubes; polarography; riveting of steel; rolling mills; spinning of steel; steel manufacture and properties; sulphur and phosphorus determination in iron and steel; tool steels; vertical boring mills; workshop practice and machine tools (books only). Applications for copies of any of the lists should be sent, with 3*d.* to cover postage, to the Central Library, Sheffield, 1.

The Lister Institute of Preventive Medicine

THOUGH damaged on two occasions and partly evacuated, the Lister Institute of Preventive Medicine has spent an active year, as shown by its annual report. As usual, the work has covered a wide field, including studies on antigens, phosphorylation in osteoid tissue, fat metabolism, and mucolytic enzymes. The Division of Nutrition, working at Cambridge and East Malling, has continued its vitamin studies. The Cambridge group has in particular investigated the nutritive value of different portions of the wheat grain and has been instrumental in recommending the use of 85 per cent extraction flour with added calcium for bread-making; the national wheatmeal flour is of this extraction, but the decision to add calcium to it has not yet been taken. The nutritive value of yeast has also been investigated, and this work is of particular importance since it is easy to grow yeast on certain waste materials, thereby providing a human food rich in first-class protein and vitamins of the B group. Dr. Zilva, at East Malling, has continued his work on vitamin C.

The Henry Lester Institute of Medical Research

The Henry Lester Institute of Medical Research, Shanghai, has also recently issued its annual report, and this shows that all activities have had to be restricted owing to the war in China. Studies on nutrition occupy a large part of the report, and Prof. Earle, who has recently been visiting Great Britain, states that "it is remarkable how many clinical signs and symptoms among Chinese patients can now be explained in terms of vitamin and mineral deficiency". Apart from many cases of two classical deficiency diseases—beriberi and pellagra—it has recently been found that ariboflavinosis is very

common among the Chinese: more than a hundred cases were investigated during the latter part of the year. Deficiency of riboflavin is the latest recruit to human deficiency diseases, and has been shown by Sebrell to be surprisingly common in the United States. The condition, which includes eye and mouth lesions, undoubtedly occurs also in Great Britain.

Winter Wheat Seed

THE Council of the National Institute of Agricultural Botany, Cambridge, has decided to offer for sale about a hundred quarters of Steadfast, a winter wheat bred by Prof. F. L. Engledow, of the Cambridge University Plant Breeding Institute. Hitherto the wheat has been grown in the Institute's trials under the number 198 (20*c*). Orders are invited from members of the Agricultural Seed Trade Association, National Association of Corn and Agricultural Merchants, National Association of British and Irish Millers, and other established dealers in seed corn. Steadfast is the outcome of a cross between Little Joss and Victor, and as regards general habit, growth and type of ear is intermediate between the parent varieties. It possesses the excellent tillering properties of Little Joss, and ripens at the same time, and requires the same seed rate. The straw is shorter and its resistance to lodging is superior to that of Little Joss, but it has the same resilience and excellent thatching and feeding properties of that variety. As regards milling quality, Steadfast approximates the bread-making value of the 'softer' English wheats; it does not attain the exceptional quality of Yeoman or Holdfast. It is particularly suited to light and medium soils, but also thrives on the Black Fen, where its resistance to yellow rust will be specially valuable.

A Film Studio Electrical Installation

MR. F. V. HAUSER, chief engineer of two studio groups at Denham (Uxbridge, Middlesex) and Pinewood (Iver, Bucks), comprising twelve stages with a plant capacity of 7,000 kw., recently gave an illustrated lecture about studios to the Association of Supervising Electrical Engineers in London. Confining his detailed description to the Pinewood installation, Mr. Hauser said that the maximum electric demand for studio photographic purposes approximated to 2,000 kw. As d.c. at low voltage is necessary for arc lighting, five electric diesel generators totalling 2,360 kw. have been installed with three-wire distribution at 230/115 v. for studio lighting and at 230 v. only for all other purposes. To reduce noise and vibration, the engine foundations were formed of single island rafts of concrete 2 ft. thick, set 9 ft. below floor level and covered with a 2.5 inch sandwich of 'Coresil' cork on which rested a common concrete block 7 ft. deep, the whole weighing 1,000 tons. The insulating air space around the foundation is 9 in. wide.

To minimize voltage ripple (hum) interfering with sound recording, the generators have graded air gaps, specially shaped pole faces and skewed armature