like foils—were in operation all over the world. Even in rough water, the ride in a hydrofoil is comparatively smooth—better, it seems, than in a craft of the same weight without hydrofoils. Mr Cook said that hydrofoils are cheaper to manufacture than hovercraft, although more expensive than conventional passenger ships.

In April this year, the Ministry of Technology established a working party to examine the design, construction and operation of hydrofoils. Its chairman is Mr A. Silverleaf, deputy director of the National Physical Laboratory, and among its members are Mr Peter Dory, who operates a hydrofoil service between Jersey and Guernsey and the French coast, and Mr M. N. Parker, of the British Ship Research Association. So far the committee has been involved with a survey of the possible markets for hydrofoils; when this is finished it will turn to the research side.

Research on hydrofoils has in fact been undertaken at the Ship Division of the National Physical Laboratory. This has been work of a fairly fundamental nature, including studies of the lift produced by the hydrofoils and the forces experienced by them. There has also been some work on propeller design and on the behaviour of the hydrofoils in waves. Experience at the NPL confirms that hydrofoils ought to be able to manage in conditions at sea. Costs depend greatly on the degree of sophistication. At the NPL, work has been carried out on surface piercing foils, which are likely to need less sophisticated control than other types. With surface piercing foils, changes of speed are automatically taken care of by the shape of the foils. If, for example, the craft slows down and sinks into the water, a greater area of foil becomes an effective lift surface, and the necessary lift is maintained. If speed is increased the effective area of foil is reduced, and the craft retains roughly the same attitude. Fully submerged foils, on the other hand, call for more complicated control systems, more like those of aircraft.

Many of those involved deny that there is any conflict between hovercraft and hydrofoils, and say that there is room for both. In a recent paper presented to a Canadian symposium (and reprinted in *Flight International* on October 19) Mr Christopher Cockerell, inventor of the hovercraft, suggested that hydrofoils would be more suitable at speeds below 40 knots and sizes of less than 100 tons. Mr Cockerell's paper suggests that hovercraft and hydrofoils would be similar in cost, but hovercraft pay a heavy penalty by the lack of suitable engines. With better engines, fuel costs, which amount to 25 per cent of total operating costs, could be reduced by a factor of two or three.

Regulated Surpluses

NATIONALIZED industries in Britain may from time to time complain that they are starved of capital, but there is no doubt that they are generously supplied with decrees by the Government about the conduct of their affairs. The most recent of these is the White Paper on the economic and financial objectives laid down for the various industries (HMSO, 1*s*. 9*d*.). For practical purposes, this document is a revised version of that which appeared in 1961 and which first laid it down that nationalized industries should earn a surplus on the capital employed in their businesses which would be comparable in many ways with the profits earned by commercial industries. The issue is important because of its influence on the prices charged by the several industries and because of the way in which it affects decisions about large items of capital expenditure.

The new document is more a statement of general principles than a set of detailed instructions—the ministers responsible for individual industries will issue them. The Treasury, which determines general policy, suggests that a revision or at least a restatement of policy has been made necessary by the "important technological changes and discoveries of natural resources" since 1961, but it is also clear that the anomalous differences which have sprung up between different industries have contributed to the need for rationalization. No doubt the Government has in mind the way in which the electricity industry, now wishing to invest in nuclear power stations, should aim at a higher rate of return than the gas industry, now unexpectedly prosperous.

Differences like these should be comfortably ironed out by the doctrine, now promulgated, that decisions about alternative forms of capital investment should be based on the same kind of calculation—one which has the effect of making the effective rate of interest a cool 8 per cent. This is the rate the Central Electricity Generating Board will have to use in calculating the economic balance between nuclear reactors and conventional power stations. This, too, is how the Gas Council will have to make decisions about alternative ways of using gas from the North Sea. This is a good start, and it is also sensible that the new statement of policy should emphasize the importance of linking the prices charged for the products and services of the nationalized industries with the marginal costs of providing them. If this means that the new commercial Post Office will charge less for trunk telephone calls, everybody will be delighted. But it is also important that the new policy statement emphasizes that industries need not slavishly aim to earn the surpluses laid down for them, for this may help in future to avoid some of the absurdities about electricity prices which there have been this summer. In other words, the new White Paper is full of good sense, although it does not go so far as to suggest that ministers should in future refrain from nullifying the benefits of sound policy by pointless interference.

More Money for France

A SUBSTANTIAL increase of the spending of the French Government on scientific research and development is allowed for in the budget for 1968, now adopted. There will be an increase of 17 per cent in the total cost of supporting what is described as scientific and technical research through the public purse, so that the amount spent in the year ahead will be approximately 1,591 million francs. The programme for assisting the development of computers, and the programme of space research, will each receive an extra 20 per cent. One of the greatest of the various increases in the year ahead is that for the support of space research, which will be absorbing an extra 68 million francs. Support for science and technology through the educational budget is substantial, and will take an extra 96 million francs in 1968.