also under investigation. Systematic measurements are made of the lift, drag and pitching moment of models at various distances from the ground.

Research is being carried out on the effects of gusts on the stresses in aircraft, and apparatus has been designed for recording the changes in vertical wind velocity in a gust. The use of this apparatus in conjunction with a recording anemometer measuring the mean horizontal wind speed, gives sufficient information to permit the effect of the gust to be predicted.

The performance of a number of high-pitch airscrews covering a wide range of pitch/diameter ratio has been measured and the results have been correlated with modern airscrew theory. Examination is now being made, by means of the hot spot method of flow photography, of the periodic flow through such airscrews, with the view of obtaining a direct experimental check of the basic assumptions of theory.

In the William Froude Laboratory, the effect of waves on ship resistance and propulsive efficiency together with the influence of hull form on this problem is under investigation. Demonstrations were given with a self-propelled model of a high-speed, twin-screw vessel. The speed, the propeller thrust, the amount of pitching and heaving, and the power required to drive the model are automatically recorded during its passage through rough water.

A number of model propellers made of a special aluminium alloy developed in the William Froude Laboratory were exhibited, together with apparatus for conducting tests with model propellers in open water.

The British Waterworks Association

ANNUAL MEETING

THE annual meeting of the British Waterworks Association at Cambridge on June 26 was the occasion for a vigorous and outspoken presidential address by Prof. C. E. Inglis, who, after a brief but interesting account of the origin and early development of the University, reviewed the policy of successive Governments in the past in respect of water supply for the needs of the country, and made some caustic comments on the "futile process of appointing water Commissions and pigeon-holing their reports" which has been its chief characteristic. He added that he regretted to observe the reappearance of the "policy of procrastination which has blighted waterworks legislation for the past 60 years" in the recent announcement by the Minister of Health in the House of Commons that as a preliminary to water legislation of a general character, a Joint Committee of the House of Lords and the House of Commons was to be set up to report "on measures for the better conservation and organisation of water resources and supplies in England and Wales".

Four papers presented to the Conference were more or less technical in character. One on "Water Softening at Cambridge", jointly written by Dr. Suckling and Mr. Philip Porteous, described the particular nature of the water at Cambridge, and the method of softening adopted after full consideration of the relevant data. The Cambridge water, which is derived from the Chalk, a formation which outcrops in the southern half of the county, is stated to be "uniformly clear, bright and colourless" containing no iron or manganese in solution. "The total solids, magnesium content and permanent hardness are not unduly high and sodium salts are only sparingly present. The water is neutral in reaction, the content of carbonic acid is low and no corrosive tendency has been exhibited during many years of use." It is also of excellent organic and bacterial purity. Being convinced on these grounds that the desired degree of softening could be satisfactorily attained by either the lime or the base-exchange process, the final decision of the local water company in favour of the latter was made on the basis of financial and engineering considerations. Tabular analyses are given of the water before and after softening, the total hardness of the untreated water being 24·0 (temporary hardness, 17·5; permanent hardness, 6·5). After treatment and blending, the total hardness (entirely temporary) is 11·5. The softened water sent into supply is described as "clear, bright, colourless, odourless and palatable". The water-softening plant consists of six units, each of 9 ft. diameter, capable of delivering "zero hardness" water continuously at the rate of 16,000 gal. per hour for 10 hours, after which it is put out of commission for regeneration. Each cylinder contains about 10 tons (420 cu. ft.) of Doucil, a synthetic zeolite, and is supported on a 12-in. bed of graded gravel. The synthetic zeolite was chosen in comparison with natural zeolite on financial and engineering grounds as in the case of the process. The salt consumption for regeneration is guaranteed not to exceed a rate 5,600 lb. per million gallons of water softened to zero hardness.

The paper by Mr. Philip Ulyott on "Biological Research in Relation to Water Supply" was a brief statement of the results of modern investigation in the subject, and of the sequence of events connected with plant life in an aqueous environment. A lengthy paper, full of interest from the historical and engineering point of view, was contributed by Mr. H. C. Darby on "Windmill Drainage in the Bedford Level" in the southern part of the Fens. Writing in 1748, Thomas Neale states that "there are now no less than two hundred and fifty [windmills] in the Middle Level. In Whittlesey parish alone I was told by some of the principal inhabitants there are more than fifty mills and there are, I believe, as many in Donnington with its members. I myself, riding very lately from Ramsey to Holme, about six miles across the Fens, counted forty in my view." But, as Mr. Darby points out, the windmill was a "wayward co-operator at the mercy of wind and gale and frost and calm. It was never powerful and it never provided a satisfactory solution to the problem of clearing water from the drains." Finally, there was a paper of a financial and administrative character by Mr. T. G. Rose on "Modern Methods of Management Control".