regular scavengers, to which the dung of seals did not come amiss.

The chief food of the millions of penguins and tens of thousands of petrels was the opossum shrimp (*Euphausia antarctica*), and when one remembers the vast numbers of this little crustacean consumed daily by the birds on Laurie Island alone, one can only compare their numbers in the sea with the grains of sand upon its beaches.

The Scottish National Antarctic Expedition is to be heartily congratulated on the excellence and importance of its ornithological work. Mr. Bruce, the leader of the expedition, has presented a complete set of the South Orkneys and other birds collected during the voyage of the *Scotia* to the Royal Scottish Museum, Edinburgh.

For the loan of the blocks from which the pictures have been reproduced we are indebted to the editors of the *Ibis*.

WM. EAGLE CLARKE.

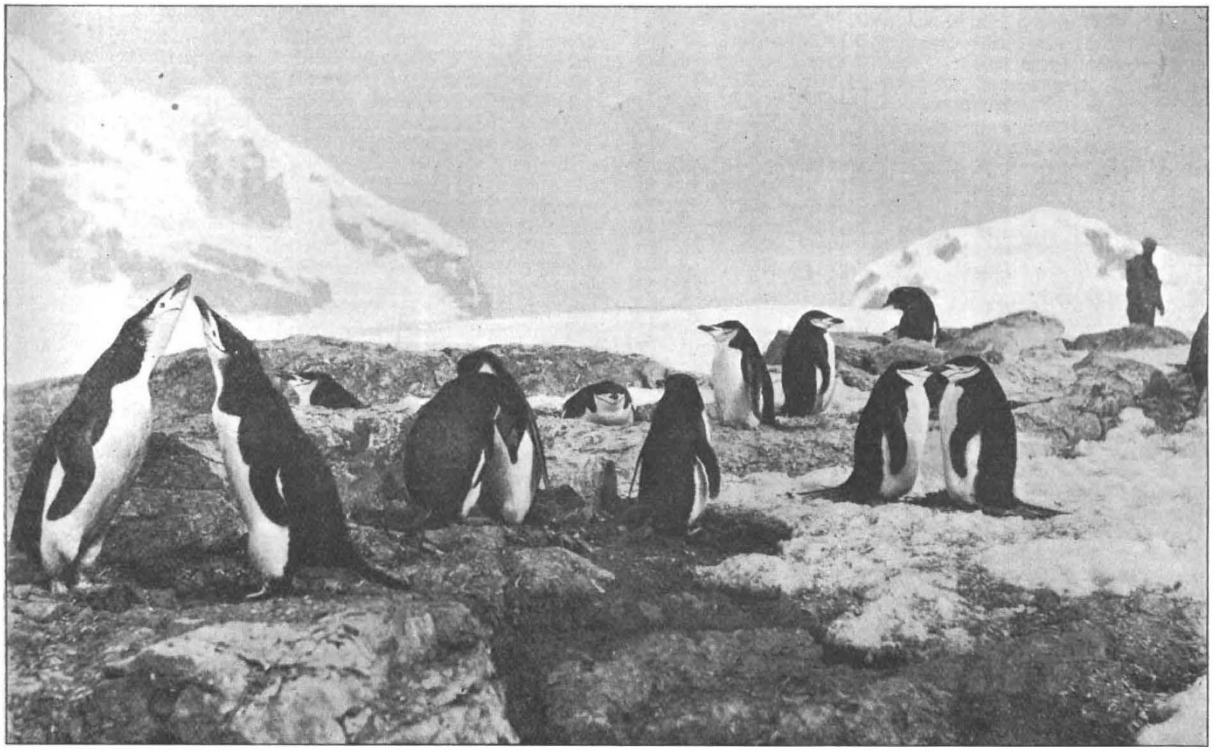

FIG. 2.—Ringed Penguins courting (Brown's Bay).

INSTITUTION OF NAVAL ARCHITECTS.

THE annual general meeting of the Institution of Naval Architects was held last week, commencing Wednesday, April 4, and being continued over the following Thursday and Friday. A full programme of twelve papers had been prepared by the secretary, Mr. R. W. Dana. The subjects dealt with were of various interest, vessels fitted with internal combustion motors occupying a good deal of attention. There was, however, no paper on the steam turbine.

On members assembling on the morning of Wednesday, the president, the Right Hon. the Earl of Glasgow, took the chair, and after the usual formal business had been transacted, proceeded to read his annual address. He referred to the launch of the large line-of-battle ship *Dreadnought*, and gave certain figures relating to the Navy Estimates. Reference was made to the proposed experimental tank at Bushy. There had been, he said, a general appeal to members of the institution for financial support, but, as the result of preliminary inquiry, it had been ascertained that a certain proportion of the amount required for building and equipping such a tank would be guaranteed by private firms and public bodies. It was obvious that the condition of shipbuilding at the time the proposals were formerly made did not favour the movement, and it was therefore decided to suspend action. Since the scheme was first mooted, additional private experimental tanks had been either laid down or projected by some of the great shipbuilding firms of the country. Such tanks as these, however, could never supply the need that existed for pure research. The council had therefore decided to call together the committee that had the matter in hand, and ascertain the views of the members on the present position of the scheme, and the prospects of its being brought to a successful conclusion. Should the shipowners of the country be unwilling to subscribe the comparatively small amount needed to build, equip, and maintain such a tank, nothing would remain but to abandon the scheme and dissolve the committee. The president hoped, however, that, before such a conclusion was reached, a fresh effort might be successfully made to carry out upon scientific lines a work of vital importance to the development of naval architecture in this country.

The first paper read was a contribution by Admiral C. C. P. FitzGerald, the subject being the new scouts recently designed for the Royal Navy. Details of these vessels were given, and the subject of naval scouting was discussed both from the strategical and tactical point of view. A discussion followed, in which several naval officers took part, and it was pointed out that the scouts were analogous to the old 36-gun frigates, these being the most powerful ships that could be detached from the fleet without weakening the line of battle.

Sir Edward J. Reed next gave an account of the vessels he had designed for service in the colonies. They were of various descriptions, consisting of both screw and paddle boats, the former being of the ordinary or of the tunnel-screw type, whilst both stern-wheel and side-wheel boats were used on the shallow waters of colonial rivers.

On the second day of the meeting the proceedings opened by Mr. R. E. Froude reading a paper on yacht measurement rules, and the late International Conference on Yacht Rating. Delegates from different countries attended this conference, but America did not send any representatives, a matter which was to be regretted. The French delegates abandoned the position they originally took up, the formula they had brought forward not being pressed. The formula ultimately agreed upon by the conference was

$$\frac{L+B+\frac{1}{2}G+3d+\frac{1}{3}\sqrt{S-F}}{2},$$

where L = length, B = beam, G = chain girth, d = girth difference (*i.e.* skin girth minus chain girth), S = sail area, and F = freeboard. The reasons on which the formula was based were set forth in Mr. Froude's paper, and were also dealt with in the discussion by which it was followed.

Two papers on motor-boats followed. The first was by Mr. Linton Hope, and dealt with the speed of motor-boats and their rating for motor purposes, and the second was by Mr. James A. Smith, and was on the design and construction of high-speed motor-boats. These papers were read consecutively, and discussed together. The Marine Motor Association has adopted a formula for rating motor-boats for racing purposes. It is as follows :—

$$(P_2/A)+\sqrt{L}=\text{rating},$$

where P = motor-power, A = immersed sectional area at the point of greatest beam, and L = length. Motor-power is obtained by the following formula :—

$$\frac{A\times S\times R}{C}=MP,$$

where A is the total piston area of all cylinders in square inches, S = stroke in feet, R = maximum revolutions per minute, and C is a constant equalling 1000 for 4-cycle and 600 for 2-cycle motors. Mr. Hope gave particulars of a large number of existing motor-boats, and the lines of several of the best known. The most interesting part of his paper, however, was a diagram giving curves of speeds and ratings of a large number of existing boats, the data being obtained either from racing records or trials made specially. Mr. Smith, in his paper, also referred to the methods of handicapping motor-boats by a rating rule, and gave particulars of certain of the best known recent craft of this type. A discussion followed, in the course of which Mr. Froude objected to the formula adopted because it was not homogeneous, as it included as factors both length and area.

At the evening meeting on Thursday an interesting paper was read by Mr. J. E. Thornycroft on gas engines for ship propulsion. Particulars of different types of producers were described and illustrated. A large part of the paper was taken up by a description of the Capitaine system. This consists of a suction producer and a gas engine. It had been fitted into a yacht which took part in the reliability trials at Southampton last year. It had also been fitted in a canal barge which recently made a trip from the Thames through the canal system of England to Birmingham, Manchester, and back to London by way of Oxford. These practical illustrations are considered sufficient proof that the system can be applied to marine propulsion. In the discussion which followed the reading of the paper, the chief point raised was whether bituminous coal could be used in a suction producer. Up to the present anthracite has been the fuel employed, the bituminous coal being subjected to caking in the producer, and thus stopping the working. Mr. Thornycroft stated that Mr. Capitaine was endeavouring to solve this problem, and had already constructed a producer which appeared to answer the purpose.

A paper was next read by Prof. R. S. Weighton, of Newcastle, the subject being the efficiency of surface condensers. In this paper the author described a new form of condenser which was presented to the engineering laboratory of University College, Newcastle, by Messrs. Richardson, Westgarth and Co. Very exhaustive tests had been made, there having been 400 full experiments in all. The results of these were plotted, and given in tables and diagrams accompanying the paper. The condenser is of the surface type, fitted with tubes on the general principle adopted in marine condensers. The tubes are divided into three nests, each nest being placed in a separate compartment. Water circulates through the tubes and the steam amongst them. On entering the first compartment a large part of the steam is condensed in the usual way. In place, however, of allowing the resultant water to flow over all the remaining tubes, it is trapped by means of a diaphragm, and flows at once to a receptacle at the bottom of the condenser. The steam that remains uncondensed flows into the next compartment, and circulates amongst the second nest of tubes; here a further quantity is condensed, and the water again trapped off. Any remaining steam is then condensed in the third compartment. From the voluminous tables attached to the paper it was to be gathered that for a given size of condenser and a given volume of cooling water a much larger quantity of steam could be dealt with in the form of condenser described.

On the last day of the meeting, Friday, April 6, the proceedings commenced with a paper on freeboard rules, the author being Mr. J. Foster King. The paper explained the difference between the British and the German rules in regard to freeboard, the latter allowing a deeper lading than in the case of vessels belonging to this country. For some time past the Board of Trade has been giving attention to this question, and amendments of the load-line tables have been under consideration. The President of the Board of Trade has given his sanction to amended rules and tables, such as are shown by the author in his paper, so as to bring the practice of this country more in conformity with the German rules, thus removing certain disabilities under which ships flying the British flag labour in comparison with German competitors.

A paper by Mr. J. L. Twaddell on the overhead wire cableway as applied to shipbuilding was next read. This system of transporting material on the building slip has been installed at Newcastle under the superintendence of Mr. Twaddell. It takes the place of the more elaborate overhead gantries and electric travelling cranes which have been a marked feature in some of our best equipped shipyards. In some respects the cableway is more flexible and convenient, but the durability of the cables was a point raised during the discussion which followed the reading of the paper. Experience will show how far this may prove a defect in the new system.

A paper by Mr. Alex. Murray on the introduction of cranes in shipyards dealt with a subject of a similar nature, and served to illustrate how enterprising German shipbuilders have proved themselves to be in the equipment of their yards. The cantilever cranes and tower cranes erected in one German yard, and illustrated in the paper, are of the most elaborate, and must be also of the most costly, description.

A paper by Mr. Herbert Rowell on oil-tight work in ships of light construction gave particulars of riveting and other details of strengthening surfaces necessary to make steel-plated vessels oil-tight.

The last paper read was by Mr. J. R. Barnett, and gave particulars of a number of steam yachts built within the last twenty-five years.

PHYSICAL AND CHEMICAL CHARACTERS OF HUFF.

AT a recent dinner of the Royal Society Club, Major MacMahon, who represents the Royal Society on the governing body of Winchester College, was so good as to present to the club a quantity of huff—a variety of ale for which the college has long been famous. It is brewed (from malt and hops only) in March of every other year, and is the "duplex visia" or "double beer" of Shakespeare, called "huff cap" in Greene's "Looking Glass for London and England, A.D. 1594," "because," according to the editor, "it inspirited those who drank it to set their caps in a huffing manner." The sample offered to the club was stated to have been ten years in bottle. In appearance it was clear and bright, and of a deep brown colour. Its taste was that of a well-hopped ale of high alcoholic strength.

As several members of the club expressed a desire to know something of the composition of this fine old ale, and in particular as to how it compared in character with