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The Editor is always glad to receive for examination illustrated articles on subjects of timely interest. If the photographs are sharp, the articles short, and the facts authentic, the contributions will receive special attention. Accepted articles will be paid for at regular space rates.

GOOD NEWS FROM PANAMA.

The latest official report from Panama gives some very reassuring facts regarding the question of seepage of water through the ground in the neighborhood of the Gatun dam. It will be remembered that in the controversy over this dam, M. Bunau-Varilla and others claimed that the head of eighty-five feet of water in the Gatun dam would probably produce a heavy seepage, if not through the body of the dam itself, then through the underlying material of the valley bottom on which the dam was built. The engineers of the canal, on the other hand, assert that not only will the body of the dam itself, which is to be deposited hydraulically, be so compact as to preclude any possibility of seepage, but that the subsoil in the valley is naturally impervious, or practically so, to water.

Partial confirmation of the engineers' statements is now afforded by the conditions which have developed during the excavating of that portion of the canal which lies between the Gatun locks and the sea, where one of the steam shovels has reached a depth of 32 feet below sea level. The excavation in which the shovels are at work is kept dry by four 8-inch pumps, and ordinarily these pumps are not run at their full capacity. When it is considered that a dike, a few feet in thickness only, keeps the water in the old French canal from flowing into the trench; that the sea is within two miles of the excavation; and, furthermore, that the Mindi River flows within a few hundred yards of the ditch, we are quite in agreement with the engineers that "there has been surprisingly little seepage into the excavation since the work was carried below sea level." During the latter part of June, the shovel on the lowest level was obliged to suspend for a few days on account of the inability of the pumps to throw out the water that was coming in; this, however, proved to be only a temporary condition, and the shovels were soon able to resume work. It does not take an engineer to understand the significance of these facts as bearing upon the security of the Gatun dam.

NAVAL ANNUALS OF 1909.

The public interest in naval affairs, which has been noticeably on the increase during the present decade, has received a decided stimulus from the introduction of the "Dreadnought" type of battleship and its dramatic effect as shown in the so-called British panic over the activity of Germany in rebuilding its fleet along "Dreadnought" lines. Hence, the appearance of the two best-known naval annuals, those of Brassey and Jane, affords much timely information on a subject of vital importance. The older annual, which opens with a quotation from the speech of the First Lord of the Admiralty on the Navy Estimates made last March, "The safety of the empire stands above all other consideration. No matter what the cost, the safety of the country must be assured," is divided into the customary four parts. The first contains general articles on naval subjects of prime importance, and is enlivened by some excellent half-tone engravings from wash drawings of the more notable of the latest ships built or building for the navies of the world. Part two contains Brassey's familiar list of British and foreign ships, which includes the class, displacement, dimensions, horse-power, builder of ship and engine, dates of launch and completion, cost, the position and thickness of armor on the ship; the gun positions; the armament, speed, and coal capacity. Following this are plates of the typical warships of each navy, including outboard profiles and deck plans, with a summary of the principal elements of each ship given below. This summary is a new departure in this

year's Annual, and adds greatly to the value of the plates. Part three is devoted to articles on armor and ordnance, and is followed by sets of tables, giving full details of the dimensions, velocity, energy, and penetration of every gun manufactured by the principal navies and by the leading private manufacturers of ordnance. Part four, embodying the First Lord's Memorandum, gives a great variety of information as to expenditures, personnel, condition of the ships, arsenals, dockyards, etc.

There is no more satisfactory way of conveying much information regarding a warship in a limited space than is found in a broadside photograph combined with a plan and side elevation. If the latter be freely dimensioned and the group of illustrations be supplemented by a tabular description, the reader is put into possession of a *mutuum in parvo* of the particular ship described. Jane's "Fighting Ships" is modeled on this plan; and since it contains this information regarding every ship of importance in all the navies of the world, big or little, it can be seen the work is remarkably complete. Naturally, in view of the little argument between Great Britain and Germany on the subject of battleship construction, readers of the Annual will turn first to the pages dealing with the German navy. Germany has been unusually successful in maintaining secrecy about her new "Dreadnoughts," so much so that Mr. Jane, in spite of all his assiduity in searching for the latest naval information, has to confess that "it is not possible even now absolutely to guarantee the exact correctness of the set of plans given with this edition." He anticipates regarding them that "there will very possibly be considerable discussion."

Turning, then, to the plates of the new German "Dreadnoughts," we find that the "Westfalen" and "Nassau" (1908) are credited with ten 11-inch 50-caliber guns, mounted in five turrets disposed similarly to those of the original "Dreadnought," viz., one turret forward, one on either beam, and two astern. This on a displacement of 17,710 tons is reasonable and probably correct. We have always, as our readers will doubtless recollect, considered that the crediting of these ships with fourteen and even sixteen 11-inch guns was absurd. The "Posen" and "Rheinman" (1908) are credited with carrying twelve 11-inch 50-caliber guns, on a displacement of 19,000 tons. Commencing from the bow, the first six guns are mounted as in the "Dreadnought"—one turret forward and one on either beam abreast of each other. Aft of the superstructure are two two-gun turrets, placed *en echelon*, and astern on the center line is another turret. This arrangement gives a concentration of six guns ahead and astern and ten on each broadside. The plans of the latest six "Dreadnoughts" of the German navy call for criticism. On a displacement of 19,000 tons they are supposed to carry twelve 12-inch guns in four turrets mounted on the center line, the forward and after turrets each containing three guns. We think it is highly improbable that the three-gun turret will ever be found on the German ships or on those of any other navy. Jane credits the Japanese with carrying fourteen 12-inch guns on their latest design, six of which are carried in two three-gun turrets, one forward and one aft. There is strong objection to the three-gun turret on the ground that a single 12-inch high-explosive shell penetrating such a turret would probably put three guns out of action at once. An even more serious objection is that the greater the number of guns carried upon a single turntable, the slower the rate of fire per gun, unless indeed volley firing be adopted and all three guns are loaded and fired together, a practice which would involve enormous strains upon the turntable. If the guns are fired separately, they must wait upon each other, since the firing of any one gun, or at any rate of either of the outer guns of the three, throws the other two guns off the target and would necessitate a re-sighting. The ideal mounting for speed and accuracy would be to mount each 12-inch gun in a single turret. This, however, would involve too much turret weight and would cut down the number of guns that could be carried. The armament of the German "Invincible" type of battleship cruisers is given as ten 11-inch 50-caliber guns, mounted as in the "Dreadnought," the displacement of the ship being 19,000 tons and the speed 25 knots. The "Bluecher," of 14,760 tons, is armed with twelve 8.2-inch guns.

Next to the German navy, perhaps that of Japan will excite the greatest interest. The two new "Dreadnoughts" which are building, and the three or four others projected, according to Jane, will carry fourteen 12-inch guns on a displacement of 20,750 tons. Since it takes 26,000 tons to carry twelve 12-inch guns in our own "Wyoming," we are at a loss to understand how the Japanese are going to carry two more guns on 5,000 tons less displacement. Either the speed must be less than the 20 knots given, or the armor plan must be considerably cut down. The Annual gives particulars of the five battleships and three cruisers captured from the Russians, or raised after the capitulation of Port Arthur. The "Iwami," formerly "Orel," has not only had her superstructures and smokestacks

cut down, but has been re-armed with four 12-inch and six 8-inch 45-caliber Japanese guns. The "Hizen," formerly "Retvizan," still carries her armament of four 12-inch 40-caliber and twelve 6-inch 45-caliber Russian guns. The "Suwo," formerly "Pobieda," has been re-armed with four 40-caliber 12-inch and ten 45-caliber 6-inch Japanese guns, and her efficiency is therefore considerably increased. The "Sagami," formerly "Peresviet," has been re-armed with four 12-inch 45-caliber and ten 6-inch 45-caliber guns. The re-arming of these ships has provided the Japanese navy with four effective battleships of the pre-"Dreadnought" type.

Very properly Jane has always laid great stress upon the main battery as being the principal determining factor above all others in a comparison of the fighting strength of the world's navies. On this basis he presents a table entitled "Ships Built or Building in the Principal Navies, Armed with Guns Equal or Superior to the 12-Inch 45-Caliber Gun," which is able to attack 11 inches of Krupp armor outside of 7,000 yards range. In this table the adherence for many years past of the United States to the 12-inch and 13-inch gun shows to good effect. As matters stand to-day, Japan comes first, with eleven such ships, followed by the United States with ten, Great Britain with nine, France with four, and Germany with three. In 1910 and 1911 Japan will still hold the first position, with Great Britain and the United States second, France third, and Germany fourth. In 1912 Great Britain will be first with twenty-two such ships, Japan second with seventeen, followed by the United States and France with sixteen each, Germany with thirteen, Austria with seven, and Italy with two. This forecast, however, is, of course, liable to great modification due to change of programmes.

AS OTHERS SEE US.

Any communications from our readers, which throw any light upon what the subscribers desire to find in our columns, are most welcome always to the Editor, whether such letters are in the nature of commendation or criticism. As a rule, the Editor is not able to determine whether certain features or departments in the paper are really appreciated by the readers, unless the friends of the paper will take the trouble to write the Editor and express their opinion or their preferences.

Occasion has arisen in the past when it was deemed desirable to make some change or eliminate some department of the paper, and the Editor has not been aware that such department may have been of the greatest interest to certain readers until a storm of protest leads to his restoring the omitted feature.

The following letters were received by the Editor recently in a single mail, and by their diversity and wide geographical range were of interest to him, and may be so to some of our readers:

A correspondent from Eugene, Ore., writes:

"I have enjoyed reading the SCIENTIFIC AMERICAN immensely, and hope to be able to continue it for years.

"Have a small shop and some tools and have made several things from directions given in the Handy Man's Workshop Department. Such work is, to me, great pleasure, since there is enough—without being too much or having anything omitted—in the instructions.

"I wish you unmeasured success."

The editor of a paper in Michigan writes:

"Allow me to commend you enthusiastically on the fourth-dimension contest. Without taking exception to the work of the committee, I feel very strongly that Mr. Cutler's paper in the issue of July 10th is most timely and valuable, as loose thinking on the part of readers, especially if it favors superstitious conclusions, is too common. What the fourth dimension is not is more important to persons not mathematicians than what it is."

A large firm of manufacturers in Jerome, Ariz., writes:

"We are steady subscribers to the SCIENTIFIC AMERICAN and could not get along without it."

A French correspondent in Paris writes:

"Being now a faithful subscriber, I must come and say to you that in the first place in this paper I read and use your Queries. This for two reasons: First. I do not know any other piece of any other scientific paper which gives me so many fresh and new ideas, in all kinds of fashion. Really, I take out a great deal from them, and I cannot say how sorry I was when several weeks, some time ago, my dear Queries were absent. Second. My second reason for liking the Queries so much is the pleasure one has in looking at the idleness (*sic*) of some fellows.

"Questions such as, 'Which goes fastest, top or bottom of a wheel?' or 'Why does salt freeze in summer (to cool drinks) and melt in winter (to melt snow?)" are a real pleasure to me, exactly as when you read Tit-Bits.

"It is the most diverting part of the SCIENTIFIC AMERICAN. Do not suppress it."