

REVIEW OF THE ATLANTIC FLEET BY THE PRESIDENT.

It takes but a glance at the names of the forty-five ships of the Atlantic fleet which will be reviewed by the President at Oyster Bay on September 3 to realize that this is by far the most formidable assemblage of American warships that has figured on an occasion of this kind. In the various squadrons and divisions will be found representatives of all the latest types of the warships of the United States navy, from the great "Louisiana" of 16,000 tons displacement down to the weird and ever-mysterious submarine of 120 tons. Incidentally the review will serve to present in concrete form a history of the growth of our navy during the past fifteen years. The fleet will be remarkable also because of the fact that it will include not a single ship that can be called strictly obsolete; for the "Indiana" and "Iowa," which date respectively from 1891 and 1893, are sufficiently up-to-date to form very valuable elements in the defense of our coast line and harbors. With the exception of the monitor "Puritan," which, although originally commenced in 1875, was not completed and put into commission until 1896, the oldest fighting ship in the fleet will be the "Indiana," whose keel was laid in 1891, and which received its first commission in 1895. The most important ships (and this is particularly true of the battleships and armored cruisers) have been built since 1901, and the most formidable of these have been put in commission during the past twelve months.

Looking at the fleet as a whole, one is impressed with the very gratifying fact that the bulk of the displacement is made up of battleships and armored cruisers—the types which must fight and win the battles of the present day. With the exception of the "Minneapolis," there is fortunately in the fleet no evidence that our naval constructors and naval secretaries have been afflicted with false ideas as to naval strategy—not, at least, as regards the possibility of winning naval campaigns by hunting for and destroying an enemy's maritime commerce. First and last, the winning of individual sea fights, and the successful prosecution of naval campaigns, will lie with the nations which can put upon the high seas the largest number of well-armed and well-protected battleships and cruisers. If the recent Russo-Japanese war taught one lesson more than any other, it was surely this; and it was only when the flower of the Russian navy, consisting of its latest and most powerful battleships, had been sunk or captured in the Sea of Japan, that the Russian government was willing to consider terms of peace.

The fleet that will gather at Oyster Bay on September 3 will consist of twelve battleships, four armored cruisers, four monitors, four protected cruisers, six destroyers, six torpedo boats, two submarines with their tender, a troopship, provision ship and water ship, and three colliers. By far the most formidable of the battleships is the 16,000-ton "Louisiana," which has recently been completed and placed in commission. With her armament of four 12-inch, eight 8-inch, and twelve 7-inch guns, she is probably the most heavily armed battleship afloat to-day, her only close competitors being the two British ships "Lord

Nelson" and "Agamemnon," which, on about the same displacement, carry four 12-inch and ten 9.2-inch guns. Next to the "Louisiana" in power are three battleships of the "Georgia" class, the "New Jersey," "Virginia," and "Rhode Island." These vessels are of about 15,000 tons displacement and all have developed on trial more than their contract speed of 19 knots an hour. Each carries the same armament as the "Louisiana," except that the secondary battery consists of twelve 6-inch in place of twelve 7-inch guns. They are easily distinguishable from the "Louisiana" by the fact that four of the 8-inch guns are mounted upon the roofs of the turrets of the 12-inch guns, a device which also appears in the sister ships "Kentucky" and "Kearsarge," vessels of 11,520 tons displacement and between 16 and 17 knots speed. In the latter ships the main battery of 13's and 8's is carried in two double turrets on the center line, while the battery of fourteen 5-inch guns is mounted in a central broadside battery protected by 5½ inches of armor. About 1,000 tons larger than the "Kentucky" and "Kearsarge" and with nearly two knots higher speed, and the advantage of having been built some four years later, the battleships "Maine" and "Missouri" must be considered to be greatly superior. Each carries four 12-inch guns in two turrets on the center line of the ships, and a powerful broadside battery of sixteen 6-inch guns.

The "Maine" and "Missouri" are improved designs based upon the plans of two other battleships which will figure in the review, namely, the "Alabama" and the "Illinois," each of which is 11,552 tons displacement, and 17½ knots speed. They carry four 13-inch guns in two turrets and a secondary battery of fourteen 6-inch guns mounted in broadside within the central redoubt. When the plans for the "Maine" and the "Missouri" were first drawn, it was decided to give them the same size, displacement, and speed as the "Alabama" class; but, fortunately, as the result of an agitation against building battleships of such low speed as 17 knots, it was decided to lengthen these ships so as to accommodate larger engines and boilers and a more numerous 6-inch battery. The "Alabama" and "Illinois" are easily recognizable by the fact that they are the only American battleships which carry their funnels abreast of each other. The other two battleships in the fleet will be the "Indiana," one of the first three battleships to be built under the modern construction period of our navy, and the "Iowa," an improved "Indiana." The "Indiana" is a little over 10,000 tons trial displacement, has (or rather had) a speed of 15½ knots, and she mounts an armament of four 13-inch, eight 8-inch, and four 6-inch guns. The "Indiana" and her sisters were the first American battleships (or battleships of any nationality, for that matter) to introduce the system of mounting a secondary battery of heavy guns in four turrets at the four corners of the central redoubt—a plan which has excellent tactical features, since it renders it possible to deliver an unusually heavy all-round fire. One great fault in the "Indiana" class was that for the heavy battery that was carried the ships were altogether too small and the freeboard too low. In the "Iowa" the freeboard was raised by the construction

of a fore-castle deck, the 8-inch guns in four turrets were retained, and 12-inch guns were substituted for the 13-inch.

Unquestionably the handsomest group of vessels at the review will be the four large armored cruisers of the "Georgia" type, namely, the "West Virginia," "Pennsylvania," "Colorado," and the "Maryland." With their great length of over 500 feet, their graceful sheer, and impressive row of lofty smokestacks and towering masts they are, to our thinking, the handsomest warships afloat upon the high seas to-day. They are of absolutely identical design, and carry about the same coal supply and the same armament; hence they will have all those advantages in action which come from homogeneity. The later vessels of this type, of which the "Washington" and "Tennessee" are the first, will differ from them to the extent of having about 1,000 tons more displacement, and of carrying four 10-inch in place of four 8-inch as the main battery. This represents a great increase in power, and will render these vessels capable of taking their place in the first line of battle.

Of the four monitors, the "Puritan," although about double the size of the other three, is the least formidable, her guns and armor being of an earlier type of low penetration and resistance. Although the "Nebraska," "Florida," and "Arkansas" mount only two 12-inch guns against the "Puritan's" four, they are more efficient weapons with higher velocity and greater penetration. It is certain that no more of the monitor type will be built, their low freeboard rendering them quite unfit for anything but harbor defense and such operations as can be carried out in still water.

Among the protected cruisers the "Minneapolis," whose keel was laid just fifteen years ago, will loom up large and apparently formidable. She is chiefly remarkable for the fact that she is the fastest cruiser in our navy, or to speak more correctly, she is credited with having made the fastest speed on trial, averaging 23.1 knots per hour. She was built as a commerce destroyer, and her armament is, therefore, very light, consisting of only one 8-inch and two 6-inch guns, besides some smaller rapid-firers. She is an expensive vessel to run, and in the present day, when there are armored cruisers of other navies afloat that greatly exceed her present speed, she is regarded in our navy as something of a white elephant. The other three protected cruisers, the "Tacoma," "Cleveland," and "Denver," vessels of 3,200 tons, 16½ knots speed, carrying ten 5-inch guns, are comfortable little craft that were designed more particularly for peace duties in foreign waters. For modern purposes their battery is too light, and their protection insufficient; consequently they would not figure largely in any future naval campaign, being too weak for effective fighting against modern armored craft, and altogether too slow for scouting purposes. It is certain that the type will never be repeated.

A feature of the review that is sure to excite the interest of the public will be the large number of destroyers and torpedo boats that will be present, there being altogether a dozen of these fleet little craft under orders to take part in the pageant. The six

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No.	Name.	Type.	Displacement, Tons.	Speed, Knots.	Coal, Tons.	GUNS.											ARMOR.				Torpedoes.	Keel Laid.
						13 in.	12 in.	10 in.	8 in.	7 in.	6 in.	5 in.	4 in.	3 in.	Small Guns	Belt.	Deck.	Turrets.	Case-mates.			
1	Maine	Battleship.	12,600	18	1,875		4				16				6	18	11 in.	2½ in.	12 in.	6 in.	Two-18 in.	1899
2	Missouri	"	12,500	18.2	1,825		4			16				6	14	11	2½	12	6	Two-18	1900	
3	Kentucky	"	11,520	16.9	1,500	4			4						38	16½	2¾	17	5½	Four-18	1896	
4	Kearsarge	"	11,520	16.8	1,500	4			4						34	16½	2¾	17	5½	Four-18	1896	
5	Louisiana	"	16,000	18.8	2,200		4		8	12					20	28	11	3	12	7	Four-21	1903
6	Rhode Island	"	14,948	19.5	1,700		4		8	12					12	30	11	3	12	6	Four-21	1902
7	New Jersey	"	14,948	19.5	1,700		4		8	12					12	30	11	3	12	6	Four-21	1902
8	Virginia	"	14,948	19.5	1,700		4		8	12					12	30	11	3	12	6	Four-21	1902
9	Alabama	"	11,552	17	1,275	4				14					30	16½	2¾	14	5	Four-18	1896	
10	Illinois	"	11,552	17.5	1,275	4				14					28	16½	2¾	14	5	One-18	1897	
11	Indiana	"	10,288	15.5	1,475	4			8	4					29	18	2¾	15	5	One-18	1891	
12	Iowa	"	11,346	17.1	1,650		4		8						30	14	2¾	17	5	Two-14	1893	
13	West Virginia	Armored Cruiser.	13,680	22.2	1,950				4	14					18	30	6	4	6½	6	Two-18	1901
14	Pennsylvania	"	13,680	22.4	1,825				4	14					18	30	6	4	6½	6	Two-18	1901
15	Colorado	"	13,680	22.2	1,825				4	14					18	30	6	4	6½	6	Two-18	1901
16	Maryland	"	13,680	22.4	1,950				4	14					18	30	6	4	6½	6	Two-18	1901
17	Puritan	Monitor.	6,060	12.4	306										10	14	2					1875
18	Nevada	"	3,225	13	338				2						13	11	1½		10			1899
19	Florida	"	3,225	13.4	355				2						13	11	1½		10			1899
20	Arkansas	"	3,225	12	344				2						13	11	1½		10			1899
21	Minneapolis	Provision Cruiser.	7,350	23.1	1,400				1	2					17		4		4 in.			1891
22	Tacoma	"	3,200	16.6	675										15		2½					1900
23	Cleveland	"	3,200	16.5	675										15		2½					1900
24	Denver	"	3,200	16.8	675										15		2½					1900
25	Whipple	Destroyer.	433	28.2	177										2						Two-18	1899
26	Worden	"	433	29.9	177										2						Two-18	1899
27	Truxton	"	433	29.6	177										2						Two-18	1899
28	Hopkins	"	408	29	154										2						Two-18	1899
29	Lawrence	"	446	28.4	110										2						Two-18	1899
30	MacDonough	"	430	28	110										2						Two-18	1899
31	Wilkes	Torpedo Boat.	165	26	66										3						Three-18	1899
32	Tingey	"	165	25	70										3						Three-18	1899
33	Rogers	"	142	24.5	44										3						Three-18	1896
34	Stockton	"	200	25.8	79										3						Three-18	1899
35	Blakeley	"	196	25.6	72										3						Three-18	1899
36	DeLong	"	196	25.5	72										3						Three-18	1899
37	Porpoise	Submarine.	120	8-5																	Five-18	1900
38	Sha.	"	120	8-5																	Five-18	1903
39	Nina	Tender.		11.1	80																	1865
40	Yankee	Troopship.	6,235	12.5	1,100										10							1892
41	Celtic	Provision Ship.	8,000	10.5	*										2							1891
42	Arethusa	Water Ship.	6,200		†										1							1893
43	Abarenda	Collier.	4,670	9	8,400										8							1892
44	Lebanon	"		10	1,800																	1894
45	Leonidas	"	4,242	8.5	2,200										1							1898

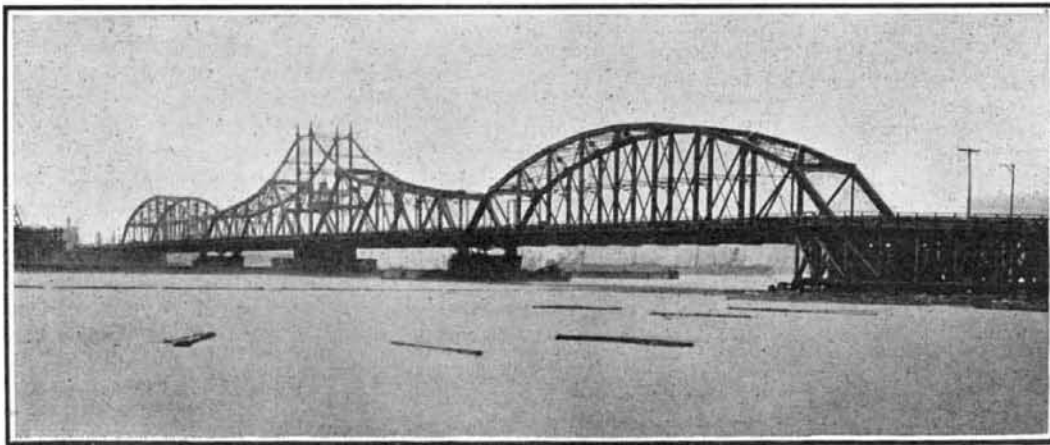
* Celtic carries 2,500 tons of supplies.

† Arethusa carries 850,000 gallons of water.

destroyers are of the general type that did such good work for the Japanese in the late war, although they are somewhat larger in displacement. The trial speeds ranged from 28 to 29.9 knots an hour, and each is armed with two of the formidable 18-inch Whitehead torpedoes. The torpedo boats are of the first class, with a displacement of from 142 tons in the "Rogers" to 200 tons in the "Stockton," and the speeds average about 25½ knots an hour. Last, and in point of spectacular interest, perhaps, the most attractive to the layman, will be the two submarines "Porpoise" and "Shark." They represent a method of naval warfare which, after a long and discouraging struggle for recognition, has now established itself, and promises to figure very largely in such future naval operations as concern the attack and defense of fortified harbors and roadsteads.

Finally, there will be seven auxiliary ships, including the "Yankee," a troopship of over 6,000 tons; the 8,000-ton Celtic—a provision ship capable of carrying 2,500 tons of supplies; the 6,200-ton water ship "Arctusa," whose tanks can hold for the use of the fleet 850,000 gallons of fresh water; and the three colliers, "Abarenda," "Lebanon," and "Leonidas," which between them can carry 7,400 tons of coal for the replenishing of the bunkers of the warships.

Summing up the fleet as a whole, the total figures



are decidedly impressive. The forty-five ships represent a total displacement of 274,251 tons, carrying in its bunkers and in the holds of the colliers a total of 41,881 tons of coal. In the whole fleet are mounted twenty 13-inch, thirty-eight 12-inch, seventy-three 8-inch, twelve 7-inch, one hundred and fifty-eight 6-inch, sixty-six 5-inch, twenty-four 4-inch, one hundred and fifty 3-inch, and six hundred and forty-five rapid fire and machine guns.

For torpedo attack there are carried about one hundred 18-inch and 21-inch torpedoes. The fleet will be assembled under Rear Admiral Robley D. Evans, as commander-in-chief, who will hoist his flag on the battleship "Maine," and the personnel will include 812 officers and 15,235 men.

Humanity and Machinery.

Machinery is the cornerstone of modern society, the very foundation on which law, science, ethics, the arts, even the state itself, rests. It is so new that we do not yet know its poetry. We do not yet understand. Only two generations have lived beside the highway of steam; only one has seen the Bessemer converter transform the blacksmith into a master builder of ships and towers. The sewing machine, the far speaker, the typewriter are common things of to-day, accepted as a matter of daily convenience, and yet are they teachers of the people. Machines that come close to our lives and homes insensibly teach truth, precision, the adjustment of universal laws to human needs, respect for that wise American idea that labor saved is labor released for higher and nobler toil. The machine is the head master of the high school of the race.—Reader Magazine.

WRECK OF THE DULUTH-SUPERIOR DRAWBRIDGE.

The two photographs which we publish of the important Duluth-Superior Bridge, otherwise known as the Interstate Bridge, show with very dramatic effect that a structure of this kind, in spite of its great size, weight, and apparent stability, is only strong and stable when the stresses applied to it act directly in the planes of the trusses and along the axes of their various members. They also show how great is the momentum existing in a large steamship even when, as in the present case, the speed has been reduced almost to the stopping point—a lesson which should be taken well to heart at the present juncture, when the question of the best location of the Panama locks is under active discussion.

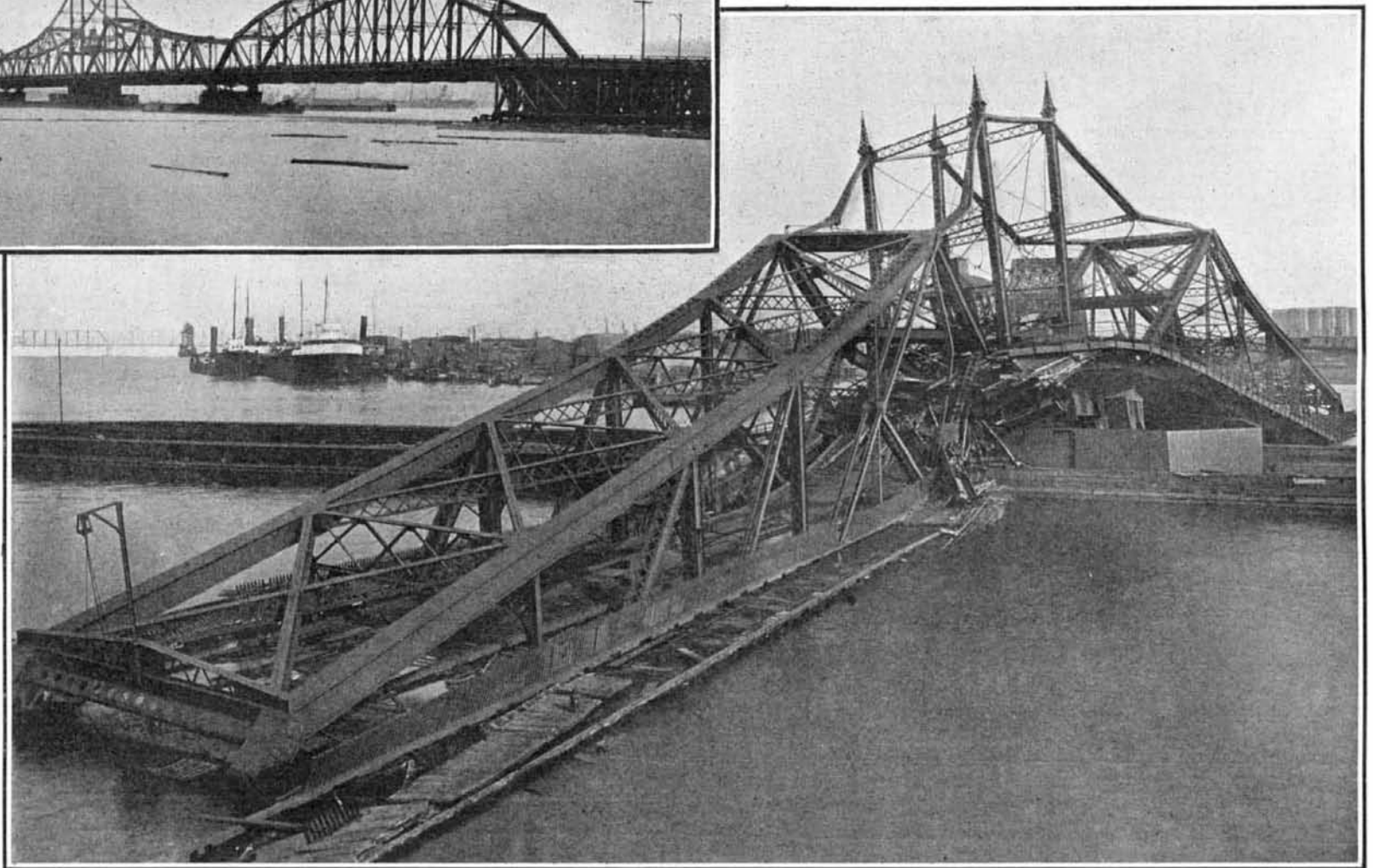
The Interstate Bridge was built in the year 1893, and consists of two large shore spans, and a center draw span with a length over all of 500 feet (which renders it one of the largest, if not the largest draw span in the world), the clear opening for shipping on each side when the span is swung clear for traffic, being 220 feet. The accident occurred on August 11, at 1 o'clock in the morning, and was due to collision with the structure of the steamer "Troy" of the Western Transit Company. The steamer was approaching the draw slowly, and although the captain noticed that the operator on the bridge was tardy in opening the

same, he continued under a slow bell in the expectation

taken in the use of this draw span, both on the part of the bridge crew and of the ships that pass through. Where masses of such great total weight have to be moved, it is courting disaster to allow only a small margin of time between the opening of the draw and the passage of the ships; and this is a fact which holds true, not merely in connection with this structure, but in others of equal importance that are to be found spanning our great waterways. A limit of distance should be imposed, nearer than which no ship should approach an important draw until it is swung entirely open and the channel is clear for passage.

The Hair an Indicator of Health.

A Japanese physician, starting with the fact that illnesses exercise a notable and well-known influence upon the growth of the nails both in length and thickness, asked himself if the hair too might not be affected by sicknesses. The result of his investigations is, that every general illness diminishes the diameter of the hairs. The medullary layer may even be wanting, and it happens to the peripheric hard envelope to disappear. The influence of illnesses is sometimes more marked in the races or the individuals that have coarse, thick hair. In this case, it is easy by the inspection of a hair to know if the person who furnished it has recently passed through a general illness. The hair is made thinner along a part of its length, and the length of the thinned part is proportional to the duration of the illness. We can, therefore, say whether the illness has been long or short, and almost to a week indicate the duration which it has had. That is a fact that may have importance, e. g., in a



The Vessel, Moving Very Slowly, Struck the Span Near the Center Pier. Her Stem Cut Through the Lower Chord, and the Two Arms Sagged Into the River.

WRECK OF THE LARGE DULUTH-SUPERIOR DRAW SPAN, 500 FEET LONG, BY A COLLIDING STEAMSHIP.

that, as is usually the case, the span would be swung clear with a rather small margin of time for the passage of the ship, this, according to his statement to the press, having been the common practice. When he discovered that the collision was inevitable, he backed his engines, the effect of which was to slow down the ship, and swing her bow from the center to the side of the channel, with the result that she struck the draw span about 20 feet from the central pier on the Superior side. It is easy to see from the photograph the nature of the collapse. The stem of the steamer struck the bottom chords (which, of course, at this point are members that are always in compression), cutting through them and causing that arm of the draw to sag into the river. The other arm followed suit almost immediately, the whole draw span settling into the position shown in the photograph. The impact of the ship was sufficient to push the whole structure over on its bearings, throwing the heavy supporting frame of girders below the central tower, and the turntable, out of plumb. One immediate effect of the disaster was to completely tie up both the water traffic in the harbor and the land traffic across the bridge itself.

Judging from the interviews given in the local press, it would seem that very grave chances have been

question of identification. From the biological point of view it is, moreover, interesting to find that a hair behaves like the nails. But that was to be expected.—L'Illustration.

Duration of Flashes of Lightning.

We possess as yet only pretty vague data as to the average duration of flashes of lightning, says L'Illustration. Faraday thought he could fix it at a second. Dufour claimed that the flashes of lightning were instantaneous, and that their rapid succession gave the illusion of one flash of a certain duration. Herr Schmidt has just been devoting himself to a series of observations, employing a disk of ten centimeters diameter bearing upon a black ground a white cross, the arms of which were two millimeters across, the disk being set in motion by clockwork with a speed of 50 to 60 revolutions a second. At certain flashes, the cross appeared a single time, very distinct; the duration of lightning was, therefore, inferior to the time of revolution of the disk, which would represent about the fiftieth of a second. In more numerous cases, the cross appeared two or three times, or even more, but with a decreasing luminous intensity; the lightning had, therefore, lasted during several revolutions of the disk.