Scientific American

TABLE OF VESSELS COMMISSIONED, COMPLETED, BUILDING, OR AUTHORIZED SINCE THE SPANISH WAR BATTLESHIPS AND ARMORED CRUISERS.

Name.	Type.	Displace- ment. in Tons.	in		Агшог.	i Armament.		
				Belt.	Gun Positions.	Main.	Secondary.	
						(4 13-in. B. L. R.	20 6-pounders.	
Kearsarge	Battleship.	11,540	16.8	161⁄2 in.	17 in.—15 in.	4 8-in. B. L. R. 14 5-in. R. F. G.	81 " 6 small guns.	
Kentucky		-	16.9			(14 b -111.11.1.1.0.		
Alabama		11,565	17.1	16½ in.	15 in14 in.	{ 4 13-in. B. L. R. { 14 6-in. R. F. G. }	{ 16 6-pounders. { 6 1	
Illinois	i.		17.4			(14 0-111.10.17.00.)	6 small guns.	
Wisconsin		••	17.2					
Maine		12,300	18.0	11 in.	12 in.—12 in.	$ \{ \begin{array}{l} 4 \ 12 \text{-in. B } L. R. \\ 16 \ 6 \text{-in. R. F. G.} \end{array} $	8 6-pounders. 6 1 4 small guns.	
Missouri		••	••			6 3-in. R. F. G.	4 sman guns.	
•hio	**	••	**		6 k k			
Georgia		14,948	19.0	11 in.	11 in. - 10 in.	4 12-in. B. L. R. 8 8-in. B. L. R. 12 6-in. R. F. G. 12 3-in. R. F. G.	$\begin{cases} 12 \text{ 3-pounders.} \\ 8 1 \\ 10 \text{ small guns.} \end{cases}$	
Nebraska	**		••			(1. 01	•.	
New Jersey				; 				
Rhode Island Virginia	**		••	••	••			
							3 6-pounders.	
Arkansas	Monitor.	3,235	11.5	11 in.	11 in.—10 in.	2 1 2 -in. B. L. R. 1 4 4-in. R . F. G. 1	6 1 2 Colts.	
Florida	54 Li		**					
Nevada								
California	Armored Cruiser.	13.680	22.0	6 in.—5 in.	61,6 in.—6 in.	$\begin{cases} 4 & 8-in. B. L. R. \\ 14 & 6-in. R. F. G. \end{cases}$	12 3-pounders.	
						(18 3-in. R. F. G.	10 small guns.	
Colorado		••						
Maryland Pennsylvania		••						
South Dakota	·· ··		••	••	**		**	
West Virginia	11 IV	••	••	••	**		۰.	
Charleston	Semi-armored Cruiser.	9,700	22.0	4 in.	Deck 3 in2 in.	14 6-in. R. F. G. 18 3-in. R. F. G.	12 3-pounders. 24 small guns.	
Milwaukie				**			, , , , , , , , , , , , , , , , , , ,	
St. Louis				1				
				<u> </u>		··	·	

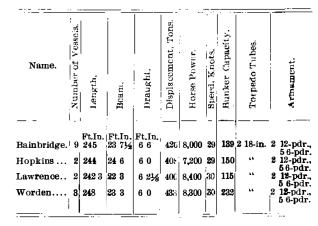
UNARMORED CRUISERS AND CUNBOATS.

		туре.		Speed	! Protect	ctive Deck.	Armament.		
	1 y	pe.	ment in Tons.	in Knots.	Slopes.	Flat.	Main.	Secondary.	
					·,`				
Chattanooga,	-			16.5	2 in.—1 i n.	⅓ inch.	10 5-in. R. F. G.) 8 6-pounders. 6 small guns.	
Cleveland									
Denver	••		·						
Galveston.		••				**		· · ·	
Tacoma		••				**			
Reina Mercedes	Unprotecte	ed Crui se r.	3,090	17.0		••••••••••••••••••••••••••••••••••••••	· · · · · · • • • • • • • • • • • • • •		
Don Juan de Austria	Cuphoat)	1,130	14.0			4 5-in. R. F. G.	∫4 6-pounders.	
	Gunboat.	1				•••••••••••••••••	4 J-III. R. F. G.	1 ± 00105.	
General Alava			1,390	10.5		•••••		6 Nordenfelts.	
Isla de Cuba		Formerly	1,125	14.0	21⁄2 in.	11/2 inches.	4 4-in. R. F. G.	114 6-pounders.	
Isla de Luzon	· •	Spanish.						4 6-pounders. 4 Colts.	
*Alvarado	**	J	1 0 6 -	19.0				2 3-pounders.	
† Gunboat No. 16			!			····			
	1		i	1			1	1	

* Twenty-one of this type of Gunboat captured or purchased from Spain, varying from 42 to 560 tons displacement and from 8 to 19 knots speed

+ Contract not awarded.

DESTROYERS AND TORPEDO BOATS. Armament. Displace Speed in Knots. Type. Name. in Tons. Torpedo Tubes. Guns. Bainbridge Barry Chauncey Dale Decatur Paul Jones 420 Torpedo-boat Destroyers. 29.0 2 18-inch Whitehead. 2 3-inch and 5 6-pounders R. F. G. Perry Preble Stewart. Lawrence. Macdonough. ... 402 30.0 2 18-inch Whitehead. Torpedo-boat Destroyers. 2 3-inch and 5 6-pounders R. F. G. Truxton Whipple 433 30.0 2 18-inch Whitehead. Torpedo-boat Destroyers. 2 3-inch and 5 6-pounders R. F. G. Worden.. Hopkins Hull..... Torpedo-boat Destroyers. 408 29.0 23-inch and 56-pounders R. F. G. 2 18-inch Whitehead. $\begin{array}{r} 175\\ 280\\ 175\\ 175\\ 200\\ 154\\ 240\\ 279\\ 154\\ 247\\ 65\\ 174\\ 174\\ 189\\ 200\end{array}$ Torpedo-boat. Bagley 29.2 30.2 29.1 28.0 26.0 23.4 30.5 **2**6.0 30.1 **2**3.1 30.0 **2**0.1 **2**6.0 **2**0.1 **2**6.0 **2**0.1 **2**6.0 **2**7.0 **2**6.0 3 18-inch Whitehead. 3 3-pounders R. F. 4 6-pounders R. F. 3 3-pounders R. F. Bailey 1333 . Barney Biddle Blakely 3 1-pounders R. F Davis Davis...... Dahlgren..... ³ 1-pounders R. F.
⁴ 3-pounders R. F.
³ 3-pounders R. F.
⁴ 6-pounders R. F.
⁴ 6-pounders R. F. ... De Long Farragut. Fox. Goldsborough..... ۰. MacKenzie..... 1 1-pounder R. ... eholson..... 3 3-pounders R •'Brien 3 3-pounders R 1-pounders Rowan



mington, Del., are somewhat smaller vessels. They have about the same length, a foot more beam, and 6 inches less draught with a displacement of 408 tons. They were designed to achieve 29 knots with 7,200 indicated horse power, and the bunker capacity will be 150 tons, the armament and the complement of officers and crew being the same as for the "Bainbridge." The "Lawrence" and the "Macdonough," which are being built by the Fore River Engine Company, Weymouth, Mass., are the smallest vessels of the fleet. They are of 400 tons displacement, and they were designed to achieve a speed of 30 knots with 8,400 indicated horse power. The coal capacity is less, namely, 115 tons; particulars of the armament and the complement are the same as for the other vessels. The largest of the fleet are the "Truxton," "Whipple," and "Worden," building by the Maryland Steel Company, at Sparrows Point, Md. They are 248 feet in length, 23 feet 3 inches beam, and on a draught of 6 feet they have a displacement of 433 tons. They have the large bunker capacity of 232 tons-a very valuable feature--and they are to make a speed of 30 knots with a development of 8,300 horse power.

These destroyers cannot fail to produce a favorable impression. Their size, roominess, coal capacity, and powerful armament, and, above all, their good seagoing qualities and high speed, will place them in the very front rank of this type of vessel.

► + **e** + OUR RELATIVE STANDING AMONG THE NAVAL POWERS.

In the accompanying table it will be observed we have placed the United States navy in the fourth position in rank, with England first, France second, and Russia third. At first glance, when comparing the navies by the total number of ships they possess, it would seem as though Germany, with her total of 77, should take precedence over the United States with 62. It must be borne in mind, however, that the truest test of naval strength lies in a comparison of the total displacement and a consideration of the distribution of that displacement among the various types of warships which it represents. Judged by these two tests we hold a remarkable lead over Germany. Thus the 77 German ships represent a total displacement of 395,858 tons, whereas the 62 ships of the United States Navy total up 474,179 tons, an excess of 78,321 tons. The fighting strength of a navy lies in its line of battle; that is in the first-class battleships and armored cruisers that can match armor with armor, heavy gun with heavy gun. Here our superiority is overwhelming, for we can put in line 28 armored ships of 339,444 tons total displacement against Germany's 20 first-class armored ships of 215,-254 tons total. Not only so, but ship for ship our 15.-000-ton "Georgias" entirely outclass the 12,000-ton German "Wittelsbachs," and our 14,000-ton armored cruisers of the "Pennsylvania" class have an equal superiority to the 9,000-ton "Prinz Heinrich" class.

COMPARATIVE TABLE OF OUR OWN AND FOREIGN NAVIES.

Total Number of Ships Built or Building as per Brassey's Annual, 1901.

utes

ain

Stockton	••	200	24.7	3 "	••	3 3-pounders	R. F.
Stringham	**	340 i	30.0	2 "	**	7 6-pounders	R. F.
T. A. M. Craven	ss,	· 146	30.5	2	••	4 1-pounder's	R. F.
Thornton	h1	200	26.0	. 3	••	3 3-po unders	R. F.
Tingey		165	26.0	3 "	••		
Wilkes	••	165	26.5	3 "		••	••
Holland	Submarine.	74 120	8 87	1 Torpedo	Tube.	1 Dynamite 5 45-cm. Whi	
Adder	**	1				5 45-CIII. WIII	ieneaus.
Grampus Moccasin	**		••	••			
Pike			••			45	**
Shark	••	v -	**	•4	••	**	
Porpoise	••		••	••	**	••	**
Plunger	**		••••	···· ••••••	•••••••••	•••• •••	•••••••
		·		·			· ·

6 inches. They are capable of carrying 139 tons of coal closely stowed in their bunkers, and the complement consists of four officers and sixty men. One excellent feature, which will give them considerable advantage over some of the latest boats that have been constructed for foreign navies, is that, in addition to their relatively large size, they are provided with a long forecastle deck, which gives them an extreme freeboard forward of 14 feet, the freeboard amidships be-

Shubric

ing about 9 feet. This will considerably improve their speed in steaming to windward in heavy weather. Three of these vessels have been constructed by Neafie & Levy, Philadelphia; two by William R. Trigg & Company, Richmond, Va.; three, as mentioned, by the Union Iron Works, of San Francisco; and one by the Gas Engine and Power Company, Morris Heights, N. Y. The "Hopkins" and the "Hull," which are being built by the Harlan & Hollingsworth Company, Wil-

Class.	Great Britai	France	Russia	United State	Germany	Italy	Japan
Battleships. 1st Class 2nd Class 3d Class	38 11 10	$ \begin{array}{c} 13 \\ 10 \\ 11 \end{array} $	14 10 1	17	$\frac{16}{7}$	9 5 2	$\frac{6}{1}$
Total	59	34	5	18	23	16	7
Cruisers, 1st Class 2nd Class 3d Class	43 62 44	19 23 13	13 7 5	13 16 5	5 8 18	5 5 11	6 10 6
Total	149	55	25	34	31	21	22
Coast Defense Vessels.	17	14	16	10	19	3	1
Torpedo Gunboats.	34	21	9	-	4	17	2
Total Number of War-					77	57	32



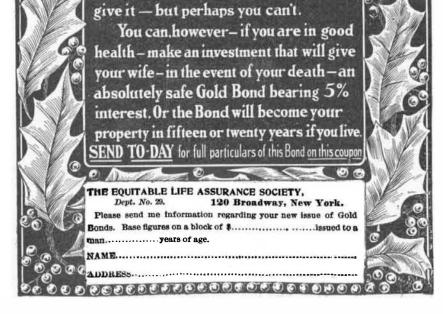


H. & R. Automatic Double Action Revolver.

The most popular medium priced revolver on the market. Barrel, cylinder and all working parts of the quality of steel best adapted to their particular uses. 32 and 38 Calibers.

Makers of H. & R. Single Guns.

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Brief Notes Concerning Patents.

John H. Lincoln, the inventor of the railway hay fork which bears his name, died on November 14 at Utica, N. Y., where he was visiting his daughter.

According to a recent bulletin of the Census Office; there was one patent taken out in Connecticut in 1900 for each 100 persons. In 1890 the figures were one for each 796 persons.

Thé Sharon Steel Cômpany has been sued at Pittsburg for infringement. The suit is brought by J. J. Pearson & Company, of Maine, and it involves the manufacture of cement-coated nails, the object of which is to increase the tenacity of the driven nail and to preserve the substance into which the nail is driven.

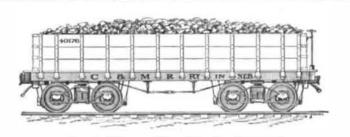
C. E. Havens, foreman of the Baltimore and Ohio shops at Zanesville, Ohio, has invented an adjustable side bearing to be used on railway cars, and by the use of this improvement a car has a greater clearance in rounding curves and less friction between the bolsters. It is therefore possible to place from six to eight more cars on a train. The value of this device has been demonstrated by practical tests.

Oscar Hedstrom, who invented a motor bicycle, recently built a machine after his own design at the works of the Worcester Cycle Manufacturing Company at Middletown, Conn., of which city Hedstrom is a resident, and has shipped the machine to London, where it will be placed on exhibition. The machine was built for speed, and the inventor had been making arrangements to race it with a locomotive, but this interesting event will be interfered with by the builder's determination to send the wheel abroad.

A dispatch from St. Thomas, D. W. I., reports that an explosion of refrigerating chemicals took place on November 21 on the Royal mail steamer "Para" which did so much damage to the steamer that she was unable to proceed. The boat had just been equipped with the Lawton fruit-preserving process to enable her to compete in the fruit-carrying trade, and the inventor was making the trip personally to observe the working of the installation. He and three of his workmen were killed by the explosion, and several others were injured.

N. S. Amstutz, of Cleveland, the inventor of a process for sending pictures over wires to distant points, has recently brought out an improved process for the making of half-tone pictures for newspaper use. Its chief value is the rapidity with which a picture of this character can be made, although it has another merit, and that is that the whites are pure and solid and not broken up by dots, as is generally the case. This makes the picture crisp and sparkling because of the sharp contrasts secured in the print.

Herbert Hoyle, an Englishman, who is the inventor of a process for making artificial silk from China grass, has been brought to this country by some capitalists of Boston and vicinity with the object of exploiting his invention, and a mill will soon be in operation at Fall River or Boston. One of the advantages of Mr. Hoyle's process is that the artificial silk can be spun on ordinary cotton and woolen machines. There are a few factories in Europe for the utilization of China grass, but this is the first venture of this kind in the United States.



A CAR OF ORE RUNS

16.31 per cent. Copper per ton from BLACK HILLS COPPER CO.

The Greatest Copper Mine in the World, the Calumet and Hecla of Michigan, runs 3.05 per cent. copper, with profits paid, \$75,850,000.

Prof. Lawson, in his report after examining our property, says: "The average per cent. of this body of ore is above the principal producing copper mines of the World." (See page 13 of our prospectus.),

Work is going forward on this property night and day. To install more machinery and rapidly open up the immense ore reserves, we offer for a short time, shares.at 25 cents each, par value one dollar, full paid, and forever non-assessable.

This is not a speculation, but a legitimate investment in an enterprise officered by conservative business men. Remember, copper mines are the safest investments, and largest dividend earners. \$15, \$25, \$100 or \$500 invested 'now promises an income for life.

Results of work on our 11 claims are so favorable, we have just bought 16 claims adjoining. By this consolidation we now own 510 acres.

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REFERENCES: FARMERS AND MERCHANTS BANK, Benton Harbor. CITIZENS STATE BANK. Benton Harbor. BENTON HARBOR STATE BANK, Benton Harbor.



Montezuma Plantat

Automobile News.

It is intended to supplant native carriers for the transport of goods in the Congo Free State by motor cars. Several experiments have been carried out in Brussels with heavy steam lorries which would prove suitable to the country. Each vehicle was loaded with 36 hundredweight of iron and tested over rough country, typical as far as possible of that indigenous to the African state. The trials were eminently satisfactory. Each lorry will displace 65 native carriers, and the inauguration of such a service will both decrease the cost of and expedite the transit of goods into the interior.

A dispatch from Odessa to The Times says that Prince Khilkoff, Russian Minister of Ways and Communications, and a party have just made a successful automobile trip from Vladikavkaz, Caucasia, to Tiflis (nearly 100 miles). The journey was the first of its kind in Russia. Prince Khilkoff is known to have a high opinion of the utility of the automobile, and, says the correspondent, he perhaps contemplates introducing it on the imperial post roads. In view of the inadequacy of the railway facilities between many important towns and the general flatness of European Russia, the automobile, the dispatch says, should prove an invaluable means of communication.

It is proposed to inaugurate a system of automobile transportation at Brussels, and an application has been made to the authorities for a concession. A series of large delivery wagons will be run over an extensive route between the city and suburbs and insure the rapid delivery of packages and merchandise. The main station will be situated at the Old Grain Market, and a number of other stations will be placed at the principal centers of traffic. The projected route is to pass by the three main railroad stations of the city. The price of transport will be fixed according to weight, with a minimum of 5 cents and a maximum of 24 cents for the heaviest packages, the limit of weight being 220 pounds. The wagons will run throughout the day (except Sundays and holidays) beginning at 7:30 A. M.

The Anniversary Run is the annual promenade which is made by the English chauffeurs to celebrate the abolition of the famous Red Flag Act, by which automobiles in England, up to November 16, 1896, could go no faster than a walk and had to be preceded by a man with a bell and a red flag. This was happily abolished by the Light Locomotives Act on that date. Last year the promenade was made from London to Southsea, and this year the chauffeurs will run to the same destination, passing by Putney Bridge, Richmond Park, Winchester, where lunch will be taken, then Waltham and Southsea. The run will be preceded by the annual dinner of the English Club which is open to all the members, these at present numbering 1,038. At a subsequent meeting the club is to discuss the question of organizing a special contest for electric automobiles.

The programme for the "Grande Semaine" at Nice, which is one of the great events of the year, has lately been published. It will commence on the 6th of April next with a parade of flowerdecorated automobiles. On the 8th are two races, the Nice-Aix-Salon-Nice, a speed race of 280 miles, and the Nice-Draguignan-Nice touring race of 62 miles. On the 9th and 10th will be held an automobile show at Nice, as well as three of the principal events-the mile race and the kilometer (0.6 mile) dash for the Henri de Rothschild Cup, on the Promenade des Anglais. Then follows the famous hill-climb from Nice to La Turbie, a distance of 9.1 miles. The week finishes with a concourse of the most handsome automobiles, which will be held at Monte Carlo. Engagements are made for the whole series of races, and will be received at the Nice Automobile Club up to the 20th of March, inclusive.

A patent has recently been filed in the Patent Office for a device which applies power to an automobile motor only when the driver's seat is occupied. The instant the operator rises from his seat or is thrown therefrom, the cushion is raised by means of a spring, and this carries with it a plunger which shuts off the power, and the vehicle comes to a standstill. This invention will prevent runaway accidents from automobiles. When the application for this patent was filed in the Patent Office it was found that there were twenty-six other applications covering like ideas.

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Admiral Dewey writes: "I join my friend, Hon Hilary A. Herbert. ex. Secretary of the Navy, in recommending your Sanitary Still. The water from the Still is absolutely

Mrs. Julia Dent Grant, widow of the famous General, writes: "I have usedyour Sani-tary Still and am very much pleased with it. The water from the Snil is pure and palatable." The Sanitary Still is used in the "White House." High-at award at ParisExposition. Write for booklet. CUPRIGRAPH CO., 138 N. Green Street, Chicago.