

HOW WAR VESSELS ARE BUILT AT THE FORE RIVER WORKS IN MASSACHUSETTS.

RISKS THAT ARE TAKEN BY GREAT ARTISTS.

Probably few people who languidly admire the pictures on the Royal Academy walls realize the conditions of hardship, labor and often personal risk under which some of them have been painted.

Thousands of the sketches from which the Chevalier de Martin, marine painter to Queen Victoria, has produced his charming sea views have been made under conditions which would daunt most men. Seated in a basket, he is lowered either from the bow or stern of a ship to within a few feet of the water, and as the waves chase each other and toss and tumble around him he makes rapid sketches until, often drenched to the skin with spray, he is pulled up on deck again.



To paint his beautiful pictures of the Holy Land Carl Haag has many times risked his life among fanatics and has lived for many months at a time alone among the Bedouins in the solitude of great deserts. On one occasion when painting within the temple area at Jerusalem he would certainly have been murdered by the guards, one of whom, he says, actually foamed at the mouth with rage, had not a friendly pasha intervened and partly by intimidation and partly by informing them that Mr. Haag had been specially commissioned by the sultan to make drawings for the restoration of the mosque managed to save his life.

Mr. Haag has also trusted himself alone among the wandering Bedouins of five deserts in order to make sketches, and he says, "had it not been for the awe in which they held my revolver and my reputation as a 'medicine man' my life would often not have been worth a moment's purchase."

Holman Hunt encountered great hardships and dangers when painting his pictures, "The Scapegoat," "The Triumph of the Innocents" and several others of his famous eastern canvases, wandering for weeks alone in the deserts, in constant danger from fanatics and meeting years over the production of a single picture.

Many of Mr. Hunt's early paintings, notably "The Scapegoat," did not actually pay his expenses. On "The Triumph of the Innocents" he spent no less than seven years of unremitting work, and when the first painting was completed he found that the canvas was so rotten that it was necessary to abandon it and paint the picture all over again. For "The Shadow of Death" he made sketches and studies during seven years before he first put brush to canvas, and the actual painting of the picture occupied him three years more.

To secure the sketches from which A. D. McCormick made his wonderful paintings of Himalayan scenery the artist risked his life more than once, many of the sketches being made thousands of feet higher than any other artist had ever climbed, in an atmosphere so rare and exhausting that the mere effort of drawing made him gasp and pant for breath.

On one occasion when Mr. McCormick was crossing a fearful chasm the frail structure of the bridge broke under his feet, and only the strength of the rope by which he was attached to his companions saved him from a fall of 2,000 feet, and on another occasion his pony pulled up dead where the mountain path ended on the very brink of a sheer precipice a mile in depth.

Mr. Goodall, the well known Royal Academician, tells many thrilling stories of adventures while sketching and painting in the far east. Accompanied only by a single dragoman, he once spent three months in the desert, painting from sunrise to sunset, with two armed Bedouins as his sole protection against roving tribes bent on murder and plunder.

The absentmindedness of Dr. Alfred Emerson, the archaeologist, formerly of Johns Hopkins university and who is now abroad making a collection of antiquities for the museum of the University of California, is well known among his Baltimore friends.

The memorable occasion when, booked for a public lecture at the Hopkins, he let his audience wait in ghastly suspense while he, all unconscious of the engagement, was found busily employed unpacking a box of casts will long be remembered. His carefully adjusting a fresh collar over one already on and going to the station and forgetting to take his train are historic in university lore, but it remains for his friend and collaborator, Joseph Thatcher Clark of the British museum, to tell the following story:

The pair were en route to make some important excavations and had reached southern Europe when Dr. Emerson appeared with an indignant face and a letter from America in his hand. He explained that the letter was from one of his several brothers accusing him of having carried off several shirts belonging to the brother when starting abroad.

"To prove how basely false and unjust his suspicions are," said the troubled doctor, "I will get all my shirts and spread them out before you and see if you can find a single one bearing any initial other than my own."

The shirts, eleven in number, were produced, and consternation followed when they were found to be variously labeled Arthur H. G. Emerson, H. Emerson, I. Z. N. F. K. In fact, all except two—these bearing no label at all and presumably Dr. Emerson's—bore initials other than his own.

UNTIL very recently ship carpenters and joiners, riggers and painters, constituted the working force of an American shipyard, with the clean smell of spruce and pine and oak and tony and the suggestion of tarry rope to give savor to the whole. Today in all the typical modern yards, as at Fore River, in Boston harbor, the newest battleship plant in the United States, one finds machinists, furnace men, electricians, toolmakers and their brother craftsmen of the age of steel and steam, with a small force of woodworkers to turn out interior furnishings and patterns for machinery. The odor of hot steel and oil has replaced the smell of wood, and a puffing locomotive does the work of slow moving, broad horned, yoked steers.

Fore River is in the old "presidential town" of Quincy, still proud of its record of having produced two presidents of the United States, but only dimly remembering that it was once a center of wooden shipbuilding. Only a few miles from Fore River the 1,000 ton thirty-six gun ship Massachusetts was launched in 1783, at the time the largest vessel ever built on this continent. But shipbuilding had long since died out on the "south shore" and the Fore River yard has sprung literally full grown from the ground. Not only the newest battleship yard, it is also the most modern, having suffered from none of the disadvantages usually involved in the evolution from a wooden ship yard. Little more than a year ago the site was a peaceful salt meadow, with graceful beaches running into Weymouth Fore River and a tributary creek. Today the creek is lined with shops; the cruiser Des Moines, named for the distant

Union in the war of 1812, and of Lawrence of Chesapeake and "Don't give up the ship" fame. Methods and machinery at Fore River are alike new. For example, the navy department plan of a separation of the construction into "hull" and "machinery" has been adopted, although either the superintendent of hulls or the superintendent of machinery, working under the general manager and general superintendent, may call upon any one of the seventeen departments into which the yard is divided. The machinery division receives the steel ingots, the castings, steel rods, tubing and all the rest of the material required for the construction of the engines and machinery of a modern ship and works them into finished shape. The hull division deals principally with the plates and frames and the actual construction of the ship. No less than sixty draftsmen are now busy for both divisions on the plans for the New Jersey and Rhode Island, each of which will be of 15,500 tons burthen, or larger than any battleship of the American navy now afloat, while an almost equally large force of government inspectors and draftsmen are at work on the original designs or in checking up progress on the Des Moines and the two destroyers.

Perhaps the most interesting feature of the work of the hull division is the treatment of the inch thick steel plates which form the "skin" of the new battleships and which in the course of treatment are cut, punched and planed as deftly as one might cut up cards with

the use of the separate motor—each machine, with the exception of a few small groups, with its own unit of power—are indeed the striking mechanical features of the whole yard. Over 100 motors are used, developing altogether more than 1,900 horsepower, a bit of statistics of which any one acquainted with the ordinary American shop will at once see the significance. Even the great spanning crane of the hull division, reaching across the plate yard, where the plates are stored for a distance of 150 feet, so that the crane spans the span of a big railroad bridge, is run by electricity.

In the work of the machinery division the most interesting features are the forgings, some of which weigh twenty tons. Here, for example, a heated ingot of steel intended for a shaft for the Des Moines weighing perhaps eight or nine tons and measuring twenty inches square by thirteen feet long is pounded down into shape by one of the three largest steam hammers in the country, capable of striking a blow of 250 feet tons many times a minute or of a touch as light as that of a feather, until it comes out over forty feet long and only a little over ten inches in diameter. Thence it goes to the lathe to be turned down and drilled out through the center, the drill going through the solid steel at the rate of ten inches an hour, so that it takes no less than four days, twenty-four hours a day, to carry the daylight from one end to the other. Fore River, too, it should be noted, is the only place in the country where

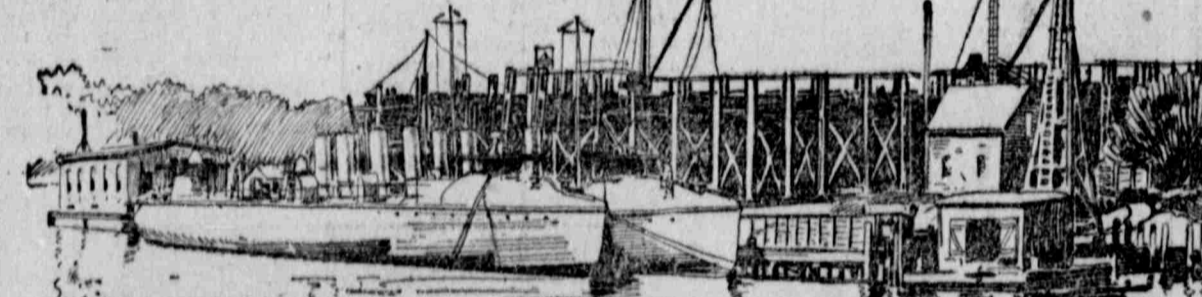
annual it and give it equal strength throughout. One of the novelties at Fore River is the floating machine shop, which can be moored alongside a vessel, so that work in which some change is found necessary need not be sent back on shore at a loss of time and labor, but can be undertaken immediately and on the spot. The big ship crane which is soon to be erected will embody another idea of Yankee ingenuity. Ordinarily the crane is the center of a shipyard, and as work progresses the ships are moved to it and from it, requiring tugs and causing many delays. At Fore River there will be a great gantry crane run on tracks fifty feet apart, towering 165 feet in the air, and with a great arm extending eighty feet beyond the edge of the wharf. This crane will be capable of bearing a load of twenty-five tons at the end and seventy-five tons

sheers for setting up a ship's masts or stacks, or it can be stuck upright to allow the ship to pass. The power will be furnished by electric motors, all under the control of one man, the largest having 150 horsepower, or more than enough to run a single great ship.

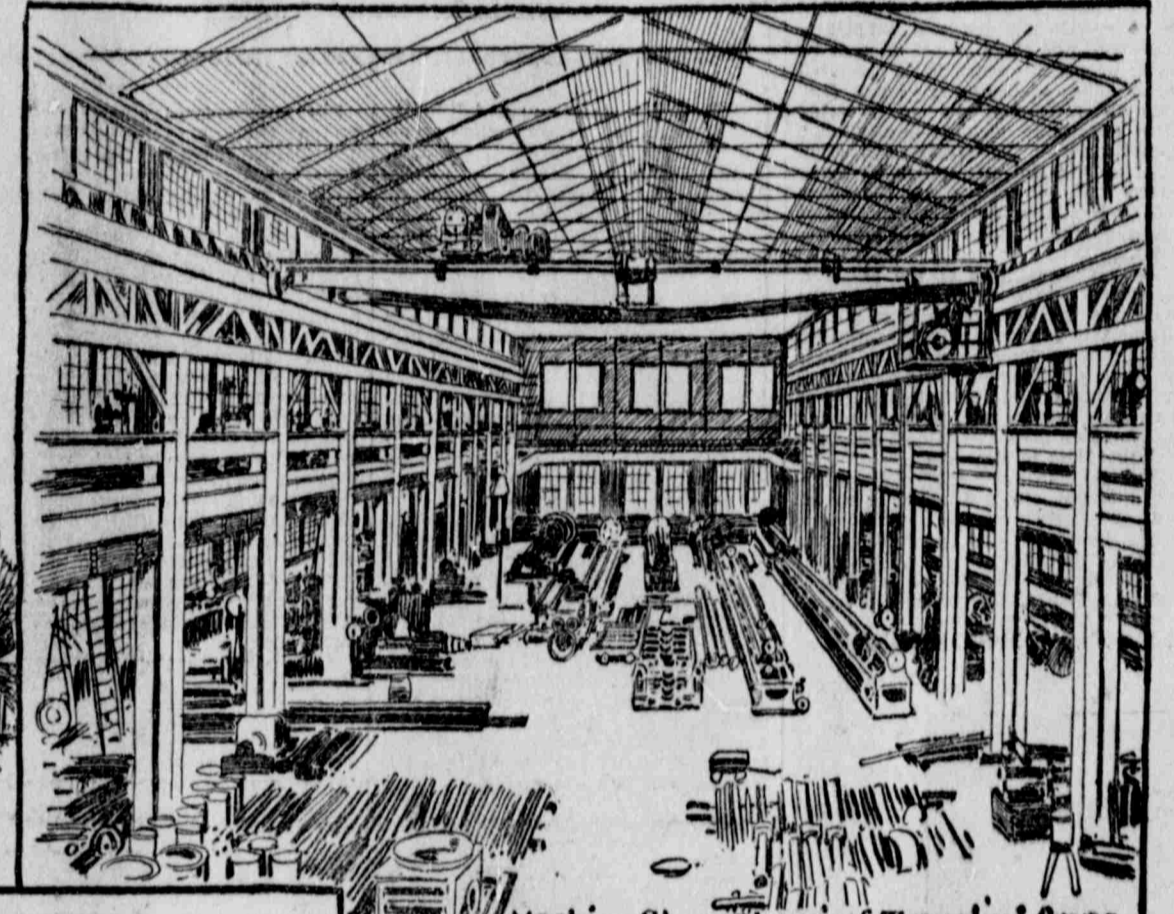
But perhaps the very latest idea in shipbuilding is a permanent structure for mounting cranes. A huge steel skeleton is now being built under which the two battleships and two cruisers or five-merchantment of the size of the Celtic, the biggest ship afloat, can be constructed at once. Here, again, the loss of time through the use of a single crane, which may be required for two or more pieces of work at the same time, is to be avoided by the installation of ten electric cranes moving along the ships at the rate of 500 feet a minute and lifting vertically at the rate of 100 feet a minute and so arranged that

method 40 per cent. really, if the time required for completion be taken as a standard, the figures would have to be reversed.

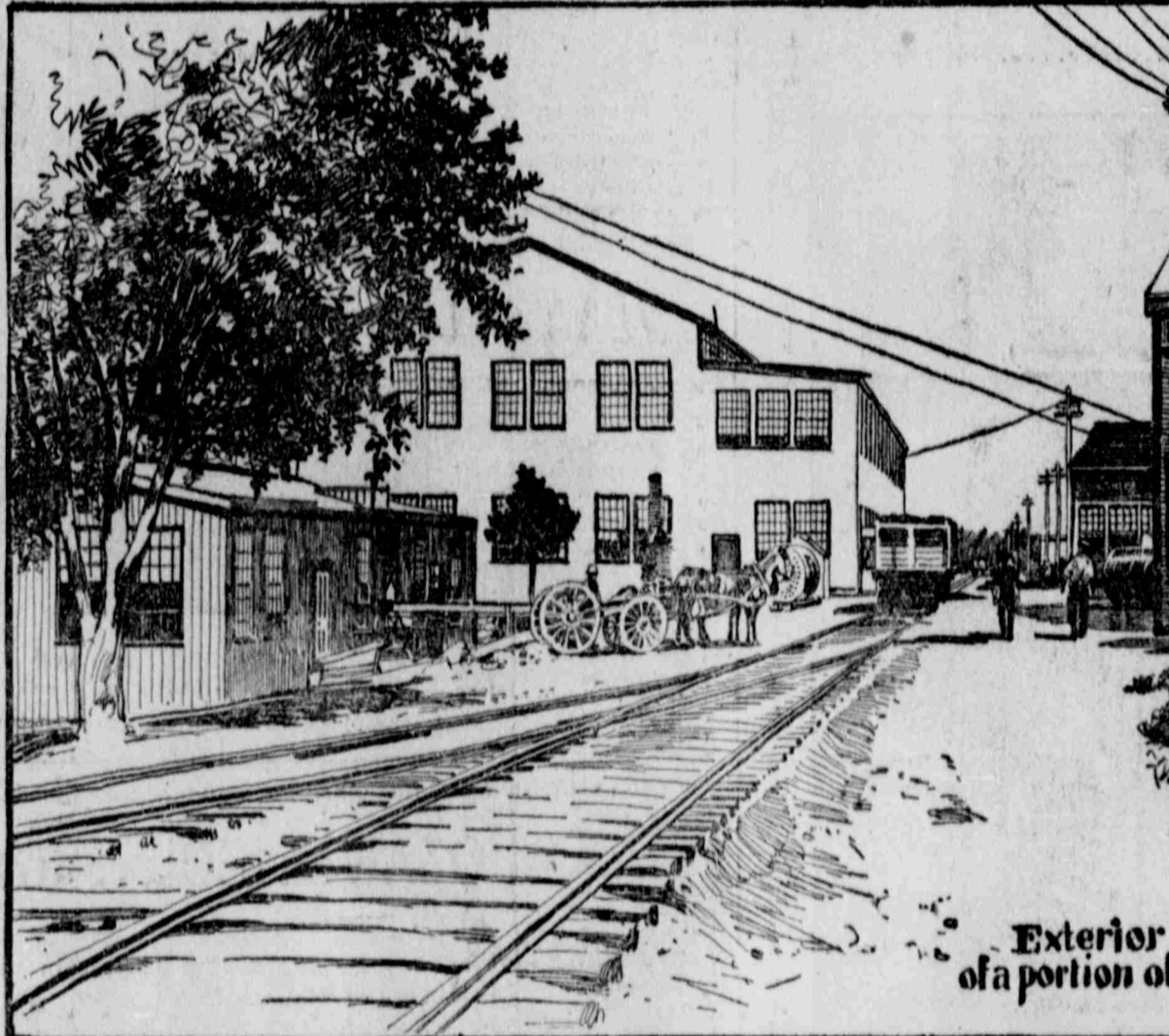
Though the description of these various features and methods—so characteristic, for instance, of the American genius for economy and efficiency—might well read like a fairy tale to the foreigner, even though he came from the far famed Clyde, so long accepted as the center of shipbuilding the world over, there are other things which would probably have an even greater personal interest to the lay visitor. Take, for instance, the quiet recognition that shipbuilding is not yet free from danger, in spite of the substitution of steel for wood, planers for adzes and machine drills for augers, as attested by the fact that each department has its "emergency" outfit and stretcher, and that there is a "stick bay" or



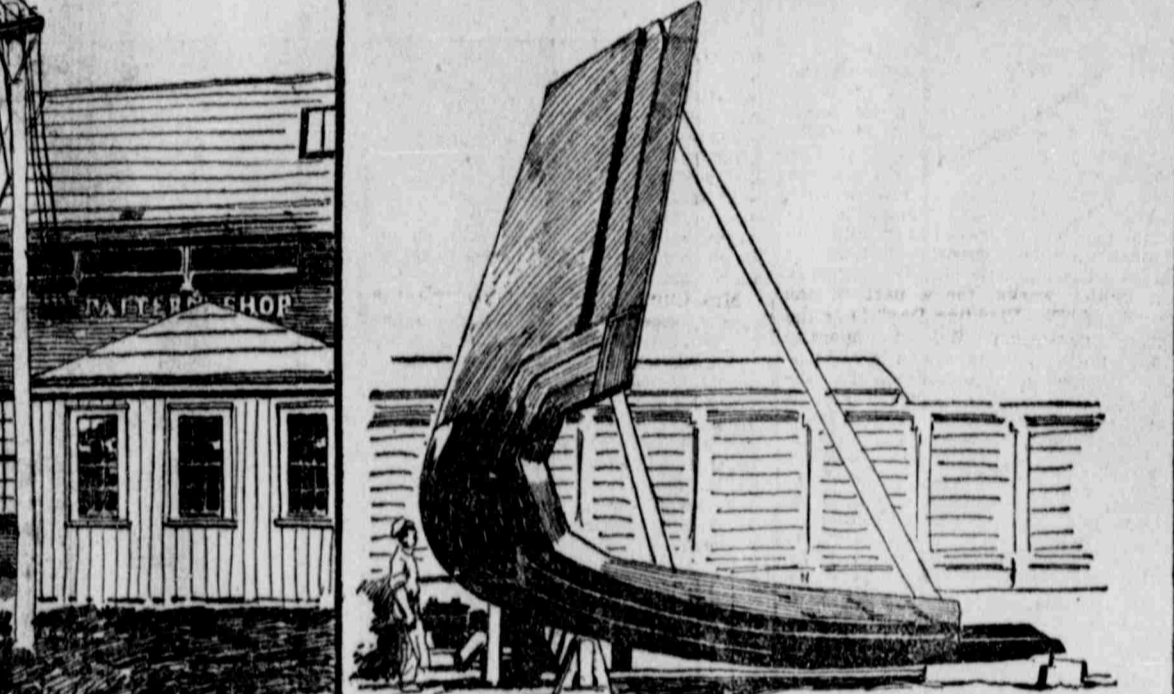
Torpedo Boat Destroyers, Lawrence and Macdonough, Moored at the Fitting-Out Pier. Floating Machine Shop at Right.



Machine Shop, Showing Traveling Crane.



Exterior View of a portion of the Works.



Wooden Pattern for Stems of the Battleships Rhode Island and New Jersey.

Western city, is building on the gravelled beach of the river; the concrete foundation is being laid for the battleships Rhode Island and New Jersey, and at the end of a nearby pier in the two largest torpedo boat destroyers yet afloat for the American navy, bearing the names, respectively, of Macdonough, whose victory on Lake Champlain kept the English from segregating New England from the rest of the

pair of destroyers. The massive machines—shears, punches, benders and rolls—required in this work are electrically driven, each with its independent motor, so that there is not a quarter part of the apparent confusion of many smaller shops in which shafting is employed and all the pulleys must be continuously driven, though not more than one or two machines perhaps are actually in use at a time. Electricity and

such a hole can be bored at one boring and from one end through the fifty-five foot shafts that will be required for the new battleships, the practice heretofore having been to bore at least twice and to work first from one end, and then from the other. When bored, the outside of the shaft is turned down until it is as true and smooth as a piston plunger. Then the shaft is reheated and takes a bath in oil to temper and

two can be worked together with an equalizing bar so as to lift ten tons, or just double the lifting weight of one alone. Ordinarily the outside, or "frames" and "skin," of the hull is built first, leaving all the interior work to be put in later under unavoidable difficulties of handling, light and air—a necessary method in the days of wooden ships, from which it has survived. But at Fore River the ship is built from the inside out, on the same lines—once called "experimental" or "honeycomb"—as in modern buildings of the "bridge steel" or "Chicago" plan. The result is that if it were reported that the Des Moines was, say, 25 per cent completed and a sister ship at a yard using a different

"emergency ward" for accident cases in one of the company buildings. Or take, again, the mold loft, a great room 80 by 320 feet, comprising more than half an acre, with a floor smooth enough for a ballroom, on which quiet young men work in felt soled shoes, handling fifty and seventy-five foot flexible rules. A seeming maze of lines, crossing and crisscrossing, marks the exact size and shape of every piece of steel that goes into the hull of a ship. With its sides of glass and its great length, the room presents a vista that one sees is not soon forgotten. As a visitor said a little while ago, "One would hardly expect to find so much perspective 'under cover.'"

WILLIAM J. RUDOLPH.

How the Colombian-Venezuelan Muddle Affects Us

REVOLUTIONS in South America are so numerous and usually so trivial that the United States seldom finds reason for giving them attention unless the interests of citizens of this republic are placed in jeopardy. As a rule, both parties to the quarrels are careful not to tread on the toes of their powerful northern neighbor. The civil trouble in Colombia which has broken out in more or less violent spasms during the past two years may prove more serious than any that has disturbed the peace there during the past quarter of a century. Between the Monroe doctrine, interest in the route across the isthmus and duty to American citizens, the United States may become involved should the so called revolution in Colombia take the path predicted by some knowing ones in Washington and South America.

More than a temporary dispute or individual ambition lies beneath the present disturbance in Central America. The fact that President Marroquin of Colombia is a usurper is not in itself one to create confusion or light the fires of universal rebellion. All rulers in the South American republics climb into power by hook or by crook. The lawful president of Colombia, Dr. Manuel A. Sanclemente, who was deposed a year ago by the Marroquin party after a successful struggle with a rebellion waged by the same elements now at war with the de facto government, is a prisoner. He has friends, or he would never have become president. Moreover, he has a party behind him hostile to Marroquin, the irrepressible party of liberty and progress. Marroquin is a conservative, a leader in the so called Clerical or reactionary element, and he and his administration are very unpopular. The opposition or liberal element has been in active rebellion since the coup d'etat which seated Marroquin in power, and failure

to suppress the uprising has contributed to the weakness of the government. Besides, the treasury is empty, the troops are unpaid and business is at a standstill.

Two men of genius and power are said to be conspiring against Marroquin's reign. One is President Castro of Venezuela, and the other General Uribe-Urbe, a young Colombia general of the type of Bolivar, Lopez the Cuban and the men who freed Mexico from the yoke of Spain. Uribe-Urbe furnishes that picturesque element without which no revolution among Latin people can get forward. He is about forty years old and has lived in and on revolutions since he was sixteen. His eulogists say that he is a born leader; that he has fought two or three score pitched battles and won them all. On the other hand, observers not quite so partial say that while he is clever, a good conspirator and social leader, he never yet won a victory at arms. General Uribe, as he is usually called, is credited by some with having directed the Colombian uprising of last spring from his hotel in Broadway, New York.

Castro's enemies say that he is a Colombian renegade, an illiterate and ambitious man and only by accident became president of Venezuela. He helped the revolution which deposed the late President Andrade, and the choice fell upon him as a "dark horse."

Colombia has about 75,000 men under arms. Venezuela can put 50,000 in the field, and her navy is weaker than that of Colombia. Castro's troops are well equipped with European arms, and the fighting which has occurred has been very bloody. The full war strength of the powers with which Colombia may have to cope single handed in case of a general war with ambitious and turbulent neighbors will be close upon 100,000 soldiers. Nicaragua has an army of 20,000, and Ecuador and Costa Rica have each 10,000. Colombia, however, has been at war for the past two years with revolutionists within her borders, and her army is well seasoned for an active campaign.

Any intervention by outside powers in the affairs of the isthmus will, of course, call up the Monroe doctrine. Some of the German press has already spread the alarm that the prompt action of the United States in sending ships to Panama was inspired by a desire to extend her conquests. It is no secret that Germany has cast longing eyes toward South America as a land of promise for colonies. Foreign intervention will be a menace to the Monroe doctrine, but the United States, by reason of her treaty with the former republic of New Granada, regardless of the Monroe doctrine or her immediate interest in the Panama route, may become involved. Colombia was created out of a part of New Granada and in-

cludes the isthmus of Panama. The treaty with New Granada in 1816 is held in some quarters to impose upon the United States the positive duty of guaranteeing the neutrality of the isthmus of Panama. In return the government of Colombia must give United States vessels, goods and passengers the same rights and privileges on the isthmus and in the ports thereof that are enjoyed by the inhabitants of Colombia. Colombia does not guarantee a permanent government, but the United States is required by the treaty to protect the isthmus from foreign invasion which might impair the neutrality of the route and her authority to compel Colombia to keep the same open in the face of domestic disturbance and, if necessary, to intervene in her internal quarrels for that purpose. In other words, the United States may say to Marroquin or any other Colombian ruler, as General Zachary Taylor did to Santa Anna on the eve of the Mexican war, "If you don't keep your brigands in order, I'll come across the border and do it for you." In fact, this is what some Colombians earnestly hope for. They even interpret the treaty as binding upon the United States to guarantee the neutrality of the whole state of Colombia, and Marroquin put in an early appeal to the state department at Washington to send forces to the scene. Within a very few weeks, also, Castro has changed front and is seeking to co-

ment the friendship of his government with that of the United States in closer bonds.

In the past this government has generally looked to Colombia to keep the isthmus free during local insurrections, but in a war with outsiders the little republic may need help. In 1873 the United States secretary of state, Hamilton Fish, gave the opinion that it "is the undoubted duty of the Colombian government to protect the route against local insurgents, and this duty will be insisted upon." Under President Cleveland United States troops were sent to the isthmus for that purpose.

Should Colombia fail in her duty the United States alone has the right to intervene and keep the route across the isthmus free from interruption. No other power has a similar right under existing treaties.

GEORGE L. KILMER.

X RAYS IN SMUGGLING. The smuggling of jewelry recently discovered at the main postoffice of Buenos Ayres has afforded an excellent test of the Roentgen rays. The practice consisted in the jewelers and goldsmiths receiving jewelry of great value in registered letters from Europe, thus cheating the custom house.

More than twenty dirigible balloons are building in or near Paris.

PERSONAL AND OTHERWISE.

There are forty counties in Texas which have to seek legal advice outside their limits, as they have not a single attorney of their own.

Most private rooms for the poorer classes of patients who may require such accommodations. One story will be used for this purpose and one for the out patient department, which has been very successfully operated, as far as accommodations would permit, for some time. The building will be constructed of the same materials and on

the same general plan as the buildings already in existence, except that it will be a two instead of a one story structure.

Professor Francis Cuyler Van Dyke of the chair of electricity and mechanics of Rutgers college has been made dean of the faculty.

A sanctimonious bore whose hobby was anti-Catholicism went to the great evangelist one day and put the direct question, "Mr. Moody, do you ever intend to do any preaching against the Catholics?" "Yes, I may some time." "When will that be?" "After all the Protestants are converted."

Walter Hubbard of Meriden, Conn., who gave that city some time ago the largest public park in southern New England, has bought another large tract of land for presentation to the public as a park. Besides this gift he intends to build a large addition to the city hospital.

In spite of its capacity for hard work, the elephant seldom, if ever, sleeps more than four, or occasionally five, hours.

One would think that the identity of the architect of such a superbly designed building as the Cologne cathedral could not possibly be lost to the world, but it is. The cathedral took centuries

to build, and many architects have modeled parts of it according to their own ideas. The result is the most beautiful cathedral in the world.

The late Bishop Mandell Creighton was once asked if he could state the difference between an Oxford man and a Cambridge man. The professor, as he then was, immediately replied, "An Oxford man looks as if the world belonged to him; a Cambridge man as if he

didn't care to whom the world belonged."

Dr. A. W. Nieuwenhuis, who some years ago made a trip across unexplored Borneo, was subsequently sent on another similar expedition by the Netherlands-Indian government. It took him two years and a half to complete this task, and the results, soon to be published, are of great geographic, zoological and ethnographic importance.