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**FIRST LADY CHAUFFEUR** at the Watertown Arsenal is Grayce Grace, 44-year-old grandmother, shown here at the wheel of her car. A capable driver, she has never had an accident, nor been nabbed for speeding in 20 years of driving.

## West Newton Grandmother New Chauffeur at Arsenal

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Mrs. Grace, who lives at 69 Commonwealth Park west, Newton Center, believes she is the first woman chauffeur in such a war plant in this area.

A capable driver, Mrs. Grace expects to be the first of many feminine chauffeurs. She hasn't had an accident, nor has she been stopped for speeding in her 20 years of driving.

She has been a telephone operator in Brookline and a hairdresser. She is the wife of Walter E. Grace, a driver for the Boston Herald-Traveler.

A few days ago when her husband told her he wanted to get

into the Navy, she decided she wanted to do something to help win the war.

She applied for the chauffeur's job so a man could be relieved for important work at the arsenal.

She was accepted and now she drives colonels and other high ranking officers. She wears a natty overseas cap and a brown gabardine dress.

Mrs. Grace has no trouble at all changing a tire and making minor repairs to her car.

She has a daughter, Mrs. Dorothy M. Gallishaw of Westwood, and two grandchildren, Frank and Grace.

### CUBAN EMBASSY STAFF OUT

HAVANA, Sept. 1 (AP) — Three manservants of the United States embassy, all of Spanish nationality, have been dismissed by Ambassador Spruille Braden for pro-fascist leanings, it was learned tonight.

### Rayon Load Suffers \$8000 Fire Damage

Fire which department officials charged to spontaneous ignition last night destroyed tons of rayon in 700-pound bales in a trailer parked in the Alger Bros. garage, at Garfield and Mystic avenues, Somerville causing damage of \$8000.

Employees said they heard a slight explosion, after which the load burst into flames. Firemen worked for an hour to unload the big trailer unit and soak each bale.

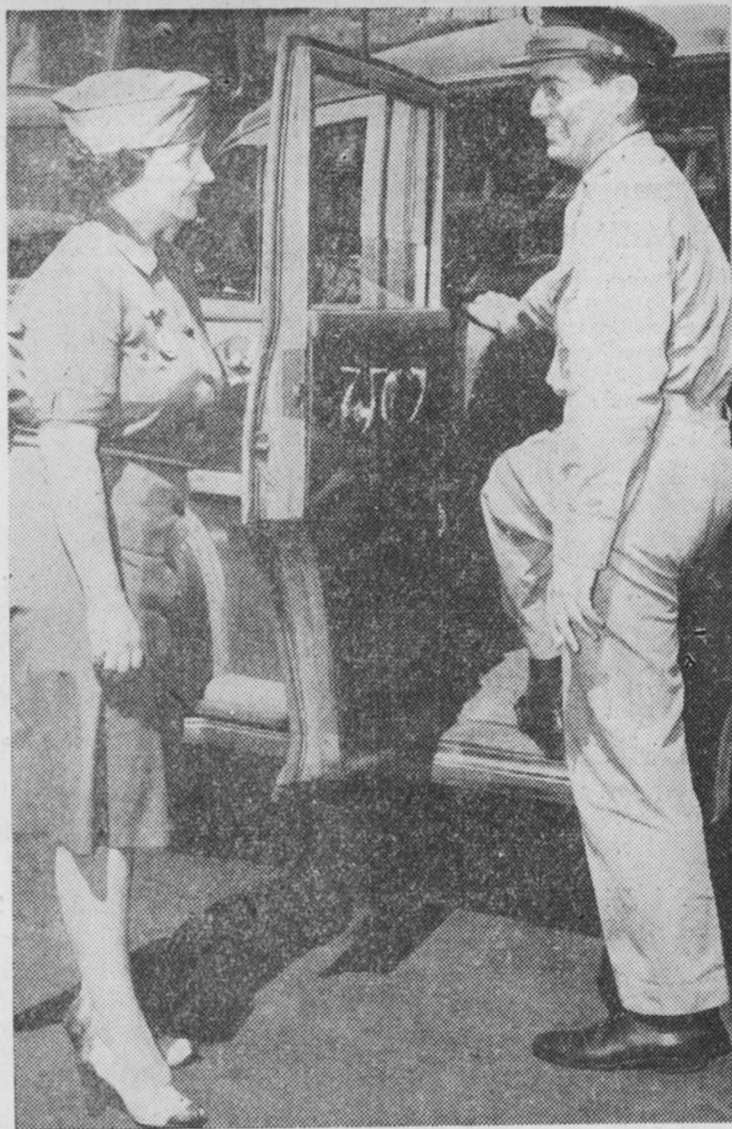
### Delaware Senator Loses Renomination

DOVER, Del., Sept. 1 (AP)—U.S. Senator James H. Hughes, (D-Del) seeking a second term, lost his bid for renomination today when the Delaware Democratic state convention chose E. Ennals Berl, Wilmington lawyer, backed by the state organization. The vote was 108 to 101.

Representative Philip A. ... of Wilmington, the ...

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**"WHERE TO, CAPTAIN?"**—Mrs. Grayce Grace, 44-year-old grandmother, who is chauffeur at the Watertown Arsenal, asks the familiar curb-to-cab quiz of Capt. Lawrence Priddy, Jr., of the Ordnance department's public relations office.

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350  
270

LUCKY AND LOVELY DEFENSE WORKER is Miss Irene Shmorack of Lynn, who is pictured above at her machine in the Watertown Arsenal where she is employed. Miss Shmorack will receive a \$25 War bond and a special invitation to attend Boston's first ALL NIGHT DEFENSE WORKERS SHOW next Tuesday evening at Loew's Orpheum theatre.

The bond is the gift of Rita Hayworth lovely star of "You Were Never Lovelier" current attraction at both Loew theatres, who is making similar awards throughout the country to pulchritudinous war workers.

This is the first of a series of defense shows scheduled to run continuously every Tuesday evening from 10 p. m. through 5 a. m. the next morning at Loew's Orpheum theatre only.

Miss Shmorack's father is also employed at the Arsenal as a blacksmith.

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*Mrs. Neta Paul, of Brookline st., South End, shows at the controls of a 10-ton crane in Watertown Arsenal, is one of the many women in war.*

*She has a brother in the Coast Guard. She serves in a man's job to release a man for active duty.*



## 3 Girls Run Arsenal Cranes as War Share

By JOSEPH PURCELL

Attention, you hard working he-men! Before breaking any vest buttons with pride over your important defense job, there are three girls at the Watertown Arsenal you should hear about.

Operators of 10-ton cranes hauling ponderous gun barrels and metals from one end of the sprawling plant to the other, these girls are truly America's "women behind the men behind the guns."

Less than a year ago Mrs. Virginia Miola, 23, of Brighton; Mrs. Neta Paul, 30, of the South End, and Frances Shugzda, 20, of Dorchester, were holding down comparatively easy, typically feminine jobs.

Mrs. Miola worked for a book-binding concern, Frances Shugzda, only a few years out of school, was an attractive asset to a cosmetics company. Mrs. Paul was a hostess.

But that was a year ago. America was at peace and young girls didn't even think about cranes. Why should they? They were too busy living happy, normal lives in which death and sacrifice were remote and impersonal.

Today, each of these girls, perched high in the cab of a crane nearly 50 feet above the heads of swarming workmen, is a grim industrial warrior, her hands controlling levers speeding the Allied victory.

They wear overalls. They climb ladders. They scream orders above an almost impenetrable din. They eat out of lunch pails.

Yet they're not losing their charming femininity. And each one has a good reason for doing a good job.

Mrs. Miola's soldier husband is in New Caledonia. She was married a year ago when he was on leave. Mrs. Paul has a brother in the Coast Guard. Frances Shugzda, too, has a brother with Uncle Sam's forces.



MRS. VIRGINIA MIOLA  
Climbs Up Watertown Arsenal  
Crane

These girls have more than just a job—they have a war to win, and they're just as earnest and determined as the soldier in the front lines.

As a matter of fact, they're taking his place back here at home and they're sure of one thing—they're not going to let him down.

# He From Altar to War Jobs

By JOSEPH PURCELL

These amazing "Women Behind the Men Behind the Guns" are so completely wrapped up in their war work that one bride won't even take time out for a honeymoon. What's more they're not afraid to take on work that requires plenty of "elbow grease," and Mrs. Alice Barnes, 31, of Carlton ter., Watertown, and Virginia Brown, 21, of Varnum st., Arlington, are two at-



**VIRGINIA BROWN**  
*Inspects Arsenal Gun Barrel*

tractive examples of that determination.

Mrs. Barnes married a storekeeper at the Charlestown Navy Yard about a month ago, but she didn't let marriage interfere with her splendid record as a drill machine operator.

## **HONEYMOON CAN WAIT**

Marriage, she admits, is a pretty important thing, but so, too, she added, is this war we're fighting, and our soldiers are going to get the equipment they need for victory.

So Mrs. Barnes, smiling from behind a coating of grease and oil, told how she got married, reporting back on the job a few hours after the ceremony. "My honeymoon," she grinned, "can wait until after the war."

Mrs. Barnes operates a machine which bores holes in huge anti-aircraft guns, a job which demands clear thinking and undivided attention.

At another end of the plant Virginia Brown, clad in grease-stained jumper, measures the outside diameter of gun barrels, another job which calls for precision and concentration.

Virginia is only a "learner" now, but in a few weeks she will be an experienced worker, holding down a job she predicts "with the best of them."

That kind of spunk is unbeatable and officials at the plant realize that these girls have something.

# Boston Girl Swings 10-Ton Crane

## Close-Up View of Grace Currier Found at Red Cross Blood Donor Centre



After working eight hours as a crane operator at the Watertown Arsenal, Miss Grace Currier goes to the Red Cross blood centre, still dressed in her oil-smeared overalls, to offer her blood as another contribution on her part in the war effort. Insert—Closeup of Miss Currier, who has pledged to give her blood to the Red Cross every eight weeks.

High above the factory floor, Miss Currier operates one of the 10-ton cranes at the Arsenal. She gave up her job as a masseuse to work in the government defense plant.

BY FRANK G. JASON

The immaculately groomed nurse at the American Red Cross, Blood Donor Centre, was just completing a report.

Automatically her left hand reached for a new blank as she affixed her signature on the one before her.

From the corner of her eye she noticed a figure clad in oil-smeared overalls as the next to be interviewed. All day long the nurse had been working at top speed, and to keep up the pace she started asking questions without raising her head.

"Name, please?"

"Grace Currier," came the reply.

"What!" exclaimed the nurse, who fully expected to hear the voice of a man. In an instant she regained her composure and sure enough sitting there at the side of the desk was a young lady, name of Currier, but looking very mannish from the outward appearance of her costume.

### Operates 10-Ton Crane

Further questioning revealed that said Miss Currier was 31 years old, lived on Park street, Dorchester, and was currently employed at the Watertown Arsenal as a crane operator.

This disclosure startled the Red Cross nurse for the second time and being startled twice the same day by the same person was a little too much for the nurse, who can generally take such unusual things in stride. She had heard of many strange occupations of women since she started working at the blood bank but never had she come in contact with a girl who operates a crane—a 10-ton crane at that.

In due course the interview was completed and Miss Currier marched upstairs to the room where the vital fluid would be extracted from her veins. She hesitated momentarily when an attendant bade her to climb upon a cot. She was afraid her grimy overalls would soil the crispy white sheets. At the insistence of the nurse, however, she lay down and soon the job she set out to do was accomplished.

Now, like many folks who have contributed their blood, Grace had in mind that if she donated once she had done her part. Well that was how she felt when she entered but before she left she had different ideas.

Something happened to her while she was lying on that cot. She got to thinking how some soldier's or sailor's life would one day be saved simply by this minute sacrifice she was making. Right then she would have been willing to give a quart of her blood but she knew that regulations forbid anyone giving more than a pint at a time. Sure, she was healthy and probably could have spared more but rules were rules and who was she to break them.

### Helps Make Big Guns

Before she left the establishment she inquired when she could come back and offer more of her blood, and on the spot, when she learned she could come back every eight weeks, she pledged herself to return at regular intervals for the duration. It's patriotism like this that keeps

this great nation of ours ticking. Here is Grace Currier, one in millions of feminine defense workers, who, although she's doing a man-sized job operating a huge travelling crane at the Watertown Arsenal, still doesn't think she's doing enough to help her country win the war.

We went out to the Arsenal to get a peek at this particular young lady, who is representative of many of her sex, and after watching her operate the crane which raises huge parts of big guns onto various machines—delicate work this even though the parts weigh several tons—we were impressed at her ability as was the army officer who accompanied us into the shop.

It was explained that she actually controls the progress of the manufacture of a big gun. One slip on her part would not only ruin the part of the mechanism her crane carries but would also smash one of the costly machines that tools the part.

The same arms from which she donated blood to save the life of a soldier or sailor operate the controls of a machine which is building a gun to deal death to the enemy.

It took Grace about seven days to get on to the knack of operating the travelling crane, which is an unusually short time, but Grace says that she is mechanically inclined and that made it easy for her.

### Like Bombardier's Job

In learning to operate the machine Miss Currier said it was something like the training a bombardier gets.

"You have to lower the big hook on a target on the floor and you've got to do it so that the rope doesn't wobble to and fro."

The mechanical operation of the crane itself is similar to that of driving a street car. Miss Currier never had the opportunity to drive a trolley but after watching the motorman on her way to work a few mornings she found that the car was run in the same manner as her crane.

The crane is situated 50 feet above the factory floor and in order to reach it she has to climb a straight ladder attached to the wall. Most girls would shrink from this task alone but it doesn't stump Miss Currier. She's quite accustomed to climbing to dizzy heights having helped her dad paint their house in Dorchester several times, and once she shingled the whole house all by her self.

Before Grace took this defense job she was a masseuse in Boston. She is a graduate of the Posse Nissen School of Physical Education and devoted most of her time to athletics.

She is an expert swimmer and her specialty in this sport is long distance swimming. Several times she has gone the distance from Charlestown Bridge to Boston Light. Last winter she was taking courses at the "Y" so she could qualify as a swimming instructor.

She is a firm believer in physical fitness not only for the protection of her own health but for the health of others.

### Ready to Do More

She knows that if she isn't feeling tops every day she is on the job some catastrophe might befall her fellow workers. One little mistake on her part while she's operating that crane and she is likely to snuff out the life of one of the men below. She's got to keep fit and she knows it. What's more, she wants to.

The only thing she regrets is that she isn't a man. She is the youngest of 10 children in her family and has three brothers who served in the last war. All of them are too old to get into the present conflict. She would give anything to get into the scrap herself. Of course that's impossible, but she's going to give everything that's in her to help win the war from this side.

You can't get her to admit that the work she's doing or the blood she is offering is a sacrifice on her part. She only wishes that there was something more she could do.

# Running 10-Ton Arsenal Crane A Delight for 'Tish' Barnum, 19

## 'Army Daughter' with Brother and Father in Service Finds War Niche

By MARJORIE BRIGHT

The youngest operator of a 10-ton crane at the Watertown Arsenal is a 19-year-old girl—Martha "Tish" Barnum of 295 Beacon street, Boston.

Sitting in a crane-cab and manipulating three intricate control systems is a far cry from carrying school books and cramming for exams, but Martha has managed the change "with the greatest of ease."

"I am fascinated with the work," she said yesterday. "I can't say enough about the splendid spirit of everyone at the Arsenal. They are a perfectly grand group of Americans."

### AN "ARMY DAUGHTER"

Being an "army daughter," Martha is somewhat of a globe trotter. Her father, Edmund M. Barnum, veteran of the world war, is a cavalry colonel now serving overseas.

Martha was born at Fort Sam Houston, Tex., and has lived in Chicago, California, and for the past three years in Milton, where she was graduated from the academy in June.

Six weeks ago she applied for a civil service rating and filled out an application blank marked "war appointment." (Anyone between the age of 18 to 50 may apply and Congress has recently lowered the limit to 16.)

Martha may not resign for six months (as if she wanted to) and her appointment automatically expires six months after the war is over.

After passing a mechanical aptitude test, she was sent to the Brookline Vocational High School for a week's magnetic lathe training.

"The aptitude test wasn't hard," she confessed. "It was more or less a matter of using good common sense."

### TINKERING HOBBY

She said she was not particularly mechanically-minded but "tinkering with gadgets," along with horseback riding, has always been her hobby.

Reporting for work at the Arsenal, she was presented a badge, given a "mechanic learner's number," and she was photographed. She purchased (at her own expense) a one-piece blue and white striped overall, with sleeves cut short to prevent longer ones catching in machines; an engineer's cap with visor; wool socks; and all-over leather soled shoes. She must keep her hair cropped close or wear a protecting hair-net.

"When I get home in the afternoon," she laughed, "I'm allowed to sit in only one chair until I've changed my work clothes. But I really don't get too black."

When she confided to one of the arsenal supervisors her aspiration to become a crane operator, he promptly asked, "Why?"

"I've always liked to drive automobiles," Martha replied confidently. "I have an idea operating the controls of a crane isn't too different."

Along with a class of 10 other "learners" who will be ranked "trainees" after six weeks, she practiced with a target and weight. Then she was sent out (the first in her class) to receive instruction on a 30-foot crane. She learned to work in conjunction with the "rigger man" below who first ties a heavy rope around the object to be lifted, then attaches the rope to the crane hook, and then gives Martha the appropriate signal.

### NOT A BIT NERVOUS

"I wasn't the least bit nervous," she insisted. "Although I knew I would have to be able to place an object, up to 10 tons, within one-

thousandth of an inch of the proper place."

She admitted, however, it was a precarious proposition to transport a load of iron pipes down an aisle, crowded with co-workers.

Martha's two basic requisites for potential crane operators are NEVER TO BECOME NERVOUS (your fellow employes must have confidence in your ability) and ACCURATE JUDGE OF DISTANCE.

Rigid eye examinations are given periodically at the arsenal.

"I get fewer signals now," she continued. "I've learned to recognize where certain pieces are going in certain parts of the shop."

Students, housewives and career women are included among the arsenal workers—and one crane operator was formerly employed by Elizabeth Ardens!

Martha reports for duty six days a week. Saturday is her "day off," and she works holidays, including Christmas.

### NOISE NOT TOO BAD

She does not object to the shop's noise, explaining it was not "deafen-

ing" but a steady distinctly audible hum of motors and machines. Conversation is practically impossible. Workers whistle, one to another, and when she gets home often finds herself talking in sign language.

"When the war news is especially good," Martha went on, "we work that much harder." Several of the arsenal "learners" have husbands serving in the armed forces.

The remainder of the Barnum family is not to be outdone by its youngest member. They, too, are performing their particular war duties. Martha's mother, Elizabeth Barnum, was born in Illinois and attended school in New England. For two years she served as monitor at the Milton Red Cross and is now planning to make surgical dressings, along with other army wives, at the Boston Service Command headquarters.

"Of course I'm proud of Martha," Mrs. Barnum smiled. "War production needs girls who have a purpose and will work hard. And I think she fills the bill."

Prior to going overseas, Col. Barnum was stationed in Boston as New England's Post Exchange Officer.

### BROTHER IN MARINES

The only Barnum son, Allen, 24, is a captain in the Marine Corps at

the flying school in Pensacola. After graduating from Pomona College in California, he joined the Marines in 1940. He attended basic training school in Philadelphia and was detailed to a battleship at Pearl Harbor. Last spring he was one of two officers selected from a group of 298 to attend the tank destroyer school at Camp Hood, Tex.

Betsy Barnum, Martha's older sister, is enrolled in the Katherine Gibbs Secretarial School. Last year she worked in Boston's Blood Donor clinic and is a lieutenant in the Nurse's Aide, denoting she has more than 300 hospital service hours to her credit. She has also served as "aide supervisor" at the Massachusetts General Hospital.

Martha is a member of the "10 per cent. bond-buying club" and said that almost the entire Arsenal personnel were members too, "some of them contributing up to 20 per cent."

"I'm sure I can safely say," she concluded, "that before long the majority of Arsenal workers will be women. I know they will enjoy being there as much as I do—they couldn't help it."



MARTHA BARNUM, youngest woman crane operator at the Watertown arsenal.



# Bay State Victory Girls Meet the Challenge of War

By KATHERINE DONOVAN

**T**HERE'S a girl behind the man behind the gun. All over this nation, in war plants great and small, in vast factories and in modest shops, American girls are meeting the challenge of war by working in war industries.

There are scores of thousands of these girls in Massachusetts alone, and soon there will be more.

Long hours, intricate, precision-demanding labor, arduous jobs requiring physical stamina and mental alertness—to this critical challenge America's girl war workers have responded with heart-warming patriotism.

They're an inspiring group—a smiling, workmanlike, competent, responsible group of young women, keenly aware of the value of their contribution to victory and freedom, rightly proud of their status as the "home frontiers," replacing and releasing men for the fighting services.

**I**T WAS the poet Virgil who sang of "arms and the man." Today it is equally "arms and the woman." For the making and manufacture of armaments, as never before in our history, is today a woman's job.

They are of all ages, of all classes, of all degrees of training and education. They are the wives and sweethearts and sisters, the mothers and even the

grandmothers of men in the armed forces.

These women are pledged to the vital task of seeing to it that those they love get what they need for victory—the guns and the tanks, the planes and the ships, the shells and the bullets.

As President Roosevelt has pointed out, there isn't a single article of war going to American servicemen and their Allies in the production of which a woman has not had a share.

For it is the women—young and old, wealthy and poor—who make all the difference between success and failure in meeting the supply needs of America's fighting men and those of all the United Nations.

These women have a name for themselves. They're the WOWS—the Women Ordnance Workers' Service. And they're all out to "wow" the Axis.

**T**HEY are working side by side in a stimulating freemasonry of those pledged to a common cause—girls with college degrees, youngsters fresh out of high school, trained technicians, debutantes and girls from humble homes, professional women and unskilled but earnest recruits.

Estimates vary as to the number of women employed in Massachusetts war plants; some go as low as 100,000, others as high as 500,000. But throughout the State women are working in hundreds of plants, from such huge centers as the Watertown Arsenal, Boston Navy Yard, Fore

River shipyards, Springfield Armory and the Lynn plants of the General Electric Co. to the little machine shops which have no more than a dozen employees.

A cross-section of these women workers is a cross-section of the nation's war effort—an effort which demands and achieves the best that women have to give in the cause nearest their hearts.

Here's one case—one of many in this state.

**O**NE was a tiny woman less than five feet tall. For a long time she had been eager to

aid in the war effort, but because of her size she had difficulty in getting a job. She was too small to work at a bench, or even over a store counter.

But as the need for women became greater in Massachusetts, as more and more young men left offices and stores and factories to join the armed forces, the United States Employment Service of the War Manpower Commission found a job for this girl. She is now working in a southwestern Massachusetts plant which manufactures barrage balloons—hand-sewing. It is an important job, requiring the precision and delicacy of touch which may mean all the difference between life and death.

A Boston forging shop recently hired several women, strong and stalwart. They need to be. One is operating a triphammer which forges hot metal. The others are swinging 12-pound sledgehammers, to shape the metal by hand. They're doing all right, too.

At a war plant in the central part of the state, a girl is running an overhead crane in a steel rolling mill. The crane controls a bucket which picks up 50 tons of molten steel at one time, and unloads into ingots



**WOMEN** war workers in Massachusetts come from every walk of life. Among them are former school teachers, actresses, office workers and hostesses. Above is Anna Dancewicz, 22, of Chelsea, lathe operator at Watertown Arsenal and former lamp company employe. She was the pretty "cover girl" on the national publication of Army and Navy ordnance workers. At left is Ruth Madden, 20, of Back Bay, fashion and photographer's model, now inspector at Watertown Arsenal.

For Fred Waring's new war song, "Miss Victory," dedicated to our girl war workers, turn to Pages 14 and 15.

before the steel is rolled into various forms. Beneath the crane, men work constantly and confidently on the floor.

The weaker sex? Not these girls. When this particular feminine operator first was hired, there was considerable grumbling among the men workers, who with some justification feared for their personal safety. Now they're her most enthusiastic boosters. She's the best crane operator the plant ever had, they'll tell you. And they mean it.

**I**N THIS state, too, is the oldest woman yet to be hired through the United States Employment Service—a 72-year-old grandmother who runs a machine in a Springfield war plant.

She qualified for the job by learning machine operation at a vocational training school run by the State Department of Edu-

cation, and her eight-hour shift leaves her hale, hearty and happy, she declares.

Also working at the government armory in Springfield is the mother of a Navy boy who was killed in action at Pearl Harbor, and who thus became Springfield's first hero of World War II. The mother, Mrs. Claire Gregoire, widow of a Navy veteran of World War I, operates a woodworking machine at the armory.

"My son made the supreme sacrifice for his country," this young Gold Star mother says. "Whatever sacrifice I may make can never be so great as his."

"I feel that it is my duty to do all I can to help shorten this war. In that way, perhaps, I can save the life of some other mother's son. I am a widow, and now I am alone. But I am not alone where I work, for I am with other mothers."

"We are doing all we can to win this war. We feel that if we shorten this war by a week, a day, or even an hour, we will save the lives of some of our men. I believe that by working in a war industry I am taking my son's place in this war. So,

naturally, it's all-out production for me."

**O**NLY a year ago, when it was first suggested that women be used on men's jobs, many an employer viewed with alarm, or laughed heartily and ignored the suggestion. Women like Mrs. Gregoire or the Springfield grandmother, and many another younger woman, had little chance to prove ability in war production.

But with the expansion of industry and the increasing shortage in manpower, employers had no alternative but to call upon women. Sceptical at first, their attitude rapidly developed into one of amazed admiration, according to Powell M. Cabot, Massachusetts director for the United States Employment Service.

"Today employers have changed their minds about women workers completely," Director Cabot declares. "They're glad to have women in their plants and they think they're doing a grand job."

"If it weren't for the women, the employers could never meet their production demands. Prac-

Continued on Page 21

## 30 P.C. of Arsenal Workers Are Women

# Girls Man Huge Cranes

By CARL DE LEUW

The answer to the current problem of women replacing men in essential war plants has definitely been given at the Watertown arsenal, where girls now comprise more than 30 per cent. of the workers.

Not only are women replacing

men by the hundreds at this plant, but officials have found they are capable of doing the job as well as, if not better than, the men they are replacing.

On a specially conducted all-day tour of the arsenal, under the direction of army ordnance offi-

cers, New England newspaper men saw for themselves that women are capable of operating the intricate and precision machinery of an up-to-date war plant.

More than 1200 men have been released for active military service, and several hundred more will be released and replaced by women during the next year, due to an extensive training program started at the arsenal more than 18 months ago.

Mere wisps of girls are operating huge 10-ton hoisting cranes, and using all types of machinery and tools. They are even working on the melting platforms in the foundry, helping to cast 5000-pound gun tubes.

Plenty of other evidence of what government arsenals are capable of doing in the way of production was seen by the newsmen, who were accompanied on the tour of inspection by Maj.-Gen. Sherman Miles, commanding officer of the First Service Command.

The Watertown Arsenal last year produced more than \$30,000,000 worth of equipment for Uncle Sam's fighting forces.

The plant is producing gun barrels for 37mm. and 90mm. anti-aircraft guns and 105mm. howitzers, besides supplying and assembling thousands of gun carriages, mounts and cradles for guns of all sizes.

Some of these mounts were 130 feet in circumference, and officers showed how they could whirl, raise and lower one of the 16-inch, 69-foot-long and 140-ton guns almost as fast as one could sight a rifle.

One of the highlights of the tour of the 100-acre plant, which included visits to the arsenal testing laboratories, and the carriage and assembling plants, was the inspection of the arsenal gun division, where the revolutionary process for centrifugal casting of 37mm. to 90mm. anti-aircraft guns was seen.

The 90-mm. guns already have be-

come famous for the part they played in the routing of Rommel's Nazi forces in Africa.

The Watertown Arsenal is credited with the development of this centrifugal casting of gun tubes. It is the only arsenal in the country today engaged in the production of gun barrels by this method.

Instead of the conventional system of forging by pressing, the molten metal is poured into hardened steel casts revolving at such a rate of speed that the molten steel is spread layer on layer until only a thin hollow remains.

This spinning action forms a gun comparable in every respect to those forged from ingots under heavy presses, and the production time is reduced considerably.

Col. John Mather, commanding, told newsmen that the centrifugal casting system has so advanced the production of gun tubes, that our army would be sadly deficient in artillery without it.

In the testing laboratories, experts explained the basic research problems which are peculiar to army ordnance.

These problems, they explained, involve the improvement of processes used in the manufacture of guns, gun mounts and recoil parts, the development of better tools for the machine shops and the corrective of any other metallurgical troubles which may develop.

Under the direction of Col. H. H. Zornig, the laboratory division investigates all failures of ordnance material, and inspects and analyzes captured enemy material to determine its structure and material value.

The successful welding of tank armor was also first accomplished at Watertown, and the knowledge gained did much to eliminate the riveted construction of early tank models.

Describing the general duties of the army ordnance arsenals, Col. Mather said it was never contemplated that the six manufacturing arsenals would be able to carry more than 5 per cent. of the country's war load, but they are now carrying considerably more than that.

# Women Playing Big Role At Watertown Arsenal

By MILTON E. CONNELLY

**WATERTOWN ARSENAL**—When the saga of World War II is finally written, there will be chapters about civilian women on the production front and in those chapters, reporters were convinced on their visit here yesterday, there will have to be many lines about mothers and daughters who have stepped into shoes of fathers and sons at this 125-year-old arsenal of Uncle Sam's Army Ordnance department to help make the big guns to fire the shells to lick the Axis.

They call the women at this war plant WOWS and they are all the name implies. There are 3000 of them on the payroll now and there will probably be a couple of thousand more before the year expires. They run heavy cranes—cranes which carry tons of steel and equipment over the heads of hundreds of men and over costly machinery. They operate all types of tool machines and even step onto the melting platforms to help pour molten metal for centrifugal casting of gun tubes.

Ordnance officers will tell you that women workers have even surprised them in their adaptability to men's work. And they'll give you evidence of this ability by a tour through the cannon plant. The WOWS are not only good workers but enthusiastic ones. For instance, there was a sign on the door of one of the powder rooms in the company's largest plant. "You can't fight the war in here".

The opening of gates at the Arsenal to newsmen for a peek at production methods as well as products was the

first time in recent years that Army Ordnance has permitted an inside view of this gun plant, one of the oldest arsenals in the country. It was by far the most revealing trip the reporters have made to date on this current tour of the First Service Command area, designed to show the public that fighting a global war and providing the equipment and supplies is big business.

Reporters saw things that the public has not been permitted to see in war time in any Arsenal. They viewed a 16-inch seacoast gun — a monster and deadly piece of machinery, the barrel of which weighs 140 tons, the cost of which is approximately \$750,000, and the making of which requires 47 days now as against 730 before the war. It is the arsenal's job to make the carriage for this gun.

They saw 90 mm. anti-aircraft guns in the process of manufacture and witnessed a demonstration of the setting up one of them in the Arsenal yard by an Army unit in less

than six minutes. They viewed 37 mm. gun tubes, carriages and cradles and 105 mm. howitzer gun tubes, chill molds and other products in the making.

Amazing was the disclosure that years and years of planning have gone into the making of heavy artillery. For example, the Watertown Arsenal has developed the process for centrifugal casting of gun tubes. It was under experimentation for 15 years and it has only been within the past two years that a production schedule has been developed.

"While I can't give figures on the process on the production lines", Col. John Mather, commanding officer of the Arsenal said, "I can assure you that it has more than justified the 15 years of experimental work. In view of the tremendous demands made upon the forging industry by the present war, the Army would be sadly deficient in artillery if it were not for this centrifugal process. As it is we have been able to keep pace with the manufacture of carriages and other artillery components".

The tour originated at headquarters of the First Service Command in Boston, where reporters were taken in Army cars to Watertown. There was a welcome by Colonel Mather, brief talks by officers in charge of departments, a tour of the various production plants, lunch in the cafeteria, set up a few months ago, and an afternoon tour and conference.

Colonel Mather made it plain in his first chat with reporters that Arsenals were never intended to be production plants. Private industry was expected

to carry at least 95 per cent of the load and the main function of arsenals was to be that of designing and developing guns and mounts, or in other words that of a jobbing shop. But the complexities of global warfare changed plans and Arsenals today are found carrying considerably more than the estimated five per cent of production.

The colonel entered into a frank discussion of employment problems. He said that the absentee rate at the Arsenal is approximately 6½ per cent, including all causes and also the periodic vacation time which civil service workers build up. Eliminate that last item and absenteeism will drop to 4½ per cent.

And take away from that 4½ per cent the absences due to illness and unexpected sickness and you have the figure down to about 1 per cent for unauthorized absence from work. The Arsenal employs about 9000 persons, 75 per cent men and 25 per cent women. And under the conditions, the colonel appeared justified in his statement that his shop's absentee rate is favorable compared with other industries.

Employment records at the Arsenal proved interesting, especially comparisons with other war years. During the Civil war about 809 persons worked here and in 1871, the number dwindled to 16. During World War I, there were 5093 workers and shortly after, the list dropped materially. And now the figure of World War I on Arsenal employment has nearly doubled.

Workers are paid on a straight 40-

hour week with time and a half for eight hours to bring the work week up to 48 hours. The average weekly salary is \$40. Women, who, according to Maj. Francis C. Crotty, industrial relations director, were found capable of doing men's work are now receiving men's pay.

The major supplemented the colonel's discussion on the matter of labor. He pointed out that 18 months ago, a shortage was anticipated and that the Arsenal was one of the first to recognize the need for engaging women. As a result, courses were made available for women trainees in Trade schools. Later they were given training on the production lines. Of the 3310 persons trained and hired in the past year, about 2000 were women. They are preferred to the older type of men but their absentee record, it was admitted, is not quite so good. One compensating factor, however, the major pointed out, was that women do not have so many grievances as men.

And on the matter of grievances: the arsenal has met the problem. Every employe has the right to be heard, first by his supervisor and then by his foreman and later by the commander himself if he cannot get satisfaction. They do things for labor at the Arsenal. They sponsor a newspaper, promote recreational activities, social events and numerous other affairs to promote good will.

The visit to the Arsenal laboratory, in charge of Col. H. H. Zornig, disclosed the high volume of detail behind the job of producing guns. Testing machines were shown, designed to bring out any defects and permit correction. Reporters saw a dismantled

German 88 mm. gun, probably used for anti-aircraft fire. It had been taken apart for study and examination. They saw metal being tested by the grandfather of testing machines, a 400-ton Emery machine which cost \$31,000.

Reporters moved along to machine shops, where they got their first peek at women crane operators and women machine workers.

They went to the only gun range on the property, a 100-yard enclosed gallery and were permitted to see a 37 mm. shell fired that distance through an inch-and-a-half metal plate. And incidentally, the shell hit right through the insignia of Hitler's Army.

The foundry visit was outstanding. It showed the actual process of centrifugal casting of gun tubes in sizes from 37 mm. to 105 mm. Molten steel, heated to the point where it flowed like water was moved by a heavy crane and poured amid a shower of whirling sparks into a hardened steel cast. In a half hour the crane returned and the barrel was ready to go on its way to the cooling department, where it was buried in sand to be cooled.

The sight of five of these big tubes being carted to various parts of the foundry building, some of them burning hot and being dumped into cooling chambers, was unquestionably the most spectacular seen by reporters.

They also have an X-ray clinic at the arsenal, a place where a million-volt X-ray machine picks out flaws in the big guns and carriages. This department and the metallurgical department centers for the War depart-

ment, have been visited by many engineers and by representatives of allied nations seeking advice.

To show the extent of business conducted at the arsenal, officials announced that the arsenal bought \$39,000,000 worth of material from 900 civilian firms in the last fiscal year. The 1942 production was valued at \$30,000,000. And incidentally, the value of the buildings at the arsenal stretched out over 100 acres of land, is exactly the production figure of 1942—\$30,000,000.

Accompanying newspaper men on the trip was Maj. Gen. Sherman Miles, commanding officer of the First Service Command, with his aide, Capt. Frederick Winthrop. Also present were Maj. C. A. Lake, in charge of public relations at First Service Command headquarters, and Maj. Robert Van Ness, public relations officer of Army Ordnance, who came to the arsenal from Washington, D. C., for the trip.

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