

# ROCHESTER HISTORY

Edited by Ruth Rosenberg-Naparsteck  
*City Historian*

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*Arsenal of Freedom*  
Part One  
**Rochester Products that Helped Win  
World War II**

*By Bob Marcotte*





*Pauline Latham riveted small parachutes for Bickford Brothers. The parachutes were used to carry small flares to light the battlefield.*

*Cover: From Rochester Times Union.*

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## **Rochester Products that Helped Win World War II**

On Feb. 23, 1945, when U.S. Marines raised the American flag atop Mount Suribachi at Iwo Jima, photographer Joe Rosenthal captured the most enduring image of World War II. It was taken with a Folmer-Graflex camera – the best of its generation – made in Rochester, N.Y., the optical capital of America. <sup>1</sup>

Rochester's industrial contributions to Allied victory extended far beyond stirring pictures, however. Eastman Kodak, Bausch & Lomb, and other Rochester companies provided, by some estimates, up to 75 percent of the optical equipment that aimed Navy guns and Army artillery, and enabled aerial reconnaissance to play a key role in planning campaigns and assessing the effectiveness of Allied bombing. No fewer than 29 Rochester plants contributed parts to the mighty B-29 Superfortress bombers. Indeed, some of the most critical weapons in the Allied arsenal – the radio proximity fuse, radar, and the atomic bomb – were made possible, in part, by the contributions of Rochester companies and workers. From 1,000-ton Odenbach fuel tanker ships to Kodak spy cameras that could fit in a matchbox, from six-ton Bausch & Lomb rangefinders to Gleason Works gears a fraction of an inch in diameter, local factories made them. <sup>2</sup>

To do so required an almost total transformation of Rochester's industry, its work force and way of life. Entire lines of peacetime production ground to a halt. Even as Monroe County sent 42,000 men and women into the armed services, its industrial employment nearly doubled. This required an infusion of students, minorities, and, above all, women, whose numbers in the workplace also nearly doubled, causing ripple effects all across Rochester's home front.

Rochester area soldiers fought with courage, and about 1,200 gave their lives. But ultimately Rochester City Historian Blake McKelvey notes, the community's "most decisive contributions" occurred in Monroe County's war plants, which received an estimated \$1.2 billion in military orders by war's end. <sup>3</sup> Local facto-

ries, foundries and assembly lines were an integral part of a vast, interconnected industrialized war effort in which dozens, hundreds, even thousands of companies nationwide might be involved in producing a particular type of tank or warplane, each supplying a vital component that would be rushed to another part of the country to complete a part that in turn would be shipped to yet another plant for the final assembly.

The United States and her allies prevailed, in large part because American industrial might literally overwhelmed the enemy. At war's end, Arch Merrill wrote, a captured Prussian tank commander stood forlornly, watching a flood of American tanks stream along a German highway, while scores of American fighter planes and bombers droned unchallenged overhead. "We could never, never beat THAT," he exclaimed. <sup>4</sup> America's industrial wartime production was staggering. So, too, was Rochester's contribution to it.

### **A Head Start**

The U.S. Navy was caught by surprise at Pearl Harbor, when Japanese carrier-based planes attacked our Pacific Fleet on Dec. 7, 1941. However, even before that attack American factories – including dozens in Rochester and adjoining towns – were gearing up for war.

By July of that year "the full facilities of scores of Flower City industries, the efforts of thousands of local men and women" were engaged in making everything for the military from dishpans to devices to control the aim and accuracy of artillery pieces, the Democrat and Chronicle reported. "Contracts have come in bewildering profusion to Rochester, orders for an assortment of supplies and materials of amazing diversity." All across America factories were humming. Partly this was to supply England and the Soviet Union under the Lend Lease program; partly this was in response to the belated recognition that the United States would likely be drawn into the conflict, and needed to arm itself quickly. A front-page

article that October described how scores of Rochester area factories “work night and day supplying many of the sinews of war for the sea forces, laboring to answer the call for more and still more production.”<sup>5</sup>

Binoculars and telescopes. Range- and height-finders. Photographic and X-ray film. Cameras. Chemical tanks. Sterilizing and operating room supplies. Artillery shell cases. Woolen gloves and officers’ coats. Dental chairs. Wooden lockers. Generators and small motors for warplanes. Blood pressure gauges. Gun assemblies for scout cars. Heavy duty lathes and boring drills. Switchboards and field telephone. Stretchers. Even French fry cutters. All poured out of Rochester, destined for the military. And that was just a sampling. Indeed, by August 1941 “numerous Rochester factories have now hit their stride in producing for national defense,” the Rochester Chamber of Commerce Business Bulletin reported. “Local industries have already received nearly \$90,000,000 in prime contracts.”<sup>6</sup>

## **December 7, 1941**

Marion Schwab Lynch vividly remembers that “beautiful, sunny, cold Sunday afternoon. I was sitting with my mother and brother at home when the news came over the radio.” Pearl Harbor had been attacked. For the 21-year-old Kodak employee the news was simply “terrible. I knew it meant the man I was going to marry was going to go (to war). He lived just across the street. I called him right away.”

Schoolgirl Catherine Hockenberger, 13, also heard about the attack over the radio, at her family’s farm in Webster. “That was a scary day,” she recalls. For all she knew, “somebody was coming over here right away (to bomb us) and we would be wiped out the next day.” Both Marion and Catherine would play roles in the all-out war effort that was about to unfold.

Even the smallest companies were drawn into war production. Some factories that didn’t get war contracts simply shut down, their workers quickly finding jobs in the factories that did. Many of those factories, in turn, had to reequip from the bottom up. It was not an easy task.

Employees at The E.C. Brown Co. on Maple Street, later re-incorporated as Monroe Ordnance Inc., had to work “as many as 20 hours at a stretch” to convert from peacetime production of agricultural pesticide sprayers to wartime production of Army flamethrowers. <sup>7</sup>

The looms that made automobile upholstery in peacetime at the Schlegel Manufacturing Co. on North Goodman Street had to be completely torn down and redesigned to make machine gun belts. For months, the company hit “snag after snag in adjusting the machines” to weave the webbing to the required double thickness. The company finally succeeded – only to discover that the Army had changed its specifications and now required a new type of belt! “That took more tearing down and rebuilding.” Finally, by the summer of 1943, Schlegel was ready to begin full production. It eventually produced six million machinegun belts for .30 and .50 caliber bullets, then switched to production of gun slings. <sup>8</sup>

National Postal Meter Co. Inc., of Rochester – a peacetime manufacturer of metered mailing machines, postal scales and letter-handling equipment – secured a contract to produce the new M-1 carbine rifle even though it had “neither equipment nor workers of its own to contribute to the contract, nor even a factory to work in ...Such was the tense tenor of the times,” notes Larry Ruth in his history of the weapon. The company soon obtained a former automobile showroom and repair shop on Culver Road. Engineering and supervisory personnel were then drawn from all over the country “so as not to disrupt existing local industries,” Ruth notes. However, like many companies, NPM “experienced great difficulty” in obtaining the necessary machinery. “In fact, the last machine was not delivered to N.P.M. until July, 1943 – the month in which the contract was originally supposed to have been completed!” From that point on, however, “requirements were scrupulously met and often exceeded in spite of all difficulties.”

By the end of the war, 413,017 carbines were produced at the Rochester plant. <sup>9</sup>

One of National Postal Meter’s key subcontractors on the project, Trimble Nurseryland Furniture Inc. on Lexington Ave., specialized in baby cribs and infants’ chairs before the war. Now it was asked to manufacture gunstocks for the carbines as well. The conversion

turned into “six months of headaches” for manager Charles De Puy and his workers. The company threw out all but five of the 100 patterns it had been using and replaced 90 percent of its machinery. The biggest challenge of all: Training the shop’s craftsmen. “The personnel, accustomed to turning out articles that were sturdily and attractively acceptable for the nursery, confronted something new in making products accurately measured to thousandths of an inch.”<sup>10</sup>

Kodak’s sprawling facilities, with its own machine and metal shops, were a godsend to the war effort. In addition to a vast array of cameras, lenses, gun sights, height-finders and other vital optical equipment, Kodak used its metal shops to churn out 14,540 one-ton pontoons that were used to connect assault craft with the shore at invasion points. They were also used as floating docks, bridges and barges, and as dry docks for PT boats and other craft. Among other non-optical war products made by the photo giant were more than 66,500,000 nut blanks to maintain “tight connections in vibrating aircraft,” 460,000 explosive canisters and 140,000 hand grenades “of unique design.”<sup>11</sup>

In some cases, entire new plants had to be built to handle the war-related work orders. A \$6.5 million foundry and steel plant, for example, was built by the government for The Symington-Gould Corp. on Lincoln Avenue. It ended up being used by General Railway Signal Co. to assemble remote controlled gun turrets for B-29 Superfortress bombers. The \$1 million-plus Odenbach ship building plant, still standing along Dewey Avenue, was built next to Round Pond in Greece. Dozens of Army fuel tanker ships were assembled there, launched into Round Pond, then navigated through an ingenious “pontoon tow” bridge on Edgemere Drive into Lake Ontario. Huge cranes were also constructed there.<sup>12</sup>

Some of the new facilities had to be built to demanding specifications. Taylor Instrument Company, Kodak, and Bausch & Lomb Optical Co., for example, did much of the work on a sophisticated new gun sight for the A-26 Invader medium bomber. It enabled a single member of the three-man crew to fire upper and lower turrets by remote control. “The upper guns follow an attacking plane until it gets to the bottom of the hemisphere of fire of that turret, whereupon the bottom guns take up automatically where the others

left off. They move in any direction with lightning speed and deadly accuracy...”

And yet, so delicate was the instrumentation that the sights had to be assembled in a newly-built, specially designed, sound-proof, temperature-controlled building at Taylor Instrument on Ames Street. The building featured dust suppression equipment and an antechamber for personnel to change to special dustproof clothing. Particles as small as .001 of an inch, it was reported, would cause rejection. Maintenance crews worked full time in continuous mopping and cleaning. “All persons connected with the program were sworn to secrecy,” *the Democrat and Chronicle* later reported. As a result, “no whisper of the confidential work had filtered to the ears of other Rochesterians” until official announcements in July 1945.<sup>13</sup>

### **An Influx of New Workers**

Ultimately, entire company product lines were transformed. The last civilian radio “until victory is ours” rolled off the Stromberg-Carlson Telephone Manufacturing Co. assembly lines in April 1942. Gleason Works, the world’s principal manufacturer of bevel gear-cutting machinery, went entirely to war production. By 1945, the University Avenue plant was manufacturing 55 different machines capable of producing gears ranging in size from a fraction of an inch to 20 feet in diameter. The machines were used in war plants all over the United States and in Allied countries to make the gears needed to operate everything from tank turrets to bomb bay doors, PT boats to bomb sights, and even the control gates for the Panama Canal. By the end of 1942, fully 85 percent of Kodak’s total output was for military or commercial uses deemed essential to the war effort. In 1943, for example, Kodak produced no amateur cameras, and by war’s end film for civilian use was extremely hard to find. So hard, in fact, that a woman in a *Collier’s* magazine wartime cartoon told her friends: “When we get film we try to make each picture count. This is one of our backyard, our four children and their families, a neighbor boy home on furlough, my sister and her husband, and a corner of our bed of gladioli”! Even so, Kodak net sales in 1942, bolstered by war contracts, were \$219.7 million, the



largest in its history and a 68 percent increase over 1940! War contracts made it a record year for Bausch & Lomb as well. It produced \$45.9 million in goods – a whopping 50 percent increase over 1941. <sup>14</sup>

The transformation extended beyond what was made, and how it was made, to who made it. To keep the assembly lines going, Monroe County's industrial workforce increased from 68,000 in 1939 to about 120,000 in the summer of 1943. With so many Rochesterians called into the service, where did all these workers come from?

In large part from the ranks of housewives, high school students, minorities and handicapped individuals who likely would have been turned away in peacetime. The number of women employed in Monroe County increased from 25,000 to 48,000. <sup>15</sup>

This required large-scale training and retraining programs. Numerous barriers, legal and otherwise, had to be removed. Work laws were relaxed so that women could work shifts between 10 p.m. and 6 a.m., for example. "Third shifts" from 11 p.m. or midnight to 7 or 8 a.m. became routine. At the peak of production in 1943, an estimated 800 employees were working the shift at Rochester Products and between 500 and 1,000 at Delco Appliance, the two big General Motors divisions in Rochester. By April 1944, 95 percent of Rochester's war plant workers were on 48-hour rather than 40-hour work weeks. Many worked longer hours. In some cases, men worked seven days a week. And no more holidays off!

<sup>16</sup>

High school students spent their summers on assembly lines – or quit school full-time to work in war plants or in retail establishments that were short-handed because of the employees they had lost to the war plants. City high schools suffered an enrollment drop of 1,500 students from September 1942 to September 1943 because so many students were entering the workplace or the armed services. City School Supt. James Spinning warned of a "lost generation" of young people, without diplomas and an adequate education to cope in the post-war economy, "unless a way can be found to save more boys and girls from quitting school to earn money while wage earning looks good." To try to stem the flow, the district instituted a new system that required parents to accompany stu-

dents to their home schools in order to obtain work permits. <sup>17</sup>

According to one official, Rochester led the nation in the number of women in war plants. <sup>18</sup> With mom at work, and dad either in the service or also on an assembly line, there was a critical need for day care. By July 1945, for example, a record 900 children of war-working moms were enrolled in city Child Care Centers for the summer.

“The complexion of many homes has changed since mothers have gone into defense industries. The war also adds to the general tension of family life,” noted Robert Mulford of the local Society for the Prevention of Cruelty to Children as early as February 1942. Most families coped. However, the wartime disruption of normal family life was largely blamed for a 50 percent increase in delinquency cases in 1943, the society reported. By May 1945, the city was confronted with “the greatest juvenile crime problem in its history,” according to one *Democrat and Chronicle* article. In the first four and half months of that year there had been 79 arrests of juveniles, some involving youths 8-12 years old, for everything from arson and gun possession to automobile theft and burglary. Monroe County found it increasingly difficult to place children in foster homes because in many households both parents were now working in war plants and/or serving in the military. <sup>19</sup>

The drain of able-bodied men into the military or war plants was also acutely felt by area farms, which ended up using high school students, prisoners of war and Jamaicans and other imported laborers to bring in the harvests. But some of the manpower shortages seemed to dovetail nicely with the overall goals of rationing. By the end of 1942, for example, the number of mechanics at Rochester auto dealerships had been more than halved, with most of them going into war plants. The National Automobile Dealers Association warned this could drastically affect transportation. However, given gas rationing and pleas to reduce unnecessary travel, it is doubtful this carried much weight with the authorities! <sup>20</sup>

Marion Schwab Lynch found herself in a room with other women employees at the Eastman Savings and Loan at Kodak Office on State Street, typing up the War Bonds that more than 90 percent of Kodak employees purchased through regular payroll deductions. <sup>21</sup> “You didn’t dare make a mistake on one of those bonds or it would

be worthless,” Marion recalled.

Marion didn't consider this to be all that significant to the war effort. “We weren't that important really,” she insisted in an interview. And yet, war bonds were critical to the war effort. In addition to helping pay for the war, they siphoned off the excess spending power of all those overtime checks that war workers were earning. And that helped control inflation at a time when consumer rationing meant there was relatively little to spend on.<sup>22</sup>

### **Accidents Take Their Toll**

“It wasn't a heavy explosion, just sort of a puff,” said two witnesses after flames raced through a building at the Rochester Fireworks Company on Whitney Road near East Rochester. Seven workers died in the fire after one of them set down a pan of powder, causing a friction spark on Nov. 6, 1942. Four more died at hospitals. Ten of the victims were women; one of them had just started working at the plant about 20 minutes before the tragedy occurred. Because the company was working on undisclosed war orders, federal officials were called in to determine that it was indeed an accident and not sabotage.<sup>23</sup>

A near doubling of the industrial workforce. Long hours. An influx of inexperienced workers. Unrelenting pressure to produce. Dangerous machinery and/or material. One would expect a rise in workplace accidents. And there was. Industrial accidents in the Rochester district surged from 28,699 in 1939 to 49,562 in 1942. “Fortunately the number of fatalities from such accidents was small,” McKelvey noted.<sup>24</sup>

Even so, in May 1944, for example, it was reported that 106 men and five women had died statewide in industrial accidents. Eleven died in Rochester, which tied Syracuse for the lowest number among upstate cities.<sup>25</sup>

That same year, a Hamlin worker at the Odenbach shipyard in Greece was attempting to light an acetylene torch in the hold of an Army tanker when an explosion filled the compartment with flames. Two workers were severely burned when they entered the compartment to try to rescue the man; they in turn had to be rescued by

two other workers. Despite the heroism of the four men, the Hamlin worker died of burns. Another Odenbach worker died after losing his balance on a scaffold, then falling 12 feet and landing head first on the steel deck of a pontoon.<sup>26</sup>

Nonetheless, several Rochester companies established outstanding wartime safety records. In fact, they dominated the grand safety award given by the Associated Industries of New York State. Rochester Products Division on Lexington Avenue, for example, won the award in 1940, 1941 and 1943 by not having any “lost-time” accidents during the last quarters of those years, despite seeing man hours during those periods increase from 831,000 to 2,836,000. RPD was displaced in 1942 by another Rochester company, Taylor Instrument, which completed “a total exposure of 796,466 man hours of operation” in the final quarter that year without a single loss of accident time. In 1944, the award went to Kodak’s Finished Film and Sundries Department.<sup>27</sup>

The war effort took a toll in another way. Because of gasoline rationing, workers were urged to car pool under a “share-the-ride” program. That meant more potential victims in every car when accidents occurred. Five Rochester Products Division workers died on the way to work in January 1943 when their car collided head-on with a Greyhound bus on Spencerport-Brockport Road. However, ride sharing may have minimized damage in another accident. When a Delco Appliance employee suffered a fatal heart attack while driving to work with three other employees, his passengers managed to bring the car to a halt.<sup>28</sup>

### **Not In My Backyard!**

Entire neighborhoods were impacted by all-out war production. Construction of that new Symington-Gould foundry on Lincoln Park brought a wave of protests from neighboring residents who said it would be offensive and hurt property values. It was built anyway.<sup>29</sup>

But there were limits to what the city would tolerate. Walz and Krenzer Inc. on Mt. Hope Avenue earned multiple Army-Navy E Awards for excellence in production. Nonetheless, the city took legal action against the company when it operated two radial drill

presses at night, keeping neighbors awake with their loud “banging and clanging.” A compromise was finally reached.<sup>30</sup>

The 30 tons of lead produced each day at Rochester Smelting and Refining Company on Sherer Street was critical to the war effort. But the melting of old automobile batteries created a “terrible smell” that carried as far as two to three miles. One nearby tool and die company threatened to close down, and the city threatened to step in after the Health Bureau determined the odors could be a menace to people with throat or nasal ailments. However, not until 1945 was a five-week shutdown arranged to try to fix the problem.<sup>31</sup>

Amecco Chemicals, Inc. on Rockwood Street was one of the few companies in the country making chlorinated paraffin to flame-proof and waterproof military tents, tarpaulins and uniforms. Nonetheless, the city waged an ongoing legal war to try to close down the “uncooperative” plant because of persistent releases of noxious chlorine and hydrochloric acid fumes that blistered paint on homes, killed tree leaves, and corroded wiring and copper equipment along nearby New Central Railroad tracks. One release caused near panic when escaping fumes enveloped the neighborhood in a “heavy yellowish fog” the night of Jan. 19, 1945. The city responded by posting police officers outside the plant! However, the city’s repeated efforts to close the plant were largely frustrated. Protection of fighting men against flame and gas, a city judge ruled, was more important than the “comfort and repose” of neighboring residents. Not until January 1946 did the ongoing feud come to a “definite end” when Amecco abruptly announced it was selling the plant and moving its operation to Nevada.<sup>32</sup>

### **The Fuse That Changed The War**

In its prime, the Duffy-Powers building downtown housed what was touted as the “largest exclusive retail dry goods store between New York and Chicago.” That was before the retail operation went into receivership in 1932. The distinctive building, with its exquisitely detailed, light terra cotta exterior, stood vacant until the city turned it into a Civic Exhibits Building in 1940. After Pearl Harbor

it was used as headquarters for the Rochester War Council and other war-related activities.<sup>33</sup>

By the time high school student Catherine Hockenberger entered its doors, it bore little resemblance to a grand department store. The Navy purchased it in 1943, and turned it over to Kodak for vital, secret war work. Guards stood at the front door to be sure only authorized people entered, Catherine recalled in a recent interview. More guards stood on each floor to be sure workers went only to their assigned posts, and never stepped beyond the painted lines that separated one work area from another.

It was a bewildering experience for Catherine, who spent a summer vacation sitting at a table alongside older women, many of whom spoke only Italian. She was put to work handling electrical components less than an inch long with wires coming out each end. "I had never seen anything like this before; it all seemed like senseless things to me." Her job was to dip the components in solder, then put them in a box. Over and over again, hour after hour.

She knew the work was war-related, and always wondered what they were used for but, like many war workers, "We had no idea what we were making."

Indeed, not until this author contacted her nearly 60 years later, did she learn that inside the former department store one of the great breakthroughs in World War II weaponry was taking place.<sup>34</sup>

Why was the radio proximity fuse so important? At the start of the war anti-aircraft gunners confronted a daunting challenge. How do you knock down an enemy aircraft diving toward you or twisting and turning at more than 300 miles per hour? Basically, only two types of fuses existed: One that would explode on contact, meaning an anti-aircraft gunner had to literally hit the target. Or one that would explode with a timed fuse, meaning the fuse had to be properly set, just before firing, then fired at just the right angle to explode close enough to cause damage.

The radio proximity fuse largely solved this problem, but it required an incredible feat of engineering. Even in theory it sounded daunting: package a radio transmitter in the nose cone of a shell, so that when the shell is fired, the transmitter begins sending out radio

waves that bounce off the target, then signal the shell to explode when the reflected radio waves indicate the shell is “just close enough to its target for the burst to be most effective.”<sup>35</sup>

The “real shocker”: making the glass vacuum tubes, batteries and other electrical components rugged enough to survive being shot “out of a gun in a shell spinning three hundred to four hundred times per second under accelerations of many thousand times that of gravity,” yet still operate “as if they were on a bread board in a laboratory.”<sup>36</sup>

Incredibly, the feat was achieved. And, as with most World War II weapons, it was achieved only by an interlocking network of researchers, engineers, contractors and subcontractors. Nearly one million Americans were eventually involved to a greater or lesser degree, and production involved required 87 different companies. More than 2,000 suppliers and sub-suppliers provided components.<sup>37</sup>

So it would be misleading to imply this was primarily a Kodak project. Nonetheless, the Rochester company:

1) was responsible for much of the mechanical design “by which the whole device was packed into the small space of the nose of a shell.”<sup>38</sup>

2) helped develop, “with its unusual engineering facilities,” the latest and best reserve battery, and invested a million man hours in producing the majority of the tools and methods for large-scale production of the battery.<sup>39</sup>

3) was one of five main plants where complete fuses were assembled. Kodak ultimately produced 2,443,914 fuses by the end of the war, and continued as the sole supplier of them afterwards.<sup>40</sup>

Proximity fuses protected the Pacific fleet against wave after wave of Kamikaze suicide planes, downed German V-1 rockets aimed at Antwerp and London, and, eventually, gave Allied artillery a devastating edge in Europe. The artillery shells could now be precisely set to explode above the ground, not on contact. This rained deadly shrapnel on enemy soldiers even when they crouched in foxholes, yet spared critical intersections and buildings from massive craters and other damage caused by ground bursts.

One war correspondent was with the headquarters of an infantry battalion during the Battle of Bulge when proximity fuses were

first fired by artillery against the Germans. “The prisoners were coming back in droves, looking absolutely shattered and stunned. They simply couldn’t believe what had been happening to them.”<sup>41</sup>

No less an authority than Gen. George Patton Jr., commander U.S. Third Army, wrote to the chief of ordnance that the “new shell with the funny fuse is devastating.” He described how it had killed 702 Germans in a single battalion trying to get across the Sauer River. “I think that when all armies get this shell we will have to devise some new method of warfare. I am glad that you all thought of it first.”<sup>42</sup>

### **Taking Aim At The Enemy**

“This is an optical war,” claimed a Bausch & Lomb booklet describing its war production efforts. By one estimate, close to 90 percent of the intelligence data gathered during the war came from aerial photographs. In 1940 the U.S. Navy had approximately 102 aerial cameras and 200 motion picture cameras. By October 1944, it had in use or under procurement 38,438 aerial cameras and 5,456 motion picture cameras. And that was just in the Navy.<sup>43</sup>

Much of this vast array of optical equipment was made in Rochester. Ironically, a controversial prewar contract with Zeiss, the famed German optical giant, enabled B&L to acquire many of that company’s production techniques before the war began. However, Bausch & Lomb wasn’t the only Rochester firm contributing to this critical part of war production. Kodak produced specialized lenses, cameras and films to take the aerial reconnaissance pictures essential to planning military campaigns and assessing the effectiveness of bombing runs. The Folmer-Graflex Corp. on Clarissa Street also produced aerial reconnaissance cameras. Its chief engineer, Oscar Steiner, worked with GE employees in Schenectady to perfect an automatic “photoelectric grid” camera shutter for nighttime aerial photography. It was triggered by bomb flashes, not by searchlights and antiaircraft fire, thereby saving film for the shots that would best assess bomb damage.<sup>44</sup>

Ilex Optical Co.’s lenses, shutters, bombsight components, sextants and drift meters earned the Portland Avenue plant multiple Army-Navy E awards. The Rochester Optical Co. on Graves Street assembled goggles for high altitude aircrews that used a new lens, enabling the airmen to see through the glare of “white haze” to



detect their targets without straining their eyes.<sup>45</sup> Lenses and telescopic sights from Wollensak Optical Co. on Hudson Avenue were used in everything from sniper rifles to B-29 bombsights.

Optics were vital to fire control on land and sea. Kodak gun sights and artillery circles help direct artillery fire; it's height-finders helped guide anti-aircraft batteries. And Bausch & Lomb range-finders, some weighing six tons and containing 1,500 mechanical parts, helped aim big battleship and cruiser guns. In a matter of seconds, they could account for a ship's speed and direction, the speed and direction of the target, wind velocity, temperature, humidity, and curvature and rotation of the earth, then compute a firing angle that would deliver the shells with devastating accuracy.

"Probably man has never built anything else so ponderous in size which requires such extreme precision in construction," the Bausch & Lomb booklet noted.<sup>46</sup>

According to one news report, Bausch & Lomb fire control equipment helped a U.S. battleship disable the French warship *Jean Bart* with only two salvos at a range of 26,000 yards.<sup>47</sup>

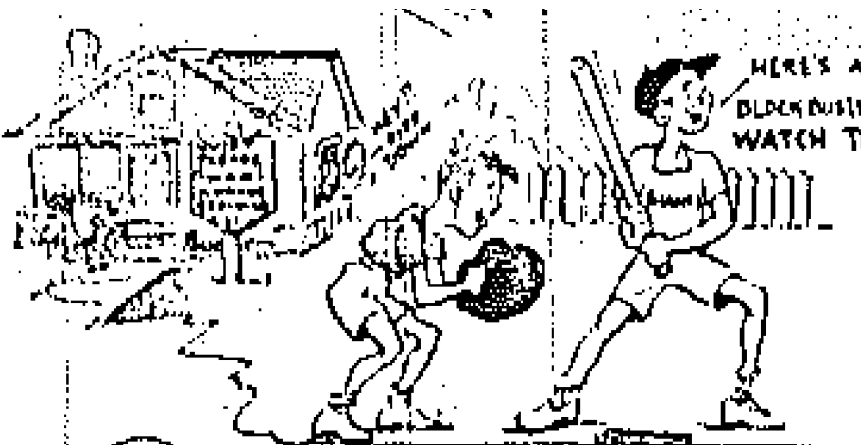
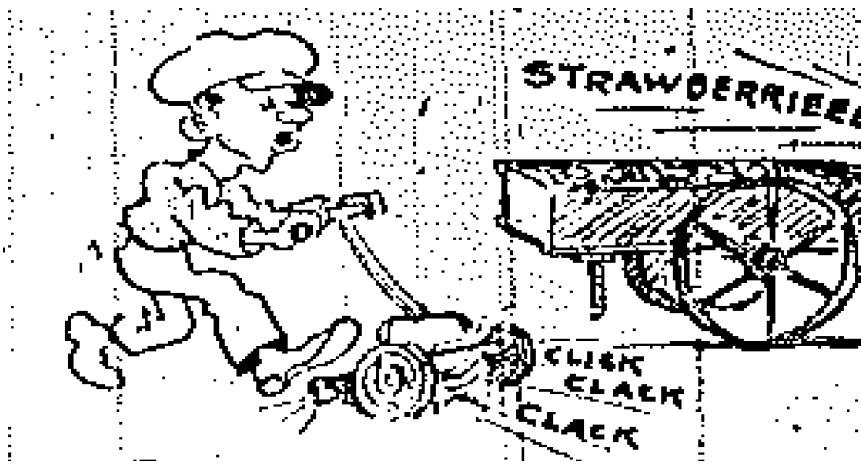
Less glamorous, but also important to the war effort were Bausch & Lomb binoculars, searchlight reflectors, microscopes and telescopes. The company's entire production of Ray-Ban sunglasses went to Army and Navy procurement offices, so popular were they with high-altitude fliers. A pair reportedly had to be rushed special delivery to Gen. Douglas MacArthur when his own Ray-Bans were broken.<sup>48</sup>

### **A Bit of Rochester In Every Plane**

"When I tell you that every combat plane that takes off in the United States has parts manufactured right here in Rochester . . . then you can understand the deep interest of the Air Forces in production here," said Col. Kenneth Collins, commander of the Eastern District, Air Technical Service Command during a tour of city war plants in January 1945.<sup>49</sup>

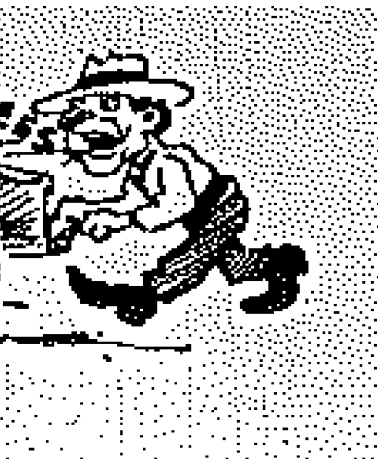
By that time, Rochester Products Division of General Motors had already manufactured more than 250,000 generators and 500,000 small motors for use in fighters and bombers.<sup>50</sup> No, RPD employ-

Wa



*From Ganett Newspaper*

# ar Shift Workers Found



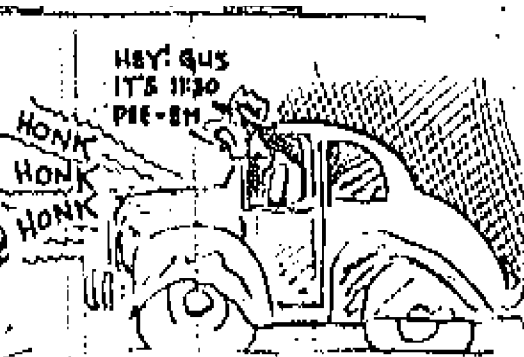
## Disturbing

## Each

## Other's Rest



CRASH SLAM BAND!



NIGHT-SHIFTER'S SERENADE

ees did not have the satisfaction of seeing a fully assembled Navy “Hellcat” fighter or B-25 Mitchell bomber roll off their production lines. But they could take satisfaction in knowing that American warplanes could not retract their landing gear, operate their wing flaps, open and close bomb bay doors, control propeller pitch or crank their engines without the critical electrical components supplied by RPD and its sister GM plant in Rochester, Delco Appliance.

The ultimate symbol of American air power was the B-29 Superfortress bomber. With its 141-foot wingspan and four powerful engines, it could fly up to 3,800 miles at speeds up to 357 miles per hour and deliver up to 20,000 pounds of bombs. Its crew was protected by four-remote controlled gun turrets – two above and two below – plus tail guns. Several Rochester companies contributed to its success. One of the largest local contracts went to General Railway Signal Co., which reportedly manufactured one third of all the remote control gun turrets used in the big bombers. To this project, the Army assigned Maj. T. J. Semans “with full authority of the Army Air Forces to take the necessary action to obtain top production....” So significant was this project, he reportedly was the first Army officer to have an AAF plane assigned to him “so he can move about the country to break bottlenecks and assure the GRS a continuous stream of parts and materials.”<sup>51</sup>

Included in that stream of parts were many made in Rochester: Retiflector gunsights and Selsyn rotating motors to turn the turrets from Electromatic Typewriters Inc. of IBM on Crouch Street; small motors to charge the machine guns from Delco Appliance; interrupters and contour followers – to prevent the guns from shooting at part of their own plane – from The Todd Co., Inc. on University Avenue; block and cylinder assemblies from Cunningham-Hall Aircraft Corp. on Canal Street, and junction boxes from Yawman & Erbe Manufacturing Co. on Jay Street. The planes were also equipped with Bausch & Lomb sextants, Kodak cameras, Gleason Works gears and castings, Ritter Co. compasses, and Rochester Manufacturing Co. pressure transmitters and safety devices.<sup>52</sup>

## Flamethrowers and Parachutes . . .

The Superfortresses were not the only high profile weapons that benefited from Rochester craftsmanship. Indeed, a Rochesterian watching a wartime newsreel would almost invariably see something made in Rochester, or dependent on Rochester components, and not even know it.

Many of those British tanks racing across the North African desert, for example, were sheathed in armor plating from Symington-Gould, some of it from recycled Rochester street car tracks. Many of the flamethrowers that killed Japanese soldiers in their pillboxes and caves were manufactured on Maple Street by The E. C. Brown Co., later Monroe Ordnance. Those Liberty and Victory supply ships plying the oceans in vast convoys used Rochester-made thermometers, barometers and other gauges in their engine rooms and on their bridges, Rochester-made gun sights and fire control equipment on their anti-sub and anti-aircraft guns, even Rochester-made laundry equipment to wash crew members' uniforms. Many of those rockets, streaking toward German tanks and trains from American fighter-bombers, were encased in shells forged at General Railway Signal Co. When thousands of parachutes bloomed in the skies of France, many of them were the products of J.G. Menihan Corp. of Clinton Avenue South, which produced women's shoes in peacetime. <sup>53</sup>

And when it came time to produce the biggest weapon of them all, the atomic bomb, Rochester companies were again involved. Taylor Instrument and Bausch & Lomb both contributed equipment, and The Ritter Co., Inc., on West Avenue supplied nose and throat equipment, dental units and half a dozen X-ray machines to the Oak Ridge portion of the Manhattan Project. <sup>54</sup>

When Brig. Gen. Leslie R. Groves approached Kodak to participate, Charles Mees, the company's research director, was initially puzzled. Why Kodak? "Do you know any better qualified?" one of Groves' assistants reportedly replied. Mees acknowledged that "few laboratories had so successfully combined pure and applied research." Soon Kodak chemists, physicists, engineers and administrators were sent to the Manhattan Project. Some went to a

research laboratory in Berkeley, Calif., dubbed “Shangri-La.” Most went to the uranium-enriching facility at Oak Ridge, Tenn., dubbed “Dogpatch.”<sup>55</sup> The stories of Rochesterians who toiled there will be told in the next issue.

### **... And Myriad Other Items**

But what about the myriad, more mundane items needed by a modern army?

The Bickford Brothers Co. plant on Mill Street produced huge tents for the quartermaster corps, capable of housing 300 men, but also tiny parachutes for dropping flares over battlefields at night. It also made special non-metal, pottery land mines to protect the flanks of armored columns pushing deep into Europe. N.J. Karl and Son was reportedly the nation’s only manufacturer of a brush needed for cleaning Army rifles. American Can Company products from Fairport housed the delicate fuse mechanisms of rockets used in the Pacific. The Kellogg Division of the American Brake Shoe & Foundry Company on Humboldt Street produced “tire service trucks” – carrying air compressors – that could race along vital supply routes, making emergency repairs to Army trucks and thereby keeping war materiel flowing to the front lines.<sup>56</sup>

From Genesee Brewing Co. Inc. came hundreds of thousands of gallons of industrial alcohol needed for the manufacture of smokeless powder. Delco Appliance, already immersed in producing warplane magnetos and motors, also assembled an “overspeed cut” device for PT boats, which automatically prevented the motors from burning out when propellers were tossed out of the water at high speed. Bausch & Lomb perfected a special gas mask insert, “designed to provide precise and correct positioning of corrective lenses before the eyes of the wearer.” Kodak donated 15 million feet of 16 mm film, so copies of current motion pictures could be made to entertain the troops. Kodak acetate sheets were used as windows in London hospitals, schools and orphanages to withstand the concussion from V-1 rockets.<sup>57</sup>

Twenty percent of the output at the Symington-Gould furnaces

on Symington Place went into journal boxes, steam chests, placer bars and other heavy parts needed for powerful locomotives carrying vital war supplies along such remote lines as the Bengal-Assam Railway into China. When not building freight cars to replace rolling stock battered by the demands of war production, the Despatch Shops in East Rochester built pontoons and steel landing mats. F.L. Heughes & Co., Inc., on Lyell Avenue fabricated huge ramps to help unload tanks from their landing ships onto beachheads.<sup>58</sup>

Rochester's reputation as a "center of better grade clothing" enabled six of its firms to secure contracts in 1942 to produce 125,000 officers' uniforms for the Army and Navy. The shoemakers at E.P. Reed & Co., Inc. on North Goodman Street turned out thousands of pairs of shoes for women in the armed services.<sup>59</sup>

And artisans at the Rochester Artificial Limb Company worked long hours to produce the hand-made prosthetic devices that would help soldier-amputees regain some semblance of normal life.<sup>60</sup>

And this, too, is but a sampling.

How on earth did Rochester do it? With a lot of sweat and toil, to be sure, using precision machine tools and sophisticated production techniques that had been a hallmark of Rochester industry. But also, in part, with a shroud of secrecy surrounding the most sensitive projects, with a lot of good ideas percolating from the bottom up, and with an all-out effort to maintain the morale of hard-pressed workers, upon whom all depended.

### **Kept In The Dark**

In March 1945, some 900 Wollensak Optical Co. employees in two shifts crowded a hall near their Hudson Avenue plant and "learned with surprise" of their "important and previously unrevealed, role in the making of the famed bombsight that is the eye of the huge and deadly Superfortress."<sup>61</sup> The lens-making company, they learned, was one of 80 subcontractors involved in producing an adaptation of the Norden bombsight, and the only one producing the telescope lens for it.

At Stecher-Traung Lithograph Corp. on North Goodman Street, literally millions of detailed bomb charts and artillery maps were printed each month. "From the time the maps are off the press until

they are in the hands of the armed forces they are handled by the code number system, so not even employees know what is being shipped,” the *Democrat and Chronicle* reported. <sup>62</sup>

And not until war’s end did Rochesterian’s learn about that tower with the funny-looking “blister” on top that was erected at the Stromberg-Carlson plant on Carlson Road. It was used for experimenting with radar. The company also produced another “tightly locked war secret”: radar-jamming equipment for American bombers flying over Germany. <sup>63</sup>

War plant security involved not only limiting what leaked out, but who got in. The security at the Duffy-Powers building was so strictly enforced that “on one occasion a visiting admiral was refused admission” by a young Naval Reserve lieutenant in charge of plant security. Rochester Products urged its workers to bring their food in transparent plastic lunchboxes – so it would be easier for guards to ensure nobody was trying to sneak a bomb into the place! The heightened concern over war plant security meant big business for two Rochester firms. By February 1943, Bastian Brothers Co. on Clinton Avenue North was churning out 5,000-10,000 metal identification buttons each day to be worn by war workers. Metal Arts Co. Inc. on Portland Avenue filled one order for 150,000 ID buttons for workers repairing Navy ships at Pearl Harbor. <sup>64</sup>

### **Hey, That’s A GREAT Idea!**

One might think that in the battle of production, a ruthless dictatorship would have all the advantages over an American-style democracy. Brilliant scientists to conceive new weapons; limitless slave labor and an obedient, lockstep domestic workforce to assemble them. Of course, in such a dictatorship the lowly, resentful assembly line worker might be loathe to suggest improvements, or simply afraid to do so. And therein lay one of the great weaknesses of Hitler’s Third Reich, noted Merle Tuve of the U.S. Office of Scientific Research and Development.

“The key to the effectiveness of the democratic system . . . is simply that criticism flows both ways; criticism and ideas come up from the workers as well as down from the bosses,” Tuve wrote. “This gives a tremendous advantage, by the pooling of ideas from everybody who knows the details of the job. This is what the Ger-



mans failed to do. With their habitual obedience to authority, they largely denied themselves this two-way flow and simply obeyed ‘orders from higher up.’<sup>65</sup>

Rochester workers at all levels, by contrast, were strongly encouraged to suggest ideas to speed war production. And they responded. In 1944 alone, for example, Kodak received a record 11,099 suggestions from its employees, adopted 3,845 of them, and paid out more than \$46,000 in rewards. By the last year of the war, 3,500 suggestions from Bausch & Lomb employees had been put to use.<sup>66</sup>

At Rochester Products Division, Henry Thurley was hired as a hand-burring operator despite his blindness. His job was to remove rough places on metal parts that had just been cast. This involved hand burring the parts at first, inspecting them, then machine burring them and plating them. Unfortunately, even small burrs sometimes remained and marred the castings, requiring a second round of hand burring and inspections. Why not do the machine burring first, then the hand burring, Thurley suggested. This saved Rochester Products a good deal of time and labor in production of 6,000-watt generators for B-29 bombers, and earned the Churchville man a \$100 War Bond.<sup>67</sup>

When split rings for shell detonators became interlocked on the assembly line at International Business Machine Corp., they had to be literally separated by hand. Albert Byron Schuyler came up with a novel solution: put the rings in an ordinary old coffee can that could be mounted on a device that would shake the can until the rings separated and fell through slots in the bottom. “Three people, thus, were freed from a tiresome task that would have taken 3,882 hours,” the *Democrat and Chronicle*<sup>68</sup>

At Stromberg-Carlson, Madison Butler, a bachelor who enjoyed listening to classical music, came up with a device that slashed the time spent testing field telephone switchboards from 80 man-hours to one. This saved 86,900 man-hours on a single government order, and earned Butler a trip to the White House to receive the nation’s highest production award from President Roosevelt.<sup>69</sup>

Talk about an idea with widespread “application”: Harold J. Humphrey of Penfield, eastern production manager for Bird’s Eye Food, was given the lion’s share of the credit for developing the protective paint that kept cans of rations from deteriorating after

being dumped out in the open on beachheads. In 1944 alone, 78 million cases of rations were painted with the coating.<sup>70</sup>

### **Morale Boosters**

Production ideas would be of little value, however, if workers weren't diligent about applying them. This was especially important when manpower shortages near the end of the war made it even more critical to obtain maximum productivity from every available worker. In June 1945, 11 Bausch & Lomb employees were rewarded for having perfect attendance records. Five women were given a three-day trip to New York City. Six men were awarded a tour of Washington and a cruise aboard, of all things, a Landing Craft Infantry (LCI).<sup>71</sup>

A variety of measures were adopted to improve worker efficiency. Stromberg-Carlson estimated it saved more than 6,000 man-hours of production by figuring out income taxes for its employees. Essential war workers no longer had to show up in court to be excused from jury duty.<sup>72</sup>

Maintaining employee morale in the war plants became a community effort. As early as March 1942, for example, midnight dances were scheduled at the Edgerton Park assembly hall for late-working war industry employees "who find it difficult to attend regular dances and theaters." Stores and banks stayed open late at night on Mondays to accommodate workers. Local clergymen, insurance men, lawyers, teachers and other white-collar workers chipped in on evenings and weekends to give weary war plant workers much needed breaks. Special athletic programs and events were sponsored by the City School District to keep workers physically fit.<sup>73</sup>

In 1943, Mayor Dicker proclaimed a Noise Abatement Week in Rochester to accommodate the huge increase in night shift workers trying to sleep during the day. Numerous complaints had been received. Offenders included "bakery workers who 'bang and slam' metal trays, 'fun-loving' drivers who play musical auto horns, housewives who appear at the door every five minutes to shriek at Johnny, late parties at night spots, and some ash and paper collection crews who 'make more noise talking and laughing than in handling the metal ash cans.'" <sup>74</sup>

In July that year, a cast of 40 Broadway stars descended upon Rochester for eight Eastman Theater performances of “It’s Only the Beginning,” depicting “industry’s vital contribution to the war effort.” The two-hour production was built around seven “hit tunes” written especially for and about General Motors employees, including “Swing Shift Sam and Swing Shift Suzy.”<sup>75</sup> Performances were scheduled so that all shifts from Rochester’s two big GM plants – Rochester Products and Delco Appliance – could attend.

Some of the biggest spectacles occurred when companies won coveted E awards from the Army and Navy for outstanding production efforts. In August, 1942, for example, Kodak’s entry into the E-award club prompted a star-studded celebration at Red Wings stadium that featured Eddie Cantor as master of ceremonies on a revolving, lighted stage. About 20,000 Kodak employees and their families attended. At one point, each person carrying matches was asked to strike one at the count of five, in a tribute to the men and women in the service. “In flickering unison the matches were lighted in the darkened stadium. Few persons there will ever forget that spectacular sight.” The program ended with stage star Helen Hayes reading “This is America.” As one headline writer noted, “It took a war to give Rochesterians [a] first hand glimpse of celebrities they might not have seen otherwise.”<sup>76</sup>

In between the spectacles, “Soldiers of Production” radio programs, honoring local war plant workers, were piped into war plants at lunchtime. Top military brass made frequent visits to thank the workers and warn them of the dire consequences if they shirked their duty. Col. George Norris admonished the barge builders at Dolomite Products that “A worker absent from his bench or place in the assembly line for no good reason is as much a deserter as the soldier who deserts in the face of the enemy. A worker who fails to give his best, every second he is on the job, and who fails to keep himself fit for duty is an aid and comfort to the enemy.”<sup>77</sup>

And if that weren’t enough, posters in the workplace provided an additional reminder. One, showing a U.S. Marine with a bandaged head, read:

“And if our lines should form, then break  
because of things you failed to make,  
the extra tank, or ship, or plane

for which we waited all in vain ...  
will you then come and take the blame?  
For we, not you, will pay the cost  
of battles you, not we, have lost.”<sup>78</sup>

## **A Job Well Done**

Far more gratifying, no doubt, were the congratulations that arrived from the front lines for a job well done. Rochester Products, for example, received a message from Brig. Gen. James. H. Doolittle revealing that parts and accessories made at the plant were used in the B-25 bombers that flew off an aircraft carrier to stage the first raid on Tokyo in 1942. “Those Jap planes couldn’t do a thing to stop us. They never will stop us if you keep up your great work.” Decorated flyer Capt. William B. Lyttle visited Sargent & Greenleaf Inc. on Seneca Avenue in June 1945, and told a reporter “It might look like a monotonous job – the same thing day after day – but the parts they are making are bringing a lot of the men back alive from the combat zone.”<sup>79</sup>

Occasionally a fully assembled tank or warplane would be brought to Rochester so its workers could see how the components they made were being used. A B-29 Superfortress arrived at the airport in June 1945 for just that purpose. Kodak Park employees were fascinated by an 8 by 10 foot enlargement of a photograph taken from a bomber – using Kodak film – showing bombs dropping on factories and rail lines at Lille, France. “The men on the other side need you people – need you now more than ever,” said the photographer, Staff Sgt. Schiller Cohen, who visited the plant in August 1943. “Without taking pictures of actual combat raids, we could never know whether we had hit our targets, how much damage we had done.” Two days later, he credited Bausch & Lomb workers with keeping him alive. “Time and again your aviation goggles enabled me to spot enemy fighters as they dived at us out of the sun.” Added Major C. J. Bishop: “It is your obligation and privilege to turn out more than 75 percent of the vital optical instruments used by the Army and Navy. You are truly working in one of America’s greatest arsenals.”<sup>80</sup>

He wasn’t exaggerating. Here are some numbers that help back

up that assessment:

– 1,250,000,000 microfilmed V-mail messages sent to and from Allied servicemen, using technology developed and produced by Eastman Kodak, and, in many cases, operated by its employees. This saved immense amounts of cargo space for shipment of vital war supplies. <sup>81</sup>

– 100,000,000 yards of material for gun slings, waist belts, chin straps, legging straps, blanket rolls and haversacks manufactured by Vogt Manufacturing Corp. on Fernwood Avenue. <sup>82</sup>

– 4,500,000 Commercial Controls Corp. fuses for bombs, artillery shells and mortar shells. <sup>83</sup>

– 4,000,000 pounds of high grade Bausch & Lomb optical glass, made in a factory next to the Genesee River by August 1944 <sup>84</sup>

– 1,600,000 Kodak magazines for aircraft gun sight cameras, essential in practicing for combat and recording “kills.” <sup>85</sup>

– 1,250,000 pairs of Bausch & Lomb binoculars. <sup>86</sup>

– 1,000,000 Taylor Instrument compasses produced in less than nine months. <sup>87</sup>

– 175,000 color maps turned out in just four days by Stecher-Traung Lithograph, earning a citation from the Army Corps of Engineers. <sup>88</sup>

– 134,000 Kodak high-precision telescopes for field artillery, fire control directors, tanks, tank destroyers and naval vessels. <sup>89</sup>

– 75,000 Kodak “drift meters” to detect an aircraft’s drift away from its plotted course. <sup>90</sup>

– 20,000 Kodak K-24 aerial cameras used in bombers and other warplanes. <sup>91</sup>

– 4,000 power-operated machine gun turrets for Avenger Torpedo bombers, made by Samson-United Corp. on University Avenue. <sup>92</sup>

Equally startling was a number at the other end of the scale – the less than 0.07 of one percent rejection rate for the military sweaters, trigger finger mittens, mosquito headsets, jungle shirts and other articles produced by Max Lowenthal & Sons on Clinton Avenue South. <sup>93</sup>

Small wonder Max Lowenthal was among 38 local companies to receive E-awards. When Taylor Instrument received an E-Award in 1943, the company’s president, Lewis B. Swift, penned

an open letter to his employees that could just as easily have been addressed to all of Rochester's "soldiers of production":

"The ... Army-Navy 'E' banner is not half so important as the job behind it, which you and I know would have continued regardless of any official recognition. America owes a debt to you – and to the Rochester tradition of skilled craftsmanship – for accomplishing, in the words of Secretary Patterson, 'more than once seemed reasonable or possible.'

"We're going to continue to try to do the impossible. And I know that none of us asks greater reward than to help win the war, a week, a day, or an hour sooner." <sup>94</sup>

*Bob Marcotte is Just Ask columnist for the Democrat and Chronicle and author of Where They Fell: Stories of Rochester Area Soldiers in the Civil War.*

## **Appendix: E-Award Winners**

The Navy tradition of giving E awards to crews displaying excellence in gunnery dated back to 1906. In June 1941, Navy "E" awards were extended to civilian plants that met certain standards of excellence in producing war material. Bausch & Lomb was among the first 14 companies so honored. When the Army sought to issue a similar "A" award to companies in 1942, a joint Army-Navy "E" award was settled upon instead. Companies receiving the award were entitled to fly an "E" award flag, and employees were given E award pins to wear. Additional awards could be earned for every six months of excellent production, and were signified by adding a star to the company's flag.

This is a list of "local concerns" that won Army-Navy E awards, and the number of additional stars they earned: <sup>95</sup>

Josiah Anstice Co. Inc., 111 Humboldt Street; Bausch & Lomb Optical Co. (5), 635 St. Paul; Commercial Controls Corp. (1), 640 Culver Road; Consolidated Machine Tool Corp., 565 Blossom Road (5); James Cunningham Son & Co., 13 Canal St. (1); Defender Photo Supply Co. Inc., 666 Driving Park Ave. (2); Dolomite Prod-

ucts Co. (1), 183 Main St. East; Dolomite Barge Plant (1); Eastman Kodak Camera Works, 333 State Street (4); Eastman Kodak Hawk-Eye Works, 1447 St. Paul (4); Kodak Office, 343 State St. (4); Kodak Park Works, 1669 Lake Ave. (4); The Folmer-Graflex Corp., 154 Clarissa St. (4); Delco Appliance Division of General Motors, 391 Lyell Ave. (3); Rochester Products Division of General Motors, 1000 Lexington Ave. (4); Gleason Works, 1000 University Ave. (4); Gundlach Manufacturing Corp., 36 S. Main St., Fairport; The Haloid Co., 6 Haloid St.; Ilex Optical Co., 690 Portland Ave. (3); Max Lowenthal & Sons, 422 Clinton Ave. S. (1); J.G. Menihan Corp., 739 Clinton Ave. S. (Plant B); Mixing Equipment Co. Inc., 1024 Garson Ave. (3); Monroe Gasket Corp., 244 St. Paul St.; Monroe Ordnance Inc., 845 Maple St.; Odenbach Shipbuilding Corp., 4800 Dewey Ave.; The Pfaudler Co., 89 East Ave. (1); The Ritter Co. Inc., 400 West Ave. (1); Rochester Manufacturing Co. Inc., 100 Rockwood Place; Samson-United Corp., 1700 University Ave.; The Schlegel Manufacturing Co., 277 N. Goodman St.; Stromberg-Carlson Tel. Mfg. Co., 100 Carlson Road (4); Taylor Instrument Companies, 95 Ames St. (2); Technifinish Laboratory Inc., 38 Scio St.; Vogt Manufacturing Corp., 100 Fernwood Ave.; Walz and Krenzer Inc., 250 Mt. Hope Ave. (4); Weber Machine Corp., 59 Rutter St.; Wilmot Castle Co., 1255 University Ave.; Wollensak Optical Co., 872 Hudson Ave.(3); and American Red Cross Blood Donor Center (2), 37 Exchange St.

## **End Notes**

1. *Democrat and Chronicle*, April 3 and May 16, 1945.
2. 75 percent: *Ibid*, Aug. 28, 1943; B-29: *D&C*, June 3, 1945; Spy camera: Collins, Douglas, *The Story of Kodak*, (New York: Harry N. Abrams Inc. Publishers, 1990) p. 248. See *D&C* April 24, June 16 and Aug. 8, 1943, and Jan. 28, 1944 for various articles and pictures of the Odenbach shipbuilding operation.
3. McKelvey, Blake, *Rochester: An Emerging Metropolis 1925-1961* (Rochester: Christopher Press, Inc., 1961) , pp. 149, 154, 178.
4. *Democrat and Chronicle*, May 13, 1945.
5. *Ibid*, July 13 and Oct. 27, 1941.
6. *Business Bulletin*, Aug. 26, 1941.
7. *Democrat and Chronicle*, July 31, 1945.
8. *Ibid*, June 25, 1943 and Sept. 21, 1945.
9. Ruth, Larry L., *War Baby! The U.S. Caliber .30 Carbine* (Toronto: Collector Grade Publications Inc., 1992) pp. 169-172, 457.
10. *Democrat and Chronicle*, June 27, 1943.
11. Pontoons: *Ibid*, April 16, 1943; Jan. 7, 1944, and April 24, 1945. See also “Forty-third Annual Report of the Eastman Kodak Company for the Year Ending December 29, 1945” (*Kodak Annual report*) , p. 31.
12. *Democrat and Chronicle*, Sept. 15, 1945.
13. *Ibid*, July 17, 1945.
14. Radios: *Times-Union*, April 21, 1942. Gleason: *Fourscore Years of Bevel Gearing* (Rochester: Gleason Works, 1945) pp. 25-26, 32-35; conversation with Clarence Barg. Kodak: Ad, *Democrat and Chronicle*, Jan. 3, 1943 and Collins, p. 244. Profits: *Ibid*, March 18 and April 4, 1943.
15. McKelvey, p. 140.
16. Training: McKelvey, p. 139, also “Rochester in World War Two: High Schools and the War Effort” by Jeffrey Scott Brown, *Rochester History*, Vol. LV, No. 4, Fall 1993. GM Shift workers: *Democrat and Chronicle*, March 9, 1945. 48-hour week: *Ibid*, April 1, 1944.
17. *Democrat and Chronicle*, Aug. 24 and 26, Sept. 12 and Oct. 6, 1943.
18. *Ibid*, Jan. 5, 1944.
19. Mulford: *Times-Union*, Feb. 20, 1942. Delinquency and



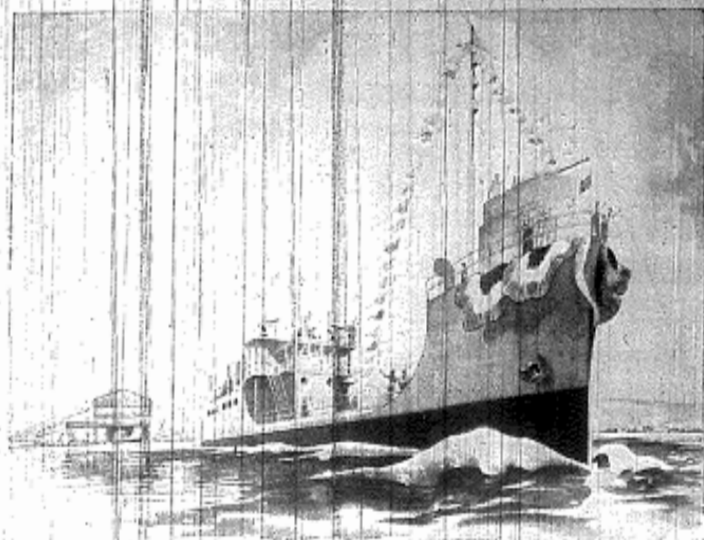
- crime: *Democrat and Chronicle*, Feb. 11, 1944 and May 20, 1945. Foster homes: *Ibid*, June 13, 1943.
20. Harvests: *Democrat and Chronicle*, Dec. 26, 1943. Mechanics: *Times-Union*, Dec. 19, 1942.
  21. *Times-Union*, Feb. 11, 1942.
  22. McKelvey, p. 136.
  23. *Democrat and Chronicle*, Nov. 7-8, 1942; *Times-Union*, Nov. 7, 1942.
  24. Annual Reports of the New York State Industrial Commissioner. See also "Accidents and Their Prevention: A Revealing Phase of Rochester's History" by McKelvey in *Rochester History*, Vol. 17, No. 1, January 1955, p. 21.
  25. *Democrat and Chronicle*, June 30, 1944. Statewide, deaths from industrial accidents hovered around 1,300 a year for 1940 through 1944, according to annual reports of the state industrial commissioner.
  26. *Ibid*, March 19, 1944 and June 10, 1944.
  27. *Ibid*, Feb. 28, 1943; Jan. 23, 1944, and Jan. 31, 1945.
  28. *Ibid*, Jan. 26, 1943 and Feb. 23, 1945.
  29. *Times-Union*, July 15, 1942.
  30. *Democrat and Chronicle*, Sept. 15, 1944.
  31. *Ibid*, July 17 and 24, 1945.
  32. *Ibid*, June 25, 1943; Jan. 20, 1945; April 3, 1945, and Jan. 26, 1946.
  33. See "Discovery in Old Trunk Opens Up History of Rochester Building," *Ibid*, Jan. 4, 1999.
  34. *Ibid*, Sept. 21, 1945.
  35. *Kodak* annual report, p. 27
  36. Baldwin, Ralph B., *The Deadly Fuse: The Secret Weapon of World War II* (San Rafael, Calif: Presidio Press, 1980) p. 21.
  37. *Ibid.*, pp. 56, 212.
  38. *Kodak* annual report, p. 27.
  39. Baldwin, p. 123.
  40. *Ibid.*, p. 216.
  41. *Ibid.*, p.288.
  42. *Ibid.*, p. xxxi
  43. *Seeing it Through* (Rochester: Bausch & Lomb Optical Company, 1945), p. 21; Collins, p. 250, and *Democrat and*

- Chronicle*, Dec. 24, 1944.
44. See *Democrat and Chronicle*, Sept. 8, 1944, for an article about Congressional concern that this contract enabled Germany to “sabotage” provisions of the Versailles Treaty. Steiner: *Democrat and Chronicle*, March 15, 1945.
  45. *Democrat and Chronicle*, March 29, 1945.
  46. *Seeing it Through*, pp. 25-30.
  47. *Democrat and Chronicle*, Aug. 11, 1943.
  48. *Seeing it Through*, p. 44; D&C, Feb. 15, 1945.
  49. *Democrat and Chronicle*, Jan. 24, 1945.
  50. *Ibid*, Feb. 11, 1945.
  51. *Ibid*, Feb. 25 and May 2, 1945.
  52. *Ibid*, June 17, 1944, and Feb. 6 and June 16, 1945.
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  54. *Ibid*, Aug. 9 and 12, and Sept. 7, 1945.
  55. Collins, pp. 243-244.
  56. Bickford: *Democrat and Chronicle*, Sept. 29, 1944 and Feb. 8, 1945. Karl: *Ibid*, May 18, 1945. American Can: *Ibid*, April 18, 1945. Kellogg: *Ibid*, April 25, 1945.
  57. Genesee Brewing: Ad, *Ibid*, Jan. 20, 1943. PT: *Ibid*, Sept. 24, 1943. Gas mask: *Seeing it Through*, pp. 41, 44. Film: *Democrat and Chronicle*, Aug. 12, 1943. Acetate: *Ibid*, Aug. 7, 1944.
  58. Locomotives: *Democrat and Chronicle*, July 12, 1944. Despatch: *Ibid*, Oct. 11, 1944. Heughes: *Ibid*, May 19, 1944.
  59. *Times-Union*, Nov. 23 and Dec. 9, 1942; *Democrat and Chronicle*, Aug. 19, 1945.
  60. *Ibid*, April 2, 1944.
  61. *Ibid*, March 30, 1945.
  62. *Ibid*, Sept. 10, 1944.
  63. *Ibid*, Aug. 19, 1945; *Times-Union*, Dec. 6, 1945.
  64. *Democrat and Chronicle*, March 28 and Feb. 8, 1943.
  65. Baldwin, p. xv.
  66. *Democrat and Chronicle*, Jan. 31, 1945, and *Seeing it Through*, page 49.
  67. *Ibid*, Dec. 17, 1944.

68. *Ibid*, May 23, 1944.
69. *Times-Union*, Dec. 3, 1942.
70. *Democrat and Chronicle*, Aug. 5, 1945.
71. *Ibid*, June 2, 1945.
72. *Ibid*, Feb. 27 and June 5, 1943.
73. Dances: *Times-Union*, March 3, 1942. Stores: *Ibid*, Dec. 3, 1942. Breaks: *Ibid*, June 1, 1942. Athletic programs: *Ibid*, July 10, 1942.
74. *Democrat and Chronicle*, May 28, 1943.
75. *Ibid*, July 11, 1943.
76. *Ibid*, Feb. 21, 1943.
77. *Times-Union*, June 17, 1942; *Democrat and Chronicle* Jan. 27, 1943.
78. *Contributing to Victory* (Rochester: Rochester Products Division, undated)
79. *Times-Union*, May 27, 1942; *Democrat and Chronicle*, June 6, 1945.
80. *Ibid*, Aug. 26 and 28, 1943.
81. *Ibid*, Sept. 22, 1945.
82. *Ibid*, April 20 1945.
83. *Ibid*, Feb. 17, 1945.
84. *Ibid*, June 7, 1944.
85. *Kodak* annual report, p. 31.
86. *Ibid*, July 24, 1945.
87. *Ibid*, April 15, 1943.
88. *Ibid*, April 27, 1944.
89. *Kodak* annual report, p. 30.
90. *Ibid*.
91. *Ibid*.
92. *Democrat and Chronicle*, March 2, 1945.
93. *Ibid*, Feb. 10, 1945.
94. Ad, *Ibid*, July 28, 1943. The Patterson reference is probably Assistant Secretary of War Robert Porter Patterson who directed Army procurement programs.
95. As reported by the *Times-Union* on Dec. 6, 1945, and by *Rochester Commerce*, Vol. 33, No. 21, Nov. 10, 1945.

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