ALL HANDS

THE BUREAU OF NAVAL PERSONNEL INFORMATION BULLETIN

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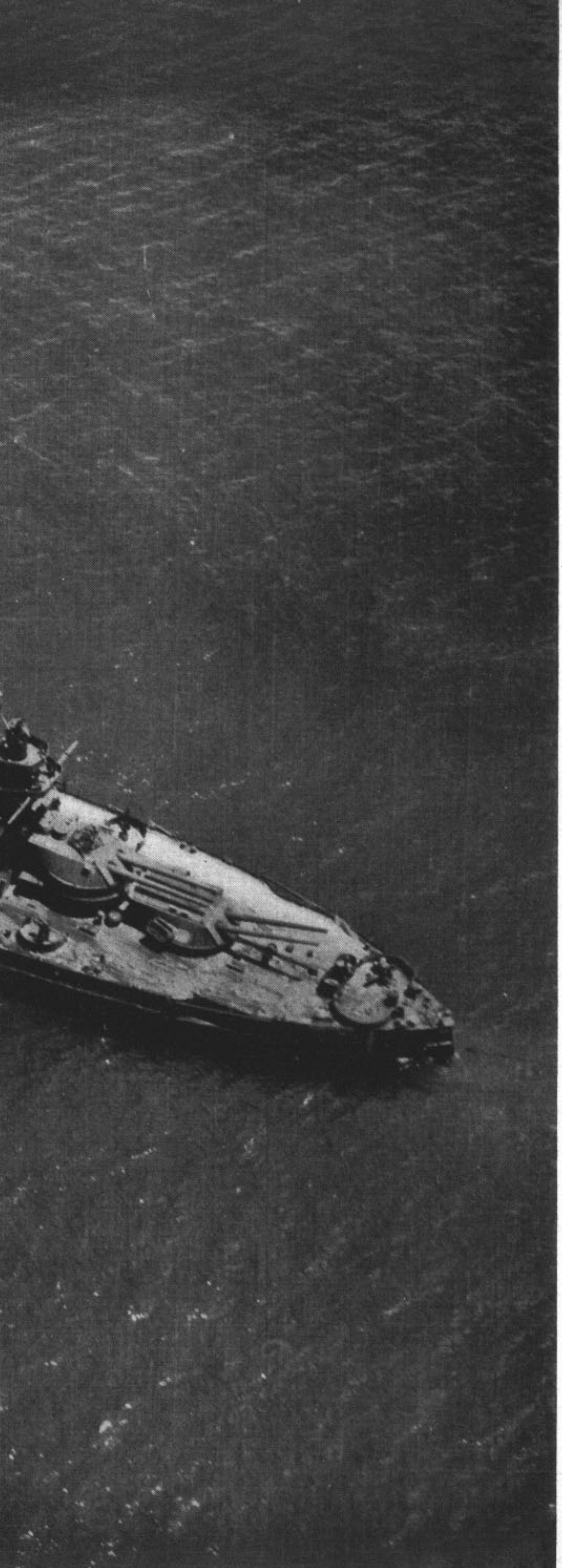
NAVPERS-O

DECEMBER 1950

WASH JOB



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DECEMBER 1950 Navpers-0 NUMBER 406

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The Chief of Naval Personnel

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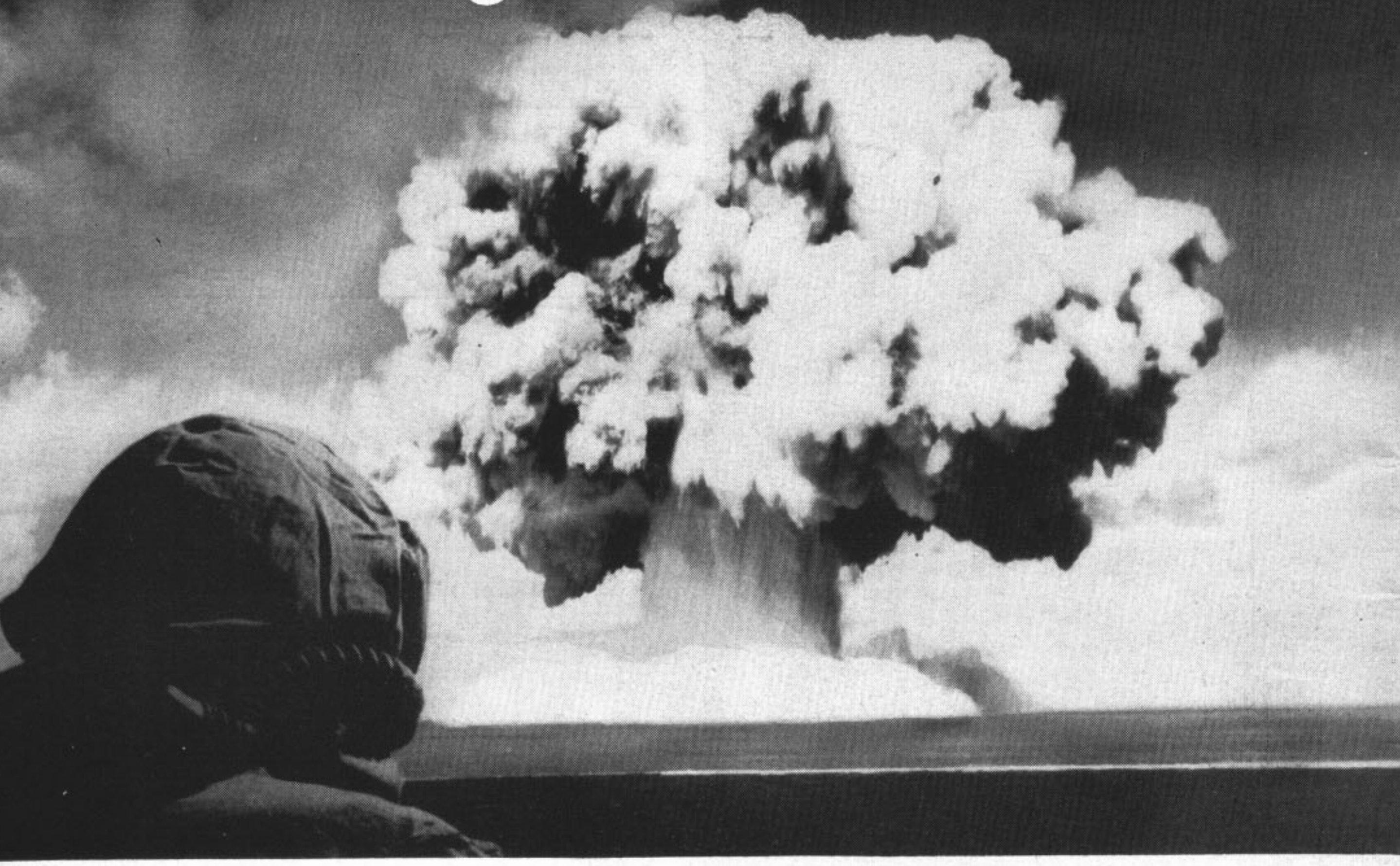
• **FRONT COVER:** A member of a survey team checking the level of radiation on a ship after an imaginary atomic bomb burst, T. R. Patrick, DC3, USN, holds one of the Navy's latest radiac instruments. See page 2.— Photo for *All Hands* Magazine by Walter G. Seewald.

• **AT LEFT:** Washing down fore and aft—where possible—cools off ships exposed to an underwater atomic bomb burst. Dust-like radioactivity that settled on USS *New York* (BB 34) at Bikini was removed in this fashion.

Battling the Atomic Bomb



WHAT would happen if your ship should be the target of an attack by enemy planes carrying atomic bombs? Ever thought about it?

Exactly what would you do? Where would you go? Where *could* you go? Would you be safe inside the ship? What are your chances of coming through it in one piece? How about the ship—would she survive?

These questions are not written to scare you—they are written rather to make you think. "But will anyone use an atomic bomb against a ship?" you may ask. The answer, of course, is that no one knows.

Several high-ranking naval officers believe that an enemy would be more likely to use its atomic bombs on a large city or crowded harbor than on a ship formation on the open sea.

But the fact remains that it is entirely possible for an enemy to atom bomb a ship. For that reason all ships must prepare to defend against an atom bombing. The threat is there and it must be squarely faced.

Is there any defense against an atomic bomb attack upon a ship? There is no complete defense (or if there is, it is a closely guarded secret). But much can be done if an atomic bomb does explode near a ship. As another article in this issue points out, we are not helpless.

How We'd Meet An Attack

Continuing its mission of bringing its readers accurate, up-to-the-minute information, ALL HANDS Magazine in this issue presents a special roundup on atomic warfare, particularly as it affects the Navy.

The article on radiological defense starting on this page was written by LTJG Arthur P. Miller, Jr. USNR, an ALL HANDS staff writer. Photos were taken aboard USS *Monterey* (CVL 26) by B. W. Spacek, AFAN, USN. The carrier USS *Alamo* mentioned in the article is a non-existent, imaginary ship.

Picture this: a mythical aircraft carrier, USS *Alamo* (CV 99) steaming, under leaden skies, somewhere in the Atlantic. Although her men would rather be thinking about home or the next liberty port, they're not. The skipper has just passed the word that enemy forces are near and an atomic attack can be expected.

In the weeks past, radiological defense drills have been held almost daily, preparing each man aboard to play his part to the full in any atomic attack. They know their parts; each man is sharp and ready.

Each one knows what he must do. The question is—would you?

* * *

Things had been tense on board *Alamo* since earlier that morning when Tom Blake, SN, had mustered with his division. The weather didn't help any. It was gray and overcast, the early morning sun barely discernible behind the screen of haze.

Lieutenant (jg) Lawton, Blake's

division officer, hadn't wasted any time telling them what was up. "You've all heard the rumors," he had said. "Well, here's the dope. The captain says the enemy is close and we may have an attack at any time.

"You all know, of course, that these guys have atomic bombs in their planes and may use them. If one of the planes does break through and drops a bomb, you know what to do. Just keep your head and go through with it as if it were a drill. That's all."

That had been two hours ago. Now Blake was standing a Condition Three watch on a 40-mm. gun, a gun that also served as his general quarters station. He looked down at his clothes.

He and everyone else topside were wearing specially designed anti-contamination suits. These outfits consisted of canvas coveralls similar to flying suits worn by naval aviators, with the addition of a hood over the head, goggles and heavy rubber boots. Each man carried his own gas mask, ready for instant use. In these outfits, the men looked more like Army ski troopers than Navy sailors.

In addition to the clothing, Blake wore one other small but important item—a dosimeter (pronounced doe-sim-i-tur). Dosimeters vary in design. The one Blake wore was shaped like an automatic pencil and clipped to the inside of the pocket of his coveralls.

Dosimeters are used to measure the amount of radiation to which a person has been exposed. A radiation film badge—a small piece of photographic film mounted in a small metal holder which clips to the lapel—may also be used for this purpose.

"Boy, this suit is as hot as the inside of an oven . . ."

Suddenly, his thoughts were cut short. Out of the early morning haze came the clang-clang-clang of the general alarm. A voiced boomed out over the PA system: "Air attack . . . air attack . . . All hands . . . general quarters . . . Prepare for atomic attack . . . All hands topside put on gas masks . . . Secure all ventilation . . . Medical and repair parties stand-by . . . Turn on sprinkler system . . . Air attack . . . Air attack."

Instantly, every man in *Alamo*

SURVEY PARTY steps out onto the weather deck. The intensity of radiation from 'hot' planking is determined by radiac instrument in man's right hand.

sprang to action. Blake and his shipmates on the forward 40s unlimbered their guns and slipped on their head phones and gas masks. Other shadowy figures in the dim light of CIC manned radars and stood by their plots. Talkers sent terse reports of air activity over their phones to Captain Callahan on the bridge.

Engineering crewmen ran from place to place closing sea water intakes (a few are necessary, however, and must be kept open), shutting off all ventilation in the ship and slamming shut watertight doors and hatches. The medical gang hustled to prepare sick bay, for casualties and to man the several decontamination change stations which had been set up throughout the ship. Damage control repairmen unlocked their gear lockers and dragged out decontamination equipment and detection devices of all shapes and sizes.

Back on deck, Blake and the others listened as the Exec spoke calmly over the PA system: "Men, there are a number of enemy bombers heading for this formation. CIC thinks there may be two groups of them. Our fighters are attacking now . . . they are about ten miles out."

Ten miles. Pretty close. Blake cursed the weather. You wouldn't be able to spot a plane through that gray haze until it was right on top of you. He supposed that was why the enemy had picked today to attack . . . "They're not so dumb," he thought.

To prepare for any attack which might be coming, the ship's sprinkler system began spewing fountains of water across the weather decks. *Alamo* had a specially built system which could play streams of water on her decks while the hosemen stayed well within the safety of the superstructure.)

EVER ALERT, trio monitors part of exposed deck, moving as rapidly as possible. Right: Too hot, monitor turns back.

The flow of this water across the decks and down the overside drains would go far toward cleansing the ship of a major part of any radioactive dirt that might settle on it from an A-bomb burst.

Wha-a-aam. Wha-a-aam-wha-a-aam. Wha-a-aam. Now the 5-inch batteries had opened fire on the unseen foe, their shells directed toward the invisible enemy planes by radar fire control. Wha-a-aam. Whaa-a-aam. They fired again.

Then it happened. It was off his side of the ship and ahead . . . perhaps a mile ahead or so. Suddenly, and only for an instant, the sea at that spot was illuminated from beneath by a flash of light that made the water glow a brilliant blue-green. Immediately, a great area of the surface of the ocean ballooned upward in a dome-like mass of filmy white spray.

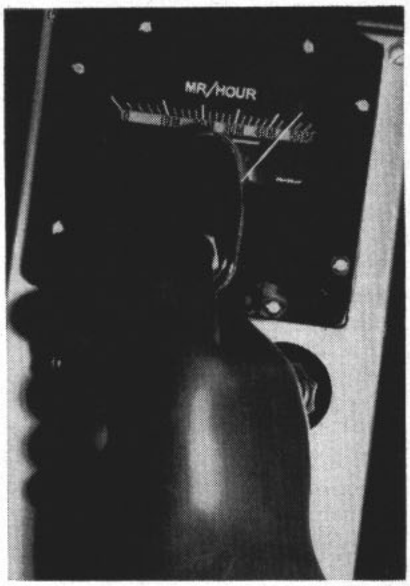
From the surface edges of this inverted bowl of heavy mist and spray, a circular slick formed and raced outward at a great speed, expanding in a wide circle.

As Blake watched, entranced, the blue-black slick raced swiftly toward the ship. Then: whoo-oo-oompp! This was the shock wave which now clamped its vise-like grip on *Alamo*.

Out of the corner of his eye, Blake saw one of the four-wheeled dollies on the flight deck slip its moorings and skid crazily across the deck. Blake himself nearly lost his grip for a moment and almost fell off his gun.

The force of the underwater shock wave, which hit *Alamo* broadside, sent shudders running up the ship's spine. Dishes in the galley clattered to the deck. A neat row of books in the chartroom tumbled from their place on the shelf.

It was as though the ship had been the object of a tremendous depth charge attack. Ton upon ton of water pressure squeezed the ship's hull. Then, as suddenly as the shock wave had come, it left. Crew members, who had grabbed porthole dogs and stanchions for support, relaxed their hold.



HOW IT LOOKS to monitor—needle points to 45 milli-roentgens. This is one of a wide variety of radiacs.

As the ship began to breathe again, Blake took another look. Where the frothing dome of white spray had been, an immense, circular wall of water was now climbing into the sky. It was as though a huge twister were sucking at the sea, sending tons of displaced water hurtling into the clouds.

All this had taken but a second. With it had come the noise and the clatter and thump of the men and objects falling to the deck under the impact.

Blake looked once more. Through the dull haze he could now see the mushroom-shaped cloud—just like in the training films—blossoming at the top of the giant column of water thrown up by the bomb. "It looks more like a big cauliflower than a mushroom," ran through his head.

The ship had now begun to turn to starboard away from the burst, trying to outrun the mass of highly radioactive water that cascades back into the ocean, raging out in great waves and billows of spray like the spume at the bottom of Niagara Falls.

"This is an atomic attack . . . This is an atomic attack" came the voice over the PA. It was calm and unhurried, not excited.

"Now all hands topside, secure

. . . Go below on the double . . . All hands leave the weather decks immediately . . . Secure all watertight doors and hatches . . ." said the PA.

As he slid from the gun to go below, Blake took one last look over his shoulder. The towering plume of water was falling now, a white-frothed column plunging into the sea and whipping the surface into a seething, swirling cloud of radioactive spray and mist that leaped outward toward the ship.

This was the base surge.

* * *

Up on the bridge, Captain Callahan turned his glasses toward the developing base surge on the port bow. The bomb, he estimated, had burst approximately one mile from his ship. Now the great, hollow column of water that had a minute before been reaching for the sky, was falling seaward in great white masses.

Ahead of the developing surge, as though paving the way for it, rolled a series of medium-sized waves. These had been caused simply by the splash made by that bomb and the resulting explosion.

"We'll be catching some of it," the captain said quietly, turning to the OD. At the same time he glanced quickly over his shoulder at the engine speed indicator. The needle registered flank speed.

Alamo had by now turned 120 degrees, was presenting her port quarter to the onrushing waves and base surge and was rapidly picking up speed following her turn. The waves were close aboard now. Between one and two minutes had elapsed.

"Everything buttoned up tight?" the captain asked.

"Yes sir. All reports are in," came the reply.

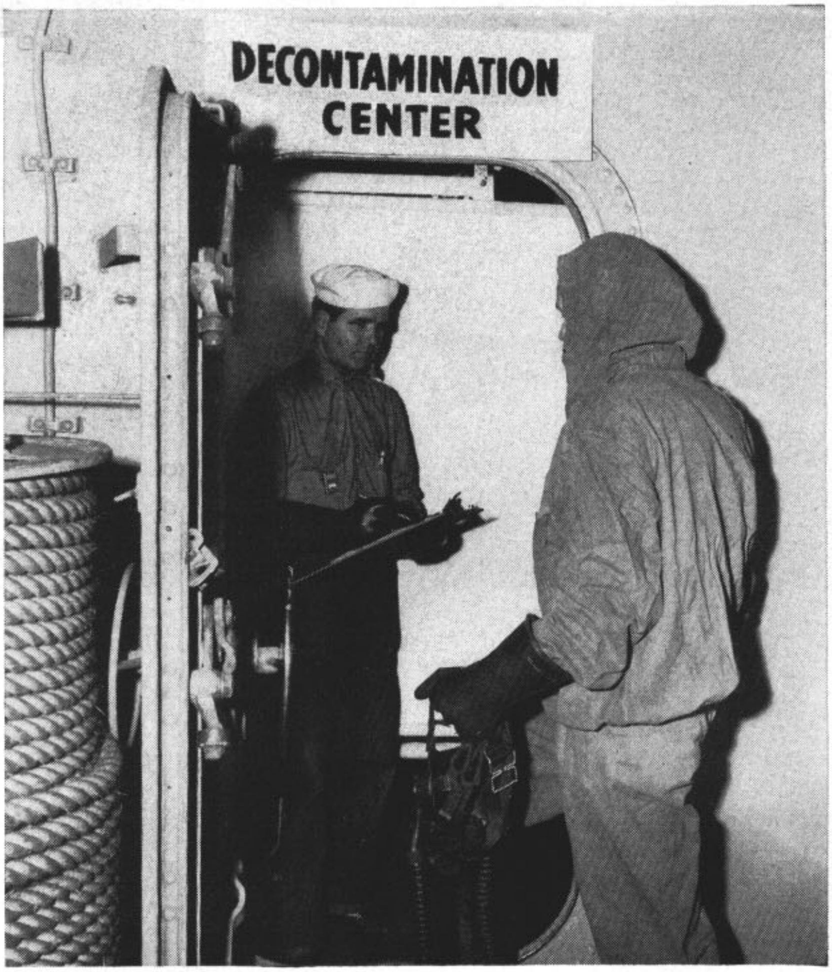
Seconds passed. Captain Callahan looked again. The first waves reached the ship, a corrugated pattern of swells each about 15 feet in height.

The swells picked *Alamo* up and set her down again. As the stern rose, the nose buried itself in the swell ahead. The ship rolled with each punch and took it easily.

No sooner had the waves come and gone than the radiation-laden mist and spray smothered the ship in a blanket of heavy fog. As the fog rolled across the ship a heavy rain dropping from the mushroom-shaped cloud that drifted overhead began pelting the decks. For perhaps half a minute, *Alamo* labored in the clammy fog and the "hot rain."

Then, almost as quickly as it had enveloped her, the base surge subsided. The ship had steamed through it as it might have steamed through an ordinary line squall. The rain let up then stopped altogether. The mushroom-cloud fell astern.

By spurring his ship to flank speed and turning it immediately away from the burst, the skipper had succeeded in outrunning all but the fringe of the dangerous base surge. But not before *Alamo* had received a stiff dose of radioactive contamination on her decks. This radiation—which had been deposited both by the surge itself and by the hot rain—had produced a level of contamination that was probably hazardous but not lethal.



AFTER SURVEY, member of 'first wave' reports to decontamination center where he gets rid of any bits of radioactivity that may be clinging to his body.

With the twin threats of the shock wave and base surge safely past, Captain Callahan could now turn his attention to the third threat—the hazard of the invisible radiation that lingered on deck. How "hot" was *Alamo*? That was what he must find out—as soon as possible.

After first ordering CIC to direct Alamo's aircraft to a nearby carrier, the skipper told damage control parties to continue to play their sprinkler hoses over as much of the ship's surface as possible in order to wash off some of the radioactivity that clung to the surface.

Perhaps 15 minutes had now passed since the atomic explosion and the ship was well clear of the radioactive area. The enemy had fled and ship's company could safely turn to on the task of cleansing the ship of radioactivity.

The PA system spoke again: "Now all hands will remain at general quarters . . . All men on deck

QUICK PEEK by corpsman into an 'auxiliary reader' reveals total exposure of monitor to radiation. Change station is within decon center.

at the time of the explosion, report immediately to nearest change station to be monitored . . . All hands stay clear of hangar deck and officer's country and aft unless directed by Damage Control or Radiological Defense officer . . . These spaces may be contaminated . . . Stay below the second deck."

By keeping all personnel below the second deck, the captain was making certain they would not get into a "hot" spot. Radiation can penetrate several decks.

A careful check of all personnel topside at the time of the burst would disclose whether they had absorbed any radiation. The doctor would check each film badge or dosimeter, recording the reading on the individual's Radiological History card. Any who were markedly over-exposed would be taken to sickbay for observation.

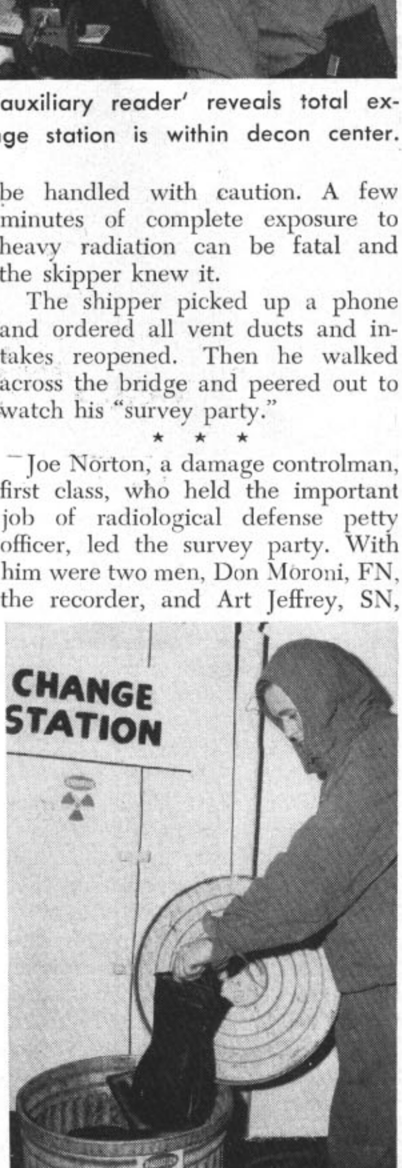
A phone rang on the bridge. It was the medical officer. Only a few cases of over-exposure, but there were 25 casualties among men who had been thrown about or hit by flying debris when the shock wave rocked the ship, the doctor reported.

As soon as he learned that personnel injuries had in fact been lighter than he had dared hope, Captain Callahan turned his full attention to decontaminating his ship. No one had yet been allowed on deck. The little bursts of energy that are radioactivity are dangerous in large doses. Radioactivity must be handled with caution. A few minutes of complete exposure to heavy radiation can be fatal and the skipper knew it.

The shipper picked up a phone and ordered all vent ducts and intakes reopened. Then he walked across the bridge and peered out to watch his "survey party."

* * *

Joe Norton, a damage controlman, first class, who held the important job of radiological defense petty officer, led the survey party. With him were two men, Don Moroni, FN, the recorder, and Art Jeffrey, SN,



INTO THE CAN the monitor tosses his rubber gloves. Gloves must be completely cleaned for further use.

talker. This was the "first wave", the fact-finding mission that would determine just how "hot" Alamo was after her atomic baptism.

Norton and his boys had been assigned to survey the after end of the carrier's flight deck, including the catwalks on either side. For protection the three wore khaki-colored outfits which covered them completely from neck to ankle and wrist. Each wore rubber gloves and boots similar to those worn by personnel on deck at the time of the atomic burst.

Norton carried in one hand the device that would give him the answers he needed—a radiac device, a light, rugged, box-like affair with a handle attached to the top. The word radiac stands for "radio activity detection, identification and computation." By holding the radiac instrument over the area to be surveyed, he could obtain a reading in roentgens per hour, which are units of radiation intensity.

With their equipment, the three now moved rapidly across the deck. Rapidly, because they had a lot of territory to cover in a little time. Only ten minutes in fact.

Despite the fact that the deck was, radioactively speaking, as hot as a two-dollar firecracker, it didn't look any different to Norton. Just wet from the wash-down, that's all. He held his counter over the deck.

"Thirty-five roentgens per hour," Norton grunted, his voice slightly muffled behind his gas mask.

The needle on the counter's dial fluctuated back and forth.

"Thirty-five," Moroni repeated, making a notation of the value next to the frame number on his plan of the ship's deck system which he carried on his clipboard.

The three were moving forward single file, Norton first with the counter, Moroni second, Jeffrey, the talker, third.

"Forty roentgens per hour," said Norton. Moroni wrote it down. "Forty-five roentgens . . . 35 roentgens . . . 55 roentgens . . . 50 roentgens. . . ." Moroni jotted each number on his diagram.

Jeffrey spoke into his sound-powered phone: "Damage Control, this is Survey Party One . . . Completed one trip across . . . Average: 50 roentgens per hour."

They worked their way back again, from starboard to port. "50 roentgens . . . 55 roentgens . . .

60 roentgens . . . 65 roentgens . . . 60 roentgens . . . this is getting hotter" Norton mumbled.

Over and back. Over and back.

"Survey One, this is Damage Control. Lieutenant Wyatt says you have five more minutes. Hurry it up," came over the phone. Jeffrey passed the word to Norton.

"Okay," Norton said, keeping his eyes glued to the clicking counter. He had to be careful not to touch the counter to the deck or it would become contaminated itself and therefore useless.

Now they had reached the port catwalk. Norton blinked.

The needle was quivering on 90! "Tell Damage Control this catwalk's hot as Hades," Norton said tensely.

"They say take the starboard side. We've only got a minute and a half left," Jeffrey said quickly, after taking the message.

"Right," replied Norton, leading them once more to the starboard side and down onto the catwalk.

"All right, that's it," Norton said after another minute on the catwalk. "Let's get inside."

They jumped up on the flight deck and half ran into the protective interior of the island. Once inside, each carefully took off their rubber boots and laid them aside. This was so they would not track any contamination into the clean areas of the ship. Then they reported to Lieutenant Wyatt, describing what they had found out on deck.

"Okay. Good job. Go below and get cleaned up," Wyatt told them.

"Aye aye, sir," Norton said, and the three turned and went down a nearby ladder.

* * *

"The doc says I should stay out of hot spots for a week. How about you?" Norton asked. He was standing under a warm shower in the change station below decks.

"Only five days for me," Moroni replied.

They were referring to the length of time the medical officer had told them to stay away from further exposure to radiation. Radiation builds up in the body. Too much will make a person sick. But small amounts over a long stretch will cause no bad effects.

To be certain that no contaminated material had stuck to their bodies when they removed their decontamination suits, the doc had told them to take a good, long shower. "And use that soap, too," he ordered. "And scrub your scalp and scrape out under your fingernails," he called after them.

Had either of them become seriously exposed, the doc would have taken nasal smears, and a blood count for future comparison purposes in blood cell count. If necessary, he would have ordered them to sick bay to be treated for radiation sickness, an illness which can render a patient nauseated and give him a high temperature, or, in bad cases of exposure, can lead to more serious internal complications and possible death.

The three had entered the change station using the "contaminated" entrance. The corpsman (he may be a seaman) had taken from each of them his pocket dosimeter and film badge. The readings were recorded on the man's card.

All contaminated clothing was placed in a separate hamper. It would be laundered separately from the rest of the ship's laundry. When they had finished showering and had been monitored, Norton, Moroni and Jeffrey were allowed to leave the change station. They left through a second door, this one marked "Decontaminated."

* * *

By now Lieutenant Wyatt had received the results of other similar preliminary surveys which had been conducted over the ship and had consolidated these reports into an overall radiation picture of the ship. This he now sent to Captain Callahan.

Glancing at this report, the captain could now decide on the steps to be taken next to decontaminate his ship. If *Alamo* were safe from further enemy attack, he would order Wyatt to go ahead and begin decontaminating. If he thought the ship might have to fight again soon, he might be forced to postpone much of the decontamination. But, at any rate, he knew how "hot" *Alamo* was and could act accordingly.

Various steps would be taken to decontaminate *Alamo*, inside and out. First, Lieutenant Wyatt himself would probably make a personal survey of the ship, marking in chalk those areas and waterlines which were to be decontaminated. Then, all loose stuff such as radioactive cordage and planking would be jettisoned.

Next, decontamination teams would come on deck, ready to attack the persistent stuff in a number of ways. Chemical solutions would be sprayed on bulkheads and decks to loosen the hold of the radioactive particles.

Paint would be removed by scraping or by steam. Radioactive bulkheads could be "sealed-in" with paint to keep the stuff from spreading until scraping teams could reach them. Signs would be erected at

PEELING OFF the monitor's anti-contamination suit, the corpsman is careful to don rubber gloves so that the stuff doesn't spread to him.

LAST STEP in personal decontamination is a good shower with plenty of soap. Corpsman gives final okay to survey man, sends him on his way.

"hot spots" stating the maximum time personnel should remain in the area. A sample sign might read: "Radioactivity – Dangerous – Intensity 25 r per hour."

Since Alamo suffered a relatively light amount of contamination, it might be possible for her skipper to keep her at sea. In a more serious case, with more injuries to personnel; the ship might be more heavily damaged by the blast and radiation and would have to return under her own power, if necessary, be towed into nearest harbor for decontamination and repair.

But in the case of *Alamo,* the ship had been saved from disaster at the hands of the atomic bomb by the coordinated efforts of Seaman Blake, Captain Callahan, Damage Controlman Norton and practically the whole crew. Fighting an atomic attack is an all hands job. It is also a job in which all hands must know exactly what to do and the right time to do it.

In order to meet this challenge, if it should arise, Navy men are now being taught the dangers as well as the limitations of the atomic bomb and of atomic attack. Schools have been set up to train the radiological defense officers, the radiological health officers, the radiological defense petty officers and the monitors who play such an important part in any defense against the bomb.

An A-bomb attack, like a torpedo attack or the suicide plunge of a kamikaze plane, is a hazard of war which can cause untold damage if adequate measures are not taken to fight it. With heads-up damage control, however, the effects of a bomb burst can be considerably lessened.

Ships of the Fleet are now girding to meet any such attack as hit the imaginary carrier *Alamo.* The men and officers of *Alamo* were ready and waiting to go to work to save their ship from being disabled by an atomic attack—and they did save her.

Through imaginative radiological defense measures—carried out to the hilt with skill and daring—other ships like *Alamo* could be saved in the future should it be necessary.

A complete roundup on "Radiological Defense Training in the Navy" appears in the December 1950 issue of the U.S. Naval Training Bulletin.

Card Tells You What to Do If An Atomic Bomb Explodes Near You

INDIVIDUAL ACTION
AIR BURST OF ATOMIC BOMB

BEFORE BURST

If Air Raid Alert or General Quarters is sounded, TAKE PRESCRIBED ACTION. The best defense against an "A" bomb is the same as against HE bombs.

DURING AND AFTER BURST

	1. Take cover, unless under other attack, and stay for 10 seconds after explosion or until heavy debris has stopped falling.	Underground shelters, ships, basements, and slit trenches give good protection. Lie close to wall out of line from possible flying debris. Keep head covered and avoid exposure of bare skin. Never stand in open. Fall flat if no protection is available.
IF AT DUTY STATION	2. RESUME DUTIES, if able	The war won't be over. Get back to work and be ready for orders and instructions (usually General Quarters or Air Raid Alert instructions).
IF NOT AT DUTY STATION	3. HELP OTHERS	Thousands of lives can be saved by prompt aid. Help save lives by helping others. **By the time the debris has stopped falling, there is no radiation hazard.**
IF NOT AT DUTY STATION	4. REPORT TO DUTY STATION	Organization is necessary to reduce the effects of the bomb. Report to **receive treatment** if necessary, and to **work to help** overall situation.
	5. DON'T PANIC and DON'T SPREAD RUMORS	Rushing aimlessly about will hinder rescue and damage control. Keep your experience to yourself and don't enlarge on what you hear from others.

REMEMBER · THE LARGE CASUALTIES IN JAPAN RESULTED FROM FAILURE TO PROVIDE AIR RAID WARNING AND FROM LACK OF ORGANIZATION

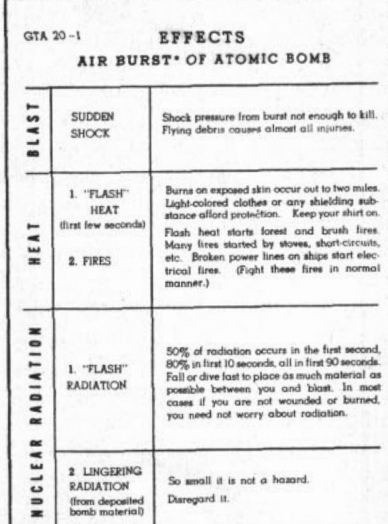
GPO 1950 O—908880

A new, wallet-size card which spells out what a man should do if an atomic bomb explodes near him is currently being issued to all naval personnel.

Purpose of the card: to get a man thinking about what to do *before* he might have to do it.

The front of the small card (at left) describes what to do after a burst. As with an ordinary bomb burst, the most important thing is to take cover—fast.

The back of the card (at right) describes the three-pronged threat of an air burst: blast, heat and radiation. In an underwater burst, such as the one at Bikini, the three hazards remain the same but the heat and blast become less of a danger while radiation becomes more of a problem.



GTA 20-1

EFFECTS
AIR BURST* OF ATOMIC BOMB

BLAST	SUDDEN SHOCK	Shock pressure from burst not enough to kill. Flying debris causes almost all injuries.
HEAT	1. "FLASH" HEAT (first few seconds)	Burns on exposed skin occur out to two miles. Light-colored clothes or any shielding substance afford protection. Keep your shirt on.
HEAT	2. FIRES	Flash heat starts forest and brush fires. Many fires started by stoves, short-circuits, etc. Broken power lines on ships start electrical fires. (Fight these fires in normal manner.)
NUCLEAR RADIATION	1. "FLASH" RADIATION	50% of radiation occurs in the first second, 80% in first 10 seconds, all in first 90 seconds. Fall or dive fast to place as much material as possible between you and blast. In most cases if you are not wounded or burned, you need not worry about radiation.
NUCLEAR RADIATION	2. LINGERING RADIATION (from deposited bomb material)	So small it is not a hazard. Disregard it.

*Bombs will probably be exploded high in the air. Surface or sub-surface bursts may reduce blast and heat effects and increase lingering radiation. (This is serious but can be handled by proper care. Most ships or vehicles can avoid by maneuvering).

How to Defend Against Atomic Weapons

DURING the five years since the first atomic bomb was exploded over Hiroshima, a frightened world has been led to believe by some of the more articulate atomic scientists that "there is no defense against the atomic bomb" and that "none will ever be devised."

As long as we were the sole possessors of the atomic bomb, with the further assurance that it would take Russia several years to make one, this dictum served largely to generate a sense of security.

The announcement that Russia had tested her first atom bomb at least three years ahead of time, followed by a few months with the Communist attack on South Korea, has changed the picture to the point where many of our people are in danger of succumbing to a sense of helplessness against a potential atomic attack.

The publication by the Defense Department and the Atomic Energy Commission of the most authoritative volume yet to appear on the effects of atomic weapons and the measures that may be taken to counteract, or at least greatly to minimize, their effects, therefore, must be regarded as one of the most important official documents in recent years.

It possibly is more important, in fact, than the hasty publication a few days after Hiroshima of the Smyth Report, which many today believe was a serious mistake that gave Russia much valuable information.

This new volume may properly be given the subtitle "Handbook for Survival Against Atomic Attack," for it gives the basic data essential for the planning and building of an effective civilian defense against potential atomic bomb attacks, whether they come by air or by water.

Unfortunately, the volume has been prepared "as a source of scientific information for technical personnel engaged in civil defense," and as such is not for the average layman. In this, and subsequent articles, the essential data will therefore be presented in nontechnical language.

By way of introduction let it be said, first, that there is nothing about atomic energy and atomic weapons that is beyond the grasp of the average layman, and, second, unreasoned fear that might lead to mass hysteria could produce more damage to life and property, and, more important, to spiritual values, than any number of atomic bombs.

In fact, a well-organized civilian defense against a possible atomic attack, added to an efficient military defense, is the best possible deterrent against such an attack.

To understand the fundamental principle underlying the atomic bomb, including also the hydrogen bomb, one must have a general concept of the relationship that exists between what we know as matter and energy, the two aspects in which the material universe manifests itself to our senses.

In his famous relativity theory Albert Einstein demonstrated that matter and energy were two different manifestations of one cosmic entity, that matter was energy in the frozen state, while, conversely, energy was matter in the fluid state, the two states being interchangeable. In a famous mathematical formula he revealed that one gram of matter represented in the frozen state the enormous total of 25,000,000 kilowatt-hours of energy.

From this we learned that whenever energy in any form was liberated, such as, for example, by the burning of coal or oil, a small amount of matter was lost, so small, in fact, that it was not possible to weigh it by any method known to us. We have to burn 3,000 to 7,000 tons of coal to convert the matter of one gram into energy, a ratio of three to seven billion to one.

When energy is obtained by the burning of coal, the atoms of the coal, mostly carbon and hydrogen, remain unchanged, the loss of matter being due to a rearrangement of the electrons on the outside surface of the atom.

In what is known as atomic energy, the energy is obtained by a break up of the atoms used as fuel. When this happens, an amount of matter three to seven million times as great as in the burning of coal is converted into energy. As compared with the amount of matter converted into energy in the explosion of TNT the ratio is 20,000,000 to 1. In other words, the explosion of one kilogram of fissionable material, such as Uranium 235 or plutonium, releases an energy equivalent to 20,000 tons of TNT.

Uranium 235 (U-235) and plutonium are at present the only two substances that can be used for the release of atomic energy, either as an explosive or for power. U-235 is the only one found in nature in sizable quantities. Plutonium is a man-made element, produced from the more abundant form of uranium, known as U-238, in our gigantic plants, known as nuclear reactors, at Hanford, Wash.

A third fissionable element, known as Uranium 233,

'We Are Not Helpless'

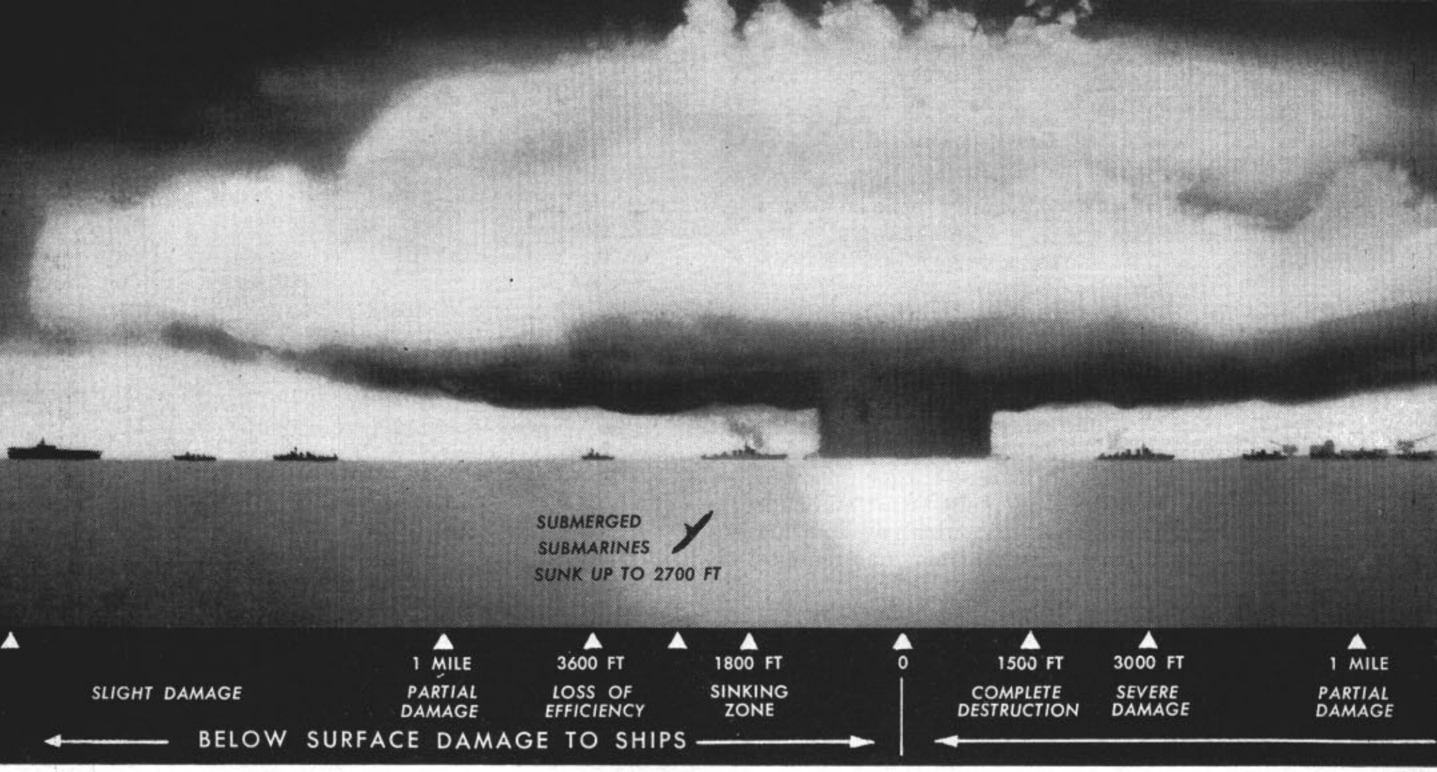
ALL HANDS Magazine takes pleasure in presenting—on pages 9-31—material reprinted from *The New York Times* which makes a non-technical analysis of a government publication: *The Effects of Atomic Weapons*.

This latter publication is an official guidebook to help in the preparation of civilian defense against atomic attack. Copies of *The Effects of Atomic Weapons* have been distributed by the Navy to all naval commands.


Mr. Laurence

The analysis of this guidebook comprised a series of articles written for *The New York Times* by William L. Laurence, a member of the newspaper's staff since 1930 and twice winner of the Pulitzer Prize, highest award in American journalism.

Illustrations (with the exception of pages 10-11) are from *You and the Atomic Bomb,* published by the New York State Civil Defense Commission, and appeared originally in *Life*. The illustration on pages 10-11 depicting a bomb burst was drawn by Jack Dempsey, PI3, USN, an ALL HANDS staff artist.



can be produced artificially out of the non-fissionable element, thorium, but to do so it is necessary to use either U-235 or plutonium. Uranium 235 is thus the key substance without which no atomic bombs or atomic power could be obtained.

Uranium 235 is found in nature mixed with Uranium 238, each ton or purified uranium metal consisting of 1,986 pounds of U-238 and only fourteen pounds of U-235. To separate the latter required the construction of a billion-dollar plant at Oak Ridge, Tenn.

Plutonium is produced by another method, in which the U-235 in the natural mixed uranium metal is made to split by means of a self-multiplying chain reaction, in which neutrons (fundamental atomic particles without an electric charge) are released. These neutrons enter the Uranium 238 in the mixture and convert it into plutonium.

Just as an ordinary fire needs oxygen to burn, an atomic fire needs neutrons. These neutrons come from the nuclei (cores) of atoms of U-235 or plutonium, each atom split releasing an average of two neutrons, these in turn splitting two atoms which release four neutrons, thus starting a chain reaction. In an atomic bomb these neutrons are released at such an incredible rate that as many as two billion trillion atoms are split in less than one-millionth of a second.

The explosion of an atomic bomb is analogous to spontaneous combustion, the explosion taking place as soon as a minimum amount of fissionable material (either U-235 or plutonium) is assembled in one unit. This minimum amount is known as the critical mass.

The actual amount is a top secret, but for purposes of illustration let us assume that it is ten kilograms. This would mean that as soon as ten kilograms of either U-235 or plutonium were assembled in one unit, the explosion would take place automatically, the reaction starting with a stray neutron from a cosmic ray coming from outer space. Hence to explode an atomic bomb, the ten kilograms would have to be divided into two parts that were brought together by a timing device after it had been dropped.

The atomic bombs dropped over Japan and tested at Alamogordo, N. M., and at Bikini had a power of 20,000 tons of TNT, which corresponds to the splitting of all the atoms in a kilogram of either U-235 or plutonium.

This does not mean, however, that these bombs contained only one kilogram of the fissionable material, because that would mean an efficiency of 100 per cent, and while the actual efficiency of the bomb is a top secret, the handbook makes it clear that this is less than 100 per cent.

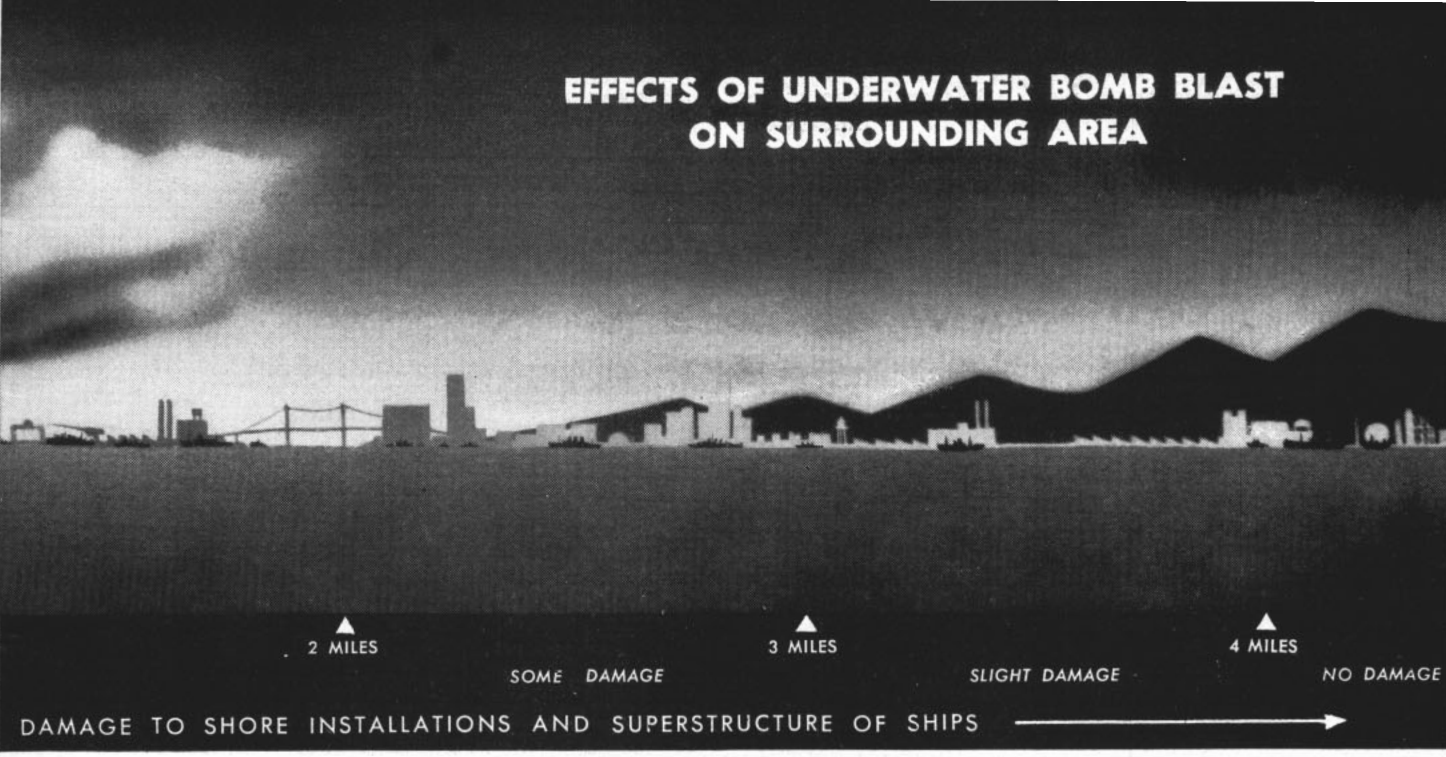
This means that a certain percentage of the atoms remain unsplit after the explosion, going off as part of the great cloud of radioactive vapor that characterized the explosion.

The explosion of an atomic bomb produces several effects, which vary greatly with the manner in which it is exploded.

It is first of all a tremendous blast weapon, concentrating within itself (that is, the "nominal atomic bomb" used over Japan) the blasting power of 2,000 wartime ten-blockbusters. Its temperature after the explosion reaches more than 1,000,000 degrees centigrade, and is thus a tremendous incendiary weapon, setting great fires in buildings and causing severe flash burns in human beings.

However, and this is very important from the point of view of planning an effective civilian defense, the blast effect and the incendiary effect have an effective range within a rather limited radius from the center of the explosion. So while little can be done for those unfortunates caught in the open within that central area, much can be done to take measures for reducing to a minimum the effects of blast and fire in the region outside this area.

In addition to the blast and incendiary effects the explosion of an atomic bomb gives off large amounts of radiations. The most serious of these are the instan-



taneous radiations that come off in the form of gamma rays, similar in nature to very powerful X-rays. These last but a very short time, no longer than a flash of lightning, and like lightning kill those they strike. However, these, too, have a rather short effective range, and those who survive it, depending on the dosage they received, may be saved by proper measures.

The second principal form of radiation released in the atomic bomb explosion is that from the fission products, some 200 split fragments of the exploded U-235 or plutonium atoms. If the bomb is exploded some 2,000 feet above the ground, as it was in Japan, and in the air burst (Test "Able") over Bikini, these fragments go up in the great mushroom cloud to some 50,000 feet and are there widely dispersed so that they can cause little harm.

On the other hand, if the bomb is exploded near the ground, as it was in Alamogordo, or under water, as in Test "Baker" at Bikini, these fission fragments may constitute a great hazard for some time.

However, here too we have learned a great deal from the Bikini test as to the nature of the danger and how to avoid it by proper counter-measures.

'Small' Bomb Found Impossible

One of the items that has been causing alarm among the public is the recent talk about "small atomic bombs."

It is known that one kilogram of the explosive material used in the bomb, Uranium 235 (U-235) or plutonium, is equivalent in energy to 20,000 tons of TNT, a ratio of 20,000,000 to 1. So the talk about a "small" atomic bomb is leadnig to the dangerous impression that such an object or objects weighing a few pounds each, could be easily smuggled into the country and exploded simultaneously in most, if not all, of our important cities.

Nothing can be further from the truth. In the handbook, the American people are given the first official assurance, without any qualifications, that "a 'small' effective atomic bomb cannot be made."

There is a sound technical reason for this. An atomic bomb is exploded with neutrons—atomic bullets released when atoms of U-235 or plutonium are split in a chain reaction in which the neutrons multiply themselves at the incredible rate of two billion trillion in less than a millionth of a second.

Since these neutrons travel with speeds of more than 10,000 miles a second and can penetrate any substance up to a certain thickness, the only way to keep them from escaping to the outside in numbers large enough to stop the chain reaction, which would prevent the explosion, is to have a quantity of explosive (fissionable) material that the neutrons in the interior will be unable to penetrate.

This quantity is known as the critical mass, or critical size, and puts a definite lower limit below which no atomic explosion can take place.

While the critical size can be diminished to some extent by surrounding the system with a suitable neutron reflector, which reduces the loss of neutrons that escape from the surface, the reduction is not very great.

The inexorable requirement for a minimum amount of material also puts an upper limit on the amount of material that can be used. This is because anything above the critical mass would explode spontaneously.

Let us assume, for purposes of illustration, that the critical mass, the actual amount of which is top secret, is ten kilograms of either U-235 or plutonium. This would mean that anything below this amount would be too small to keep too many neutrons from escaping, so that no explosion could ever take place.

On the other hand, as soon as a quantity totaling ten kilograms is brought together, the neutrons would start multiplying automatically and an explosion would take place in less than a millionth of a second.

Hence, as explained previously, to explode an atomic bomb, two pieces, say, of one and nine kilograms, respectively, are made to come together by a timed trigger mechanism after the bomb is released.

According to Dr. Louis N. Ridenour, dean of the Graduate College of the University of Illinois, "no amount of ingenuity has yet allowed the design of an efficient fission bomb so much as two or three times critical size."

Now if the atomic bomb consisted only of its explosive material, it would be very small indeed. We know that the so-called "nominal atomic bomb" used on Japan exploded with a power equal to 20,000 tons of TNT, which is the total power of just one kilogram (2.2 pounds) of U-235 or plutonium.

Even assuming that the efficiency of the explosion was no more than 1 per cent, the critical mass would be no more than 100 kilograms (220 pounds), while if the efficiency was 10 per cent, the amount of explosive material would be no more than 10 kilograms.

However, to bring about an efficient explosion, in other words, to keep the bomb assembly from flying apart at a stage when the number of atoms split equal only a few blockbusters, and to maintain the assembly long enough until the amount of energy released equals 2,000 blockbusters, very intricate and heavy parts are necessary.

One of these, of course, is a heavy shell, since a light shell would disintegrate too quickly. Another is what is known as a tamper, which must be made of a substance of very high density. Then there are the many intricate devices to bring the assembly together at the instant of the explosion.

All these auxiliary parts of the bomb weigh many times more than the explosive material, so much so that it required the bomb bay of a B-29 to carry it. And the fact that the bomb needs large amounts of material of high density to serve as a tamper and as a reflector of neutrons, together with the other intricate mechanisms to make certain that the explosion is at the highest possible efficiency, makes a "small" atomic bomb that can be successfully hidden and smuggled an absolute impossibility.

Of course, the bombs could be smuggled into a country in ships and exploded in the harbor, but they could be rather easily discovered if proper measures for searching suspicious vessels were instituted.

HANDKERCHIEF held up to face will strain out radioactive particles from the hazardous mist from a water burst.

It must be mentioned in passing that an unexploded atomic bomb does not give off any sizable amounts of radioactivity, to make possible their detection by means of Geiger counters. This makes necessary a thorough search of the suspected ship before it is allowed to dock.

To design a more powerful bomb does not mean the building of a bomb larger in size, or one containnig a large amount of fissionable material. What it calls for is to improve the efficiency of the explosion.

For example, if our hypothetical critical mass of ten kilograms explodes with an efficiency of 10 per cent we would have a bomb equal in power to 20,000 tons of TNT. If the efficiency of the explosion were improved to 20 per cent we would have a bomb equal to 40,000 tons.

To improve efficiency would thus mean improved auxiliary mechanisms, such as a better tamper that would make possible the maintenance of the bomb's assembly for a few fractions of a millionth of a second longer before it flew apart, thus making possible the splitting of many more atoms.

This is the incredible thing about the explosion of an atomic bomb, the release of such an enormous amount of energy in such an unbelievably short time. It takes less than a millionth of a second to split one gram of fissionable material, equal to only twenty tons of TNT. It takes only about a tenth of a millionth of a second longer to split a kilogram of the fissionable material, equal to 20,000 tons.

By holding it together for another fraction of a millionth of a second, two kilograms, equal to 40,000 tons of TNT, would be split. It is thus an incredible race against time, measured in fractions of millionths of a second.

While the official handbook deals with what may be called the "Model T" bomb of 1945 vintage, it gives scaling laws to extrapolate on the effects of larger bombs. Here it clears up a general misconception that a bomb twice the power will do twice the damage, which is far from true.

There are different scaling laws that apply to the different effects of an atomic explosion. The blast effect, for example, increases with the cube root of the power so that a bomb eight times the power of the 1945 model, one equal to 160,000 tons of TNT, would increase its radius of destruction by the cube root of eight.

This means that a bomb releasing 160,000 tons of TNT would produce damage and casualties to about twice the distance from the center of the explosion as would be caused by a 20,000-ton bomb.

Even the hydrogen bomb, which may reach an explosive power as high as 20,000,000 tons of TNT, 1,000 times the 1945 model, would produce damage and casualties over a radius ten times greater, the cube root of a 1,000.

When it comes to the incendiary effect, the increase in the radius of destructiveness goes by the square root of the power, so that you would need to increase the power of a bomb four, instead of eight, times to produce the incendiary effect over a radius twice as great as that of 20,000-ton models.

The official handbook provides the most detailed description yet to appear anywhere of the immediate visible effects of an atomic detonation, in the air and under water. These effects take place at such an incredibly rapid rate that actually no complete observations of all the phenomena have been made, some eluding even the highest speed cameras.

First come the phenomena of an air burst, an explosion at a distance of about 2,000 feet above the earth's surface. The liberation of such a large amount of energy in a very short period within a limited space results in an extremely high energy density, which causes the fission products to be raised to a temperature of more than 1,000,000 degrees centigrade. The maximum temperature in a conventional high explosive bomb is about 5,000 degrees.

Since this material at the instant of the explosion is restricted to the region occupied by the original constituents of the bomb, the pressure is of the order of hundreds of thousands of atmospheres.

Because of the extremely high temperature, there is an emission of energy by electromagnetic radiations, covering a wide range of wave-lengths, from infra red (heat rays) through the visible to the ultraviolet and beyond. Much of this radiation is absorbed by the air immediately surrounding the bomb, with the result that the air itself becomes heated to incandescence.

In this condition the detonated bomb begins to appear, after a few millionths of a second, as a luminous sphere called the Ball of Fire.

As the energy is radiated into a greater region, raising the temperature of the air through which it passes, the Ball of Fire increases in size, but the temperature, pressure and luminosity decrease correspondingly.

After about one ten-thousandth of a second has elapsed, the radius of the Ball of Fire is some forty-five feet, and the temperature is then in the vicinity of 300,-000 degrees centigrade.

At this instant, the luminosity, as observed at a distance of 10,000 yards (5.7 miles), is about 100 times that of the sun as seen at the earth's surface.

The Ball of Fire continues to grow rapidly in size for about fifteen milliseconds (thousandths of a second), by which time its radius has increased to about 300 feet. The surface temperature has by then dropped to around 5,000 degrees centigrade, although the interior is very much hotter.

As the Ball of Fire grows a shock wave develops in the air. At first the shock front coincides with the surface of the Ball of Fire, but as the temperature drops below 300,000 degrees the shock wave advances more rapidly. In other words, transfer of energy by the shock wave is faster than by radiation.

Although the rate of advance of the shock front, which reaches the vicinity of 15,000 feet per second, decreases with time, it continues to move forward more rapidly than the Ball of Fire. After the lapse of one second the Ball of Fire has essentially attained its maximum radius of 450 feet, and the shock front is then some 600 feet further ahead. After ten seconds the Ball of Fire has risen about 1,500 feet, the shock wave has traveled abuot 12,000 feet and has passed the region of maximum damage.

If the bomb is detonated at a height of less than 450 feet, the Ball of Fire can actually touch the earth's surface, as it did in the historic "Trinity" test at Alamogordo, N. M. Because of its low density the Ball of Fire rises, like a gas balloon, starting at rest and accelerating within a few seconds to its maximum rate of ascent of 300 feet per second.

REMOVE INJURED from scene of atomic blast if you can do it. Otherwise, wait for the rescue squad to arrive.

After about ten seconds from detonation, when the luminosity of the Ball of Fire has almost died and the excess pressure of the shock wave has decreased to virtually harmless proportions, the immediate effects of the bomb may be regarded as over. The emission of gamma rays and neutrons accompanying fission, the most deadly forms of radiations, will also have ceased by this time.

Soon after the detonation a violet-colored glow is observed, particularly at night or in dim daylight, at some distance from the Ball of Fire. This glow may persist for a considerable length of time, distinctly visible in the column of cloud that forms after the Ball of Fire has disappeared. It is believed to be the ultimate result of a complex series of processes initiated by the action of gamma radiation on the nitrogen and oxygen in the air.

How to Recognize Nuclear Blast

There is a sound reason why the official handbook on the effects of atomic weapons, issued by the Department of Defense and the Atomic Energy Commission as a guide in planning and executing effective civilian defense measures against possible attacks by atomic bombs, describes in detail the various spectacular phenomena accompanying an atomic explosion.

Very few people alive have seen an atomic explosion, and to know what it looks like is an essential for the education of large masses of people, so they would know how to behave in an emergency with calm and precision and, above all, without panic.

The phenomena of an atomic explosion are so spectacular, and they take place in such incredibly short time, measured in split seconds, that individuals surprised by the awe-inspiring, dazzling spectacle may lose precious seconds that might mean the difference between life and death.

Knowledge in advance what the phenomena are,

CROUCH behind nearby tree the instant bomb's blinding light appears. Turn from blast, cover face, neck, hands.

will serve to eliminate the element of surprise. In an effective civilian defense, mental preparation is of equal importance with physical means of defense. The unprepared mind is the one most likely to succumb to panic and hysteria, and, when that happens all physical measures are likely to become disorganized.

It also is necessary for the average person to learn to distinguish between an atomic and an ordinary explosion. To mistake an atomic explosion for an ordinary one would lead to the needless loss of many lives.

On the other hand, the mistaken identification of the explosion of an ordinary TNT bomb, or an incendiary, as an atomic explosion might lead to needless panic on the part of tens of thousands and to great disorganization in the life of a city.

Depending on the height of the burst of the atomic bomb and on the nature of the terrain, high winds will occur in the immediate vicinity of the explosion. These, together with the air blast from the shock wave, will cause various amounts of dirt and other particles from the earth's surface to be sucked up.

At first the rising Ball of Fire carries the particles upward, but after a time they begin to fall under the influence of gravity at various rates dependent on their size. Consequently, an ascending and expanding column of smoke is observed to form. It consists of water droplets, radioactive oxides of the fission products, and more or less debris, largely determined by the height of the explosion.

This is the spectacular mushroom-shaped cloud which rose to 40,000 feet at Alamogordo and to 60,000 feet at Nagasaki.

At the beginning its rate of rise is about 200 miles per hour, reaching 10,000 feet in 48 seconds. It reaches 15,000 feet in 1.5 minutes, when its rate of rise has dropped to 50 miles per hour; goes to 20,000 feet in 2.6 minutes, a rate of rise 33 miles per hour; 25,000 feet in 4.6 minutes, rising at the rate of 20 miles per hour, and to 30,000 feet in 8.5 minutes when its rate of rise has dropped to 12 miles per hour.

The height to which an atomic cloud will rise depends on the thermal energy emitted by the bomb, the temperature of the surrounding air, and the density of the air. The greater the energy liberated as heat, the larger will be the buoyancy thrust on the rising cloud, and hence the greater will be the distance it ascends.

It is believed that the maximum height attainable by an atomic cloud will be limited by the height of the base of the stratosphere.

If the radioactive cloud should pass through a temperature inversion layer, a layer at which the temperature begins to increase again after it had been falling with increasing altitude in the atmosphere, it will tend to "mushroom" to a small extent.

Because the air in the inversion layer is fairly stagnant, some of the particles in the cloud will tend to spread out horizontally instead of continuing to move vertically. Nevertheless, as a result of the enormous heat energy of the hot gas bubble, most of the cloud will usually pass through an inversion layer.

Upon attaining a region where the density of the gas bubble is the same as that of the surrounding air, or upon reaching the base of the stratosphere, at about 40,000 to 60,000 feet, where the temperature of the atmosphere is almost constant and there is practically no motion to convection, the radioactive column will spread out for a distance of several miles and form the characteristic mushroom-shaped cloud.

Having reached the final stage of its development, the cloud remains visible for an hour or more, until it is dispersed by the winds into the surrounding atmosphere.

When the radioactive, metallic oxide particles in the cloud collide with the particles of dirt, which are in general considerably larger, they adhere. Consequently, the dirt particles in the cloud become contaminated with radioactivity. When the violence of the disturbance from the bomb has subsided, the contaminated dirt particles gradually fall back to earth, giving rise to the phenomenon known as the "fall-out."

The extent and nature of the "fall-out" will be determined by the combination of circumstances associated with the height of the explosion, with the nature of the surface beneath, and with the meteorological conditions. If the height of the bomb burst exceeds a certain value, it is possible that there would be no detectable "fall-out," since no extraneous particles would be sucked into the cloud.

The importance of the "fall-out," the handbook points out, lies in its radioactivity. Only in exceptional circumstances would the intensity of the activity be great enough to constitute a hazard upon reaching the ground.

The evidence from the Hiroshima and Nagasaki explosions, where the height of the burst was about 2,000 feet, is that casualties ascribable to the radioactive "fall-out" were completely absent.

However, the handbook adds, if the bomb burst occurred relatively close to the ground, a situation that would be uneconomical from the standpoint of the destructive effect, and considerable amounts of dirt and other debris were sucked into the radioactive cloud, the "fall-out" would have to be considered as a danger.

The "fall-out," consisting mostly of water drops, would also be important if the detonation took place at a low level above the surface of the water; and the presence of salt in the water would enhance the hazard.

There was at one time considerable speculation about the possible effects on the weather of an atomic burst, especially one over water, some forecasting violent weather reactions. Actually no such effects have been observed.

The handbook declares that a careful examination of all the available evidence would lead to the conclusion that an atomic bomb burst has a negligible effect on the weather. It would appear that the atom bomb could not be used as a rainmaker.

So far, only one underwater atomic burst, the Bikini "Baker" test, has been reported. The burst was made well below the surface of the lagoon, which was about 200 feet deep. From the results of this test many of the effects of a deep underwater burst can be inferred. Athough there are certain characteristic effects, the details would vary with the depth and area of the water and the distance below the surface at which detonation occurred.

In the underwater detonation a Ball of Fire is formed as in an air burst. As the writer can testify from personal observation, the water in the vicinity of the explosion on "Baker Day" was lighted by a luminosity that could have come only from the intense visible spectrum of the Ball of Fire.

The general effect had the appearance of light seen through a ground-glass screen, the distortion from the waves on the surface of the lagoon preventing any clear view of the ball. The luminosity remained for a few thousandths of a second, but it disappeared as soon as the bubble of hot gases constituting the Ball of Fire reached the surface, for then the gases were expelled and cooled.

In the course of its rapid expansion the gas bubble, which now contains steam and its dissociation products, atomic hydrogen and oxygen, in addition to the fission residue, initiates a shock wave.

The trace of this wave, as it moves outward from the burst, is evident, on a reasonably calm surface, as a rapidly advancing ring, apparently darker than the surrounding water.

This ring, sometimes called the "slick," is visible in contrast to the undisturbed water because the ripples or small waves are partially calmed by the reflection of the shock wave as a rarefaction (suction) wave at the surface of the water.

The part of the shock that passes into air through the water surface causes the compression of the moist air. When this is followed by a suction wave, the conditions become favorable to the formation of a spherical cloud of vapor, known as the cloud-chamber effect.

This manifested itself almost immediately after the Bikini underwater burst in a dome-shaped cloud that formed over the lagoon. This great dome, set in the midst of the ring from the shock, looked like a gigantic white derby hat with a huge garland ringing the top of its crown.

After the appearance of the ring, or slick, a mound or column of broken water and spray, called the spray dome, is thrown up directly over the point of the burst by the reflection of the blast wave at the surface. The initial velocity of the water is proportional to the pressure of the incident shock wave, and so it is greatest directly over the explosion.

Consequently, water thrown up over the center rises more rapidly and for a longer time than water farther away. As a result the sides of spray dome become steeper as the water rises. Its upward motion is terminated by the effects of gravity and the resistance of the air.

The total time of rise and maximum height attained depend on the energy of the explosion and on its depth below the surface. For a very deep burst the spray dome may not be visible at all.

If the depth of the detonation of the bomb is not too great the bubble of hot gases will remain essentially intact until it rises to the surface of the water. At this point the gases, in the form of a jet carrying some water by lateral entrainment, will be vented to the atmosphere.

As the pressure of the bubble is released water rushes into the cavity, and the consequent complex phenomena cause the water to be thrown up as a hollow cylinder, or chimney of spray, known as the Plume. The radioactive contents of the gas bubble are vented through this hollow Plume and form a gigantic mushroom-shaped cloud at the top.

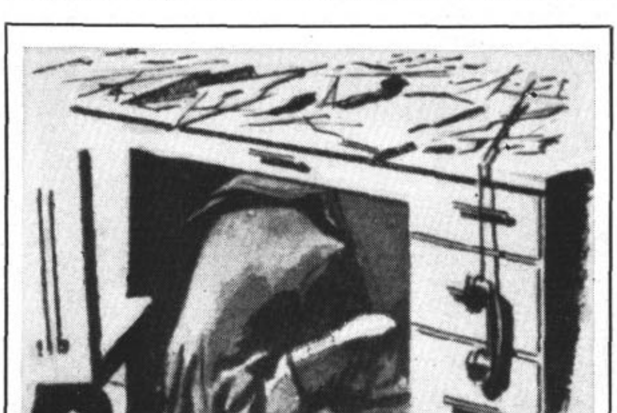
The Plume and its mushroom top are without doubt among the most spectacular and awe-inspiring phenomena to be seen. It was like watching the birth of a new continent rising resplendent out of the sea.

A photograph of the Plume, taken with a super-speed camera, shows a small black smudge on its right edge. It was the 33,000-ton battleship Arkansas, lifted out of the water, suspended vertically in the air for a split second before it plunged to the bottom of the lagoon. A second photograph, taken less than a millisecond later, shows no trace of the Arkansas.

In the shallow underwater burst at Bikini, the conical spray dome began to form at about four milliseconds (thousandths of a second) after the explosion. Its initial rate of rise was some 2,500 feet per second, but this was rapidly diminished by air resistance.

A few milliseconds later, the hot gas bubble reached the surface of the lagoon and the Plume began to form, rapidly overtaking the spray dome at a height of a few thousand feet.

The maximum height attained by the hollow Plume, through which the gases vented, could not be estimated exactly because the upper part was surrounded by cloud. It was probably some 8,000 feet, and the greatest diameter was about 2,000 feet. It is now estimated that the maximum thickness of the walls of the



DIVE UNDER any desk immediately after explosion. Keep back to the window to avoid cuts from flying glass.

Plume was about 300 feet, and that about a million tons of water rose in the Plume.

Earlier estimates by scientists on the scene, made soon after the burst, placed the quantity of water raised in the Plume at ten to fifteen million tons.

The cloud, which concealed a large part of the upper portion of the Plume, resembled a cauliflower, rather than a mushroom, in shape. It contained some of the fission products and other bomb constituents, as well as water droplets. In addition, there is evidence that material sucked up from the bottom of the lagoon was also present, for calcarous sediment, which must have been part of the fall-out, was found on the decks of ships some distance from the burst.

As the column of water and spray constituting the Plume fell back into the lagoon, there developed, on the surface at the base of the column, a gigantic wave of mist about 1,000 feet in height, completely surrounding the neck of the Plume.

This wave began to form within ten seconds of detonation, and traveled rapidly outward, maintaining an ever-expanding doughnut-shaped form. The wave or wall of dense mist, much like the spray of the base of Niagara Falls or another waterfall of considerable height, represents the initiation of what is known as the base surge. It is, in effect, a dense cloud of liquid droplets which has the property of flowing almost as if it were a homogeneous fluid.

As the base surge at Bikini traveled outward at high speed, it gradually lifted from the surface of the lagoon and, after about five minutes, assumed the appearance of a mass of strato-cumulus cloud, which eventually reached a thickness of some thousands of feet.

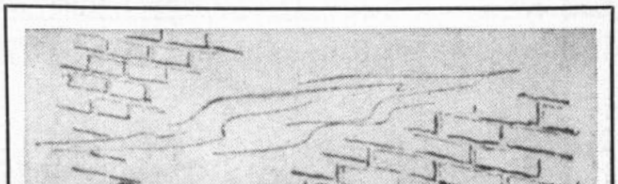
A moderate to heavy rainfall, moving with the wind and lasting for nearly an hour after the explosion, developed from this cloud mass. In its early stages the rain was augmented by the small water droplets, equivalent in a sense to the fall-out of an air burst, still descending from the cloud.

Were it not for the fact that base surge is highly radioactive, because of the presence of fission products, it would represent merely a curious phenomenon. Because of its radioactivity, however, which is augmented by that of the water droplets in the fall-out, it may represent a serious hazard for a distance of several miles, especially in the downwind direction.

There are reasons for believing that the base surge can be produced only in fairly deep water. In the event of a sufficiently deep underwater atomic burst, the hot gas bubble would lose its identity in a mass of turbulent water before it reached the surface and vented to the atmosphere. In this case, the spray dome would be relatively insignificant and no Plume would be formed. Hence there would be no formation of a base-surge and no appreciable fall-out.

The disintegration of the gas bubble into a large number of very small bubbles, which are churned up with the water, would produce a radioactive foam or froth. When this reached the surface, a small amount of radioactive mist would be emitted, but most of the activity would be retained in the sea water. The deposition of the highly active foam on a near-by shore might, however, represent a hazard.

It seems possible, the handbook adds, that a base surge, made up of small solid particles, rather than droplets of water, but still behaving like a fluid, might result from an atomic bomb burst below a soft terrain consisting of sand and mud. The debris would, of course, be very radioactive.



FALL FLAT on the sidewalk if there is no shelter near at hand. Press body against building and shield your head.

Nuclear Desolation Depicted

The shock wave produced by an air-burst atomic bomb, is from the point of view of weapon delivery and disruptive effect, the most important agent in producing destruction.

This implies that the other characteristics of an atomic bomb that can be employed in warfare, such as heat and visible radiations, neutrons, gamma rays, and fission products, are at present not serious competitors in the production of damage by a bomb that is burst in the air.

There are, of course, other applications, such as the possible use of an atomic weapon as an instrument of radiological warfare by exploding it in a conveniently located body of water, to produce a base surge, or in restricting the escape of fission products by means of a subterranean explosion. The bomb might also be employed to produce earth or water shock through a subsurface explosion.

Such uses, although potent, must, because of the restrictive conditions placed on the delivery problem and the target location and configuration, be regarded as special applications of the varied destructive characteristics of the bomb.

There is an important difference between the effects of an atomic bomb blast and those of a conventional high-explosive bomb.

The great power of the former results in a destruction feature called mass distortion of buildings. An ordinary explosion usually will damage only part of a large structure, but the atomic blast can engulf and flatten whole buildings.

Further, because the shock wave of an atomic explosion is of relatively long duration, of the order of a second as compared with a few milliseconds for a conventional bomb, most structural failures occur during a small part of the positive phase while the pressure is essentially constant.

An examination of the areas in Japan affected by atomic bombing shows that small masonry buildings were engulfed by the oncoming pressure wave and collapsed completely. Light buildings and residences were totally demolished by blast and fire. Manufacturing buildings of steel construction were denuded of roofing and siding, and only the twisted frames remained.

Nearly everything above ground at close range, except reinforced-concrete smoke stacks, was destroyed. Some buildings leaned away from ground zero, the center of damage, as if struck by a hurricane of stupendous proportions. Telephone poles were snapped off to ground level, carrying the wires down with them, and gas containers ruptured and collapsed.

Many buildings that at a distance appeared sound were found on close inspection to be damaged and ruined by fire. Telephone poles were charred and granite surfaces were etched by heat and by sand blasting from the high winds carrying abrasive material.

There were many evidences of the effect of radiant heat in starting fires and in scorching and drying out materials that were not highly combustible. All vehicles at close range were damaged by blast and burned out. Most important, water pressure was lost by the breaking of pipes, mainly as a result of the collapse of buildings, thus greatly increasing the additional destruction by fire.

Certain structures in Japan were designed to be earthquake-resistant, which probably made them stronger than their counterparts in the United States, while other construction undoubtedly was lighter than that in this country.

However, contrary to popular conceptions about the flimsy characteristics of the Japanese residence, it is the considered opinion of a group of highly qualified architects and engineers who surveyed the atomic bomb damage that the resistance to blast of American residences in general would not be markedly different from those in Hiroshima and Nagasaki.

While the destructive effects observed in Japan are comparable in general to those to be expected in the United States, there are some differences. There is also the question of damage to the large bridges of many American cities for which there is no direct guide from damage to the small bridges in Japan.

The multi-story buildings in this country are generally designed to withstand a wind load of fifteen pounds per square foot. For an average six-story, reinforced concrete, frame building this would be roughly equivalent to 2 per cent of the vertical load.

On this basis, American reinforced-concrete buildings would be much less resistant to collapse than those designed for earthquake resistance in Japan. However, no firm conclusions can be drawn on this subject, because most American buildings have lateral strength far more than that required to withstand a fifteen pounds per square foot wind load.

In the eleven Western States of this country, the building codes provide for the design of structures to resist horizontal, earthquake forces varying from 2 to 16 per cent of the vertical load, which is usually taken as dead load plus half the vertical design live load. There are three earthquake zones, the Pacific Coast area having the highest requirements.

The design specifications, as stipulated in the building codes, are similar to those for wind loads, with a 33 per

GET DOWN fast, that's the idea. Open trench or other depression gives protection from the blast, heat or mist.

cent increase in the allowable working stresses. These buildings would be proportionately more resistant as the ratio of the horizontal to the vertcial load increased.

The effect on steel-frame buildings, such as multiple storied office and hospital structures, should be about the same as that on reinforced concrete buildings, except that steel has a somewhat greater energy absorption capacity than reinforced concrete.

This is bcause of the fact that, with usual design stresses, the work necessary to produce failure in steel is greater in proportion than in reinforced concrete. Consequently, tall buildings with heavy steel frames, constructed so as to provide good continuity at connections, and a long period of vibration, should withstand the effect of blast quite well.

American steel industrial buildings would probably fare no better than those in Japan, according to expert opinion.

Tests made on typical housing of wood-frame construction with conventional bombs up to 500 pounds and at various distances indicate a high degree of resistance against blast beyond thirty feet.

While no direct interpretation of these results can be made with regard to the blast from a large explosion, which would have quite different characteristics, it is believed that the radius of material structural blast damage would not exceed 7,500 feet. This is slightly less than that in Nagasaki where the severe damage to houses extended to 8,500 feet.

From the data obtained in the Bikini "Able" air burst, it may be concluded that the general nature of the damage to houses and other buildings and installations on shore by air burst over water would be much the same as air burst over land.

Destruction of ships and their contents would be almost entirely from the shock wave in air. From the results observed at Bikini, it appears that, up to about 2,500 to 3,000 feet of horizontal distance from the explosion, vessels of all types would suffer serious damage or would be sunk. Moderate damage would be inflicted out to 4,000 feet, and minor damage would be expected to occur within a radius of 6,000 feet.

Because of the shock wave transmitted through the air, exposed structures, such as masts, spars, radar antennae, etc., would be expected to suffer damage. This would be severe up to 3,000 or 3,500 feet from the explosion.

With the same radius, vehicles and airplanes on the ships, and other light structures and electronic equipment would be seriously damaged. Boilers would be expected to suffer heavy damage up to 2,700 feet, moderate damage to 4,000 feet and light damage to nearly 5,000 feet. This would account for most cases of immobilization.

The damage to be expected from an underground detonation appears to be less than from an air burst. It has been estimated that a bomb dropped from the air, which penetrated to a depth of forty to fifty feet below the surface before exploding, would cause blast damage over radii of about one-half to two-thirds of the radii for corresponding damage due to an air burst.

However, the reflection of the shock wave from rock strata, at depths of less than 200 to 300 feet beneath the point of detonation, would probably result in an appreciable increase in the area of damage.

If a nominal atomic bomb were dropped in such a manner as to explode at a depth of about fifty feet in ordinary soil, a crater of about 800 feet in diameter and 100 feet in depth would be produced. Tests indicate distributions of appreciable quantities of crater material to a radius of one mile downwind and 0.2 mile upwind. The material expelled from the crater would be highly radioactive, because of the presence of trapped fission products and of material activated by neutrons.

The major portion of the shock from a shallow underwater explosion is propagated through the water. The sinking range of all types of surface vessels would be in the neighborhood of 1,200 to 1,800 feet, from surface zero, center of damage on the surface, for burst of a nominal atomic bomb. Some ships would probably be sunk out to 2,700 feet, but others in this range would suffer considerable structural damage.

Serious loss of efficiency is to be anticipated within a radius of 3,600 feet from surface zero. Even at this distance the peak pressure of the underwater shock wave would be over 500 pounds per square inch. Submerged submarines would probably be lost out to 2,700 feet from the explosion.

SAFE SPOT is under table. Indoors, main dangers are cave-ins, flying debris rather than burns, contamination.

A not inconsiderable amount of the shock from a shallow underwater explosion is transmitted as a shock wave in the air. The data obtained at Bikini indicate that the energy of the air shock for a nominal atomic bomb is roughly equivalent to 4,000 tons of TNT. Such a shock would, of course, be capable of producing extensive destruction.

The data indicate that a shallow underwater atomic bomb burst within something like half a mile from shore would cause serious damage to harbor facilities and to warehouses and other structures near the water. Partial damage would extend to somewhat over one mile. Light damage, mainly cracking of plaster and window breakage, would occur for a distance up to four miles.

This means that if the bomb were detonated under water more than one mile from shore, the structural damage on land would not be serious.

At one mile from surface zero at Bikini, the maximum height of the wave formed in the water, from trough to crest, was about twenty feet. Even at a distance of two miles, the wave height reached a maximum of ten feet. The water at Bikini was moderately deep, so that for an explosion in shallow water the waves at the same distance would be twice as high. Such waves breaking over the shore could do serious harm to port facilities and warehouses.

The general type of damage ensuing from a deep underwater burst would approximate those following from a shallow one, since the effects would be from the shock wave transmitted through the water. Shock damage to machinery in ships, resulting in immobilization, would extend to 4,500 feet.

Apart from damage caused by waves, it is believed that, with the possible exception of piers and breakwaters, little harm would result to harbor and shore installations as a consequence of a deep underwater explosion of an atomic bomb.

Nuclear Blast Triple Threat

The explosion of an atomic bomb produces three major effects, which make it three major weapons in one.

It devastates by blast, by heat and by radioactivity. It has been estimated that the blast wave, in an air burst, is responsible for 50 to 60 per cent of the deaths; the heat-flash for 20 to 30 per cent, and radioactivity for 15 to 20 per cent.

An important difference between an atomic and a conventional explosion is that the energy liberated per unit mass is much greater in the atomic blast. As a consequence, the temperature attained is much higher, with the result that a larger proportion of the energy is emitted as thermal radiation (heat) at the time of the explosion.

An atomic bomb, for example, releases roughly one third of its total energy in the form of this radiation. For the nominal atomic bomb, equal to 20,000 tons of TNT, the energy emitted in this manner would be about 6.7 trillion calories, which is equivalent to about 8,000,000 kilowatt hours.

It is evident that such an enormous amount of radiant energy would produce considerable damage to living organisms and to combustible materials.

When the radiation falls on matter, part may be reflected, part will be absorbed, and the remainder, if any, will pass through, ultimately to fall on other portions of matter. It is the radiation absorbed that is important for the present purpose.

The extent of this absorption depends on the nature of matter and also upon its color. A black material will absorb a much larger proportion of the thermal radiation falling upon it than will the same material when colored white. Most of the absorbed thermal radiation is converted directly into heat.

It has been estimated that in the atomic explosions in Japan, which took place some 2,000 feet above the ground, the temperature at ground zero, from thermal radiation, was probably between 3,000 and 4,000 degrees Centigrade, 5,400 to 7,200 degrees Fahrenheit. It is true that the temperature fell off rapidly with increasing distance from the burst, but the effects were definitely noticeable as far as two miles away or more.

An important point in connection with the thermal radiation from an atomic bomb is not only the amount of energy in this radiation, but also the fact that nearly the whole of it is emitted in an extremely short time, about three seconds from the initiation of the explosion. In other words, the intensity of the radiation, which is a measure of the rate at which it reaches a particular surface, is very high.

Because of this high intensity, the heat accompanying the absorption of thermal radiation is produced rapidly, most of it on the surface of the body upon which it falls. Since only a small proportion of the heat is dissipated by conduction during the short interval, high surface temperatures are attained.

A set of data have led to the conclusion that exposure to thermal radiation from a nominal atomic bomb, on a fairly clear day, would lead to more or less serious skin burns within a radius of 10,000 feet from ground zero. This is in general agreement with the experiences in Japan.

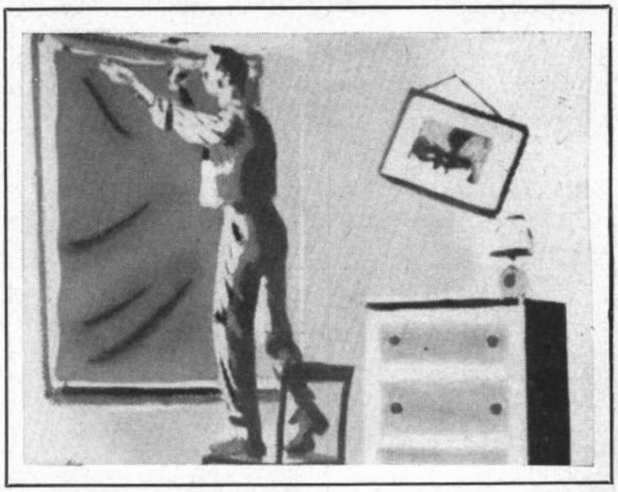
However, in spite of its great range, protection from thermal radiation is easily achieved. The rays travel in straight lines, and so only direct exposure, in the open or through windows, would lead to harmful consequences. Shelter behind almost any object, such as anywhere in the interior of a house, away from windows, of course, or behind a tree, or even protection of one part of the body by another so as to avoid direct exposure to the atomic Ball of Fire, would be effective.

Only fairly close to ground zero would the thermal radiation be expected to penetrate clothing, and so parts of the body covered in this way are generally safe from thermal radiation burns.

One of the striking facts connected with the atomic bombing of Japan was the large number of casualties attributed to what have been called "flash-burns," caused by the instantaneous thermal radiation. It has been estimated that 20 to 30 per cent of fatal casualties at Hiroshima and Nagasaki were from such burns, as distinct from those who suffered the more familiar flame burns.

Thermal radiation burns were recorded at a distance of 7,500 feet from ground zero at Hiroshima and as far as 13,000 feet at Nagasaki. The incidence of these burns, as might have been expected, was inversely related to the distance from the explosion.

A very distinctive feature of the thermal radiation burns was their sharp limitation to exposed areas of the skin facing the center of the explosion. They were consequently sometimes referred to as "profile burns." This is because of the fact mentioned above that radiation travels in straight lines, and so only regions directly exposed to it will be affected.



NAIL DRAPES over windows shattered by blast. This will pretty well keep out the drifting radioactive dust or fog.

A striking illustration of this behavior was that of a man writing before a window. His hands were seriously burned, but his face and neck, which were not covered, suffered only slight burns because the angle of entry of the radiation was such as to place them in partial shadow.

Although thermal radiation burns were largely confined to exposed parts of the body, there were a few cases in which such burns occurred through one, and very occasionally more, layers of clothing. Instances of this kind were observed only near the center of the explosion.

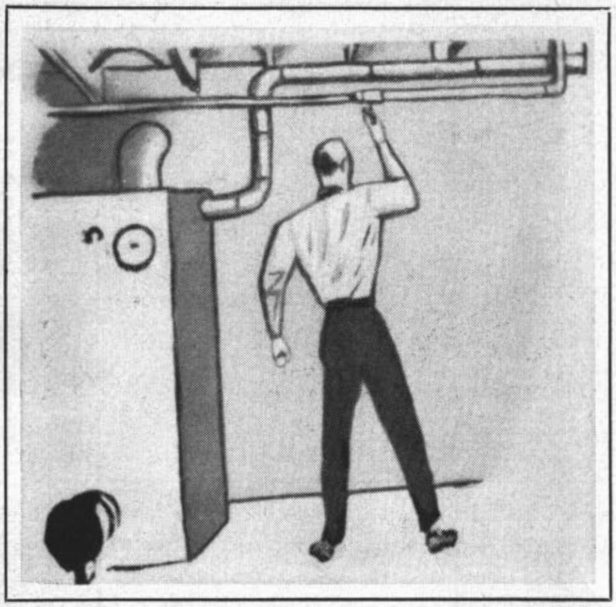
Where burns did occur through clothing, these tended to involve regions where the clothes were tightly drawn over the skin, at the elbows or shoulders, for example, while areas where the clothing fitted loosely were unharmed.

Because white or light colors reflected the thermal radiations, they generally afforded better protection than dark clothing. Thus it was not unusual to find burns through black clothing, but not through white material worn by the same individual.

This was strikingly shown in the case of a woman clad in a kimono at the time of the explosion. Her back and arms were badly burned in a pattern corresponding to the dark portions of the kimono, while the skin under the light portions was unaffected.

Studies on the part played by the ultra-violet range of the thermal radiations have led to the conclusion that the ultra-violet radiations from an atomic bomb do not make the major contribution to skin injuries. This means, therefore, that the infra-red radiation is the main factor in causing the flash-burns.

This is a subject of more than mere scientific interest. If it is the infra-red that is the most important, then there is the possibility that a person caught in the open by the explosion of an atomic bomb might have sufficient time to take cover, or other appropriate evasive



TURN OFF house water supply at main valve. Do this immediately and save water badly needed to fight fires.

action, thus reducing the thermal radiation damage.

This would be possible because most of the infra-red radiation is emitted by the Ball of Fire in its later stages, following the second temperature maximum, 7,000 degrees Centigrade; that is to say, from about 0.3 to three seconds after the explosion.

Thus, if protection could be found within one second of the explosion, the exposure to infra-red radiation would be very roughly one-third of the total amount received at that distance. Under many circumstances this difference would be very significant.

At distances close enough to the explosion to cause actual ignition of wood, etc., the blast wind, coming within a few seconds, generally would be strong enough to blow out the flame.

For this reason it would appear that relatively few of the numerous fires, which developed almost instantaneously after the atomic bombings of Japan out to distances of 4,000 to 5,000 feet from ground zero, that is, almost to the limit of severe blast damage, were directly caused by thermal radiations from the bombs.

It is probable that most of the fires originated from secondary causes, such as upsetting of charcoal or wood stoves, which were common in Japanese homes; electrical short circuits; broken gas lines, and so on, which were a direct effect of the blast wave.

It is true that fire-fighting services and equipment were poor by American standards, but it is doubtful if much could have been achieved, under the circumstances, by more efficient fire departments.

At Hiroshima, for example, 70 per cent of the fire-fighting equipment was crushed in the collapse of fire-houses, and 80 per cent of the personnel were unable to respond. Even if men and machines had survived the blast, many fires would have been inaccessible because of the streets being blocked with debris.

Another contributory factor to the destruction by fire was the failure of the water supply in both Hiroshima and Nagasaki. The pumping stations were not largely affected, but serious damage was sustained by distributing pipes and mains. Most of the lines above ground were broken by collapsing buildings and by heat from the fires that melted the pipes.

About twenty minutes after the detonation of the atomic bomb at Hiroshima there developed the phenomenon known as fire storm. This consisted of a wind that blew toward the burning area of the city from all directions, reaching a maximum velocity of 30 to 40 miles per hour, two to three hours after the explosion, decreasing to light or moderate and variable in direction about six hours later.

It should be noted, however, that the fire storm was by no means a special characteristic of the atomic bomb. Similar fire storms have been reported as accompanying large conflagrations in the United States, and especially after incendiary bomb attacks in both Germany and Japan during World War II.

The high winds are produced largely by the up-draft of the heated air over an extensive burning area. They are thus the equivalent, on a very large scale, of the draft that sucks air up a chimney under which a fire is burning.

In addition to the flash-burns, many of the casualties from the atomic bomb explosions were caused by flame burns. In buildings collapsed by the blast, many persons who might otherwise have survived their injuries were trapped and burned. The burns suffered were of the kind that might accompany any fire and were not especially characteristic of an atomic explosion.

Burns of both types, flash and flame, were believed to be responsible for more than half of the fatal casualties and probably at least three quarters of all the casualties at Hiroshima and Nagasaki.

The magnitude of the problem therefore, points to the necessity for making adequate preparations for dealing with large numbers of burned patients in the event of an emergency. This means the training of great numbers in giving the most rudimentary first aid for burns, because a sufficient number of doctors and nurses could not be provided.

The explosion of an atomic bomb is accompanied by the emission of nuclear radiations, consisting of gamma rays, similar in nature to X-rays, neutrons, beta particles (electrons) and a small proportion of alpha particles (nuclei of helium atoms). Radiations emitted within a minute of the detonation are referred to as initial nuclear radiations. Those emitted after more than a minute are known as residual.

The initial radiations of importance to us are the gamma rays and the neutrons. Both have considerable penetrating power, so that they can reach the earth even when liberated at appreciable distances away. Both can produce harmful effects on living organisms.

The energy of the gamma rays present in the instantaneous, or prompt nuclear radiation is about 3 per cent of the total energy liberated by the bomb, but only a small proportion of this, perhaps 1 per cent, succeeds in penetrating any great distance from the bomb. A somewhat similar amount is present in the gamma rays emitted by the fission products in the first minute after an atomic explosion.

Nevertheless, in spite of the energy being considerably smaller than that appearing in the form of thermal radiation, the gamma radiation can cause an appreciable proportion of the atomic bomb casualties. On the other hand, nuclear radiations do not have any incendiary effect.

Shielding from gamma rays or neutrons is not the simple matter of shielding against thermal radiation. For example, at a distance of 3,000 feet from the explosion of a nominal atomic bomb, the initial nuclear radiation would probably prove fatal to 50 per cent of human beings, even if protected by twelve inches of concrete.

However, beyond about 7,000 feet the nuclear radiations would be virtually harmless, without protective shielding, whereas exposure to thermal radiation at this distance could produce serious skin burns.

Radiation dosage is measured in terms of a unit called the roentgen, or the r. It is usually accepted that a dose of 400 r of radiation over the whole body in the course of a few minutes represents the median lethal dose that would be fatal to about 50 per cent of human beings. The median lethal range of the gamma radiation from a nominal atomic bomb is about 4,200 feet.

Thus a large proportion of human beings exposed to the initial gamma rays within 4,200 feet of an atomic explosion would die from radiation sickness. If part of the body were protected by a suitable shield, it is probable that a larger dose than 400 r would not prove fatal. Ordinary clothing can in no sense be regarded as protective.

At less than 2,100 feet from the explosion, physical and thermal destruction are so serious in unprotected regions that radiological injury does not need consideration. At distances greater than 9,000 feet, the dosage is, in general, too small to be of serious consequences, unless it is repeated at short intervals.

At the minimum distance of 2,100 feet from the explosion, the dosage of gamma rays in an unprotected location would be 10,000 r. To reduce this to below the median lethal dose of 400 r would require something like twenty inches of concrete or about three inches of lead. A layer of some thirty inches of soil would be equally effective. Underground shelters could thus provide adequate protection against the radiation hazard.

An outside shelter of the type used in World War II as a protection against blast bombs, covered with about twenty inches of packed soil, would decrease the radiation dosage below the median lethal value at distances greater than about 3,000 feet from the explosion. For a height of burst of 2,000 feet, this would represent 2,250 feet or more from ground zero. The thickness of concrete that would produce the same effect is roughly twelve inches, that of iron four inches, and that of lead about two inches.

The statement that an unprotected person within 4,200 feet of an atomic explosion would receive a median lethal dose of 400 r is based on the supposition that the exposure lasts for the whole minute of the period of initial radiation. It has been determined that at this distance about a half of the gamma ray dosage is received during the first second.

Taking shelter quickly behind a convenient building or in a slit trench, an act that is conceivable within a second of seeing the bomb flash, might thus mean the difference between life and death to a human being at a point where the unprotected dosage would be near the median lethal value.

If the energy release of the bomb were doubled from 20 to 40 kiloton TNT equivalent, the median lethal range, at which the dosage is 400 r, would be increased from 4,200 feet to 4,750 feet. This means that the lethal area of the initial gamma radiation would be much less than double.

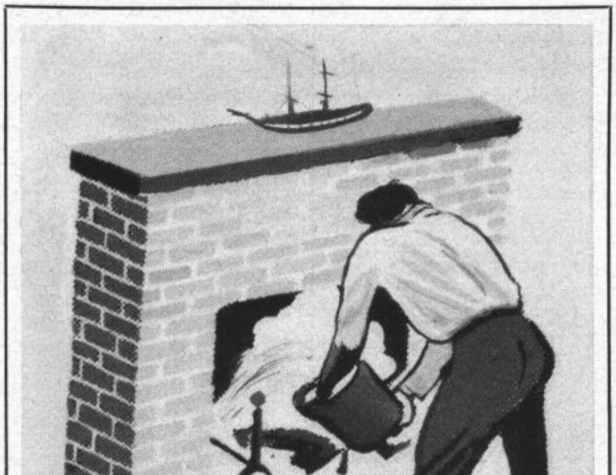
Consequently, the thickness of shielding necessary to attenuate the radiation to less than the lethal value at any point would not have to be increased greatly. For a forty kiloton TNT equivalent bomb the dosage at 2,100 feet would be 20,000 r and about twenty-five inches of concrete would reduce it to 400 r, the median lethal dose. This may be compared with twenty inches required at the same distance for the nominal twenty kiloton TNT energy equivalent bomb.

The neutrons emitted in the fission process carry about 3 per cent of the energy of the atomic explosion. Of this amount, perhaps less than 1 per cent appears outside because of the loss of energy to the components of the exploding bomb. Like the gamma rays neutrons can penetrate considerable distances through air, and since they are a physiological hazard, they are a significant aspect of an atomic explosion.

More than 99 per cent of the total number of neutrons accompanying the fission of Uranium 235 or plutonium are released almost immediately, probably within one hundred-millionth second of the explosion. These are referred to as the prompt neutrons. In addition, somewhat less than 1 per cent, called the delayed neutrons, are emitted subsequently. The latter are actually expelled from some of the fission products.

It is estimated that the lethal range of neutrons from a nominal atomic bomb would be 1,800 feet for fast and slow neutrons, while for neutrons of intermediate energy the distance would probably be increased to 2,400 feet.

All the neutrons from the bomb would reach a point 2,000 feet distant within less than a second. It would



EXTINGUISH fires to make sure flames do not spread should home be damaged. There's no use inviting trouble.

appear, therefore, that most of the neutrons reaching the earth would do so within such a short period of time after the explosion that evasive action would not be possible.

Increasing the energy of the bomb by two would lead to an increase of less than 400 feet in the lethal distance of the neutrons.

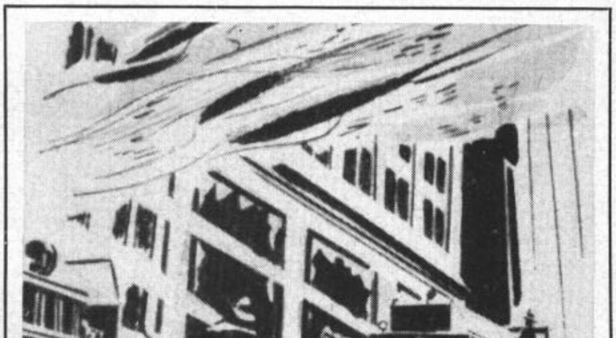
In general, concrete may represent a fair compromise for neutron shielding. However, unless used in considerable thickness, the main function of concrete is to slow down the fast neutrons and so make them less of a biological hazard. Better results would be obtained by using a modified concrete made by adding a considerable proportion of iron (oxide) ore, such as limonite or magnetite, to the cement. Small pieces of iron, such as steel punchings, may also be incorporated.

World Ruin Doubtful

The nuclear radiations emitted after one minute from the instant of an atomic explosion, namely the residual radiations, arise mainly from the fission products. To a lesser extent they also come from the uranium 235 or plutonium atoms that had escaped fission, and, in certain circumstances, from activity induced by neutrons in various elements present in the earth and in the sea.

Any of the radioactive material reaching the inhabited surface of the earth in appreciable amounts may represent a serious physiological hazard. In addition, there is the possibility, which, although not highly probable, must nevertheless not be ignored, that radioactive material might be used deliberately, apart from an atomic explosion, for the purpose of making certain areas uninhabitable.

The problem of dosage emitted in a very short period of time, namely, the "one-shot" dose, is quite different from that arising in the case of the residual nuclear radiations which might persist for days, weeks or months. A human being receiving a total of 400 r (roentgen units of radiation) of the initial nuclear radiation, that is, over a period of a minute or so, would have a 50 per cent chance of survival, but, if the same amount of radiation was absorbed over a period of a month, the probability of death would be considerably less.



FIGHTING FIRES will be major job, for flash will set buildings ablaze and concussion may rupture gas tanks.

The United States Committee on X-rays and Radium Protection concluded in 1936 that the maximum human tolerance dose of X-rays or nuclear radiation, which could be taken up on successive days was 0.1 r per day over the whole body. In other words, it was thought that the whole body could absorb up to 0.1 of radiation per working day for long periods without permanent harm.

This rate of absorption was accepted as the tolerance dose or permissible dose of nuclear radiation. However, in order to insure an adequate factor of safety for personnel exposed to radiations every working day for many years the accepted permissible dose rate in the United States has now been reduced to 0.3 r per week.

Among X-ray technicians regularly exposed to radiations analogous to gamma rays there is no authenticated case of injury where the exposure has been kept down to 0.1 r per day over extended periods.

It should be understood that this safe dose applies to absorption over the whole body and for repeated and protracted exposures over long periods of time. Small areas can be exposed to very much larger quantities of radiation with no more than local injury being experienced. In addition, there is a difference between acute, that is, brief and occasional, exposure and the chronic exposure to which the tolerance limit applies.

Thus, a dose of 5,000 r can be used to treat a small skin cancer, leaving a scar but no other permanent effect. Even the whole body may absorb 50 r in one day without any apparent harm. Somewhat larger single doses may have unpleasant consequences, but will not prove fatal unless repeated on successive days.

The fission of uranium 235 or plutonium (they very seldom split in equal parts) results in the formation of at least sixty atomic fragments representing isotopes (twins) of probably thirty-four different elements. All of these are radioactive, decaying by the emission of electrons, accompanied by one or more gamma rays.

It has been calculated that at one minute after the detonation of a 20-kiloton TNT equivalent atomic bomb, when the residual nuclear radiation begins, the fission products will be emitting gamma radiation at the enormous rate of 934.5 kilowatt-hours of energy per second. Even after an hour, the rate of emission of gamma radiation will be nearly 7.12 kilowatt-hours per second, so that, although the gamma activity has decreased by a factor of about 130, it is still extremely large.

A widely used method of expressing rates at which radioactive atoms decay is in terms of a unit called the curie, named after the discoverers of radium. A curie is defined as a quantity of radioactive material undergoing 37 billion disintegrations per second, which is equal to the rate of disintegration of one gram (1/28th ounce) of pure radium. A megacurie is a million curies, corresponding to disintegrations at the rate of 37 quadrillion atoms per second, namely, that of 1,000 kilograms (2.200 pounds) of radium.

Neutrons from an atomic explosion which reach the earth's surface may interact with elements there and make them radioactive. Radioactivity induced by the neutrons may persist for some time, contributing to the residual radiation activity. As the neutron's intensity at the earth's surface decreases rapidly with increasing distance from the bomb, the induced activity would probably be significant only for relatively low air burst, and then at distances not too great from ground zero. Underwater and underground explosions present special problems.

A third possible source of residual nuclear radiation is the uranium 235 or plutonium which may have escaped fission. Their radioactivity, measured in curies, is very small compared with that of the fission products.

For a contamination of one megacurie per square mile due to fission products, the dosage rate at about three feet above the ground, calculations show, is approximately 4 r per hour, which is equivalent to about 100 r per day. An activity of one megacurie per square mile would be attained if at the end of one day these products were spread uniformly over 133 square miles. In a normal air burst only a portion of the fission products would have descended by the end of one day, and the area covered would probably be greater than 133 square miles.

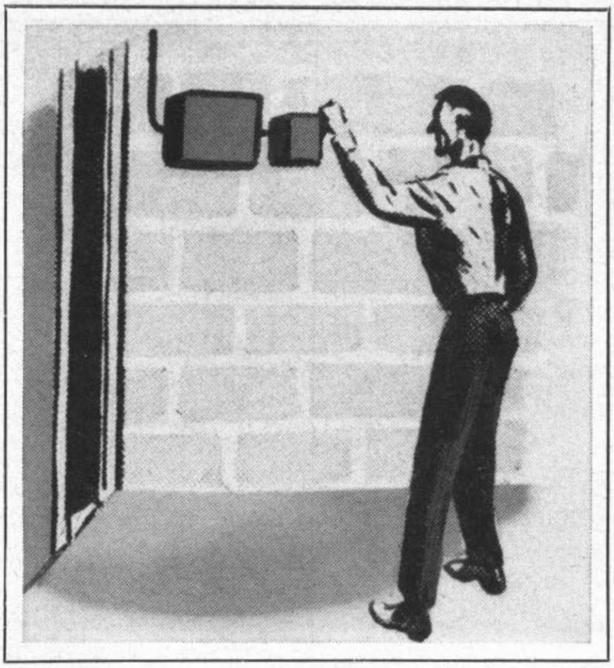
It is of interest to note that even under normal circumstances long before X-rays or atomic bombs were even dreamed of, all living organisms were continually being exposed to radiations. This "background radiation" is due partly to the high energy particles, known as cosmic rays, originating in outer space, and partly to radium and its disintegration products which are present in the earth and in the air. In addition, it is not generally realized that the human body contains not insignificant amounts of radioisotopes of carbon and potassium. These radioactive species are also present in plants and in the soil.

It has been estimated that at sea level a human being absorbs, from all the aforementioned background sources, something like 0.003 r of radiation per week throughout his life. This is about one-hundredth part of the accepted tolerance dose believed to be harmless. At high altitudes, where the intensity of the cosmic rays is increased three-fold at 15,000 feet, the total background radiation is appreciably higher.

It appears that during the average lifetime every individual receives from 10 to 15 r or more of radiation over the whole body in addition to amounts that may be absorbed as a result of X-ray or similar treatment. The same state of affairs has undoubtedly persisted during the whole period of man's existence on earth, although the total radiation absorbed in a lifetime has increased as the average lifespan has lengthened.

Fears have been expressed in some quarters concerning the danger of world-wide contamination by radioactivity resulting from atomic explosions. That such fears are groundless can be shown by estimating the number of bombs which would have to be detonated to produce enough activity to cover the earth. Such calculations may be made for external gamma radiation from the fission products, on the one hand, and for the internal hazard due to plutonium which has escaped fission.

If the whole surface of the earth is to be contaminated, with a minimum number of bombs, they would have to be exploded within a very short period of time. Further, since contamination from fission products would be due essentially to the fall-out, sufficient time must be allowed for all the particles to settle out. On the basis of these postulates, it has been calculated that in order to constitute a world-wide hazard something like a million atomic bombs, of the nominal size, would have to be detonated, roughly one to each 200 square miles of the earth's surface.



THROW SWITCH at master fuse box. This will reduce danger of a short circuit and consequent fire hazard.

An estimate of the possibility of world-wide contamination by plutonium is more difficult, because of the uncertainty concerning the proportion which escapes fission. In order to take the extreme case it is supposed that the whole of the plutonium originally present in the bomb is uniformly distributed in the top centimeter of soil. This plutonium may then be presumed to be absorbed by plants and thus find its way into the human body in the form of food. Inhalation of dust represents another possibility. It appears from the calculations that for plutonium to constitute a world-wide hazard millions of atomic bombs would have to be exploded.

World-wide radioactive contamination would thus appear to be extremely unlikely, but local contamination due to a relatively small number of bombs might be a serious problem over a large area. The fact that the fall-out may be so widely dispersed means that radioactive particles will descend hundreds and even thousands of miles from the point of detonation. Although they may not necessarily do any physiological harm, the particles may cause trouble. An illustration is the case of radioactive dust from the test explosion at Alamogordo appearing in strawboard manufactured over a thousand miles away and spoiling sensitive photographic film wrapped in this material.

When an atomic bomb is detonated at a high altitude, as it was in Japan, so as to cause maximum blast damage to a city, the hazard due to radioactivity on the ground after the explosion is small.

Atomic bombs were exploded experimentally at low altitudes at Alamogordo and Eniwetok. Radioactive contamination of the ground was many times greater than for the high altitude bursts, due to the fact that the

RESCUING WOUNDED from debris, emergency squads will need aid of bulldozers. Thousands may be trapped.

Ball of Fire touched the earth's surface. The radioactivity near the center of the explosion resulted partly from condensation of fission products upon contact with the ground, and partly from radioactivity induced by neutrons.

The approximate radiation dosage rates, in roentgens per hour, measured on the ground at Alamogordo one hour after the detonation had taken place at a height of 100 feet was 8,000 r at ground zero, 5,000 r at a distance of 300 feet from ground zero, 600 r at 600 feet, 150 r at 900 feet, 30 r at 1,200, 10 r at 1,,500 feet, 5 at 2,250, 0.3 r at 3,000 and 0.07 at 3,750 feet.

It can thus be seen that near the explosion center an area subjected to a low altitude air burst, small compared with the damage area due to the bomb, would be uninhabitable because of the radiation hazard. Nevertheless, calculations show that a vehicle traveling at a moderately high speed could cross the contaminated ground about 15 minutes after the explosion without the occupants being greatly harmed.

It would probably be six hours or more before it would be safe to walk across the area but to stay for any length of time would, of course, be out of the question, unless proper shielding were available. The great amount of radioactive dust remaining in the air after a low-altitude explosion would require special precautions to prevent entry of the active material into the system. Masks such as used in chemical warfare protection are suitable for this purpose.

The disturbance of large quantities of earth and other material in the formation of a crater, which accompanies an air burst at low altitude, results in the deposition of contaminated debris at some distance away. In addition, much of the dust is carried aloft into the atomic cloud, but it eventually settles to the earth as the fall-out, after picking up fission product particles, to contaminate areas much further from the center of the explosion.

After the Alamogordo test, for example, high concentrations of radioactivity were detected on the ground several miles north and east of the site of the explosion. The integrated dose was, however, not dangerous to human life.

Of various types of atomic explosion the underwater burst at Bikini produced by far the greatest degree of radioactive contamination. It is estimated that almost all of the fission-product activity either remained in the water immediately following the detonation, or fell back into the lagoon in the form of the radioactive base surge and rain. The total dosage due to the base surge and contamination from the underwater burst ranged from 8,000 r down to a 100 r to a distance of about four and one-half miles.

There is the possibility that after an underwater burst of an atomic bomb, the radioactivity might be spread over a large area due to the action of marine life. It is well known that land plants absorb and so concentrate mineral elements from the soil, and that these are further concentrated in animals feeding on the plants. Similar circumstances arise in water environments; the simple plants, i.e., plankton and algae, absorb the nutritive salts from the water, and they are then accumulated in the large aquatic forms, namely fish, which directly or indirectly consume the simple plants.

In water containing radioactive materials, the latter are concentrated by the fish in the same manner and for the same length of time as are the stable forms of the corresponding elements. If the fish die, the radioactive isotopes are not lost, but they return to the water, as do the stable isotopes, to take part once again in the life cycle.

Because of the landlocked nature of the Bikini lagoon there is evidently little or no outward migration of the larger aquatic organisms, so that there is no appreciable tendency for the radioactivity to spread. However, due to the behavior of the anadromous migratory fishes, namely, salmon, shad, etc., which feed in the sea and then migrate upstream to die, or of birds that concentrate the minerals of the sea in guano, there might be some distribution of radioactivity in other cases following an underwater atomic explosion. The extent of such dispersion and its effect would depend greatly on circumstances and appears difficult to estimate.

The possibility must also be considered of an underwater explosion so near to the shore that significant amounts of the fall-out and the base surge will reach the adjacent land areas, and possibly affect dock facilities, warehouses, etc.

The general consensus at the present time is that the size of an area highly contaminated by an underground explosion would be less than in the case of an underwater burst. One reason is that the density of the soil is greater than that of water and so a smaller mass would be thrown into the air to descend at a distance from the explosion. However, although the area covered may be less, the radiation intensity may be correspondingly greater at small distances from the bomb burst.

The possibility exists of contaminating persons, objects or areas with radioactive materials not produced in an atomic explosion.

This deliberate use of radioactive isotopes as an offensive military weapon is known as radiological warfare. The materials to be used can be either fission products, obtained in a nuclear reactor, or artificially made radioactive isotopes, produced from stable elements by exposing them to neutron bombardment. Such warfare would present many difficulties, both in the production of the materials and in delivering them to the target. Perhaps its most important application would be its psychological effect as a mystery weapon.

If gamma ray emitters were to be used as radiological warfare agents, and these seem to be the only ones likely to be effective, the problem would arise of shielding personnel from the radiations during manufacture, storage and delivery of the weapon. The use of adequate shields, presumably of concrete, iron or lead, would add greatly to the weight of the munition and would complicate the mechanism of dissemination on the target. The uniform distribution of a relatively small amount of material over a large area would itself present a difficult problem, the solution of which might nullify the advantage of compactness.

While it is impossible to predict, as in the case of chemical warfare, whether radiological warfare will be used or not, it is necessary to understand and be prepared for it.

Only in the event of being unprepared are the consequences likely to be as serious as the destruction caused by an atomic bomb.

How Decontamination Works

Radioactive contamination, as explained earlier, may come from four sources. It may be caused by the fission products formed in the explosion of an atomic bomb; by activity induced from neutrons in soil and water, and by the deliberate use of radioactive materials in radiological warfare as a particularly vicious form of poison gas attack. There also is the possibility that plutonium that has escaped fission may act as a contaminant representing an internal hazard.

There are essentially three ways whereby the hazard associated with radioactive contamination may be minimized:

- Disposing completely of the material by deep burial in the ground or at sea.
- Keeping it at a distance for a sufficient time to permit the radioactivity to decay to a reasonably safe level.
- Attempting to remove the contaminant, that is, to decontaminate the material.

These three procedures were used in radioactive contamination suffered by ships and their equipment in the Bikini underwater ("Baker") test.

At Bikini, the *Independence,* a small aircraft carrier, received such a large radiation dosage that, had there been any one on the hangar deck at the time, he would have died from external radiation, apart from the effects of the blast.

Yet two weeks after the detonation, the dosage rate was about three r (radiation dosage units) per day, permitting short-time access. About a year later, the average dosage rate was only 0.3 r per day. Three years after the original contamination, the Independence was in use at the San Francisco Naval Shipyard, where she housed the experimental engineering group of the Naval Radiological Defense Laboratory.

It was difficult at that time to find any areas on the ship in which the radiation dosage would have exceeded the limit of 0.3 r per week adopted at the insallations of the Atomic Energy Commission.

No decontamination of the Independence was attempted because the vessel was in a battered condition, and it seemed unlikely that she could be returned to service as an aircraft carrier. However, some of the other vessels at Bikini were decontaminated and reclaimed much sooner.

Two submarines thus decontaminated were used soon afterward in the Naval Reserve with no risk to the operating personnel. Most of the other target vessels were destroyed, not because decontamination was not feasible, but mainly because they were damaged in other ways and decontamination would not have been economical.

Except where radioactive solutions, such as were present after the underwater burst at Bikini, soak into porous materials, such as rope, textiles, unpainted or unvarnished wood, etc., or where neutrons have penetrated and induced radioactivity to some depth, the decontamination will be largely restricted to the surfaces of materials, objects and structures.

The problem of decontamination is thus, to a considerable degree, a problem of removing sufficient of the surface material to reduce the activity to the extent that it is no longer a hazard. The methods of surface removal may be divided into two main categories, chemical and physical.

In the first case the contamination is eliminated by making use of chemical reagents which if sufficiently mild will have a minor effect on the underlying material. In the second case an appreciable thickness of the actual surface is removed.

It should be understood that the activity of a particular radioisotope is not changed in any way by chemical reaction. All that chemistry can do is to convert the active isotope into a soluble compound so that it can be detached and washed off as a solution. Certain processes of decontamination involving the use of detergents, represent a category intermediate between the chemical and physical.

The actual process of decontaminating material and equipment can be resolved into two stages: first, immediate emergency measures, to permit continued operation; and second, final more thorough decontamination operations.

Although the degree of decontamination achieved

TRANSFUSIONS will keep medics at casualty stations busy. Whole blood helps lower patient's physical shock.

by the initial treatment may not be large, it at least reduces the physiological hazard to an extent that will make possible, probably with changing personnel, an operation that otherwise would have been impractical. A more complete decontamination can then be carried out, if necessary or desirable, at a later time.

The decontamination of personnel who have come into contact with radioactive material is, of course, a primary requirement. Normally clothing will prevent access of the material to the skin. When contaminated, clothing should be removed and disposed of, by burial, for example, in such a manner as to prevent the spread of the radioactivity into uncontaminated areas, like the interiors of buildings.

A fair degree of decontamination of the exposed skin can be achieved by vigorous rubbing with soap and water, paying particular attention to the hair, nails, skin folds and areas surrounding body openings, with due care to avoid abrasion. Certain synthetic detergents, of which many are now on the market, soapless household cleansers, have been found effective.

In the event of serious radioactive contamination of a large part of a city, steps would have to be taken to make the locality habitable within a reasonable time. Most important would appear to be removal or coverage of loose material that might form dust that would be inhaled or ingested with food.

For paved streets, flushing, perhaps with the aid of detergents, street cleaning or vacuum sweeping, if feasible, might be the first steps.

Concrete, stone and brick building . . the contaminant is on the surface, or has not penetrated too deeply, perhaps would have to be wet-sandblasted and reroofed. Stucco buildings might have to be removed. The same would well apply to roofs, which would collect considerable amounts of radioactive material, but could not be easily decontaminated.

Properly covered foods should undergo little or no contamination. The same would be true for canned goods or any materials in impervous, dustproof wrappings. There appears to be no feasible means of salvaging unprotected food, either in the home, the store, or in the fields.

In surface waters, radioactive contaminants will tend to be adsorbed by the suspended and colloidal matter

TREATING BURNS—An urgent task since anyone standing in the open within mile from an air burst will be burned.

that invariably is present. In urban water systems, radioactive material that has escaped adsorption in a reservoir itself may be picked up by the surface of the distribution system.

When, in addition, the purification process includes coagulation, sedimentation and filtration stages, it is expected that very little radioactive material would normally reach the consumer.

Underground sources of water are generally safe from contamination. So are moderately deep wells, even under contaminated ground, provided surface drainage of contaminated material is prevented.

If a reservoir or river is seriously contaminated, and the water is not subjected to coagulation or filtration, the water might be unfit for consumption for several days. However, because of dilution and natural decay of radioactivity, the degree of contamination will decrease with time.

The types of injuries suffered by personnel in an atomic explosion will vary with the manner in which the bomb is used. In a high air burst, such as at Hiroshima and Nagasaki, most of the casualties will be from burns and blast effects.

There will be a small proportion of radiation injuries resulting from exposure to the initial nuclear radiations, emitted within the first minute after the burst, but the effect of contamination by the residual radiations, emitted after the first minute, will be negligible.

An explosion at low altitude or at ground level would produce somewhat fewer casualties from blast or burns, but a small area would be highly contaminated with radioactive material. If proper precautions are taken, the casualties from this residual radiation should be a very small fraction of the total.

After a shallow underwater burst, the number of casualties from blast and burns also will be diminished. However, some casualties might arise from exposure to radiation from fission products and to a lesser extent, material that has escaped fission, spread over an appreciable area by the base-surge and the fall-out.

During the first two months or more the primary danger would be from the gamma rays, in particular, and the beta particles (electrons) from fission products. Subsequently, the ingestion of plutonium might in exceptional circumstances become a hazard. In the event of serious contamination of this kind it would be necessary to evacuate the population from the affected areas until they could be adequately decontaminated.

Injuries by blast are of two kinds, direct and indirect. Direct blast injuries result from the positive pressure phase of the shock wave acting on the body to cause injury of the lungs, stomach, intestines and eardrums, and internal hemorrhage. Such injuries occurred in World War II after large-scale air raids with conventional high explosive bombs.

At Hiroshima and Nagasaki, however, the direct blast effect was not a significant primary cause of fatality, because those near enough to the explosion to suffer injury in this manner were burned or crushed to death. A pressure of about thirty-five pounds per square inch or more is required to cause direct harm to a human being. The peak pressure of the shock wave from a nominal atomic bomb would attain such values only at distances of 1,000 feet or less from ground zero, assuming a height of burst at 2,000 feet.

More important than the primary blast injuries in the Japanese bombings were the indirect or secondary effects from collapsing buildings, and from timber and other debris flying about in the blast wave. Persons were injured by flying objects, crushed or buried under buildings, and thrown against fixed structures. Glass fragments penetrated up to an inch beneath the skin, and the light summer clothing worn at the time offered little protection. Unless proper precautions are taken, to be described later, glass is a considerable hazard.

For practical purposes of diagnosis and treatment, it is not necessary to distinguish among burns caused by thermal radiation (flash-burns), by flame, or by contact burns, a form of flash-burn caused by dark-clothing materials becoming hot and burning the skin with which they are in contact.

Although there are differences in body surface involved, depth of the injury to the skin, and general reactions of the individual to burns of different types, the indicated treatment for burns from an atomic explosion appears to be the same as for those encountered in large-scale incendiary raids and in civil disasters.

The unique feature of atomic bomb burns is the great number of casualties produced in a brief period, the variety of burns encountered, and the wide range of severity, depending on the distance from the explosion.

A great deal was learned during World War II about the treatment of burns, but the subject is still under investigation and has not yet become stabilized. It is recommended, therefore, that until there is more general agreement, the medical men in each community employ the treatment for severe burns they have found most efficacious.

Because of their importance in relation to the effects of an atomic explosion, a comprehensive study of flash burns is being sponsored by the Atomic Energy Commission.

The effect of thermal radiation on the eyes was surprisingly small. Even those who looked directly at the explosions at Hiroshima and Nagasaki, from some distance, of course, reported only temporary loss of vision. One patient was so blinded by the flash that he was unable to distinguish light from dark for two days, but eventually his recovery was complete.

The effects of nuclear radiations, as distinguished from thermal, on living organisms depend not only on the total amount absorbed, but also on the rate of absorption; on whether it is chronic or acute, and on the area of the body exposed.

Some radiation phenomena, such as genetic effects, are apparently independent of the rate of delivery of the radiation, and depend only on the total dosage. In the majority of instances, however, the biological effect of a given dose of radiation decreases as the rate of exposure decreases.

Thus, to cite an extreme case, 600r would certainly be fatal if absorbed by the whole body in one day, but it would probably have no noticeable consequences if spread over thirty years. The most reasonable explanation of this fact is that if the dosage rate, that is, the amount of radiation taken per day, is very small, the damaged tissues have a chance to recover. If the intensity or rate of delivery of the radiation is increased, recovery cannot keep up with the damage.

It is apparently the recovery factor that makes it possible for human beings to accept limited doses of

SCRUB DOWN fore and aft—with plenty of soap—to remove any radioactive dust particles clinging to skin.

radiation, at least 0.3 r per week for long periods without any apparent harmful consequences.

While little of a specific nature can be done in the treatment of radiation sickness where the acute dose is 600r or more, there is a possibility that where the dose is smaller, particularly 400r, or less, many lives can be saved with proper treatment. Immediate hospitalization, to insure complete rest, and avoidance of chills and fatigue, is an essential first step.

Whole blood transfusion should be given, as required, until the bone marrow, the blood-forming tissue quickly damaged by radiation, has had time to regenerate and produce blood cells. Adequate nourishment could be provided by intravenous feeding to supply the necessary sugars, proteins, vitamins, etc.

The danger of infection, from destruction of the germ-fighting white blood cells, may be controlled by the use of penicillin and other antibiotics. The whole subject of radiation sickness, a rare occurrence before the bombings of Hiroshima and Nagasaki, is intensively studied, and important advances in its treatment may be expected.

Because of the possible importance of the subject for the future of the human race, no discussion of radiation injury would be complete without consideration of the genetic (hereditary) effects. These effects differ from most other changes produced by radiation in that they appear to be cumulative and, within limits, independent of the dosage rate of the energy of the radiation.

The mechanism of heredity is essentially similar in all sexually reproducing plants and animals, including man. The material responsible for inheritance is organized into discrete structures, the chromosomes, which are visible microscopically in the nuclei of dividing cells.

The chromosomes, rod-shaped bodies, are considered to be fine threads of nucleoproteins (group of proteins combined with nucleic acid, the latter a constituent of the nuclei of living cells), which are differentiated along

HOW HOT?—To find this out is job of monitor teams who probe into radioactive areas with radiac instruments.

their length into thousands of distinctive but submicroscopic units, the genes.

The development of inherited characteristics is controlled by the action of the genes. Chromosomes, and hence the genes, occur in pairs in the nuclei of the cells of individuals, one member of each pair contributed by each parent through the sperm or egg.

Mutations, defined as changes in inherited characteristics, may be classified roughly into two categories. Microscopically detectable changes in chromosome structure are called chromosomal mutations or aberrations. They may be responsible for visible changes in inherited characteristics, may cause reduced fertility, and frequently may be lethal, preventing development of the embryos.

The second category, gene mutations, include those cases in which sudden changes in inherited characteristics are not the result of demonstrable changes in chromosome structure but rather are believed to be from changes in the chemical composition of the normal gene. The possibility remains, however, that many so-called gene mutations may actually be ultramicroscopic changes in chromosome structure.

Mutated genes are commonly classified as either dominant over the normal genes, in which case the individual will show the particular characteristic if he receives the mutated gene from either parent, or recessive, in which case an individual must receive the mutated gene from both parents before exhibiting the characteristic.

While most gene mutations appear to be recessive, recent evidence indicates that many so-called recessives are partially dominant. Almost all mutations are deleterious, the occurrence of beneficial mutations being very rare.

There is a large body of data which indicates that any dose of radiation, no matter how small, increases the probability of genetic changes. Until recently the risk would have been thought to apply mainly to distant descendants, when the probability of two recessives mating would be greater. New information on the frequency of partial dominants indicates that the risk may not be negligible even to the first generation.

Incomplete experimental work on mice leads to the important practical conclusion that the probability of passing on chromosome aberrations to the next generation will be greatly reduced if individuals exposed to doses of radiation refrain from begetting offspring for two to three months after exposure.

It should, however, be stressed that, according to the evidence available, this practice would cause little or no reduction in the risk of transmitting gene mutations.

Many of the basic data necessary for a reliable estimate of the genetic effects of radiation in human populations have not yet been obtained. We are not yet able to calculate the exact magnitude of the risk. It is obvious, therefore, that until more basic knowledge is available, exposures of personnel should be kept to a minimum.

It may be mentioned, however, that the possibility of the production of a race of monsters in Japan as a result of radiation emitted by the atomic bombs is extremely improbable in the opinion of geneticists who have made careful study of the subject.

Protection Requires Planning

Adequate protection against the effects of an atomic bomb attack would require comprehensive and detailed planning. Such planning would be necessary to avoid panic, for mass hysteria could convert a minor incident into a major disaster.

The purpose of the Government handbook, "The Effects of Atomic Weapons," is to provide the essential scientific and technical information that would permit necessary plans to be made for dealing with the new and unusual situations that would arise as the result of the explosion of an atomic bomb.

The organization, preparation and techniques designed to deal with these situations involve considerations beyond the book's scope. Their precise nature depends on many factors that must be evaluated nationally, and their applications would vary with the patterns of regional and community development.

Any planning and organization against a possible atomic attack must be designed to meet the various destructive effects that an atomic explosion is likely to produce. These, as we have seen, include damage caused by air blast, ground and water shock, thermal radiation, initial nuclear radiations, and residual nuclear radiations. In addition, extensive fires from various secondary causes would follow an atomic explosion.

Fortunately, protection from these hazards, although by no means simple, is not as complex as the existence of so many danger factors would imply. In general, it appears that proper protection against blast, shock and fire damage could also minimize the danger to personnel from thermal radiation and initial nuclear radiations.

As far as burning caused by thermal radiation is concerned, the essential points are protection from direct exposure for human beings and the avoidance of easily combustible materials, especially near windows.

The only known defense against the gamma rays and neutrons constituting the initial nuclear radiation is the interposing of a sufficient mass of material between the individual and the atomic bomb, including the rising Ball of Fire. The use of concrete as a construction material, which is necessary to reduce air-blast and ground shock damage, would, to a great extent, decrease the initial radiation hazard.

From the standpoint of physical damage, the problems of construction and protection from atomic bombs are not fundamentally different from those associated with bombs of the conventional type. It should not be forgotten, however, that atomic bombs are enormously more powerful. The damage would cover an extensive area, probably several square miles. These facts are important in planning for control of fire-fighting and rescue operations.

Protection from the effects of radioactive contamination presents a problem that has not previously been encountered. The results of blast and fire are visible and can generally be controlled in a relatively short period after an explosion. But nuclear radiation cannot be detected by the senses without the use of instruments, and, unless the contamination is removed, the deleterious effects may continue for weeks, months or longer.

Even though the dangers from radioactivity after an atomic explosion are uncertain and perhaps exaggerated, nevertheless some consideration must be given to possible contamination of areas, structures and equipment.

Monitoring of regions close to, and especially downwind from, the explosion should be undertaken soon after the detonation for the guidance of fire fighters and rescue teams. Subsequently, more detailed monitoring may be required to find which areas are safe for occupation.

Many steps can be taken to reduce both the personal casualties and the physical damage effects of an atomic explosion. The planning of new construction affords the best opportunity for the inclusion of protective measures at a minimum cost. But existing structures can, in many cases, be strengthened to make them more resistant to blast, fire and radiation, thus increasing the protection afforded to personnel and equipment.

For example, blast damage can be reduced by strengthening structures, particularly against lateral and downward forces. It is desirable to keep to a minimum fixtures, ornamental plaster, or other interior treatments that might be dislodged when the buildings are subjected to violent forces.

The fire hazard may be decreased by avoidance of exposed inflammable material. General protection against gamma radiation may be achieved by a sufficient thickness of structural material.

In taking protective measures, how far away may it be supposed that the atomic explosion will occur? Of course, it is impossible to supply a definite answer, but a decision must be made on the distance from the explosion at which protection becomes practical. Steps can then be taken to provide protection appropriate to this distance.

Taking various factors into consideration it seems that a distance of about half a mile from ground zero would be a reasonable compromise for the planning of general protective measures. The assumption is made that the bomb is exploded in the air at such a height as would provide maximum physical damage.

It must be admitted, however, that the choice of distance involves an element of risk, for there may be accidental or deliberate bursts of several bombs in proximity at the same time. Further, there is the possibility that these bombs might have different energies and be detonated at different heights.

On the other hand, there is some justification for the choice of half a mile from ground zero, from a nominal (20 kiloton TNT equivalent) atomic bomb, as the point from which protection should be considered.

In the first place, the evidence from the Japanese bombings indicated that within this distance the chances of survival, from one cause or another, were very poor. It is only beyond 3,000 feet or so that the proportion of persons killed begins to fall off at an appreciable rate. Suitable protective measures would result in an even sharper drop.

Further, protection against blast, initial radiation, and thermal radiation becomes practical at a half mile from ground zero, while at closer distances it would not generally be feasible. In certain cases, however, stronger construction may be desirable on the ground of the essential nature of the operations carried out in a particular building.

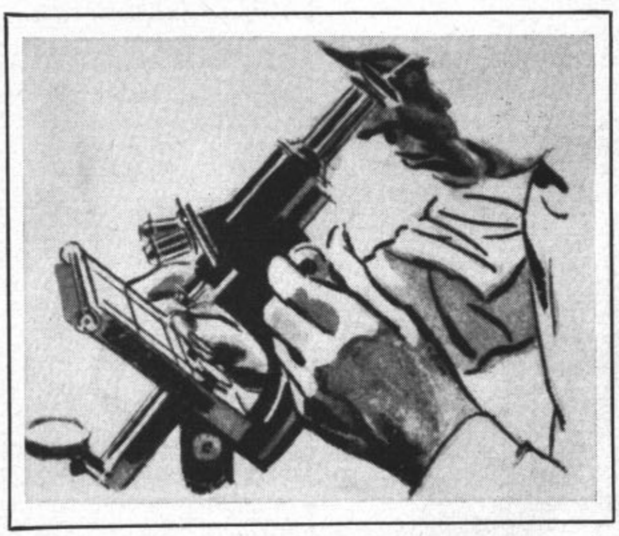
One of the most important lessons learned from the atomic bomb attacks on Japan is the necessity for the provision of an adequate water supply for the control of fires.

In Nagasaki the water pressure was only thirty pounds per square inch at the time of the explosion and because of breaks in mains and house service lines it soon dropped to ten pounds per square inch. On the following day the pressure was almost zero. This drop in the water pressure contributed greatly to the extensive destruction caused by fire.

The experience at Hiroshima was similar.

A large proportion of the fire devastation in Japan after the atomic bomb attacks was because the fire-fighting services were incapacitated. It would seem to be advisable that fire departments of strategic cities and industrial plants should be housed in structures capable of withstanding the blast at about half a mile from the explosion. Underground construction of concrete walls two feet thick would provide this degree of blast protection.

Facilities for the direction of disaster-relief activities,



ANALYZING BLOOD of patients will be done by technicians. Cell counts provide cue to radiation sickness.

and provision of first aid in a city require a protected area on one of the lower floors of a well-constructed, fireproof, reinforced-concrete or steel-frame building.

Facilities required for rescue and damage control operations, in addition to the measures found necessary on the basis of World War II experience with conventional explosives, must be given special treatment in view of some of the novel effects of atomic weapons.

The problem of radiological hazard control requires more elaborate facilities, and this hazard, as well as the magnitude of the mechanical damage effects, requires that careful consideration be given to the communications networks, probable need for duplicate facilities, special storage requirements, emergency medical services, evacuation procedures and immediate debris clearance.

Shelters inside buildings should be in fireproof, reinforced-concrete or steel-frame structures that are resistant to collapse. The areas chosen should be on the lower floors and in halls, or in the interior portions of the buildings, since these seem to offer the most reasonable possibilities for protection. Secondary hazards, such as those from falling plaster or fixtures, or from fire, should, of course, be avoided.

Shelters outside the larger structures should, in general, be designed to resist the effects of blast and radiation from an atomic burst at a reasonable distance, say one-half mile. They should be well clear of buildings to avoid hazards from debris and fire.

A buried, or semi-buried, shelter will usually be the best choice for protection from an air burst, because the earth cover will act as protection against radiation. In addition, blast effects will be less than on a surface shelter. Such buried shelters would, of course, be useless in the event of a near-by underground detonation of an atomic bomb.

It might be advisable to construct shelters so that they would provide protection in case of surface or subsurface bursts, in which the spread of radiation through the air might be a hazard. Hence, special consideration should be given to the problem of insuring suitable ventilation for shelters.

The most effective method for providing adequate ventilation is to use a pressurized installation in which the air is forced through special air filters that would remove radioactively contaminated particles. The practicability of such extreme measures, however, is open to question.

BURY CLOTHES and other material exposed to radiation. Contamination will be worst in an underwater burst.

Basements of homes, especially if they were extended beyond the main structure of the house, would offer reasonable protection against blast damage, provided they were not too near the center of the explosion.

However, care must be taken to provide escapes to be used in case the house catches fire or collapses. A shallow rampart of soil or of sand bags outside the house would probably be advantageous. Semi-buried shelters for individual families, of the type used in Europe during the last war for protection against conventional bombs, would also provide worth-while protection against atomic explosions.

In cities like New York, the subways would make good shelters, though they probably would collapse in case of a near-by underground explosion.

The discussion of shelters is, of course, based on the assumption that there has been sufficient warning to permit people to take shelter. In the event of a surprise atomic explosion, immediate action would mean the difference between life and death.

The first indication of an unexpected atomic burst would be a sudden increase of the general illumination. It would then be imperative to avoid the instinctive tendency to look at the source of this light, but rather to do everything possible to cover all exposed parts of the body.

If a person is in the open when the sudden illumination is apparent, the best plan is to drop instantaneously to the ground, curling up so as to shade bare arms and hands, neck and face with the clothed body. Although this will not protect against gamma rays, it might help in reducing flash-burns.

This is important because disabling burns can be suffered well beyond the lethal range for gamma rays. The curled-up position should be held for at least ten seconds. The immediate danger is then over, and it is permissible to stand up and look around to see what action appears advisable.

If in the street, and some sort of protection, such as a doorway, a corner or a tree is within a step or two, then shelter may be taken there with the back to the light, and in a crouched position to provide maximum protection, as described above. No attempt should be made to reach a shelter if it is several steps off.

The best plan then is to crouch on the ground, as if completely in the open. After ten seconds, at least, a standing position may be resumed, but it is strongly advisable to press the body tightly against the side of a building to avoid breaking glass, or falling missiles, as far as possible.

A person who is inside a building or a home when a sudden atomic attack occurs should drop to the floor, with his back to the window, or crawl behind or beneath a table, desk, counter, etc. This would also provide a shield against splintered glass from the blast wave.

The blast wave might reach the building some time after the danger from radiation had passed, and so windows should be avoided for about a minute, because the shock wave continues for some time after the explosion. The safest places inside a building are the interior partitions, and it is desirable to keep as close to these as possible.

In considering the practical problems of a radiological hazard it may be supposed that there would be three stages, the duration and severity of which would depend on circumstances. These are as follows:

1. Complete disorganization stage: In the event of heavy and widespread physical damage, it may be presumed that roads would be blocked for some distance from the explosion, and that all normal communication systems would be out of commission. Emergency transportation and communication, except perhaps for self-contained radio equipment, would not be immediately in effect.

2. Emergency control stage: This phase would begin as soon as margin roads had been cleared, and transportation and communication had been re-established, at least on an emergency scale, so that information could be transmitted to a control room. In the case of moderate physical disaster, the emergency control phase would start immediately, and might last a week or more.

3. Recovery stage: The final phase would be reached when most persons were out of immediate danger of injury, and there was time to start more thorough decontamination operations where necessary.

In the emergency control phase, an important factor in the operation of radiological defense would be rapid gathering of data on contamination. The radiations that may be encountered are gamma rays and beta particles (electrons) from fission products, neutron-induced activity or other radioactive material, and alpha particles (nuclei of helium) from plutonium or uranium.

Of these, the gamma radiation can be measured most readily. This is perhaps the greatest immediate hazard because of its considerable penetrating power. Beta particles as such are not a serious menace unless the source enters the system or remains on the skin for some time.

Monitoring of suspected contaminated areas for gamma radiation should be carried out at the earliest possible moment. Initially, this might even be done by means of low-flying aircraft. From the gamma radiation dosage measured at a known height above the ground it would be possible to obtain an approximate indication of the area and intensity of the contamination.

However, ground monitoring for gamma radiation, with portable instruments, would be necessary at the first opportunity. The monitoring for beta radiation would, in general, be an auxiliary measurement, made in the later stages after the immediate emergency had passed.

The question of the amount of exposure to the residual nuclear radiation that would be permissible for control and rescue personnel would depend a great deal on circumstances and the risks that inevitably would have to be taken. In the initial disorganization phase, when the radioactivity was also most intense, it would be important for emergency personnel to avoid overexposure to radiation except where it was necessary to carry out missions of the greatest importance.

It may be noted in this connection, however, that because of the rapid initial decay of the fission products, a person who is exposed to the radiation from this mixture for the first hour after an explosion would not suffer any further appreciable injury by staying for several hours more. A situation of this kind might arise because of the immediate fall-out from an underground or an underwater burst.

During the emergency control phase the radiological defense system should be fully operable. Every effort should be made to minimize the dose of gamma activity received by the general population.

Personnel entering a contaminated area, whether to perform monitoring or other emergency work, should wear protective clothing of some kind. Actually ordinary clothing is adequate protection against alpha and beta radiation, but since it is likely to become contaminated it would have to be destroyed.

Soon after an atomic explosion there is likely to be a large amount of dust in the air, especially in the regions of appreciable damage.

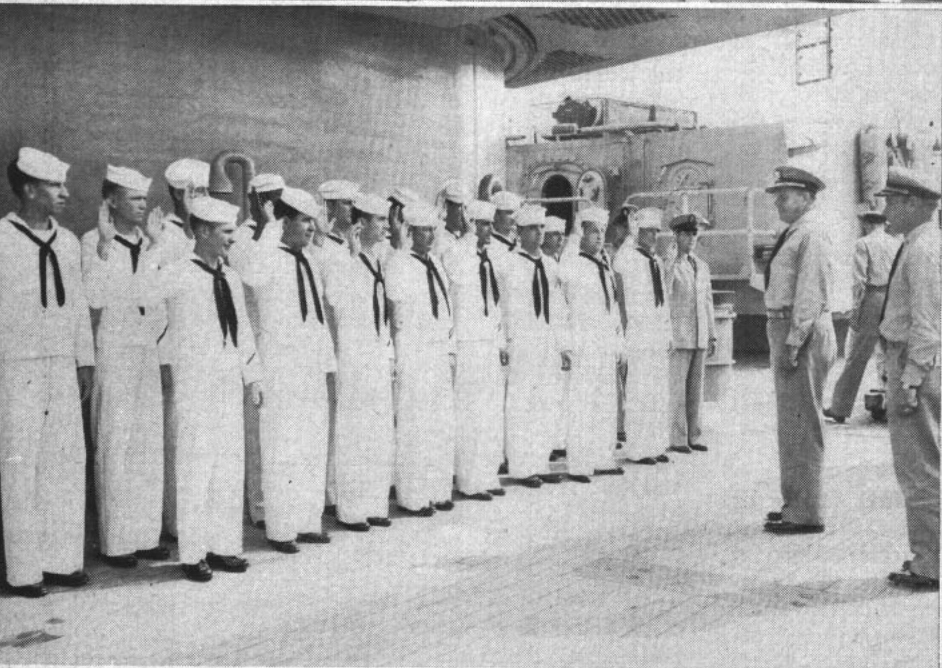
Consequently, all members of emergency teams entering a contaminated area should wear respirators. Masks covering the nose and mouth, of the type developed as a protection against chemical warfare agents, have been found to be satisfactory in preventing inhalation of dust particles. Where the amount of dust is very large, it might be necessary to use a respirator hood to give complete protection of the head.

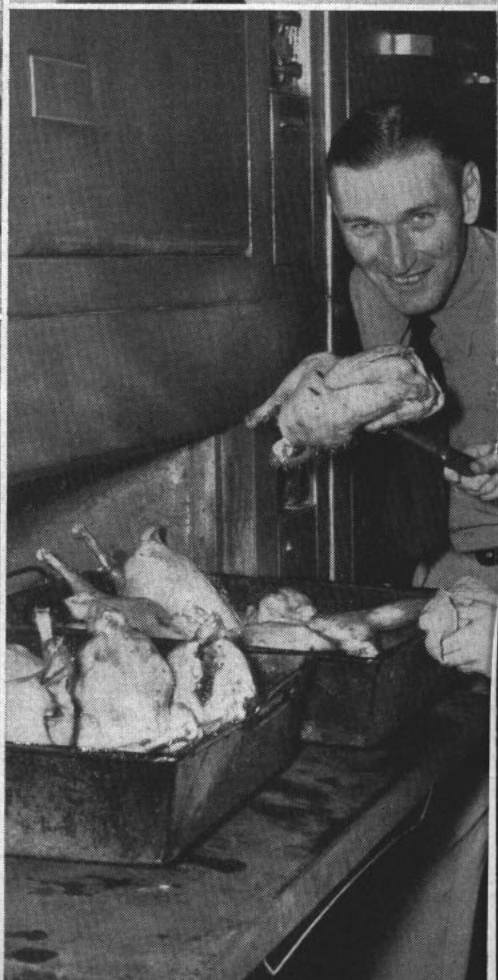
In planning defenses against the atomic bomb, it is essential to remember that in addition to its multiple physical effects, it is also a weapon calculated to arouse terror in a population. One of the essential defenses against it, along with those outlined, must therefore be psychological preparedness.

Without minimizing the seriousness of a possible atomic attack, intelligent planning based on the known facts could make it much less serious, while a state of mind accepting as true the notion that "there can be no defense against the atomic bomb" will most certainly make its effects much more serious than they otherwise would be.

Had the people in Hiroshima and Nagasaki known and put into practice the defense measures outlined in the official handbook on how to prepare against atomic attack, there can be no question that their casualties would have been but a fraction of what they actually were.

SANDBLASTING with detergents will be needed on wide scale to cleanse buildings of 'hot' dust, grime and spray.





TODAY'S NAVY

344 Ships Will Be Built or Converted as Navy Launches Construction, Modernization Program

A major shipbuilding and ship modernization program is being launched by the Navy. Some 344 ships are scheduled to be built or altered at a cost of approximately 282 million dollars.

New ships to be built include an experimental submarine (SST), and a 250-ton coastal submarine, plus these smaller craft: 11 165-foot minesweepers; 18 mine sweeping boats; 70 landing vehicles, tracked, armored; 43 landing vehicles, tracked, personnel; 20 open lighters and 10 covered lighters.

One *Essex*-type carrier, USS *Bennington* (CV 20), is scheduled to be altered to carry heavier, newer planes. Ten submarines will be converted to guppy-type undersea craft, and two submarines will be redesigned as radar picket subs. Nineteen submarines will have snorkels installed, 102 destroyers will have their armament modernized, and 24 destroyers will be converted into radar picket ships.

Also scheduled for alteration are four destroyer escorts to radar pickets; four destroyer escorts to be converted for anti-submarine warfare, one landing ship, medium, to a cable layer; one fleet tanker to a replenishment ship; one cargo ship to a general store issue ship; and one store ship to a reefer ship.

Construction and alterations of these vessels will be accomplished by 13 naval and civilian shipyards within the U. S. and Hawaii.

← The Navy in Pictures

TRIPLETS born to James Talbert, CSI, and Mrs. Talbert were the first delivered at the Navy Dispensary, Argentia, Nwfd. (top right). Top left: At Parris Island women Marine recruits keep in shape during "boot" training. Center left: Shipping over for six are 20 EMs aboard the USS *Newport News* (CA 148). Bottom left: Happy Navyman with toothache is Herman Locke, BM2, USNR, shown getting sympathetic treatment from Boston Waves. Lower right: James Mauldin, MMC, watches his pretty wife Lois Mauldin, SK2, sample home cooking Navy style. She plans the meals at NAS Jax where both of them are stationed.

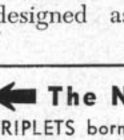
Blood Donor Cooperation

High praise was given to the Navy by a New York official of the American Red Cross for the Navy's whole-hearted support of the blood donor program.

In a letter to the Chief of Naval Operations, the Red Cross spokesman said, "I want you to know how grateful we are for the public-spirited action taken by the Navy." The letter mentioned especially an instance when the battleship USS *Missouri* (BB 63) authorized the operation of a bloodmobile unit aboard ship during a visit to New York.

The Red Cross letter of thanks was forwarded to the Commandant, 3rd Naval District, by the Chief of Naval Operations.

YESTERDAY'S NAVY



Historic iron-clad *Monitor* launched at Green Point, L. I., N. Y., 30 Jan 1862. Virgin Islands of the U. S. acquired 17 Jan 1917 from Denmark, and remained under supervisory control of the U. S. Navy Department until 1931.

JANUARY 1951

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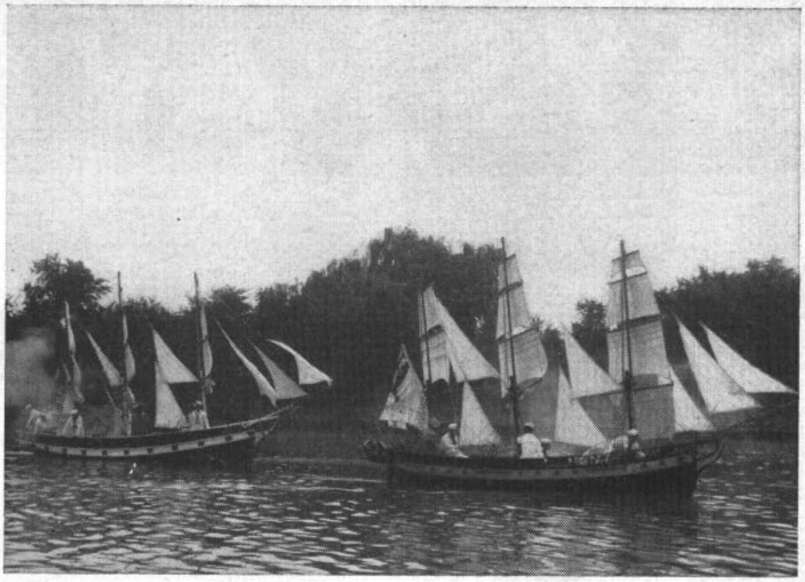


MINIATURE historic ships resume feud during celebration in Washington, D. C., as *Old Ironsides* and the British *Guerriere* exchange "mock" fire.

Waves Spend a Day at Sea

Five Wave officers went to sea on board USS *Nipmuc* (ATF 157).

During a day's cruising out of Narragansett Bay, the women officers were given an opportunity to see first-hand a ship's routine at sea.

While *Nipmuc* steamed out of the harbor and joined a formation of four destroyers screening two tankers, the Wave officers were given a turn at the wheel, and were taught how to plot the ship's position on a chart. They watched the convoy take evasive action when "attacked" by three submarines. They tramped from the bridge to the firerooms to watch all of the various tasks necessary to the operation of the ship being performed.

Dinner was served on the way back to port. The Wave officers agreed that food aboard ship was excellent.

All five of the Wave ensigns were undergoing training at the Line School, Newport, R.I. The trip was arranged by Commander Fleet Training Group, Narragansett Bay, in order to afford the women officers an opportunity to observe the operation of a ship under simulated wartime conditions. The women stated they felt the experience gained had given them a better understanding of the courses they were taking at the Line School, and of the high degree of technical and operational ability that seagoing personnel must possess.

New Navy Attack Bomber

Cruising off the Virginia Capes, USS *Coral Sea* (CVB 43) turned into the wind and picked up speed. On her decks sailors peered at a big bomber circling above, its tricycle landing gear down. Several minutes later the plane crossed *Coral Sea's* stern, its massive wings eclipsing two-thirds the width of the flight deck. Dropping on deck it rolled a distance then came to a sudden and screeching stop. The Navy's new AJ-1 attack bomber—largest carrier plane in the world—had made its first trial landing at sea.

There were more of them—an entire squadron—and in turn each lowered its huge bulk on the flattop.

Designed for high-speed attack missions from carriers, the AJ-1 weighs more than 17 tons, unloaded. Powered by a unique piston-jet arrangement, it has a top speed "in excess of 400 miles per hour."

Chief Put Fleet Reserve Time to Good Use, Received Medical Degree

Back on active duty once again, a Fleet Reservist who spent four years studying psychiatry under the GI Bill has his shipmates at Great Lakes, Ill., mighty puzzled.

The last the Navy saw of Chester C. Gallimore, QMC, USN, he was a temporary lieutenant of the line and a navigator *par excellence*.

But with the Korean fuss, Gallimore, now in his permanent rate of chief, turns up at Great Lakes as a doctor of mechanotherapy. He's an instructor in recruit training at Great Lakes. Six days before his recall he had taken the oath and degree at an Ohio college of psychiatrics.

Next step for the high-stepping chief is the Ohio state license examinations in December. After that, he'll be fully qualified to practice mechanotherapy, which Webster's defines as the treatment of disease by mechanical means, especially by forced movements.

TOOLS of his trades are held by C. C. Gallimore, formerly ace navigator, who hopes to be a medic.

The chief has plans to get his temporary rank of lieutenant back: He has submitted a request to the Bureau of Medicine and Surgery to change his classification to temporary lieutenant in the Medical Service Corps, specializing in physiotherapy.

It's all quite a change for a man who rose to the command of various subchasers in the Atlantic and who became navigator in USS *Hamul* (AD 20) in the Pacific. Right now, however, he's putting boots through their paces as an instructor in recruit training.

Its towering, four-bladed propellers produce a high take-off thrust—enabling it to lift its heavy bulk from a flight deck—and provide excellent performance at high speeds and altitudes. The plane carries a crew of three in its pressurized cabin.

To ease the problem of handling and stowing the big plane on board carriers, the plane is equipped with an unusual "folding" arrangement. The outer wing panels fold inboard, and the vertical tail folds onto the right surface of the horizontal stabilizer.

Power for the AJ-1 is supplied by a reciprocating engine located under each wing and a single turbo-jet mounted in the after section of the fuselage. The two piston engines develop 2,300 horsepower each, and the turbo-jet produces an additional thrust in excess of 4,000 pounds.

The AJ-1s are assigned to Composite Squadron 5, based at the Naval Air Station, Norfolk, Va.

Seven Brigadier Generals

Seven Marine Corps colonels are now slated for advancement to brigadier general, with actual promotion to take place whenever vacancies occur.

Names of the seven in the order of their position on the recommended list, and their latest duty assignments, are as follows:

James P. Risely; Professor of Naval Science, Princeton University.

Gregon A. Williams; Chief of Staff, First Marine Division.

Frank H. Lamson-Scribner; Assistant Director, Marine Corps Aviation.

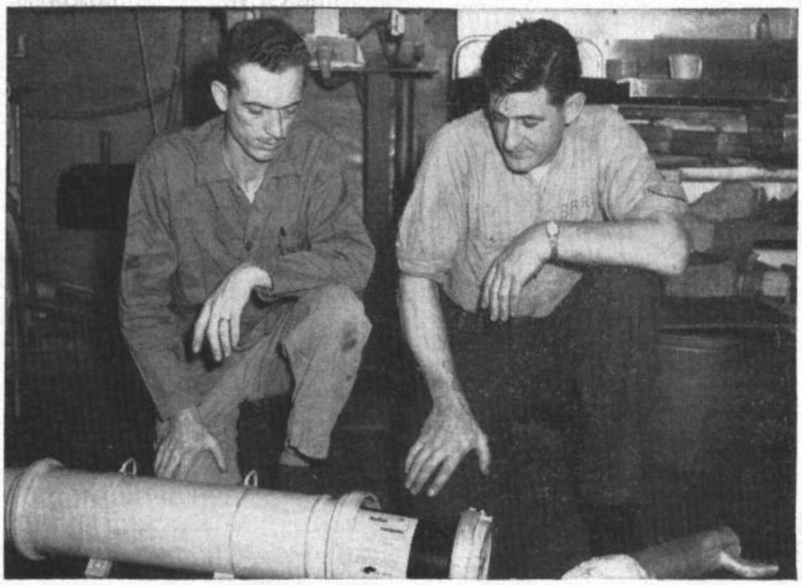
William J. Scheyer; Assistant Director, Marine Corps Personnel.

Albert D. Cooley; Director, Junior School, Marine Corps School Center, Quantico, Va.

Lewis B. Puller; CO, Marine Corps regiment, Korea.

Robert O. Bare; Chief of Staff, Quantico School Center.

Colonel Lewis B. Puller is one of the Marine Corps' most famous officers, and is one of the three in this group who were commissioned from the ranks. His rise to renown began in the early 1930s, when the U.S. Marines were fighting in Nicaragua. Colonel Puller twice won the Navy Cross there, and twice in World War II.



SAVVY shipmates Robert VanBeck TSgt, USMC, and Robert Barr, ME1, USN, designed film container to be dropped from *Corsair* bomb racks.

Film Bomb Scores Hit in Korean Action

Reconnaissance photos of the invasion were taken; the problem was to deliver them to the CO of Joint Task Force 7 aboard the flagship USS *Mount McKinley* (AGC 10) and to headquarters of the First Division Marines somewhere inland.

The problem was soon solved, when it was turned over to a Navy metalsmith and a Marine sergeant. In less than 45 minutes, the two had devised a film container which could be carried on a *Corsair's* bomb racks and dropped therefrom. The container was tight enough and sturdy enough for parachute dropping on land or sea.

Raw material for the droppable film container was a powder can for five-inch charges. In collaboration with Robert L. VanBeck (the Marine), Robert H. Barr (the MEI) devised two metal straps to encircle the powder can. To the straps were welded a couple of loops of quarter-inch round stock to hook onto the plane's wing bomb racks.

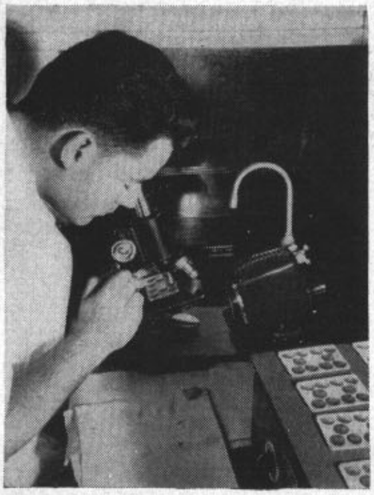
That's all there was to it, actually, and the pair was able to turn out production models in even less time than they spent on the first experimental model. Packs of rolled 9-inch by 200-foot film strips fit in nicely.

People aboard the aircraft carrier USS *Valley Forge* (CV 45), where the two inventors are stationed, were highly complimentary about the device. Modestly passing the credit on to their organizations as a whole, the men said, "It helps prove that a Navy-Marine combination can lick any kind of problem."

Dentists Get Drilled

A new group of dentists on duty at the Naval Training Center, Great Lakes, Ill., now know how to drill outdoors as well as in. Like their predecessors, they have completed a two-week military indoctrination course in which military drill is included.

Other subjects on which the 30 new Great Lakes dentists were drilled were fire fighting, naval history and firearms. The instruction is designed as a review for dentists who have had some military experience and as a general course for newly commissioned officers. It is mandatory for all dental officers up to the rank of the lieutenant commander on duty at the training center. A similar course is conducted at NTC San Diego and such courses for dental officers are planned for Parris Island, S.C., and Newport, R.I.



SPECIMEN is checked to determine type prior to processing at the Navy laboratory.

Central Blood Processing Lab Ships to Far East

U.S. Naval Hospital, Oakland, Calif., is the site of a laboratory which is unique in all the U.S. armed forces and perhaps the only one of its kind anywhere—a central blood processing laboratory.

Working rapidly in its temporary home at Oakland, the laboratory prepares blood for air shipment to U.S. forces in the Far East. Within a few days after the lab opened, more than 1,200 pints of group "O" whole blood had been received for processing. It arrived from 34 Red Cross blood centers across the nation.

Only certain type "O" blood is processed by the laboratory. This type can be used without harm by anyone, regardless of his own blood type. Employment of this "universal" type results in a great saving of time and confusion in combat emergencies.

The staff at the laboratory consists of seven persons in addition to the woman lieutenant commander of the Medical Service Corps in charge. They are a chief hospital corpsman, an HM1, two HM2s, an Army sergeant and two administrative secretaries. Processing consists of testing for group, titer, Rh factor, clotting ability and freedom from disease, and of packing the blood for shipment.

Engine Governor with Brains

Scientists at the Navy's Engineering Experiment Station at Annapolis, Md., are putting the finishing touches on a new engine governor which will be almost able to think.

The electric governor for generator engines won't be able to think, of course, but it will be superhumanly quick in responding to a stimulus. If the engine's load skyrockets instantly from zero to 100 per cent, the governor will have its speed back where it belongs within one-half a second. Ordinary load speed will be kept within one-fourth of one per cent of absolute constancy.

While most engine governors depend upon mechanical means of operation, the electric governor for engine-powered generators is actuated by slight variations in current. This means of control brings the engine back most quickly to its preset speed. Engine-powered generators for which the governor is being designed are primarily emergency equipment for airports and military installations. The electrical frequency of these units must be controlled as closely as that of large central power plants. Thus, the need for exact speed control.

Movie on Marine Aviation

If Marine veterans of Guadalcanal now stationed at Camp Pendleton, Calif., suddenly become nostalgic about that former battleground, they can hardly be blamed.

By gazing down one of Pendleton's runways, they get the illusion of staring down the old runway of Henderson Field, the wartime airfield on Guadalcanal.

Moviemakers have built a jungle along the strip to make it into a replica of that famous South Pacific airfield. Many of the scenes of a forthcoming movie on the feats of Marine aviation during World War II, from Guadalcanal to Okinawa, will be filmed here. Air combat scenes will be staged by the Marine Corps' combat-trained pilots for the film, and planes used in the scenes will be furnished by the Navy and Marine Corps.

The moviemakers chose Camp Pendleton for the runway scenes because a runway there closely resembles the Guadalcanal strip. Other scenes for the picture will be shot at MCAS El Toro, Calif.

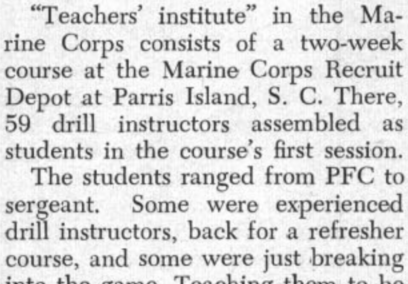
SANDBLASTING prepares sunken hull of gallant USS *Arizona* for a permanent memorial to the ship and crew.

Future DIs Go to School

"Teachers' institute" in the Marine Corps consists of a two-week course at the Marine Corps Recruit Depot at Parris Island, S. C. There, 59 drill instructors assembled as students in the course's first session.

The students ranged from PFC to sergeant. Some were experienced drill instructors, back for a refresher course, and some were just breaking into the game. Teaching them to be better teachers was a staff of three officers and five enlisted instructors. The training, it was hoped and believed, would make the 59 scholars into good—or better—instructors for Marine recruits.

Such subjects as "technique of instruction," "orientation and duties of a drill instructor," and "infantry weapons" are emphasized in the course. The drill instructor is con-



NEW ID CARD will be regulation for all armed forces personnel. Reserves will get a similar ID card.

sidered to be the key man in all Marine Crops recruit training. He is concerned with every aspect of the newcomer's life throughout the eight weeks of "boot camp" training.

All the instructor-trainees were slated for "DI" duty at the Parris Island recruit depot.

Academy Honors Its Heroes

Seventeen noted Naval Academy graduates, Congressional Medal of Honor men who gave their lives in World War II, are being honored by the Academy in 17 separate ceremonies.

The first of these events was conducted in honor of CDR Ernest E. Evans, USN, who distinguished himself in the Battle of Samar, 25 Oct 1944. Although seriously wounded, CDR Evans, then CO of the destroyer USS *Johnston* (DD 557), kept the ship in the thick of battle until all power was lost. During the latter stages of the three-hour action CDR Evans stationed himself on the ship's fantail. There, he shouted orders down through an open hatch to crewmen who were steering the partially disabled ship by hand.

Three plaques were dedicated in CDR Evans' honor. One bears the commander's Medal of Honor; one, his name and picture, and the other the words "The Evans Room." All three bronze plaques were placed outside the room in Bancroft Hall which CDR Evans occupied when he was a midshipman. The room will henceforth be known as The Evans Room.

Automatic Pilot for 'Copters

A successful automatic pilot—the device that keeps a plane automatically flying level—has been developed for use on helicopters.

Previously, no type of automatic pilot had proved successful for use on a helicopter because of the peculiar flight characteristics of rotor wing aircraft. Operation of helicopters at night or during "instrument" weather was not considered safe because of the difficulty of maintaining constant stability. The new automatic pilot makes possible normal instrument flight, and will decrease pilot fatigue during long trips. In the past it has been necessary for the pilot to keep his hands on the controls at all times while flying.

DISTINGUISHED naval career of Fred Harnig, QMC, nears end as the chief is piped 'over the side' in the traditional manner at Guantanamo Bay.

Career of 30 Years' Honorable Service Ends

Another distinguished naval career which has had its share of exciting moments ended when Fred Harnig, QMC, USN, went aboard USNS *General H. F. Hodges* at Guantanamo Bay, Cuba, enroute to the Naval Receiving Station, Brooklyn, N. Y., to be separated from the naval service for the second time. This time it was after more than 30 years of honorable service.

After completion of his recruit training, Chief Harnig served aboard several ships of both the Atlantic and Pacific fleets.

The grounding of USS *S. P. Lee* and three other destroyers on the night of 8 Sept 1923 of Pt. Honda, Calif., is just about the most exciting thing that ever happened to Harnig.

Just a few months prior to the Japanese attack on Pearl Harbor in 1941, Harnig received his orders to recruiting duty. Receipt of these orders terminated 15½ years of sea service.

In July 1943 he was promoted to the rank of Bosn(T) and 13 months later was hiked to CHBOSN-(T). He served in that capacity until the latter part of 1946. In February of 1947 he went aboard the USS *AFDL*-47 and later that same year was transferred to the U. S. Naval Station, Guantanamo Bay, Cuba, for duty where he remained until he ended his career.

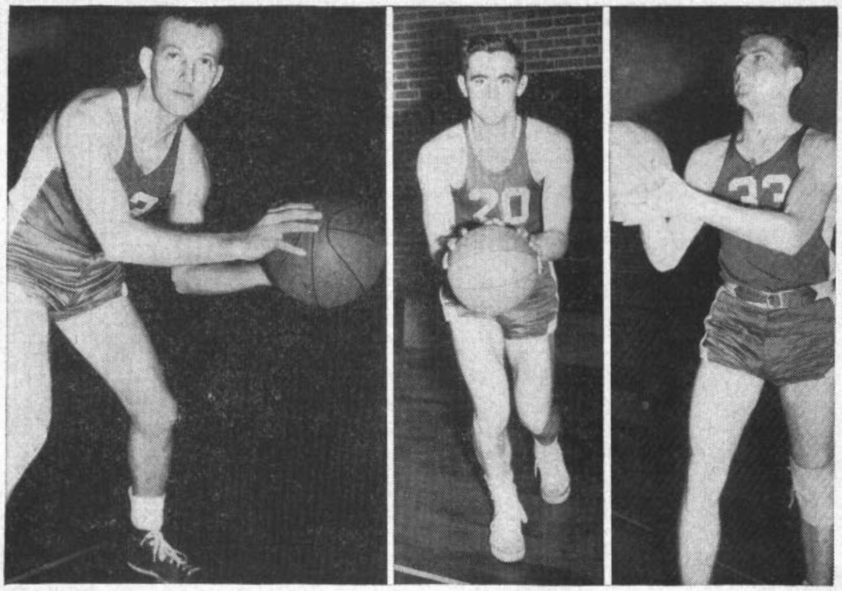
On a Saturday Chief Harnig was invited by Captain W. K. Romoser, USN, Commanding Officer, Naval Station, Guantanamo Bay, to inspect the assembled personnel of the station. Afterwards he was piped "over the side" in traditional manner.

Two Lucky Survivors

Two mighty happy Gilbertese islanders stepped ashore at the Navy's base on Kwajalein and told a story of seven weeks adrift in Central Pacific waters. They were the only known survivors of a group of 12 natives.

In three canoes, the party had set out from Maiana in the Gilbert Islands, bound for nearby Tarawa in three canoes. A 41-year-old man, Timon, and a 16-year-old boy Tutera, related how the canoes became separated the first night at sea. After traveling more than 450 miles at sea, they were cast ashore on Ailinglapalap in the Marshalls, the only survivors of the six in their large canoe. It had been provisioned with only enough food for a week, and four died of starvation. No reports were received of the fate of the two other canoes.

A Marshallese sailing vessel picked up the two natives and brought them to Kwajalein.



OLD RELIABLES of champion Norfolk Flyers back this season include (L to R) set shot artist Lloyd Wood, AD1; Ted Tomlin, AN, Frank "Ace" Blatcher, SN.

Navy Men Bag Elk

The antlers of four large elk are now decorating the homes of Navy personnel stationed at NOB, Kodiak, Alaska.

Four hunting enthusiasts from the Naval Operating Base went to Afognak Island, about 20 minutes flying time northwest of Kodiak, for the hunt.

This was the first year there has been a hunting season on elk in Alaska. As an experiment, a small herd of Roosevelt elk was transported from Washington State to Afognak by the U.S. Fish and Wildlife Service in 1928. Only 50 elk hunting licenses were issued this season, and it has not been determined whether or not it will be an annual event.

First elk legally killed at Afognak was shot just 30 minutes after the season opened by Lieutenant Commander L. J. Carr, USN. The largest elk was shot by J. W. Phelps, QMC, USN. Its antlers measured over 48 inches in length, had 10 points, with a 51-inch spread between tips. Chief Phelps shot the animal with a Winchester 348 at 200 yards.

Chief Phelps plans to have the elk trophy mounted and a rug made from the bear skin as ornaments for his living room. In addition to these trophies, Chief and Mrs. Phelps have obtained a set of Alaskan "totem poles" which stand on either side of their living room fireplace.

Phelps has been stationed at the Naval Communications Station, Kodiak, for 21 months and says that he and his wife have enjoyed every day of it. Both are enthusiastic hunters and fishermen, and they find Kodiak an ideal duty station. The chief is in no hurry to leave. "In fact," says Chief Phelps, "I spend so much of my off duty time on the rivers and lakes during fishing season that my wife threatens to make me pitch a tent on the bank of the river and live there."—W. D. Gardner, JO2, USN.

New Recreation Center on Guam

Sailors at the Naval Operating Base, Guam, M. I., are anticipating with pleasure the opening of their huge new recreation center.

Now under construction, the building will house an indoor gymnasium, large library, super snack bar, complete hobby shop, laundry issue room, pool and billiard parlor, barber shop, shoe cobbler, small game room, and a centralized gear room complete with all types of sports equipment. The building will also house a modern shower and locker room.

Other recreation facilities planned at NOB Guam include a swimming pool, an indoor basketball and tennis arena, and a driving range for golfers.

A fast-paced sports program is maintained at the Naval Operating Base all year. This past season two Navy football teams competed in "Sweat Bowl" games, and 10 Navy touch football teams participated in the local football league. Over 40 NOB boxers are working out regularly for the weekly bouts that are the principal attraction of regularly scheduled smokers.

Bowling and intramural basketball are in full swing. Fifty-four teams are entered in NOB's new bowling league, and 30 basketball squads are battling for the base's hoop superiority. Altogether, some 1,000 personnel are engaged in one or more of these sports, and it is

FAST GAME of volleyball is played by these sailors from Kwajalein, making the most of recreation facilities on Burnett Island in the Marshalls.

estimated that approximately 1,000 more will be participating regularly when the swimming pool and driving range are completed, and the golf league is organized.

Currently, NOB boasts of some of the best recreation facilities on Guam. It has a large bowling alley (12 lanes), football field for night play, with a seating capacity of 4,000, and a battery of tennis courts for night matches.

Sailing Races Revived

For the first time since 1945 competition has been revived for the USS *Reina Mercedes* Knockabout Trophy.

A series of sailing races to select the trophy winner are being held on the Severn River, near the U.S. Naval Academy, Annapolis, Md. Individual trophies will be awarded to winners.

A "knockabout" is a sloop-rigged yacht of 21 feet waterline, designed for sailing in open water. It has no bowsprit.

Organized Sports for Waves

Plans are being made for conducting seven organized sports for Waves within the naval districts. These sports are basketball, softball, volley ball, bowling, golf, tennis, and swimming.

A BuPers letter to Commandants outlines the revised sports policy for Navy women personnel. It also states that other sports such as badminton, field hockey, table tennis and archery are encouraged where time and facilities permit.

Primary objective of the revised program, according to BuPers, will be to provide means of recreation for as many women personnel as possible with emphasis on intramural level competition, although varsity competition within district boundaries is encouraged. BuPers explains that while it is not the intention to minimize the importance of varsity level athletics, it is felt that a varsity program should be the outgrowth of a successful intramural program.

Secretary of the Navy certificates, Navy "Ns" or Marine Corps "Ms" will be awarded yearly to district women champions in each of the seven organized sports. These awards will go to the top teams as determined by tournament playoffs, eliminations, or league standings within the district.

SIDELINE STRATEGY

First Lieutenant Tom Theisen, USMCR, MCAS El Toro, Calif., had teed off for a solitary round of golf when another player showed up. "Hey, Mac," yelled Lieutenant Theisen, "If you want to get beat, join up."

The man, clad in sports clothes, said he would be glad to join Theisen, but he didn't think the lieutenant could beat him. At the fourth hole the scores were even, and Lieutenant Theisen appeared an even money bet to live up to his claim. It was there his genial companion turned and said, "By the way, I don't believe we've met. I am General Wallace."

The general won the match.

★ ★ ★

No one can blame any sailor-hunters who cast an envious glance in the direction of MCAS Cherry Point, N. C. With the wild goose calling and numerous other game stirring, Cherry Point announced it has 200 shotguns available for use by Marine hunters. Game available in the vicinity: bear, deer, Russian boar, rabbit, squirrel, quail, turkey, grouse, and pheasant.

★ ★ ★

It would have been interesting if MCS Quantico and MCRD San Diego could have clashed in a post-season football game. There can be little doubt in anybody's mind that the Marines again came up with the top two pigskin squads within the Navy—probably within the Armed Forces—and that these teams were Quantico and MCRD.

In their first five games the MCRD San Diego leathernecks scored 275 points to their opponents 14. Quantico got off to a shaky start, losing to potent Xavier University, but when their star-studded backfield began clicking they were an awesome sight. There wasn't a college coach in the country who wouldn't have traded backfields with the Virginia Marines, whose first string ball handlers were Second Lieutenant Eddie LeBaron (College of the Pacific), First Lieutenant Hosea Rodgers (North Carolina University and Los Angeles Dons), Second Lieutenant Bill Hawkins (Naval Academy) and Second Lieutenant Bob Farrell (Holy Cross).

MCRD rooters stoutly maintain their team would have polished off the perennial champs from across the nation had they been given the opportunity. Quantico fans just smile when the argument is brought up. It's the smile of a man sighting down the barrel of a loaded pistol from the right end.

★ ★ ★

First women ever to land a berth on NTC Great Lakes' rifle team is Rose Valarosi, SA, USN. The bullseye-smashing Wave was such a hit at local matches she was invited to become an alternate member of the elite NTC team that fires in some of the top midwestern matches.

Rose Valarosi, SA

Taught to shoot by four brothers addicted to hunting, Rose was the local Annie Oakley with small-bore rifles in her home town. She apparently is no less proficient with the heavier rifles used by the team, and is eagerly awaiting a chance to move into a regular spot. "I hope none of the regulars sprains a finger," says Rose, slyly.—Earl Smith, JOC, USN, ALL HANDS Sports Editor.

SALVOS AND

DEADLY fire from USS *Worcester* (CL 144) blasts North Korea (above). Right above: Purple Hearts awarded wounded by RADM B. J. Rodgers, Com 12.

GUN CREW pours it on (above) as *Corsair* gets potent rocket load (below) Right, below: Mines were cleared by fearless UDT men before vital landing.

WITH 135,000 enemy prisoners in the fold and another 200,000 troops written off as "other enemy losses," United Nations forces still were finding it tough going above the 38th parallel, encountering stiffening resistance and visible aid from Red China.

The picture was the same at sea, where enemy mines claimed three minesweepers sunk and two destroyers damaged. Besides the actual damage, mines enforced a threat of damage so severe that the U.N. landing at Wonsan was held up for six days while the world's most intensive minefield in history was cleared.

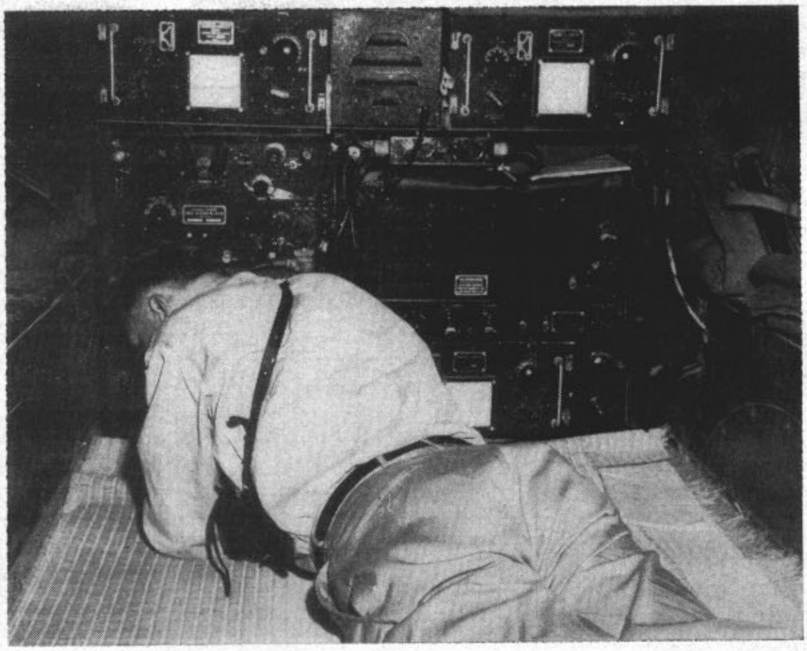
This consisted of 1,500 to 2,500 moored and influence mines, the latter a type which lies on the bottom and explodes under a ship with

HEROES

a force two or three times that of the horned, moored mine. The sweeping operation involved UDT teams and aircraft as well as surface craft doing their share.

A minesweeper with a history is the first vessel of the unofficial "United Nations Navy." Launched and refloated at Wonsan on U.N. Day, MS-41, now unofficially named the UNS *Guinea Pig*, was a former Japanese vessel turned over to South Koreans after World War II.

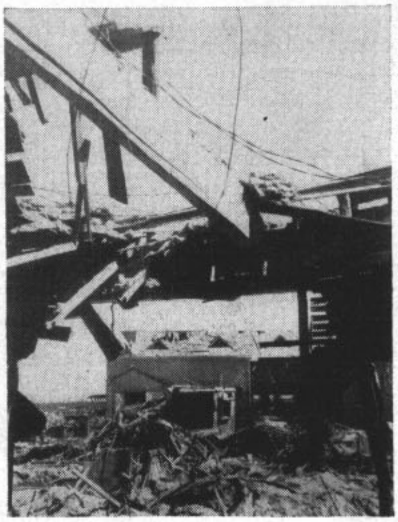
When the North Korean attack began, her crew murdered her captain and delivered the vessel over to Communist forces. She might have helped lay the Wonsan minefield, but a rocket in her engine started a fire which caused her to be beached. She was recaptured and refloated by U.N. forces.



Shore Fire Control

Daring inland sortie by Navy members of shore fire control parties are making history in Korea with their sea-land coordination. One of these teams concealed themselves within an impudent hundred yards of a vital traget, calmly relayed instructions to USS *Helena* (CA 75), then watched screaming shells from her 8-inch guns deliver a death blow.

A perfect barrage was talked in from a radio transmission truck by CDR Lester H. Hubbell, USN, (above) as USS *Helena* pounded away (below). Center: Only devastation remained.



THE WORD

Frank, Authentic Advance Information On Policy—Straight From Headquarters

• **RETROACTIVE SAVED PAY**—A decision of the Comptroller General may result in retroactive "saved pay" for certain enlisted aviation personnel.

The ruling has been made that enlisted personnel receiving aviation pay (hazardous duty incentive pay) on 30 Sept 1949 because of temporary flight orders in effect on that date may continue to receive aviation pay as an item of saved pay for such period as entitlement to and credit of aviation pay remains uninterrupted. The fact that the temporary flight orders may have expired by limitation, or were revoked on or after 30 Sept 1949, will not prejudice their entitlement to saved aviation pay if their new temporary flight orders are effective from the day following the date of expiration or revocation of their previous temporary flight orders.

As a result of the Comptroller General's decision, retroactive entitlement to saved pay of concerned enlisted personnel must be redetermined. The directive, ALNAV 95-50, (NDB, 15 Sept 1950), stated this information should be brought to the attention of all personnel concerned, and that anyone who considers his right to saved pay affected by this decision should request his disbursing officer to review his pay account to determine his entitlement to retroactive saved pay.

• **SURPLUS PROPERTY**—A new task of the Navy is to receive reports of surplus property which is being released by civilian government agencies and to see that the property is screened for possible military use.

This procedure is part of a new system of determining that all government property usable in any U. S. agency is retained. Navy, Army and Air Force property found to be surplus in its original branch of the service is screened by both the other branches for possible use. If still found to be surplus, it is released to civilian agencies of the government for screening. The Navy has final responsibility for determining whether supplies and equipment are excess to the entire Department of Defense.

The new rescreening process already has resulted in the recovery of more than five and one-half million dollars' worth of property previously slated for disposal as surplus. It is expected to continue to bring about great savings.

• **EN SCHOOLS**—The schedule of classes at the Navy's two Naval Engineman Class A schools, located in San Diego, Calif., and Great Lakes, Ill., is being stepped up.

Starting 2 Jan 1951, classes at the two schools convene every second Monday. Previously classes at the schools convened every four weeks.

Billets for 13 recruits and five fleet personnel are available at each of the convening classes of the San Diego school. Each class of the Great Lakes school will have billets available for 15 recruits and seven fleet personnel.

Old-Time Airship Chief Retires After Outstanding 30-Year Career

Formal inspection at NAS Lakehurst, N. J., of the crew of Airship Squadron Two on a recent day climaxed the 30-year career of George William Moser, BMC, USN.

Entering the Navy in 1920 at Scranton, Pa., Chief Moser went to Great Lakes for recruit training and remained there to graduate from what was then known as the aviation mechanic school.

The following years found Chief Moser at NAS Pensacola, NAS Lakehurst and USS *Wright*. The latter was originally built as a kite-balloon tender but later used as a sea plane tender servicing F5Ls.

At Hampton Roads, Va., in 1922, he participated in an experiment using helium as compared to hydrogen in balloons. Results of these tests helped determine the Navy's selection in favor of the safer helium.

In 1925, he went aboard the rigid airship USS *Los Angeles* (ZR3). He served seven years on this airship and made chief boatswain's mate while on board. In 1933, he was ordered to another rigid airship, USS *Macon* (ZR4), remaining with her for two years.

FORMAL INSPECTION of crew of Airship Squadron Two climaxes 30-year career of George Moser, BMC.

Chief Moser is just about the last of the rigid airship men to leave the Navy. During his 30-year tour of duty he has logged over 8,000 flying hours. The last entry in his log was made in 1942, and it can be assumed he has over 10,000 hours actual flying time.

A citation for meritorious service was awarded Chief Moser in 1946 for participation as crew chief in the flight of a blimp from Key West, Fla., to NAS Lakehurst. This particular blimp could not maintain level flight due to an unbalanced condition in the construction of the ship. After 1,250 miles of sweat and work, the airship made a successful landing.

Chief Moser has been with the squadron for many years. Quiet in speech, unassuming in manner and efficient in his duties, Chief Moser leaves behind an outstanding and enviable career.—W. E. Fitzgerald, AO2, USN.

• **MORE CRUISES**—Twice as many volunteer Naval Reservists as usual may be assigned annual training duty in a pay status during the remainder of fiscal 1951, due to authority granted naval district commandants by the Navy Department. Under the new quotas, approximately 20,000 naval officers and some 10,000 enlisted personnel may receive training.

The approximately 30,000 Reservists to receive annual training duty with pay will be apportioned among many types of activities, with emphasis on duties afloat. Among these will be duties with reserve fleets, ship activation units and mobilization teams, in combat information centers, and in mine warfare, anti-submarine warfare and harbor defense.

PROUD citizen on leave Ki Yih Sun, SD1, explains Buddhist religious rites to shopkeeper Frances Chan.

American Dream Is Reality For Navyman and Family

American citizenship and a home in the U.S. were the ultimate goal of a young man named Ki Yih Sun who joined the Navy in Canton, China, in 1932.

Ki Yih Sun was granted U.S. citizenship in August 1949, while serving aboard the repair ship USS *Ajax* (AR 6). Not long afterward, he realized his other ambition. After 18 years in the Navy, Ki Yih Sun, SD1, was assigned to shore duty at NAS North Island, San Diego, Calif. Now he can establish a relatively permanent home in America.

Steward Sun is married; has three sons, aged 16, 14 and 10. At last report, his wife and sons were waiting in Hong Kong for transportation to San Diego.

• **NAVY TRAINS ARMY**—As of 10 Jan 1951, the U.S. Naval School of Music, Anacostia, D. C., becomes coeducational, so to speak. Its doors will be open to Army musicians, as well as to musicmen of the Navy.

Approximately 150 Army trainees were slated for the first '51 class, due to begin studies on the first Tuesday in January. Army students are being selected by appropriate commanders on established quotas, from the zone of interior commands only. One year's previous service with a band of the Army, Navy, Marine Corps or Air Force is required for applicants, and they must be currently assigned with an organized service band.

The Navy will provide the necessary funds and training facilities for training Army bandsmen at the Anacostia school. The Army will assign a selected group of personnel, both officer and enlisted, to the school to augment the staff.

• **MSTS SHIPS**—Consolidation of all sea transportation facilities of the armed services is now complete, with some 460 vessels being operated by the Military Sea Transportation Service at present.

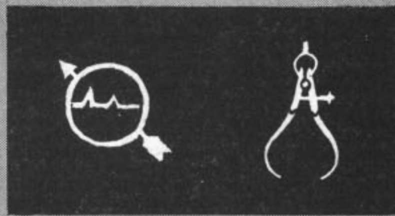
MSTS, under cognizance of the Navy, was established 1 Nov 1949 to provide ocean transportation for personnel and material of the armed forces. Since that time, a great many ships have been transferred to the new organization.

Of the total now under MSTS, approximately 230 are operated by MSTS proper, with the remainder being time chartered. A tag-end transfer of ships to MSTS occurred at the end of the Alaskan shipping season, when 10 small coastal type Army vessels and 11 harbor boats were transferred from the Army's Alaskan command.

At that time, MSTS had rolled up a record of over 3,000,000 measurement tons of cargo moved to the western Pacific area since the beginning of the Korean conflict. This was in addition to 195,000 passengers and more than 9,000,000 barrels of petroleum and oil products.

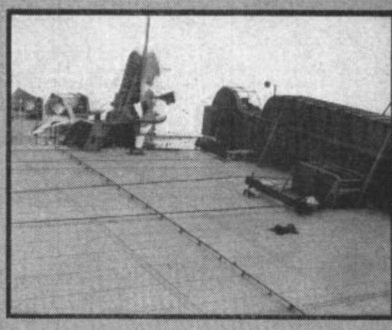
QUIZ AWEIGH

The little things you think you're sure of can trip you up when it comes to a showdown. For instance, how sure are you of the correct answers to this quiz?



1. The specialty mark at the left is worn by (a) telemen (b) radarmen (c) sonarmen.
2. Those who wear the specialty mark at the right are (a) opticalmen (b) instrumentmen (c) draftsmen.

3. The distinctive design of this flag identifies it as the (a) merchant flag of Argentina (b) national flag of Guatemala (c) United Nations flag.
4. The central design is white on a field of (a) green (b) light blue (c) yellow.



5. What is this picture?
6. If you have guessed correctly, you should know the type of vessel is (a) AV (b) CV (c) CA.

ANSWERS TO QUIZ ON PAGE 53

Duty Assignments Defined For Personnel Entitled to Sea, Foreign Service Pay

Duty assignments that will entitle personnel to sea and foreign service pay have been defined.

Except for personnel receiving "saved pay,"—who are not affected by the new sea pay regulations—S&FSD pay will be paid to the following enlisted personnel:

• Those permanently assigned to a vessel (other than a vessel restricted to service in the inland waters of the U.S., or a non-self propelled vessel). Sea pay continues for personnel permanently assigned to a vessel and during any period of continuous temporary additional duty ashore of not more than 15 days. The definition of inland waters of the U.S. is contained in Coast Guard publications 169, 172, and 184.

• Those permanently assigned to a ship-based aviation unit. Personnel continue to receive sea pay during any period of (1) temporary additional duty ashore, or (2) while the unit is temporarily based ashore, provided these periods are of not more than 15 consecutive days.

"Temporarily based ashore" refers to a ship-based aviation unit that has been landed ashore with intent to return to a ship.

• Those permanently stationed ashore but who temporarily serve for a period of eight continuous days or more on board a vessel.

• Those serving on a vessel restricted to service in inland waters of the U.S., or a non-self-propelled vessel, when that vessel actually operates outside of inland waters for a period of eight or more continuous days.

• Those permanently assigned to a commissioned landing craft tank squadron, or a commissioned motor torpedo boat squadron which is a tactical component of an operating fleet, and subject to movement as an integral unit of such fleet.

Other than the exceptions listed above, no enlisted personnel will be considered to be on sea duty for additional pay purposes while on duty at (1) a receiving ship or receiving station, (2) a vessel which is in an inactive status, (3) a shore based administrative or maintenance organization of any unit.

Until the question is settled as to whether or not they are entitled to sea duty pay, none will be credited to personnel while they are in the U.S. for leave or hospitalization.

Foreign duty pay accrues to enlisted personnel on duty beyond the continental limits of the U.S. or in Alaska as follows:

• From (and including) the date of departure from the continental limits of the U.S. enroute to join a vessel or to report for sea duty or other duty beyond the continental limits of the U.S. or in Alaska.

• While enroute between duty stations, afloat or ashore, beyond the continental limits of the U.S. or in Alaska.

• While enroute to the U.S. after detachment from sea duty or foreign duty, to and including the date of return to the continental limits of the U.S.

• While assigned to permanent duty in the continental United States, for periods spent outside the continental U.S. on temporary additional duty, or on operational aircraft flights, but only when such duty or flights are eight days or more in duration, including the dates of departure from and return to continental U.S.

Foreign duty pay will not be credited while personnel are in continental limits of the U.S. for temporary additional duty, hospitalization or leave.

This information is contained in Alnav 119-50, (NDB, 31 Oct 1950).

Study Material Recommended For Prep School Candidates

A list of study material recommended for men who may be assigned to the Naval School, Academy and College Preparatory, is given in BuPers Circ. Ltr. 159-50 (NDB, 15 Oct 1950).

The list includes both correspondence courses providing lesson grading service, and education manuals. Information on the availability of these courses may be secured from educational services officers.

HOW DID IT START

Port and Starboard

In nautical language, port and starboard are terms used to indicate the left and right sides of a ship. To a person on board ship and facing forward toward the bow, the port side would be on his left, the starboard side to his right.

The word "port," believed to have come from the Portuguese "oporto" ("the port") appeared in British naval terminology as early as 1580.

At the same time, the term "starboard" was used to refer to the right side.

Because of growing confusion resulting from the similar sound of larboard and starboard, the term "port" eventually superseded "larboard," and in the 1840s "port" was officially adopted by the American Navy.

Third Interservice Photography Contest Opens; Rules Are Listed

Shutterbugs throughout the Navy, Marine Corps and Coast Guard should dust off their best cameras, and, as the saying goes, get hot. The third Interservice Photography Contest is now underway, with deadlines fast approaching.

Here are the rules:

- All personnel on active duty for more than 90 days are eligible.
- Photographs will be judged on originality, appeal of subject matter, technical excellence, and composition.
- No photograph may be withdrawn by any contestant during the contest.
- Photographs will not be returned until all commitments for publicity purposes have been met.
- Portraits must be accompanied by a statement signed by the subject or subjects, authorizing entry of the photograph in the contest and its reproduction and use in connection with contest publicity.
- No official military photographs may be submitted as entries.
- No liability or responsibility can be assumed by the Navy for loss or damage of any photograph submitted.

Photographs may be entered in any of three classes—Class one: salon photographs, Class two: color transparencies, and Class three: snapshot photographs (black and white only). Under Class one there are four categories. They are:

Service life—on duty and at leisure: Photographs documenting representative scenes from daily life in the service, compositional photographs of equipment and surroundings, and recreational scenes.

Landscapes and architecture: Photographs of scenery, land and seascapes, picturesque buildings, bridges, monuments and similar structures.

People and customs: Portraits, photographs depicting personalities, customs, beach scenes, fashion studies, and full length photographs of people.

General pictorial: Story-telling photographs, humorous shots, photographs of pets, animal scenes, compositional or abstract photographs, and miscellaneous subjects.

Classes two and three are single categories, with no specified subdivisions. However, there are certain rules pertaining to each of the three classes. Here they are:

Class one. For purposes of this contest, salon photographs are defined as black-and-white or colortone photographs which have been enlarged and mounted in accordance with the contest rules. Salon photographs must be submitted on 16-by-20-inch mats. It is preferred that the photographs themselves in this class be 11 by 14 inches in size. However, those eight by 10 inches in size will be accepted. The negative must accompany the entry in an envelope attached to the back of the photo mounting. Photographs in this class must be taken and processed by the individual contestant.

Class two. Color transparencies must be submitted in standard two-by-two-inch cardboard ready-mounts, if they are of the 35-mm size. Other sizes of color transparencies up to and including four by five inches should be mounted on five-by-seven-inch mats with rectangular cutouts so that the transparencies may be viewed when lighted from the reverse side. All color transparencies should be protected to prevent scratching in transit, but

PO1s on Eligibility List Advanced to Chief; New CPO Exams are Planned

Petty officers first class, in the past held to limited opportunities of promotion in comparison with lower rates, can take encouragement from a new Bureau of Naval Personnel directive.

BuPers Circ. Ltr. 168-50 (NDB, 31 Oct 1950) makes two important announcements. One provides for advancement to chief petty officer, acting appointment, of 252 men on the eligibility list. The second announcement is that BuPers plans have been changed and Navy-wide examinations for advancement to chief petty officer, acting appointment, will be held sometime "during the latter part of fiscal 1951"—which means before 30 June 1951, the end of the 1951 fiscal year. A previous directive had stated these examinations would not be held until fiscal 1952.

The eligibility list was published in enclosure (B) to BuPers Circ. Ltr. 56-50 (NDB, 30 April 1950), which contained the names of 250 petty officers first class who had competed successfully in Navy-wide exams on 1 Dec 1949 but were not to be promoted unless authorized later. Two more names were added to the eligibility list by individual letters from BuPers to the commanding officers of the two men, a DK1 and a CM1.

The necessary authorization to promote these men on the eligibility list is in the new directive, which provides for the promotion of all men on the list who are "in all respects qualified and eligible." The individual's commanding officer is directed to effect the advancement not earlier than 16 Dec 1950 nor later than 28 Feb 1951.

It was previously known that at least some advancements would be made from the eligibility list, particularly since no Navy-wide examinations were scheduled to be held in January 1951 when lower rates will be examined. But this is the first announcement of a blanket advancement of all men on the eligibility list who are still qualified.

In regard to the coming examinations for advancement to CPO acting appointment, the directive states that "for information and planning purposes," the examinations will be held "during the latter part of fiscal 1951." No specific date was set.

'Remember me? About 15 years ago I said I wanted a boat I could be captain of . . .'

glass or metal mounts are not desired.

Color transparencies must be taken by the individual contestant, but they may be processed commercially. Tinted black-and-white prints and color prints are not eligible in this contest.

Class three. Snapshot photographs must be taken by the individual contestant, but may be processed commercially. Negatives must accompany the entry in an envelope attached to the back of the photograph. Snapshots need not be mounted.

Each photograph in any category must be accompanied by an envelope—attached to the photo mounting, if there is one—containing a good deal of information. Information required is as follows: name, rate, serial number, military address and permanent home address of the contestant; his home town paper's title and address; date, title of photograph, category, type of camera, size, type of film and exposure and aperture used, type of paper, developer; and special treatments used, such as toners, papers and negatives. There should be an informative paragraph giving any existing facts of interest about the subject and the conditions under which the photograph was taken and processed.

All naval activities are divided into eight groups for purposes of the contest. The groups and the areas which comprise them are listed below, along with the commands which will select finalists from the various groups:

Atlantic Fleet Group—Fleet and shore-based units of the Atlantic Fleet, including Atlantic Fleet units operating under CincNELM; ComServLant.

Middle Atlantic Group—Activities within the 5th, 10th and 15th Naval Districts and the Potomac River and Severn River Naval Commands; ComPRNC.

Northeastern Group — Activities within the 1st, 3rd and 4th Naval Districts; Com3.

South Central Group — Activities within the 6th, 8th and 9th Naval Districts; Com8.

West Coast Group — Activities within the 11th, 12th, 13th and 17th Naval Districts; Com11.

Pacific Fleet Group—All Pacific Fleet units on the U.S. west coast; Com13.

Hawaiian Group—Activities ashore and afloat in the Hawaiian area; ComServPac.

Far East Group—Activities ashore and afloat west of the Hawaiian Islands; ComServPac.

Naval air training activities, reserve fleets and all other activities will compete in their respective naval district eliminations. Fleet air wings are considered to be Fleet units. Fleet Marine Force units will be considered as shore based activities and will participate in the naval district eliminations, unless otherwise authorized by the Commandant of the Marine Corps. NROTC units are not eligible to compete.

Each of the eight "group headquarters" will select up to 50 photographs in each category from activities within its group. That is, up to 50 in Class two and Class three, and up to that many in each category of Class one will be selected in each group for the finals. These will be forwarded to the Chief of Naval Personnel (Pers-G115) in time to arrive by 1 June 1951. Photographs deemed unsuitable for publication or public exhibition will not be considered for final competition.

In addition to any prizes which may be awarded at preliminary levels, the following prizes will be awarded at the interservice level:

A first, second and third prize and two honorable mentions in each of the four categories of the salon photographs.

A first, second and third prize and two honorable mentions in Class two, color transparencies; and in Class three, the snapshot class.

One grand prize will be awarded for the salon photograph judged "best of the show."

The perpetual Interservice Photography Contest Trophy will be awarded to the service earning the largest number of points in all classes and categories combined. One point is awarded for a fifth-place award, going up to five points for a first-place award.

If the military address of any contestant is changed after he enters the contest, it is suggested that the Chief of Naval Personnel (Pers-G115) be notified. Each contestant must certify, witnessed by his recreation or welfare officer, that the photograph submitted was taken by himself.

This contest may be the kick-off point on somebody's road to fame or fortune. Start thinking and acting on it, and meanwhile watch for a BuPers circular letter which is coming out on the subject.

WAY BACK WHEN . . .

Oldtime Gunners

Looking back on the days when naval armament consisted chiefly of brass or cast iron cannons, one cannot help but marvel at the degree of marksmanship attained by the oldtime gunners—particularly when the awkwardness of the "fire control" of the times is considered.

Guns were classified as "pounders" in accordance with the weight of shot they could throw. For example, a 24-pounder was capable of hurling a solid iron ball weighing 24 pounds.

A typical 24-pounder was mounted on a wheeled platform or carriage, and had a barrel nine feet long. The gun itself weighed well over two tons, while the carriage weighed close to a half ton.

Maximum train angle on most guns was 30 degrees (15 degrees to right or left) and was controlled by paying out or hauling in on side tackles (pronounced *taykles)* which were attached to the gun carriage and the side of the ship.

The 24-pounder threw round shot (cannon balls), sometimes fired to a red heat ("hot shot") in the galley stove; also chain shot, bar shot, and grape. The "grapes" were especially murderous. A whole bagful of miniature cannon balls would be rammed into the 24-pounder.

17 Areas Report Critical Shortage of Housing for Naval Personnel

Housing for naval personnel is critically short in at least 17 areas, according to information received by BuPers and briefed here for interested Navymen.

Personnel being transferred to these areas should not send their dependents there without making previous arrangements for their housing.

Shortages may also exist in other cities because of the current increase of personnel in the armed forces. As additional information becomes available, ALL HANDS will publish the full details.

Here's the latest on the 17 areas where known shortages exist:

• *New York City*—No emergency naval housing is available and there are long waiting lists for all Navy and government-controlled housing. "Personnel ordered into this area," reports an official communication from the 3rd Naval District, "are advised that unless they are prepared to pay a minimum rental of approximately $80 per month for three rooms and are willing to travel a commuting distance taking two hours a day, immediate housing is not available."

Hotel rooms, although not short at the present time, may be reserved in advance through the 3rd Naval District Hotel Reservation Bureau, Room 1413, 90 Church St., New York City, N.Y.

A waiting period of three to eight months exists for the Wallabout Naval Housing Project, which offers three, four or five-room units to Regular Navy married enlisted men and their families reporting to the 3rd Naval District on a normal tour of shore duty. Applications should be made immediately upon reporting at the Office of the Assistant Chief of Staff for Personnel (Wallabout Housing), Room 1416H, 90 Church St., New York City.

Applications for rooms or apartments in civilian housing units can be made with the U.S. Naval Housing (attention Mrs. R. P. Baxter), Naval Shipyard, Building 312, Brooklyn, N.Y.

The Traveler's Aid Society, 144 East 44th St., New York City, handles emergency applications for rooms, light housekeeping room and small efficiency apartments. A personal interview is required.

'Then add four cups . . .'

• *Norfolk*—The Benmoreell Housing Reservation, a low-cost Navy-owned project, at the time of the report from this area had a waiting list of 1,731 for two-bedroom units and 585 for one-bedroom units, making a total of 2,316 applications.

"Approximately 50 per cent of the personnel on the waiting list for one-bedroom units," notes the report, "are in pay grades 3 and 4, and they have an insufficient number of years of service to draw rental allowance under the Career Compensation Act of 1949.

"Because of this situation it is becoming increasingly difficult to grant priorities to personnel at the time they arrive for duty in the Norfolk area. Under the regular rotation program, personnel must wait 11 months for a one-bedroom unit in Benmoreell and 19 months for a two-bedroom unit."

For Federal Housing Office projects in Norfolk, there is a waiting list of seven to eight months. No priorities for hardships are granted unless there is a court notice of eviction. Waiting lists for the government controlled projects have increased to a point where now the number of names is 75 per cent greater than the peak of World War II, the report states.

So unless naval personnel are prepared to pay $85 per month or more for rent, the report reads, they are strongly advised against bringing their families into the area without making prior housing arrangements.

• *San Francisco*—The report from this city makes a special effort to advise personnel coming to the Pacific area not to bring their families or have them come to San Francisco unless private arrangements for housing have been made in advance. "The present housing shortage for naval personnel," states the information, "is critical and of increasing seriousness."

There is, however, no shortage of hotel accommodations.

• *New Orleans*—"The housing situation in New Orleans is still somewhat critical and civilian housing is quite expensive," says a letter from the headquarters of the 8th Naval District.

"Enlisted personnel with children will have a varying period of delay, from one to four weeks, depending on their needs, before assignment in the Bienville Homes, a low rent naval housing project. These apartments are unfurnished except for stove and refrigerator. Officers and enlisted personnel without children are not assigned quarters in Bienville Homes at present. Civilian furnished hous-

Special Book Reviews Medal of Honor Men

A new book, entitled Medal of Honor, The Navy, will soon be ready for distribution.

Prepared by the Bureau of Naval Personnel by direction of the President, this book gives briefly the story of the Navy's growth and traditions. Included is a short resume of the wars and campaigns which served as a basis for the Medals of Honor awarded by the Navy since 1861. There is a citation for each man, describing his valiant deeds, and accompanying photographs for World War I and World War II.

The distribution list consists of Medal of Honor recipients or their surviving next of kin, the President and his Cabinet members, certain Congressmen, Defense officials, libraries and patriotic organizations.

The book is priced at $4.00 when purchased from the Government Printing Office, Washington, D. C.

ing is available at rates of $50 and up for one-bedroom apartments, $90 and up for two-bedroom houses. Unfurnished civilian housing is very scarce."

Hotel accommodations are "practically impossible, except by very early reservation and then are limited to a maximum of five days. Auto courts are available at five dollars and up per day."

• *San Diego*—"The housing situation for service personnel in San Diego," states the correspondence from 11th Naval District, "continues to be critical and the need for adequate housing of service personnel is not being satisfied.

"In order that undue hardships may not result, it is requested that service personnel be cautioned against bringing dependents into the San Diego area in expectation that government or private housing can be provided, unless they have made arrangements in advance for housing."

The report states that rental rates in private housing are now "excessive" because of the rent decontrol which became effective 1 September 1950, migration of defense workers, and "other circumstances connected with the present international situation."

• *Quonset Point, R.I.* — Correspondence from this naval air station states that the housing situation there is "still critical." Personnel ordered to this area are advised to make definite housing arrangements prior to transporting their families here. All Navy and government controlled housing projects have long waiting lists. Prices of local civilian rentals for a two-bedroom house or apartment range from $90 to $125 a month without utilities."

'Parted or straight back?'

Correspondence from the 13th Naval District indicates housing shortages in the following areas:

• *Bremerton, Wash.* — There are long waiting lists for all Navy and other government-controlled housing, and private housing is virtually unobtainable. Naval personnel ordered to the Bremerton area are advised not to transport dependents to the Bremerton area unless they have made arrangements in advance for housing. This applies to hotel accommodations and other temporary housing as well as permanent-type housing.

• *NAS Whidbey Island, Wash.*—At present there is a long waiting list for housing for both officer and enlisted personnel. The only housing available is a very limited number of dwellings owned by private citizens and a limited number of government rental housing units. The nearest metropolitan areas of any size are Anacortes, Wash., 20 miles distant, and Mount Vernon, Wash., about 26 miles away. Adequate housing should be obtained before service personnel send their dependents here.

• *Astoria, Ore.* — Long waiting lists exist for public quarters and rental housing at the naval station. The nearest metropolitan district is Astoria, Ore., five miles away, which has a limited number of dwellings available for rental by private citizens. At the present time, many of the naval personnel stationed in this area are living at Seaside, Ore., 21 miles distant from the station, in a summer resort where the rental rates will become prohibitive when the tourist season starts. Personnel ordered to NAS Astoria, Ore., or the Columbia River Group, Pacific Reserve Fleet, are advised against transporting their families into the area wthout making definite housing arrangements in advance.

The following information was received from the 9th Naval District:

• *Great Lakes, Ill.*—The housing situation is now critical, with long waiting lists for all Navy and other government controlled housing. Naval personnel should be strongly advised against transporting their families to the area without making previous housing arrangements, unless they are prepared to pay in excess of $75 per month for rent. Civilian rentals are available in very limited number in small communities 10 to 20 miles from the Naval Training Center. Motel and trailer camp accommodations are very limited in number.

• *Forest Park, Ill.*—"Military personnel assigned to the activity, civil-

Recruit Never Attended School a Day in His Life

With all due respects for formal education, there is still much to be said for the college of hard knocks. One Marine recruit wrote on his application blank "High school education: none. Grammar school education: none." Yet he wrote his entrance tests with high scores—twice above passing.

Although he has never gone to school a day in his life, Tom Puckett, 19, the new Marine, has been doing some studying since last Fourth of July. And he intends to do some more studying, especially of courses offered free to all Marines by the Marine Corps Institute.

This unusual story goes back to a boyhood when Puckett lost first his father and then his mother. The youngster had to work for a living and there was no time for "schoolhousing." Later, he got the wanderlust, and spent a good deal of time seeing America's great southwest.

On 4 July 1950, Puckett found a sister of his whom he hadn't seen since childhood. She took him into her home and handed him a stack of school books. On the same day, Puckett found a new girl friend and a new job—all in the Illinois city where his sister lives.

But a few months later, after a round-table discussion, Puckett decided to join the Marines. He obtained a mark of 67 in his entrance test, while 31 is passing. His GCT, too, was well above average.

While at the Marine Corps Recruit Depot, Parris Island, S.C., Puckett expressed a hope of entering the Motor Transport Section and moving ahead in automotive mechanical work.

ian personnel transferred from other stations, and married civilian personnel who must reside in the general area of the Naval Ordnance Plant for reasons of economy are compelled to pay exorbitant rentals if they are successful in locating apartments, houses or housekeeping rooms," the report states. "Realtors who handle rentals in the Forest Park, Maywood, Berwyn, Cicero and Oak Park communities, all near the plant, mutually term the conditions with respect to availability of rental housing as 'poor' with no foreseeable prospects of relief. There is no public housing in the area and there is none proposed at this time."

• *Crane, Ind.* — Limited government rental housing is available in Crane Village for military personnel assigned or attached to the Naval Ammunition Depot and not eligible for existing quarters. Arrangements for this housing should be made in advance through the commanding officer, Naval Ammunition Depot, Crane, Ind. There is no other rental housing, public or private, available in the immediate area, and housing conditions in communities 20 to 35 miles away are critical.

• *Indianapolis, Ind.*—"The housing situation is not good and rental housing is not within the means of the average Navyman or civilian. Reopening of Army installations in the area is making the situation worse," states the report.

• *Omaha, Nebr.*—"There is an acute shortage of housing of any description," information from Omaha points out. "Rental property is particularly scarce, and rents are exorbitant. Any person with dependents ordered to this area for duty and for whom public quarters on this Reserve Center are not available will have extreme difficulty in locating a place to live, suitable or otherwise."

• *Hastings, Nebr.*—New civilian employees reporting in to the naval ammunition depot will probably reduce available housing to zero by early 1951, but the local command believes housing can be arranged for the relatively small increase in naval personnel as now planned.

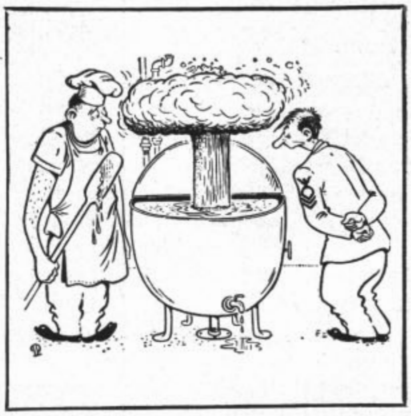
• *NAS Olathe, Kans.* — Housing conditions are regarded as "poor" and immediate housing is not available. There are housng possibilities in smaller towns 20 to 30 miles away. The U.S. Housing Agency at Sunflower, Kans., 20 miles away, reports "numerous units available for small families." But, the report says, this situation could change at any time due to the expected reopening of the Sunflower Ordnance Plant.

"Housing in the Kansas City area," the report continues, "is regarded as critical, unless personnel are prepared to pay $90 to $100 per month for rent. Desirable housing for less is extremely hard to find."

• *NAS Grosse Ile, Mich.*—This station has three barracks converted into 120 apartments, which are privately controlled housing for enlisted personnel. There are no vacancies in these housing units and at the present time, there is a waiting list. Area adjacent to this station has little housing available for enlisted men due to high rentals, and only limited space for officers.

"In areas up to 35 miles from this activity," the information states, "including the Detroit area, there are apartments, rooms and houses available.

• *St. Louis, Mo.*—No Navy or Government-controlled housing is



available, and there is an acute shortage of private rental units. Rents for furnished apartments are from $100 to $150 per month.

• *Denver, Colo.*—Homes to rent are hard to find and those available usually rent from $125 per month and up. Small unfurnished apartments, when one can be found, may be rented from $75 and up per month. Numerous motels offer two rooms with bath and kitchen at $100 per month during the winter and during the summer at $50 per week and up. Hotel rooms are scarce and remote from the station.

CLUSA and Overseas Rotation Of Enlisted Women Outlined

The Navy's policy for duty rotation of enlisted women is outlined by a new BuPers directive as follows:

• Enlisted women normally will serve three years in the same geographic area in the continental U.S. before reassignment within CLUSA.

• The normal tour of duty outside CLUSA for enlisted women will be the same as for enlisted men. The length of a tour is dependent upon the geographical location of the duty station as outlined in BuPers Circ. Ltr. 74-50 (NDB, 31 May 1950).

The directive which gives this information is BuPers Circ. Ltr. 170-50 (NDB, 31 Oct 1950).

An overseas-duty eligibility list for enlisted women is maintained by BuPers. Enlisted women may submit individual requests for overseas assignment to the Chief of Naval Personnel (Pers-B211f) via the CO. These requests must include the following information:

• Name, service number, rate and Navy job classification.

• Date of expiration of enlistment. A statement of intention to agree to extend enlistment if less than two years' obligated service remains at time of actual transfer overseas should be included.

• Total continuous duty in the geographical area to which presently assigned, computed to end of month.

• Overseas location perference.

• Statement concerning previous tour or tours of duty outside the U.S. continental limits.

Overseas areas to which enlisted women are assigned at present are England and Hawaii. Enlisted women will be expected to serve the following minimum tours of duty within CLUSA before becoming eligible for assignment to overseas duty:

Pay grades 4 and above—three years.

Pay grades 2 and 3—one year.

If requests are already on file in accordance with BuPers Circ. Ltr. 80-49, (NDB, Cumulative Edition 1949), they need not be resubmitted.

Statement on Recall of Naval Reserve Personnel to Active Duty

(Editor's note—To provide guidance and information for the benefit of Naval Reservists, planning officials of the Bureau of Naval Personnel have made the following statement on recall of Reservists to active duty, defining present and future considerations as closely as they are known at this time.)

To implement the rapid expansion of the Navy to meet the current international situation, it has been necessary to call to active duty relatively large numbers of trained Reserves, officer and enlisted, to supplement Regular personnel strength. At the same time, recruitment of Regular Navy enlisted personnel has been accelerated to the greatest possible extent.

It is regretted that the requirement for a rapid expansion has in the past necessitated the issuance of recall orders with a relatively short period of delay in reporting for active duty. Present policy requires that a Reservist called to active duty will be allowed at least 30 days between the time he is called and the date on which he must report for active duty.

It is further planned to institute at the earliest practicable date a program which will provide that Reservists selected for recall will receive a four months' notice of such recall. By such a method, all Reservists, not so selected, will be notified through press and radio releases that recall to active duty is at least four months remote unless a material change in military requirements otherwise dictates.

Probable deferments of some individuals, with the necessity for replacement by other individuals, will cause a certain number of exceptions to the complete success of such a program. It is felt that this program can be made effective for all Reserve personnel to be recalled after 1 July 1951. That date will be anticipated to the maximum possible extent, and while it may well apply to numerous individuals recalled during April, May, and June 1951, it cannot be guaranteed to apply to all individuals during this period.

In addition to the Reserve officer and enlisted personnel requirements for the expansion of the Navy during this fiscal year, it will be necessary for the Navy to continue the recall of Reserve personnel, officer and enlisted, for the foreseeable future in order to maintain its personnel strength. The numbers of Reserve officers recalled involuntarily in future years will depend on many factors, the major one being the number who choose to volunteer or to remain on active duty after recall.

It is expected that only a relatively small number of Reserve enlisted personnel will be involuntarily recalled to active duty after the completion of the initial expansion during the current fiscal year. It is also anticipated that in the main those Reserve enlisted personnel recalled in fiscal 1952 and in future years will be relatively untrained personnel without prior active service who will be sent through recruit training prior to assignment to regular billets.

By such means the mobilization potential of our Naval Reserve will be increased and the year by year manpower requirements of the Regular Navy will be met.

Both Organized and Volunteer Reserve personnel, officer and enlisted, are subject to involuntary recall, but the Navy effects recalls on a priority basis—Organized Reserve personnel first and Volunteer Reserve personnel second—to the extent necessary to meet the needs of the service.

In this connection, it is considered pertinent to call attention to the fact that enlisted quotas issued to date have, in the main, depleted the recall potential of the Organized Reserve in the ratings needed. It is also anticipated that by 1 Jan. 1951 it will be necessary to call some officers in the categories required from the Volunteer Reserve since the Organized Reserve potential for these categories will be largely depleted.

In calling Reserves to active duty, their qualifications to fill Navy billets on the basis of their records are the controlling factor. It may well be that an individual has other special qualifications as a civilian which might be considered more important to him in civilian employment, but for which the Navy has no need under the conditions prevailing on his recall. The Navy Department encourages all members of the Reserve to report new skills or specialties acquired while in inactive status and which can be converted to classifications or job codes for Navy record purposes. Such reports are important to insure to the maximum practicable extent that members of the Reserve called to active duty are given assignments which utilize their primary skills for which the Navy has need.

Present law which authorizes the involuntary recall of Reserve personnel specifies that the maximum period of involuntary duty is limited to 21 months. This does not preclude such personnel from volunteering for additional active duty. Reserve personnel released to inactive duty after completion of 21 months active duty will be replaced by newly procured Regular personnel and the remainder, as necessary, by other Reserve personnel who have had no postwar active duty.

The Secretary of Defense has established a policy with regard to delay in calling of Reserves who are filling key billets in essential industries or positions essential to com-

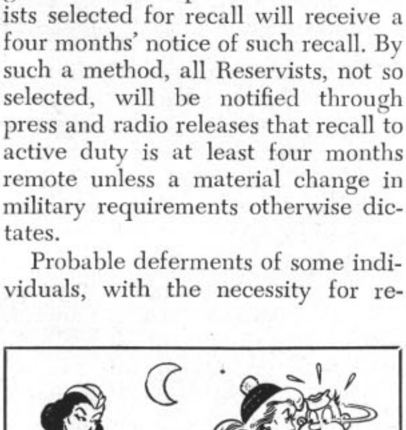
Two New Navy Training Courses Now Available

The following new Navy training courses are now available:

Instrumentman First and Chief, NavPers 10194.

Lithographer First and Chief, NavPers 10451.

Radioman First and Chief, NavPers 10229.



"A shipmate of yours, dear?"

munity welfare. In addition, the Navy Department considers elements of extreme personal hardship as justifying delay or deferment. In this connection the Navy Department is not knowingly ordering Naval Reserve personnel to active duty on an involuntary basis if they have four or more dependents. Such personnel who had previously been recalled are permitted to request release or discharge at the option of the individual. The procedures for requesting delay or deferment by an individual member of the Reserve or his employer have been well publicized. Prompt request, addressed to the Commandant of the Naval District or River Command through whom orders to active duty are issued, is necessary.

Since the need exists for personnel fully qualified for sea duty, the age of the individual will be a dominant factor in determining whether or not recall orders are issued.

The needs of the fleet for junior line officers will be met by supplementing Regular personnel by Reserve officers who have completed their college education since V-J Day and have had no active duty.

Recall of medical and dental officers will be in accordance with priorities recently enunciated by the Secretary of Defense.

The Navy Department does not contemplate the necessity of resorting to Selective Service to meet personnel requirements for enlisted personnel since USN recruitment augmented by untrained Naval Reserve personnel will be sufficient to meet anticipated needs for the foreseeable future.

The future recalls of Naval Reserve personnel discussed above is predicted in the extension of the Selective Service act of 1948 as amended by recent Congressional action.

Since members of the Naval Reserve who have been commissioned or enlisted since June 24, 1948, the date of enactment of the present Selective Service Act, are not thereby exempt from the draft, the Navy Department does not intend to commission or enlist in the Naval Reserve draft-eligible personnel unless their services can be immediately utilized on active duty.

The following statements contain a more detailed summary of policies that have and will govern the recall of Reserve personnel, officer and enlisted:

Officer Program

The primary consideration governing the recall of officers has been the needs of the service. Because of that fact officers with certain qualifications must be called while officers of equal capabilities but with other qualifications will not be required. In general, the recall has been limited to general duty officers for service afloat in the grades of lieutenant commander and below. The following categories of officers have either not been recalled or the numbers recalled have been severely restricted:

- Captains of all categories.
- Commanders of all categories.
- Officers with special qualifications in law, public information, intelligence, communication security and hydrography.
- General line officer specialists such as athletic instructors, educators, postal officers and civil administrators.
- Warrant officers except those who have volunteered.
- Civil Engineer Corps officers for CBs.
- Officers overage in grade.

Aviation Reserve Officer Program—More requests for voluntary active duty from Aviation Reserve officers have been received than can be utilized in the foreseeable future. Therefore until further notice no further applications for active duty are desired from Aviation Reserve officers. (As requested in BuPers dispatches 191930Z July, 081735Z July). Names of officers whose requests have already been received will be retained on file. It is anticipated that only a limited number of naval aviators will be required during remainder of this fiscal year. Criteria for future recalls will normally be as follows:

- Were released from active duty in past eighteen months or
- Are currently assigned to Organized Aviation Reserve units and have been so assigned for a period of more than six months immediately preceding recall to active duty or
- Who possess special qualifications.

Requirements for aviation ground officer specialists have been substantially fulfilled for the immediate future.

As soon as the exact requirements for aviation officers can be determined each individual applicant will be advised as to his status relative to recall.

All Reserve officers involuntarily recalled in fiscal 1951 will be phased out in an orderly manner commencing in October 1951. This will mean that some officers will be released after 15 months of service while others will serve varying periods but not to exceed 21 months. Such releases would be phased evenly over the months, at the rate of approximately 1,500 per month, until December 1952 when the last of the original

Navy Band Completes Swing Around West

The United States Navy Band has completed a month's tour of cities in the western U. S. The famous band held concerts in 36 cities of six states and at seven veterans' hospitals.

States visited by the band were Utah, Idaho, Washington, Oregon, Nevada, and California.

SONGS OF THE SEA

A Social Glass

And now we're safely moored in the Buffalo Creek at last,
And under Brigg's elevator the Bigler is made fast.
And in some lager beer saloon we'll let the bottle pass,
For we're all happy shipmates and we like a social glass.

—Great Lakes Song.

involuntary recalls would return to inactive duty. Consistent with the needs of the service, the desires of the individual will be taken into consideration prior to the establishment of a phasing-out schedule.

It will be necessary to replace some of these Reserve officers by other Reserve officers also involuntarily called to active duty. Every effort will be made to reduce to an absolute minimum the numbers of Reserve officers so called involuntarily. It is not possible at this time to estimate accurately the numbers and categories that will be required.

Enlisted Personnel Program

By 1 Jan. 1951, the Navy will have completed the major portion of USNR enlisted recalls. There will remain a further requirement for 31,000 Reservists to be recalled during the first six months of calendar year 1951, spread evenly over that period. This number will be comprised of approximately one-half petty officers and one-half non-rated personnel in pay grade E-3 or in pay grades E-1 and E-2 who have had at least six months' prior active duty experience.

The quota for the recall of personnel to report for active duty in January, February and March, 1951, has recently been issued. It is comprised of:

- CPOs in the ratings of instrumentman, teleman, communications technician, personnel man, storekeeper, ship's serviceman, journalist, draftsman, machinery repairman, I. C. electrician, pipe fitter, construction electrician's mate, driver, builder, steelworker and utilities man.
- Petty officers first, second and third class in the following ratings: quartermaster, torpedoman's mate, gunner's mate, instrumentman, teleman, communications technician, personnel man, storekeeper, disbursing clerk, commissaryman, ship's serviceman, journalist, draftsman, musician, machinist's mate, machinery repairman, boilerman, metalsmith, damage controlman, patternmaker, molder, construction electrician's mate, driver mechanic, builder, steelworker, utilities man, hospital corpsman, dental technician.
- Non-rated personnel in the seaman, constructionman, airman, hospitalman, dentalman and stewardsman categories.
- Waves in the ratings of teleman, communications technician, personnel man, storekeeper, disbursing clerk and dental technician.
- A limited number of men in various ratings who are qualified in submarines.
- A group of general service ratings and airmen of the Organized Air Reserve.

The exact numbers in ratings to be included in the April-May-June 1951 recalls have not yet been determined. The general pattern of ratings will be similar to the first three categories listed above, with some additions and deletions to the listed ratings as may become necessary, but the basis will continue to be:

- Calls on chief petty officers limited to ratings in which acute shortages exist.
- Calls on other petty officers in the ratings wherein the need is greatest.
- Calls in the order of 7,000 non-rated personnel.

After 1 July 1951, recalls will be composed of:

- About 5,000 non-rated men per month.
- Negligible numbers of petty officers, and these only as necessary to meet severe shortages in certain rating groups that may develop.

The non-rated personnel will consist of relatively untrained men, a category which will not have been

WHAT'S IN A NAME

Navy Ranks and Titles

Currently the Navy has 11 officer ranks—ensign, lieutenant (junior grade), lieutenant, lieutenant commander, commander, captain, commodore, rear admiral, vice admiral, admiral and fleet admiral. However, at various times during its existence, the Navy has established and later discarded many other unusual ranks and titles for officers.

In December, 1775, the Continental Congress passed a resolution establishing relative ranks for both sea and land forces. The first commander-in-chief of the newborn Navy was given the rank of just that—"Commander In Chief Of The Continental Navy." This rank was bestowed on Esek Hopkins, a former brigadier general, in 1775. However, this long-winded title was a little unwieldy, and he was usually addressed as "admiral." (The Navy he commanded consisted of 13 frigates.) When Hopkins resigned the rank lapsed and was never again used.

In 1799 the rank of "master commandant" was established. In 1837 it was changed to commander. The rank of "lieutenant commanding" was also established in 1799 and later changed to lieutenant commander.

In appreciation for certain services rendered (he aided Commodore Bainbridge in persuading Congress to keep U.S. warships at sea instead of in New York harbor during the early days of the War of 1812) Captain Charles Stewart was appointed "senior flag officer" (comparable to commodore). This rank lapsed when Stewart was promoted to rear admiral.

About 1836 a "professor of mathematics" rank was authorized for instructors of midshipmen at the Naval School, the Observatory, and on board men of war. The rank and corps were abolished in 1916.

A rank of "ensign (junior grade)" was established in 1883. It lasted for about 15 months. It was the title for midshipmen who had completed schooling and were serving their "internship" at sea.

During World War II the rank of fleet admiral was established on a temporary basis, the original intent being that it would expire six months after the end of the war. However, Congress on 23 Mar 1946 approved a bill authorizing the permanent appointment to fleet admiral of those officers who served in this grade after 14 Dec 1944 and before 14 Aug 1945. Four officers now hold this rank. They are: William D. Leahy, Ernest J. King, Chester W. Nimitz and William F. Halsey.

The highest rank ever bestowed on an officer of the U.S. Navy was that of "admiral of the Navy." On 2 Mar 1899 George Dewey was appointed to this "six star" rank. It expired upon his death.

recalled up until that time. The term "untrained" is used to designate men in pay grades E-1 and E-2 whose prior active service has been less than six months and who will have to go through the regular recruit training. Deferments will be granted to untrained men who are under age 19, or who have dependents, or who are enrolled in high school, or who are completing a school year in college or an equivalent institution.

Commencing in July 1951, it is planned to commence the release of enlisted Reservists who are serving involuntarily. The program will permit about 5,000 men to return to inactive status each month. The order of release of various categories will be dictated by the needs of the service. No personnel will be held involuntarily over 21 months, but those who are released short of that period will be in the ratings for which the need is least pressing. Personnel who desire to remain voluntarily on active duty will be permitted to do so to the extent of the Navy's needs for the particular rating. Those who originally volunteered for active duty will not be held beyond 21 months if they desire release.

All the policies above briefed are of course based upon the present circumstances which require a build-up of the fleet and its supporting establishment to a new, presumably stabilized, level but does not envisage full mobilization. Should the international situation become such as to require the declaration of a new emergency by the President or the Congress, mobilization procedure would, of course, be necessary and all members of the Reserve would be counted on to serve on active duty when and as required to man a wartime fleet and supporting shore establishment.

QUIZ AWEIGH ANSWERS

QUIZ AWEIGH is on page 43

1. (b) Radarmen.
2. (b) Instrumentmen.
3. (c) United Nations flag. Adopted by the General Assembly 7 Oct 1947.
4. (b) Light blue.
5. If you failed to guess correctly the first time, turn the picture on end to the left. It shows the side on an aircraft carrier. If your eyes are extra sharp, you can find side cleaners at work.
6. (b) CV.

NROTC Ensigns Eligible For Training Assignments

Ensigns commissioned in the U. S. Navy from NROTC Units, but who have not yet been selected for retention in the Regular Navy, are eligible for certain training assignments and changes in designation.

In a new directive, BuPers Circ. Ltr. 162-50 (NDB, 15 Oct 1950), BuPers has indicated available training courses and designations for which officers in this status are eligible. They are:

Training or Change	*Eligibility*
Flight Training	Yes*
Submarine Training	Yes
Postgraduate Instruction	No
Short Term Instruction (5 mos. or less)	Yes
Long Term Instruction	No
Change in Designation to ED, SD, AED	No
Change from Line to SC or CEC	No

* Ensigns of NROTC origin who apply for flight training should note the provisions of subparagraph 3(h) of BuPers Circ. Ltr. 209-47 (AS&SL, Cumulative Edition, 1948) which states that officers designated as naval aviators must agree to serve as such on active duty for a period of three years subsequent to completion of flight training.

NROTC officers who complete three years of service and are selected for retention in a Regular USN status will be eligible for all training and assignments open to their contemporaries. Applications for a change from Line to SC or CEC may be submitted during the third year of commissioned service, but action on such requests will be delayed.

No Applications Desired From Reserve Aviators; Line, Staff Still Open

Additional applications for active duty are not desired by the Navy at the present time from Naval Reserve aviation officers. More applications from both aviators and aviation ground officer specialists have been received than can be granted in the immediate future.

Applications which have already been received in BuPers will be filed for possible future use. Not many additional naval aviators will be required during the rest of fiscal year 1951, it is believed. Each volunteer will be informed by letter as to his recall status as soon as the Navy's aviation-officer needs can be determined.

The three top priorities for recall of naval aviators in the future will go to the following, in this order:

- Those who were released from active duty in the past 18 months.
- Those who are at present assigned to organized aviation Reserve units and have been so assigned for more than six months immediately preceding recall to active duty.
- Those who possess special qualifications.

When orders are issued, at least 30 days' delay is ordinarily allowed between physical examination and deadline for proceeding to the duty station. No personal plans should be made until official notification of the results of physical examination have been received.

Applications from General Line and Staff Corps officers of the Naval Reserve are still desired.

Here's How Selective Recall to Active Duty Works for Reserve Personnel

How does the selective recall system work? How does BuPers go about picking the officers to fill the gaps in Fleet manpower?

Briefly, the answers are to be found on a cream-colored punched card with a yellow edge along one side. This is your Qualification Card.

Each officer on active or inactive duty in the Navy or Naval Reserve has one or more of these tucked away in one or several filing cabinets in BuPers. Each of the cards bears several qualification code numbers which effectively describe an individual's experience, education and training.

Each Qualification Code is a six digit number which reflects experience in a job significant to the Navy. These code numbers—you may have as many as five of them—are awarded by expert analysts who take your total experience, weigh it, sift it and decide which types of experience will be of most value to the Navy.

These types of experience are then translated into the code numbers. Where do the analysts obtain the information concerning your background? Basically, from these three sources:

- Basic Qualifications Questionnaire (NavPers 309).
- Page 2 of each of your Fitness Reports (NavPers 310).
- Annual Qualification Questionnaire (NavPers 319) which, if you are a Reserve officer, you fill out each year, listing any changes in your experience and training.

The "Qual Code" cards, as they are called, are rechecked periodically against the latest information you send in to keep them up to date.

To understand how these cards with the holes in them are used to select you or someone else to fill a necessary billet, take this example.

Sample Order: Get us 50 ensigns for communications officer billets aboard destroyers; 25 ensigns for communications officer duties aboard LSTs; and 25 lieutenants for communications officer billets aboard troop transports (APA or AP).

Taking this order, an analyst looks up the Qual Code for the first part of the order. "Officer, qualified as communications officer aboard destroyer types 165323. The analyst searches through the "Primary File" for all cards bearing this Qual Code number.

Incidentally, the Qual Code number reflects the duties in which an officer has already qualified, not those for which he has been recommended. A rule of thumb is that an officer must have filled the billet for which he is coded for at least six months.

The analyst finds 30 such cards in the Primary File. Not enough. He now moves to his "Supplementary File" where he again riffles the cards and chooses 40 more which bear 165323 as a "secondary" number. Having a secondary Qual Code number indicates that you have the qualifications to fill the job but there is another type you can do better.

Needing more cards for a good sample, the analyst now culls the Primary File once more, this time selecting cards whose Qual Code numbers are not quite 165323 but which are very close to that. A code number such as this indicates that, for example, an officer has been communications officer aboard an LCI but not aboard a destroyer. He finds 40 more.

The analyst now has a stack of cards as high as his telephone. He then checks for the following things: that the rank on the cards corresponds with the rank desired; that the officer's education is acceptable; that his special qualifications (language, foreign travel) do not outweigh his usefulness in the communications billet; and that he is in the preferred category of the Naval Reserve.

The Officer Detail Section keeps the officer selection section constantly up to date on changes in requirements for the Naval Reserve. If only Organized Reservists in most categories are to be called, the selection people are told that. If they are to be allowed to dip into Volunteers in certain special categories, they are also told that.

After this screening, 80 cards now remain out of the original 110. The 80 are next checked individually against each officer's jacket to make certain that each card correctly describes that officer's qualifications and status.

Now down to 70, these names are placed on a sheet of paper in file number order and are sent to the officer order-writing section. If you're in the first 50 of these carefully screened names, you'll soon get

"You guys always got it easy. Look at the responsibility I got."

Man's Shipmates Prove Sailors Have Big Hearts

Shipmates on board USS *Valley Forge* (CV 45) responded with generosity when a fateful tragedy claimed the life of a Navy ordnanceman just 30 minutes before news arrived of the birth of his new son.

Attached to Carrier Air Group Five on board *Valley Forge* in Korean waters, the ordnanceman was on the hangar deck working with 20-mm. ammunition. A cartridge dropped onto the steel deck and exploded, killing the man.

Half an hour later, radiomen on the carrier received a telegram that the ordnanceman's wife had just given birth to a baby boy. Both mother and son, it reported, were doing fine.

In a short time, everyone on board had heard. Although engaged in keeping up the carrier's round-the-clock flights, personnel from every division and every squadron in the air group contributed to a fund that would lighten the blow just a little.

More than $1,500 was collected and sent off to the wife. Half was a check for the mother, and the other half was a trust fund for the new boy.

orders to active duty as a communications officer on a destroyer.

The identical process is followed to find the 25 ensigns best suited to serve as communications officers on 25 LSTs and the 25 lieutenants best suited to serve on 25 transports. This process is what is meant by "selective recall."

One word of warning: don't write or call BuPers asking that your Qualification Code be changed as soon as you read this. It changes in normal fashion as your qualifications or status changes. Just be sure you fill out and send in your annual Qualification Questionnaire (NavPers 319) and Fitness Reports.

Recruit Depot Conducts Novel Recruiting Drive

Only one man in each five who apply for enlistment in the Marine Corps is accepted. At the same time, the Marine Corps takes great pride in being an all-volunteer organization. Results: A need for many applicants.

U. S. Marine Corps Recruit Depot, Parris Island, S. C., conducted a novel recruiting campaign during the Corps' 175th anniversary observance. Each Marine at the "boot camp" filled out a card, giving the name and address of a hometown buddy. This card he submitted to his company first sergeant, after which the cards were forwarded to MarCor Headquarters in Washington. There the cards were processed and sent to the appropriate recruiting divisions.

Also, each Marine and ex-Marine in the Parris Island area was requested to write a letter to a friend, telling about the Marine Corps. A small folder was supplied for enclosing. The folder is entitled "Be A Marine," and gives a down-to-earth description of the Marine's life and tasks. Given first, and underlined, is the statement, "Active combat is no picnic."

In recommending a recruit, each Marine was advised to ask himself, "Would I want this man next to me in combat?"

Members of the Marine Corps Reserve Officers Association and the Marine Corps League offered full cooperation in this unique recruiting drive.

Non-Pay Reservists May Drill Elsewhere

Naval Reservists in a non-pay status can now, under certain circumstances, attend drills with Reserve units of the Marine Corps, Army or Air Force, and earn promotion and retirement points.

Reservists may drill outside the Navy, if—

- Naval Reserve training is not reasonably available.
- The CO of the unit with which training is desired recommends approval of the request.
- The appropriate command of the other service concerned recommends approval of the request.
- The naval command having cognizance of the Naval Reservist approves and issues the necessary orders.

Non-pay Reservists of the other services may drill with Naval Reserve units under similar conditions.

Books for Navy Libraries Returning to Active Duty

As Navy ships awake from their postwar rest, books for their libraries are similarly being restored to active duty after a period of inaction.

After World War II, many thousands of volumes were removed from ships being deactivated. Books too obsolete or too dilapidated for further use were disposed of, but a large portion of the total was stored at the naval supply centers in Norfolk, Va., and Oakland, Calif. This supply, bolstered by new volumes currently being distributed, is filling the book shelves of ships returning to duty. It is estimated that redistribution of stored books has saved the Navy $500,000 to date, the amount an equal number of new books would have cost.

Approximately 6,000 different titles exist among the supply of books at one supply center. Popular books of earlier times are kept on hand along with the latest releases.

The BuPers Library Section plans and directs the library program, selecting and ordering the books and supervising their issue. Actual procurement is handled by a Navy purchasing office, usually the New York branch.

Certain Naval Reservists Eligible for Commissions Upon Completion of Studies

Naval Reservists who are enrolled in medical, dental and theological schools, preparing for their doctorate or theological degrees, are being urged to request appointment in the Naval Reserve as ensign, probationary, 1135, USNR. Upon completion of their studies, these officers will be commissioned lieutenants (junior grade) in their respective corps.

Included in this call for officer candidates are enlisted Naval Reservists who can fill the bill, as well as persons already holding Naval Reserve commissions in other categories. However, none of this applies to students who are in *pre*-medical, *pre*-dental or *pre*-theological phases of professional training.

Full details on the matter are given in Naval Reserve Multiple Address Letter No. 33-50. Included are instructions for applying, with sample blanks provided. Commandants of all naval districts have received copies of the directive and were instructed to forward them to appropriate schools in their districts.

Navy Flight Nurse Uniform Now Designated Official

Two uniforms which have been worn by Navy flight nurses since approximately the beginning of World War II are now officially included in "Uniform Regulations."

They are the tan summer and the green winter uniforms. Each uniform consists of slacks, shirt, skirt, baseball cap and garrison cap, and battle jacket of matching color. Black gloves and a black handbag will be used as accessories for each uniform.

Both uniforms may be worn by the nurses when on the ground as well as in the air, if authorized.

Up to the present time, flight nurse uniforms have been furnished by the Bureau of Aeronautics. Now, according to BuPers Circ. Ltr. 130-50 (NDB, 30 Aug 1950) they will be listed as official uniforms for designated flight nurses when they are assigned to flying duty.

The official change means also that nurses must buy their own uniforms.

Officer, 7 Enlisted Men Receive High Awards for Heroic Action in Korea

One naval officer and seven enlisted men have been decorated for heroic service in slipping ashore in enemy-held Korean territory and demolishing a railroad tunnel.

The officer, Commander William B. Porter, USN, attached to USS *Juneau* (CLAA 119), was awarded the Legion of Merit with Combat "V" for planning and leading the demolition raid.

Three boatswain's mates, three gunner's mates and a seaman, all of whom volunteered for the dangerous mission, were awarded the Bronze Star Medal with combat distinguishing device. Four of them disembarked at night on the rocky and unfamiliar coast, sneaked inside the railroad tunnel and planted demolition charges. The explosion blocked the tunnel and rendered the railroad useless. The other three men were the boat crew that skillfully maneuvered through enemy-patrolled waters, landed and picked up the shore party and returned to their ship without being detected.

The seven decorated enlisted men are: Junior E. Wilson, GM3, USN, Howard C. Scheunemann, GM3, USN; Myron K. Lovejoy, GMC, USN; Paul A. Keane, BM2, USN, all from USS *Juneau;* Joe C. Windham, BMC, USN, and Eugene A. Harwell, SN, USN, of USS *Mansfield* (DD 728); and Harold F. Jones, BM3, USN, of USS *Lyman K. Swenson* (DD 729).

Pilot Saved from Flames By Courage of Corpsman

Many tales of valor come back from the Korean front, and not all are born of battle-line action. There's the case of Charles B. Stalcup, HM3, USNR, 22, and how he saved the life of a Marine pilot.

The Marine pilot, a member of the 1st Marine Air Wing in Korea, had taken off from Kimpo Air Field with a load of bombs and ammunition for a combat strike. Noticing that the engine was leaking oil, he immediately turned back. When he was 25 feet from the ground on his way in for a landing, the plane suddenly burst into flames. The pilot brought it on down for a crash landing, then scrambled out of his cockpit and collapsed beside the plane.

The crash crew and emergency ambulance had been alerted when trouble first became apparent. Upon their arrival at the scene—which was almost immediately—the situation looked almost hopeless. It appeared that the flames would set off the plane's load of rockets and napalm bombs at any moment. With an eruption imminent, the surrounding crowd withdrew—except for Stalcup. Ignoring cries of warning from bystanders, he rushed in and carried the pilot to safety.

Seconds later, the plane disappeared in fire and explosion, the area where the pilot had been a cauldron of seething heat.

MMR Officers on Ships Of 1,000 or More Tons

Merchant Marine Reserve officers serving on active duty in the Navy are to be assigned to duty on board ships of 1,000 or more tons whenever possible.

This policy was announced by the Chief of Naval Personnel, who stated that because Merchant Marine Reserve officers are professional seamen, essential to both the Navy and merchant shipping, they should be given assignments that will enhance their professional careers.

The directive, BuPers Circ. Ltr. 165-50 (NDB, 31 Oct 1950), points out that Merchant Marine officers do not receive credit toward their licenses for service on board vessels of less than 1,000 tons, or if they fail to perform appropriate duties.

BuPers will assign Merchant Marine Reserve officers on active duty to appropriate ship types whenever practicable, the directive states. Commanding officers concerned are being requested to insure that these officers are assigned to primary duties involving deck or engineering watchstanding, as appropriate, and to additional duties which will further their professional as well as their naval training.

160 Enlisted Men to Be Selected as Midshipmen In Naval ROTC Program

Next year about this time approximately 160 men who are now enlisted in the Navy and Marine Corps will have become midshipmen, USNR (NROTC) (Inactive), and be wearing the "beanie" of a freshman on the campuses of several popular colleges and universities.

On 9 Dec 1950 the Navy's college aptitude test will be given to recommended candidates now on active duty. Around 160 men, it is estimated—will finally be enrolled as midshipmen in the Naval Reserve Officers Training Corps for the fall term of 1951, at the various colleges.

The deadline for nominations from commanding officers of men to take the test was 8 Nov 1950, latest date that nominations could reach the Bureau of Naval Personnel.

Fees for such as tuition, textbooks, and laboratory work are paid by the Navy, and the required uniforms also are paid for by the Navy. Midshipmen students receive retainer pay of $600 per year from the service, but, depending on the college, an additional $100 to $600 must be furnished by the NROTC midshipman himself. Some or all of the money required of the midshipman may be earned by outside employment if it does not conflict with NROTC and academic activities.

Students may enroll in a wide variety of courses, in which they must include 24 semester hours (or the equivalent time in quarter hours) in naval science. The course normally lasts four years.

The middies are required to take two summer cruises and one period of aviation indoctrination, usually of eight weeks or more. On graduation they are obligated to accept a commission as ensign in the Navy or second lieutenant in the Marine Corps—if it is offered.

After two years of active duty they may apply for retention as permanent officers in the Regular Navy or Marine Corps, becoming career officers.

Anyone interested in the program—either for this year or next year—should read BuPers-MarCorps Joint Letter of 15 Sept 1950 (NDB, 15 Sept 1950) for full information.

DIRECTIVES IN BRIEF

This listing is intended to serve only for general information and as an index of current Alnavs, Navacts, and BuPers Circular Letters, not as a basis for action. Personnel interested in specific directives should consult Alnav, Navact and BuPers Circular Letter files for complete details before taking any action.

Alnavs apply to all Navy and Marine Corps commands; Navacts apply to all Navy commands; and BuPers Circular Letters apply to all ships and stations.

Alnavs

No. 106 – Announces administrative plans for tax increases as specified in Public Law 814.

No. 107–Cancel previous directives (Alnavs 117-49 and 119-49) which authorized discharge of personnel entitled to "saved pay" under provisions of the Career Compensation Act of 1949.

No. 108 – Supplements existing directives pertaining to physical examinations of flag officers.

No. 109 – Carries out intent of Public Law 862, providing that post card applications for absentee ballot be delivered to service personnel directly.

No. 110 – Announces Presidential approval of selection of four Marine Corps officers for temporary promotion to major general.

No. 111 – Announces Presidential approval of selection of 346 naval officers for temporary promotion to captain.

No. 112 – Informs the naval establishment that Alnav 76-49, specifying desire of the Secretary of the Navy that no Navy installations, vessels or aircraft should engage in civic celebrations of Navy Day, is still effective.

No. 113 – Sets purchasing procedures for certain stock replenishment or emergency procurement.

No. 114 – Announces Presidential approval of selection of seven Marine Corps officers for temporary promotion to brigadier general.

No. 115 – Amends two paragraphs of BuPers Manual in regard to certain monthly report procedures.

No. 116 – Sets procedures to effect Public Law 844 concerning choice of compensation method for Reservists on duty or training.

No. 117 – Extends to 1 Jan 1951 the period during which personnel may apply for National Service Life Insurance under emergency conditions.

No. 118 – Authorizes extra hazardous duty pay now in effect to continue for the year 1951.

No. 119 – Sets regulations for entitlement to sea and foreign duty pay.

No. 120 – Warns against use of certain canned food.

No. 121 – Announces program for appointment of enlisted personnel to commissioned grades in Naval Reserve.

No. 122 – Extends deadline to 18 Nov 1950 for nomination of enlisted personnel for NROTC program.

BuPers Circular Letters

No. 159 – Lists recommended texts for use in review for preliminary examinations for Naval School, Academy and College Preparatory.

No. 160 – Establishes authority to convene boards of medical examiners to examine and report on the physical qualifications of candidates for appointment in the Navy.

No. 161 – Serves as guide to commanding officers in instructing service personnel on their conduct and attitude while serving or visiting in foreign countries.

No. 162 – Lists eligibility for training of ensigns commissoned in the U.S. Navy from NROTC units.

No. 163 – Enumerates current recognition training aids available for use in training programs of fleet units.

No. 164 – Lists areas of critical housing shortages.

No. 165 – Announces policy for assignment to active duty of officers of the Merchant Marine Reserve.

No. 166 – Contains further details on assignment to duty of sole surviving sons of war-depleted families.

No. 167 – Gives details for eligibility of naval personnel to compete for appointments to cadetship in the U.S. Coast Guard.

No. 168 – Announces advancements to chief petty officer, acting appointment, of personnel on waiting list and provides for examinations for advancement to same grade to be held during latter part of fiscal 1951.

No. 169 – Cancels requirement that commands submit training school reports regularly.

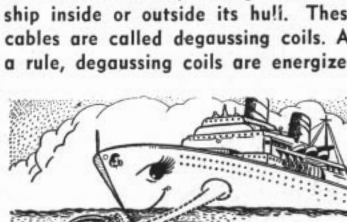
HERE'S YOUR NAVY

"Queen Mary sails with new secret girdle," said New York papers one day early in World War II. Thus broke upon the world a new item of our technical age—"degaussing," with its as-

sociated gear. Germany's magnetically actuated mines and torpedoes had made necessary this equipment for neutralizing a ship's magnetic field.

* * *

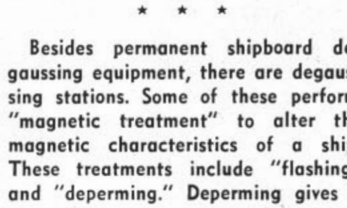
Degaussing gear consists mainly of electrical cables, including many insulated conductors, strung around a ship inside or outside its hull. These cables are called degaussing coils. As a rule, degaussing coils are energized



only when ships are in magnetic mine danger areas, when alerted for torpedo attack or when crossing degaussing ranges for magnetic check. Special equipment offsets the degaussing gear's influence on magnetic compasses.

* * *

Besides permanent shipboard degaussing equipment, there are degaussing stations. Some of these perform "magnetic treatment" to alter the magnetic characteristics of a ship. These treatments include "flashing" and "deperming." Deperming gives a



ship an over-all magnetic condition which will provide for the best operation of permanent degaussing coils. Flashing is a treatment given ships with no degaussing gear of their own, to make them less likely to set off magnetic mines and torpedoes.

Brief news items about other branches of the armed services

★ ★ ★

HELICOPTER-EQUIPPED transport companies are being organized by the Army to supplement and to replace, in part, its ground transport.

Each of the new companies will be equipped with 23 helicopters, two of which will be used for reconnaissance and for command purposes. The others will be employed to transport men, supplies and equipment. Faster and more effective transportation is expected, especially in areas where ground travel is difficult—such as in the Arctic, in jungles and mountains, and in amphibious warfare. River crossings are another operation in which helicopter companies are expected to be highly valuable.

The 'copters will be considered as flying jeeps or flying two-and-one-half-ton trucks. Helicopter companies will be used with Army corps, divisions and some smaller tactical units.

★ ★ ★

RANGER COMPANIES are being organized by the Army, one to be assigned to each infantry division. The companies will follow in most respects the make-up and duties of Ranger units employed in the U.S. Army in World War II.

All personnel of the 110-man, five-officer companies will be volunteers. All must possess high mental and physical qualities, and will undergo intensive special training. They will be qualified as parachutists, and will possess a knowledge of foreign weapons and maps, demolition and sabotage, guerrilla warfare, amphibious and airborne operations, and close combat. Each will be equipped with much personal armament, and in addition, each company will have either a 60-mm mortar or a bazooka.

A Ranger training section now exists at the Infantry School, Fort Benning, Ga. Plans now call for four companies of Rangers to be organized. Each company will consist of three platoons, each platoon will contain three 10-man squads.

A NEW ARMY AIR SUPPORT CENTER is now in operation at Fort Bragg, N. C.

Principal purpose of the air support center is to assist Army field forces in conducting air-ground operations training. The student body will consist primarily of air-ground operations personnel and commanders of units which would require air support in combat.

Training conducted by the center will not be confined to Fort Bragg. Instruction teams will travel to various locations to conduct conferences, demonstrations and exercises for troops in training. Every effort will be made to keep the center's curriculum up to date in all aspects of air support doctrine, technique and tactics.

★ ★ ★

ALREADY FAMED for its miraculous properties in alleviating arthritic pains, the new hormone drug ACTH is recognized by Army medical research scientists as an important counteragent in treating certain battle wounds. Large supplies of the new drug already have been rushed to Army frontline hospitals.

ACTH is now known to be of use in retarding the growth of fibrous tissues which, forming in large quantities in scarring wounds, may choke a close-by nerve and impair its function. By slowing the growth of the scar tissue, ACTH prevents blocking of the nerve.

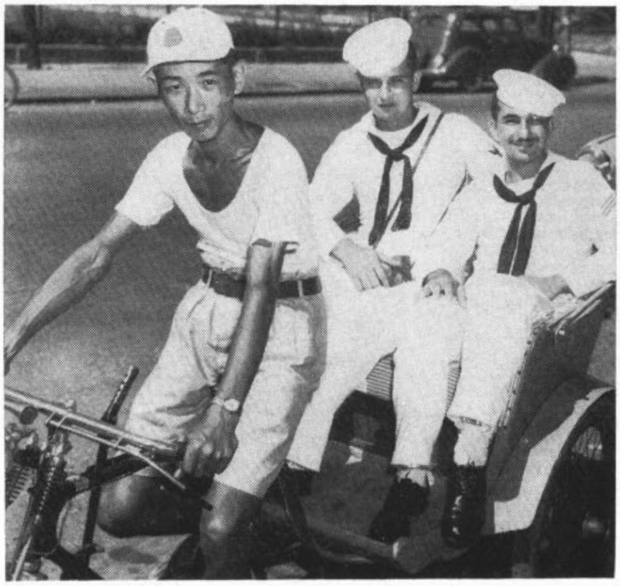
Of particular use is the drug in combating the ill effects of wounds to the eye. A minor scar on or near the eye can produce blindness, but the Army feels that ACTH has every promise of cutting down the number of servicemen who might ordinarily lose their sight in one or both eyes.

★ ★ ★

THERE ARE WAYS AND MEANS of getting ice off airplane wings when you want to, but getting it *on* when you want to has been another matter. To do this, the Air Force's Air Material Command devised a rig known affectionately as "Squirtin' Gertie."

The reason the Air Force wanted ice on wings was to help them develop better ways to get it off. To bring

RECRUIT TRAINING at Fort Dix includes log lifting for exercise and teamwork (left) and practice with bazooka (right).



PEDICAB hauls sailor-sightseers around Yokosuka, Japan (left). Right: four services gather on patio of Navy EM Club.

on icing conditions at will, "Squirtin' Gertie," the most amazing system of struts and braces ever airborne since 1930, was devised. She—or it—can produce the water in any style from a solid stream to a fog. The proper temperature is obtained by altitude.

"Gertie"—the framework mentioned—is attached to the fuselage of a C-54, forward of a wing. The engine just aft of the framework is equipped with a special propeller and spinner. Upon order, Gertie makes with the raw material and the frigid temperatures of high altitude do the rest. The plane is equipped to reveal the results of various de-icers, and even to take samples of spray-filled air for future study. Thermal de-icing methods, sometimes employing enough heat for nine six-room houses, are coming under special study.

* * *

A NEW HELMET which is both lighter and tougher than the present one has been designed by the Army for its combat soldiers.

Instead of the present steel helmet with a thin plastic liner, the new headgear takes advantage of a new, rugged plastic for its liner to use light-weight aluminum for its outer covering.

Preliminary shock tests prove that the new liner alone affords as much resistance to shell fragments and falling objects as the present helmet and liner together.

The aluminum shell, while it does give additional protection to a soldiers head, is intended primarily for other uses—including its traditional service as a combination cooking pot, shaving basin and water bucket.

* * *

SIX NEW BUS-TYPE ambulances are being delivered to continental U.S. Air Force Bases, with the first of the group completed only six weeks after the order was placed.

The ambulances are 35 feet in length and weigh approximately nine tons. They are being made from cross-country-type busses, and will have room for 18 litters. The Air Force is supplying equipment for modifying the interiors, which duplicate in most respects the interiors of MATS planes fitted for air evacuation of wounded.

Following are the Air Forces Bases to which the bus-ambulances are being delivered: Fairfield-Suisun, Fairfield, Calif., three busses; Westover AFB, Chicopee Falls, Mass., two busses; Kelly AFB, San Antonio, Tex., one bus. The vehicles are specially adapted for receiving litter cases which have been delivered to the bases by air. Wide rear doors have been installed, with a ramp leading to the ground after only one step down from the interior. Air conditioning is installed in all the six.

Delivery of the ambulances was given high priority, and was accomplished through coordinated efforts of the Army Ordnance Corps, the Office of the Air Force Surgeon General, MATS, and the civilian contractor.

* * *

HEAVY WHITE CHINAWARE, long familiar in U.S. Army mess halls everywhere, is on its way out. It is being replaced by plastic dishes.

More than three years of experiments and testing went into development of the new mess gear. The plastic proven best has quite a name: rag-filled phenol-melamine-formaldehyde.

A major hurdle it had to pass was acceptability to the soldiers. Two other demands were the meeting of military requirements, and low annual replacement cost. This material has excelled all the plastics tried as a dish material during World War II.

Among the tests of the experimental plates, cups and other items was exposure to great extremes in temperatures. The dishes survived tropical heat and Arctic cold without damage. Although not yet adopted by the Army as a standard item of issue, the new plastic tableware is expected to replace eventually all the Army's chinaware now used in mess halls.

LETTERS TO THE EDITOR

Reenlisting with Old Rate

SIR: In the Naval Reserve on active duty during World War II, I made the rating of AOM1 and was discharged as such. After staying out of the service over the 90-day period, I reenlisted as a seaman in the Regular Navy. (1) I understand that the Navy is now enlisting men in their former rates. Will men like myself who reenlisted in a lower pay grade than was formerly held be reinstated to their former rate? (2) If I don't get my former rate back and if I don't advance beyond seaman, at which rating will I be retired at the end of 20 years, AOM1 or SN?—C.W.S., SN, USN.

• *No, personnel enlisting in the Regular Navy under broken-service are not now being enlisted in the rate held at time of discharge. Recent changes to recruiting instructions provide that personnel previously discharged from the Regular Navy or Naval Reserve with certain rates, pay grade E-5 and above, are to be accepted for enlistment or reenlistment in the Regular Navy under broken-service conditions in pay grade E-4 instead of pay grade E-3, which was the highest previously authorized in these particular ratings. Therefore, for the benefit of personnel who like yourself would be eligible to come in as PO3, if you were to enter the service today, the Navy has issued instructions to commanding officers in BuPers Circ. Ltr. 145-50 (NDB, 31 Aug 1950) directing a review of service records and submission of names of those eligible for advancement to pay grade E-3 according to requirements contained in the circular letter.*

(2) In accordance with existing law, enlisted men are entitled to receive retainer pay based on the rating held at the time of transfer to the Fleet Reserve. Any man who is a seaman at the end of 20 years in the Navy will, most assuredly, be transferred to the Fleet Reserve as a seaman.—ED.

Changing Rating on Recall

SIR: I am a radioman second class and a member of an active Reserve electronics company that expects to be called to active duty at any time. Would it be possible to change my rate to either teleman or air controlman after I am called back, or before I am recalled?—J.R., RM2, USNR.

• *Yes, you may request a change in rating either before or after being recalled to active duty.*—ED.

This section is open to unofficial communications from within the naval service on matters of general interest. However, it is not intended to conflict in any way with Navy Regulations regarding the forwarding of official mail through channels, nor is it to substitute for the policy of obtaining information from local commands in all possible instances. Do not send postage or return envelopes. Sign full name and address. Address letters to: Editor, ALL HANDS, Room 1809, Bureau of Naval Personnel, Navy Dept., Washington 25, D. C.

CPOs in Aviation Greens

SIR: Are general service ratings such as YNC, PNC, etc., authorized to wear the aviation winter working uniform while serving with an aviation unit? Is there some directive other than Uniform Regulations which permits general service ratings to wear the winter working uniform and, if so, can you quote me the source?—J. C., YNC, USN.

• *The provisions of article 6-1, U. S. Navy Uniform Regulations, 1947, with respect to the wearing of the aviation winter working uniform, state that "all other chief petty officers assigned to duty in aviation commands may wear the aviation winter working uniform when that uniform is prescribed as the uniform of the day for aviation personnel." The phrase, "all other chief petty officers" means exactly what it says and would permit a chief yeoman attached to an aviation command to wear the uniform on an optional basis if he wished to do so, when such is authorized by the commanding officer.*—ED.

No Stenotype School

SIR: (1) Does the Navy have a stenotype school that enlisted personnel may attend? (2) If there is no school, will the Navy pay for my attendance at a civilian school? I have my own machine. —C. W. G., YN3, USN.

• *(1) No, there is no Navy stenotype school nor does the Navy provide instruction on any other type of machine shorthand. (2) Although two classes in the past were trained in civilian schools at Navy expense, there are no plans to train additional classes in machine shorthand at this time.*

The Training Research Section of the Bureau of Naval Personnel is making a study of Navy requirements for machine shorthand operators. When the study is completed, the Navy will decide whether training requirements justify machine shorthand instruction for Navy yeoman. Further information will be carried in ALL HANDS *when a decision is reached.*—ED.

Clothing Allowance for Chiefs

SIR: If a temporary officer is reverted to his permanent enlisted status as chief petty officer, is he entitled upon reverting to a monetary allowance for clothing in a similar manner as when he was advanced from first class to chief petty officer? If so, to what amount is he entitled, what are the references, and to whom should the claim be submitted? —R.W.T., YNC, USN.

• Paragraph 12-b(2)-6, Military Pay Instructions Memorandum 4 to Volume V, BuSandA Manual, provides that an initial clothing monetary allowance in the amount of $118.35 is payable to enlisted members of the Navy serving as commissioned or warrant officers under temporary appointments upon reverting therefrom to serve on active duty in an enlisted status, including that of chief petty officer. Such allowance can be credited by the disbursing officer carrying the pay record of the man concerned. —ED.

Courses in New Code

SIR: I've been reviewing the Uniform Code of Justice as contained in the *JAG Journal.* Having graduated from Naval School of Justice, Port Hueneme, Calif., I would like to learn if any course of instruction in the new "Code" has been proposed.—M.C.R. YN1, USN.

• *A brief correspondance course in the Uniform Code was begun in November 1950 and is offered by the U.S. Naval Correspondance Course Center, Bldg. RF, U.S. Naval Base, Brooklyn 1, N.Y. It is based on the Code itself (Public Law 506, 81st Congress). When the new Manual for Courts-martial is completed, a complete correspondance course will be based on the manual. This latter course will not be available until late in 1951, however.* —ED.

Eligible for Recruiting Duty?

SIR: BuPers Circ. Ltr. 45-50 (NDB, 15 Apr 1950) states that BuPers desires requests for recruiting duty. Article C-5208, BuPers Manual, 1948, states that "Only chief petty officers and petty officers, first class, are assigned to recruiting duty." Does this mean there are no billets for men with lower ratings than petty officer first class at recruiting stations?—R. R. J., SK2, USN.

• *Yes. Only chiefs and petty officers first class are assigned to recruiting duty.*—ED.

Radio Announcing Duty

SIR: I am seeking information about the Armed Forces Radio Service. What I would like to know is whether service or civilian personnel are doing the announcing. If it's service personnel, I would like to know the procedure for getting in touch with someone who would be able to let me know how I might get into the Armed Forces Radio Service as an announcer. I have had previous radio training and announcing experience.—F.P.C., SN, USN.

• *Both civilians and service personnel are utilized as announcers. Detailing of naval personnel to the Armed Forces Information and Education Service (AFRS) is performed directly by BuPers. Requests should be submitted to BuPers via official channels, giving a complete outline of educational background and experience in the radio announcing field.*—ED.

Broken Service Rates

SIR: I was in the active Naval Reserve from 1943 until May of this year. I was rated YN1 in February 1945. Throughout this period I lost no time through misconduct or in any other way.

In May 1950 I enlisted in the Regular Navy, and had to take a reduction in rating to YN2, although I had been first class for five and one-half years. I was told that after I enlisted as YN2 in the Regular Navy I would be eliglible to go up for first class at the next exam.

In all the advancement in rating directives it is stated that I must requalify for YN1 the same as anyone who has just made YN2. Please straighten me out on this.—J.J.A., YN2, USN.

• *Records indicate that you were correctely enlisted as YN2, the highest pay grade in your rating which was then open to ex-USNR personnel enlisting in the Regular Navy. You'll become eligible for advancement to YN1 not earlier than 11 May 1951, as provided in paragraph 3a (3) of enclosure (A) to BuPers Circ. Ltr. 12-50 (NDB, 31 Jan 1950).*

BuPers Circ. Ltr. 145-50 (NDB, 31 Aug 1950) is the only current directive for adjusting the rates of broken-service personnel and ex-USNR personnel. This directive authorizes adjustments as high as pay grade E-4 only. No higher adjustments of broken-service personnel are contemplated at this time.—ED.

"Couldn't get here any sooner, sarge. Ran outta gas."

10% Extra for Good Conduct

SIR: I am being physically retired in the near future with 100 per cent disability, which gives me 75 per cent of pay and longevity. I am classified F-4-D, having first enlisted 2 Jan 1924, and have served continuously since. Under this classification, I believe I am entitled to an extra 10 per cent of pay and longevity for good conduct for over 20 years of service. Can I receive this in addition to my disability pay? No one I can contact seems to know the answer.—W.J.N., MUC, USN.

• *No. When retired for physical disability, the provision in the Naval Reserve Act of 1938 authorizing 10 per cent for good conduct does not apply.*—ED.

Appointments to Naval Academy

SIR: (1) Are sons of naval personnel allowed preference in appointments to the Naval Academy? (2) Where would he request application for examination? —LT. W. W. M., SC, USN. (Ret).

• (1) *Yes. Details are published in the pamphlet "Regulations Governing the Admission of Candidates Into the U. S. Naval Academy as Midshipmen and Sample Examination Questions, June 1950." Page 18, paragraph 13, points out that 75 midshipman appointments are given by the President to the sons and adopted sons of officers and enlisted personnel of the Regular Navy, Marine Corps, Army, Air Force and Coast Guard for the reason that officers and enlisted personnel, because of the nature of their duties, are unable to establish permanent residence to secure nominations for their sons from their senators and representatives. Stepsons are not eligible. Adopted sons must have been adopted before reaching 15 years of age.*

(2) *These candidates are required to take either the substantiating examinations or the regular mental examination in competition with each other, the highest 75 passing the examination receiving the appointments. Applications should be addressed to the Chief of Naval Personnel giving full name, date of birth, home address and present address of the candidate, full name and rank or rate of his parent, and, in case of an adopted son, evidence as to the date of the adoption.* —ED.

Saluting When Dismissed

SIR: How about giving our platoon the straight dope on saluting when dismissed from ranks? Here's what happened:

We have a Wave lieutenant as platoon leader. After captain's inspection last Friday we marched from the inspection area, came to a halt, then made a left face. Then the Wave lieutenant said, "Dismissed," and we saluted her as we fell out of ranks.

Is this salute proper for naval personnel falling out of ranks, or isn't it used any more? Some say yes and some say no. We would like the straight dope, and I'm sure you're the people to give it to us.—R.M.H., BM2, USN.

• *There is no regulation which specifically covers this point. The landing Force Manual and the Army Field Manual FM 22-5 do not state that a salute is required upon dismissal from ranks. Neither do they say that a salute is not required. However, personnel under arms, who would find it awkward to give one upon being dismissed, do not salute.*

It is customary on board ship for personnel, who are usually not under arms, to salute when the command "Leave your quarters" is given. This custom is generally followed also at receiving ships and shore activities.

In this case, like the case of deciding whether to say "The smoking lamp is lit" or "The smoking lamp is lighted," it's best to take your cue from the practice followed at the local command. Come on, Boats, break down and give her a good snappy salute next time.—ED.

Physical Disability Retirement

SIR: Information is requested concerning provisions of physical disability retirement, to which I might be entitled. I was transferred to class F-6 on 26 Feb 1948. My disability is permanent but the percentage of disability was not estimated, although I believe it might exceed 30 per cent. What action shall I take?—R. B. B.

• *The Navy is presently evaluating the cases of all naval personnel who were transferred to the retired list for physical disability prior to 1 Oct 1949 in accordance with Section 411 of the Career Compensation Act. Notification will be made by letter of the percentage of disability rating, together with the entitled amount of retired pay. It is anticipated that at least five months will be required to complete this evaluation. Any benefits to which you may be entitled will be retroactive to 1 Oct 1949.*—ED.

Rotation of Duty

SIR: Can you tell me just what is meant by the Navy's "rotation of duty?" I joined the Navy 20 Aug 1947, and reported on board this vessel four months later. After being on board for 29 months I requested a change of duty and was reassigned to a PCEC, where I served for about a month and a half. I liked PCEC duty and reenlisted on board. Then, two days later, I was transferred right back to the ship I had served on originally. I would like to know if there is such a thing as rotation of duty, and if so, why one man is required to spend so much time on one ship. I now have over 32 months on board this vessel.—A.L.C., RM3, USN.

• *The distribution and duty rotation of enlisted personnel depends primarily upon the personnel requirements of the various units of the Navy. When all other factors have been taken into account, however, due consideration is given to individual requests for duty in a particular ship or locality.*

Because of the constantly changing situation, it is impossible for the Navy to establish a hard and fast rule of rotation. From time to time instructions are issued by BuPers setting forth the length of tours of duty at foreign stations, and the length of shipboard tours necessary to establish eligibility for shore duty.

Requests submitted by individual enlisted personnel for changes of duty are forwarded by commanding officers to the appropriate administrative command for consideration, or to BuPers where disposition cannot be made by the administrative command. For more complete information on the Navy's policy in this matter, it is suggested you read Chapter 5, Section 2, of BuPers Manual.—ED.

No Dentist Training Program

SIR: I am interested in dentistry training and was wondering if there is any possible chance of getting my schooling through the government while still in the Navy.—B. F. F., Jr., YNSN, USN.

• *The Navy has no current program for college training of dentists as were formerly trained under the V-12 program.*—ED.

Reserves and Flight Status

SIR: What is the present policy regarding return of Reserve officers now in an unrestricted general line status to a duty-involving-flying status? Alnav 103 sheds light on *temporary* officers in this category, but doesn't mention reserve officers.

I know of a few ex-aviators in the Naval Reserve who have been returned to a duty-involving-flying status, but local inquiries have failed to reveal what procedure is being employed in selecting these officers.

Also, is it the ultimate goal of BuPers to return all personnel in that category to duty-involving-flying assignments or will this be limited to a selected few?—C.L.E., LTJG, USNR.

• *Ex-aviator Reserve officers are being returned to a duty-involving-flying status as required by the aeronautical organization. Approximately one-third of these officers have been returned to date. Individual requests are not desired. Selection is based on qualifications, rank and availability.*

Alnav 103-50 *(NDB,* 30 *Sept* 1950) *does not apply to Reserve officers; only to* USN *(T.).*—ED.

Chronic Seasickness

SIR: Every time my ship pulls out, I come down with seasickness despite the use of seasickness pills. Is there any possibility of getting duty on an overseas base because of this?—J.E.G., YN3, USN.

• *Your trail to an overseas shore station via chronic seasickness would have to begin at routine sick call. Here is what the Bureau of Medicine and Surgery has to say about it. "Motion sickness has to be evaluated individually, since there is a wide variation in its significance in different individuals. When motion sickness has been observed by the medical officer, or by the hospital corpsman on independent duty, to be so protracted and severe as to interfere with the performance of duty, information to that effect is forwarded with the patient when he is transferred to a shore medical facility. There he is given treatment if required, and appropriate disposition is instituted."*

Among other possibilities, "appropriate disposition" could be assignment to an overseas shore station, of course.

However, you can request such duty the same as anybody else. Address your request to ComServLant or ComServPac as appropriate, with such information as you wish to include.—ED.

Rating Change for POs

SIR: If a man wishes to be assigned to duty where he may work in the duties of another rating, with a view toward eventually changing his rating, through what channels should he submit his request? In this case I am assuming that the rating to which he wishes to change is not employed on the station on which the man is currently serving, but is used at other stations under the same administrative commander or district commandant.—I.R.E., YNI, USN.

• *This is a matter between the individual and his commanding officer, and involving the administrative commander should the CO recommend that the man be assigned to other duty within the cognizance of that officer. In all cases, however, service needs would be the primary consideration and the man's desires next.*

If the case you present involves yourself, the current service needs for YNIs would almost certainly prevent your request for assignment to duty out of your rating from being approved. In general, BuPers does not approve of reassignment of petty officers to duties outside their rating, and this disapproval becomes more definite as pay grade increases. Except in extreme cases, as for highly critical ratings, a transfer to provide an opportunity for a man to train and prepare for a change in rating will make his past training and experience a waste of time and money.—ED.

Ship Reunions

News of reunions of ships and organizations will be carried in this column from time to time. In planning a reunion, best results will be obtained by notifying The Editor, All Hands Magazine, Room 1809, Bureau of Personnel, Navy Department, Washington 25, D. C., four or more months in advance.

• USS *Bancroft* (DD 598)—All former members of this ship's crew interested in holding a reunion in an eastern U.S. city in February or March 1951 should contact LTJG D. M. Dravis, USN, or LTJG J. C. Blake, USN, U.S. Naval Receiving Station, Washington 25, D. C.

• *ZP* 11—A reunion of all members of this blimp hedron and blimp squadron, which is attached to NAS South Weymouth, Mass., is planned for May 1951. All who are interested should contact Albert P. Dancause, AOUI, USNR, Glen Ave., Norwalk, Conn.

• USS *Yukon* (AF 9)—A reunion of all USS *Yukon* people will be held at the Hotel Governor Clinton, New York City, on 24 Feb 1951. For information, contact Alfred J. Clark, 59 Christie Ave., Clifton, N.J. Reservations should be made by 15 Jan 1951, if possible.

• *Seabee Veterans of America*—A national reunion will be held in August 1951, in Boston, Mass. All Seabees interested in organizing "Island Xs" in New England States should write to John F. Tallent, National Vice President, 11 Bell Rock St., Malden, Mass. Such groups have been organized in 19 other states.

• USS *Vincennes* (CA 44). "A Log of the Vincennes" by the late LT D. H. Dorris, USNR, and several ship's company survivors of the lost vessel. It may be obtained by writing J. T. Dorris, Ph.D., professor of History, State Teachers College, Richmond, Ky. Price: $5.00.

The Word on LDO Program

SIR: Concerning the LDO program: (1) What would be the status of an enlisted person with 10 years' service and commissioned LDO ensign or lieutenant (junior grade) if he failed his medical or professional examination? (2) Specifically, would he be given an opportunity to revert back to CPO, or would he be automatically rejected from the Navy without retirement pay? (3) If an LDO officer, having completed 20 years' service, and is eligible for further promotion, fails his examination, what disposition would be made of his case? (4) Would a yeoman commissioned LDO (Administration) be required to perform duties of communications officer, or would he perform only administrative and clerical duties in which he is trained and acquainted?—H.L.F., YNC, USN, and R.W.B., YNC, USN.

• *We wouldn't want to chide a couple of YNCs (administration) but you must have missed BuPers Circ. Ltr. 62-50 (NDB, 15 May 1950). Most of the answers you want are spelled out there specifically and would require too much space to write in full here. In regard to that directive (1) For ensigns failing professional exam, see subparagraph 3D(2)(c). For lieutenants (junior grade) failing professional exam, check subpara 3D(2)(b). In regard to failing the physical examination, any LDO will be subject to medical survey and physical retirement proceedings. (2) Subpara 3D(2)(g) pertains to ensigns, 3D(2)(b) and 3D(2)(f) to lieutenants (junior grade) and above. (3) Same answer to the above question. If eligible, he may request retirement. (4) LDOs in the administrative classification are charged with duties pertaining to their technical field—naval administration and personnel management. Since the duties of communications officer rightfully belong under naval administration, it is logical that LDOs in that field may be assigned that duty. The Bureau of Naval Personnel wants it emphasized that LDO classifications cover a much broader scope of knowledge than does the individual rating, and that prospective candidates should be well prepared to assume the attendant responsibilities.*—ED.

Barbers Learn Hard Way

SIR: Is there a school of beauty culture for male barbers?—J. P. D., SH2, USN.

• *There is no formal training available for ship's servicemen (barbers).*—ED.

When to Request an Allotment

SIR: How much notice must the Field Branch, Bureau of Supplies and Accounts, have in accepting applications for registering a voluntary allotment? For example, say a man registered a voluntary allotment—not a "Q" allotment—on 22 November. Could he make the first payment in December with the allottee receiving the first check in January, or would he have to wait until January with the first check being mailed out in February? Your answer will settle a friendly argument.—D. P., YNCA, USN.

• *Consider your friendly argument settled. Allotment authorization bearing request to register allotments only must reach the Field Branch, BuSandA (Allotment Division) between the first and 20th day of the month preceding the month of first payment. Provisions are made for retroactive allotments in certain specified cases. In the above case, first payment would be made in January with the check being mailed the first part of February.*—ED.

Retired Status of CWO

SIR: In a previous answer to a letter about retired status, you stated that a commissioned warrant officer may retire in warrant officer grade W-4 and after retirement will be advanced to the highest temporary rank satisfactorily held.

I was retired as a chief warrant officer prior to 1 Oct 1949, at my own request, after completing 30 years' active service. After being retired, I was advanced to lieutenant, the highest temporary rank I held. To receive the higher pay of warrant grade W-4, I had to request to be restored to that grade.

Will I retain my present rank as lieutenant (retired) as long as I remain in a retired status?—LT W. L. G., USN (Ret).

• *If you requested to be restored to your former retired status as chief warrant officer and such restoration is effected by the Secretary of the Navy, Public Law 351 of the 81st Congress requires that you will thereafter be deemed to be a chief warrant officer for all purposes, including pay and recall to active duty. If restored to your former CWO status, you would not, therefore, retain your present rank as lieutenant,* USN, *retired.*—ED.

Fines Not Deductible

SIR: Is it possible to deduct from incomes taxes fines imposed by a Navy court-martial?—R.J.B., TEI, USN.

• *No. As specified in item 41(b) of Federal Income Tax Information pamphlet published by BuSandA in 1949 for the information of naval personnel, no deduction is allowable for loss resulting from fines and penalties as imposed by court-martial and civil courts.*—ED.

TAFFRAIL TALK

WE'D LIKE to drop a hint to unsuspecting readers that Captain James Thach, USN, mentioned as being selected for rear admiral recently, is not the same person as Captain "Jimmy" Thach, USN, mentioned in news stories from Korea. They're two people—brothers—and therein lies a tale of quite some confusion.

At present Captain James Harmon Thach, Jr., USN, is assigned to the International Affairs Division of the Office of the Chief of Naval Operations. His brother, Captain "Jimmy," skipper of USS *Sicily* (CVE 118) is really John Smith Thach.

All the confusion dates back to midshipman days. James, the older of the two brothers, attended the Naval Academy in 1919-23 and was widely known by the nickname "Jimmy." He graduated in the summer of 1923, and a few months later his brother John reported in as a plebe. Midshipmen who had known the older brother promply tabbed the plebe as "Jimmy" also.

To this day John is still known as "Jimmy."

★ ★ ★

"I truly believe," writes a lady housewife to the Bureau of Naval Personnel, "that a married man should have his wife's written permission before his orders are issued, especially in the

case of veterans whose wives have had a taste of living alone and not liking it."

Her Naval Reservist husband is on active duty. We've had no word from him.

★ ★ ★

Hear ye, hear ye, and be it known that tongue wagging is strictly out of order at meetings of the Aloha Navy Wives Club at Pearl Harbor. Their oath: "I pledge myself to be kind and charitable to my sister members, to attend meetings regularly, and to avoid all gossip. . . ."

★ ★ ★

Front runner in a $15,000 race at Saratoga Springs was the three-year-old filly "Busanda," named after the Navy's Bureau of Supplies and Accounts. A former Navy commander owns her.

★ ★ ★

Largest private telephone exchange in the world is in the Pentagon, with 68,600 miles of trunk lines to handle the 315,000 average daily calls.

The All Hands Staff

ALL HANDS

THE BuPERS INFORMATION BULLETIN

With approval of the Bureau of the Budget on 29 April 1949, this magazine is published monthly by the Bureau of Naval Personnel for the information and interest of the naval service as a whole. Opinions expressed are not necessarily those of the Navy Department. Reference to regulations, orders and directives is for information only and does not by publication herein constitute authority for action. All original material may be reprinted as desired if proper credit is given ALL HANDS. Original articles of general interest may be forwarded to the Editor.

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DISTRIBUTION: By Section B-3203 of the Bureau of Naval Personnel Manual the Bureau directs that appropriate steps be taken to insure that all hands have quick and convenient access to this magazine, and indicates that distribution should be effected on the basis of one copy for each 10 officers and enlisted personnel to accomplish the purpose of the magazine.

In most instances, the circulation of the magazine has been established in accordance with complement and on-board count statistics in the Bureau, on the basis of one copy for each 10 officers and enlisted personnel. Because intra-activity shifts affect the Bureau's statistics, and because organization of some activities may require more copies than normally indicated to effect thorough distribution to all hands, the Bureau invites requests for additional copies as necessary to comply with the basic directive. This magazine is intended for all hands and commanding officers should take necessary steps to make it available accordingly.

The Bureau should be kept informed of changes in the numbers of copies required; requests received by the 20th of the month can be effected with the succeeding issues.

The Bureau should also be advised if the full number of copies is not received regularly.

Normally, copies for Navy activities are distributed only to those on the Standard Navy Distribution List in the expectation that such activities will make further distribution as necessary; where special circumstances warrant sending direct to sub-activities, the Bureau should be informed.

Distribution to Marine Corps personnel is effected by the Commandant, U. S. Marine Corp. Requests from Marine Corps activities should be addressed to the Commandant.

REFERENCES made to issues of ALL HANDS prior to the June 1945 issue apply to this magazine under its former name, The Bureau of Naval Personnel Information Bulletin. The letters "NDB" used as a reference, indicate the official Navy Department Bulletin.

• AT RIGHT: Sailors unload a barge alongside USS *Toledo* (CA 133) in Sasebo Harbor, Japan. They are unloading powder cans and 8-inch shells for use against the enemy in Korea. ➡


BARRAGE
BARGE

1951 ALL HANDS 1951

THE BUREAU OF NAVAL PERSONNEL INFORMATION BULLETIN

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