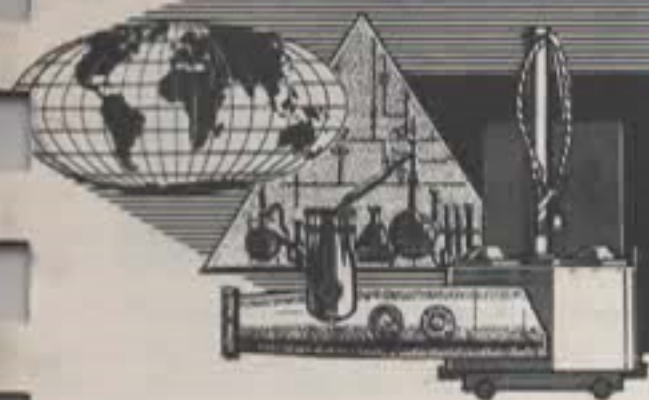


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mine and depth-charge

THE TROUBLESHOOTER

► Dry Batteries

► Reverse Polarity

► Depth-Charge Detonators



THE OFFICIAL JOURNAL OF THE *RUDMINDE* PROGRAM

in this issue . . .



mine and depth-charge
THE TROUBLESHOOTER

Published by the Naval Mine Engineering Facility, Yorktown, Virginia

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COVER PICTURE: Seaman Apprentice Gary Spreutles, left, and Engineman Marvin Galbreath are shown handling a box symbolic of the Mine Warfare School's removal to Charleston, S.C. For more on move see page 12.

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The Rudminde Program is a world-wide troubleshooting campaign designed to achieve and maintain a high level of undersea warfare readiness through the discovery and correction of material defects, through refinement of weapon design, and through encouragement of the unique knowledge and skills demanded of highly specialized segments of the U.S. Navy and Coast Guard. The program is sponsored by the Bureau of Ordnance.

The basic instrument of the program is Navord Form 2776—"Report of Unsatisfactory or Defective Mines, Depth-Charges,

or Associated Equipment"—supplies of which can be requested from NSC Norfolk or NSC Oakland. Anyone who encounters problems with these weapons is encouraged to report them to the Naval Mine Engineering Facility using this Form. Instructions for its use and handling are contained in NAVORD INST. 8500.7.

The Troubleshooter is published quarterly by the Facility's Publications Division and is printed by the 5th Naval District Printing and Publications Office using funds as approved by the Director, Bureau of the Budget, on 10 November 1958.

Contributions, questions, notifications of change in address, requests for distribution, etc. should be addressed to: Editor, The Troubleshooter, Naval Mine Engineering Facility (Ts2), U.S. Naval Weapons Station, Yorktown, Virginia.

THE OFFICIAL JOURNAL OF THE RUDMINDE PROGRAM

RUDMINDE REPORT TO THE FLEET

What's Been Reported?

What's Being Done?

EVERY ONCE IN A WHILE a few loyal Rudminers make their way to NMEF for a visit during which they drop into the T-Shooter office to say hello. We're always glad to meet them, of course, but we hardly get time to say so before they pop the inevitable question: "How often is THE TROUBLESHOOTER supposed to come out?"

For the benefit of other readers who may be wondering too, there's supposed to be an issue every quarter. We say *supposed* to be because, as you know, we haven't been able to make quarterly deadlines yet. The reason is that NMEF has been pretty short on manpower for the job it was set up to do, and while we've become more used to living with that problem than we like to admit, we're in complete agreement with the many minemen all over the world who have told NMEF observers that the T-Shooter could be *supposed* to quite a number of problems . . . that it's badly needed and should come out more often.

Fortunately it looks like some help is in sight. We're more than glad to report that after the next issue (for which we refuse to go out on a limb and name a date at this time) we hope to be able to hit deadlines right on the button.

Rudminde Program has grown

Another question we're frequently asked is the number of participating activities involved in Rudminde. Usually our guests have been pretty startled when they learned the number was 600.

We'll admit that it seems like a surprising number of activities to be using depth-charges or mines, yet the thing that's been even more surprising is the fact that so few Navy men (who should certainly know better) are aware that depth-charges are still a destroyer's prime weapon for close anti-submarine infighting . . . and that today's mines are incredibly cheap, incredibly effective ship and sub-killers. (Be sure to read the Soundings section

in this issue for some new facts and figures.)

In any case, the Rudminde figure is no longer 600. Right now we're not sure what the new total will be, but Rudminde participation has recently been opened to all Coast Guard vessels that have authorized allowances of depth-charges, and to Navy units concerned with acoustic systems and controlled mines.

To both groups we say welcome aboard. Don't be bashful about relaying those Rudmindes whenever you have troubles with the weapons, and if you want back copies of the T-Shooter write the editor direct.

What Rudmindes report

Still another question we're frequently asked is whether most of the Rudmindes that come in from the Fleet aren't concerned with just a handful of components. To this one the answer is emphatically no.

We group the vast array of items such as cases, relays, batteries, clock-starters, extenders, and parachutes, as "miscellaneous hardware." Taken all together, they account for 39 percent of the Rudmindes we receive. The many firing mechanisms in the system come next on the list. So far, 26 percent of the defects you've reported have been attributed to them.

Clock-delay mechanisms come next, adding up to 16 percent, with errors in technical publications accounting for 14 percent and test-sets near the bottom of the list at 4 percent.

Depth-charges make trouble

If you took the trouble to add up the percentages quoted above, you'll be wondering what happened to the missing 1 percent. In a sense, this one has us wondering too.

The final 1 percent of your Rudmindes have reported depth-charge failures. In comparison to the whole this seems almost negligible, but you can quickly see how statistics can play tricks when we state that within that 1 percent are Rudmindes that indicate an incredibly high

failure-rate among certain charges. What has us wondering, though, is something quite different.

The fact that the failures are not fiction has been partially confirmed by our Test Engineering Department which, as a result of the Rudmindes, has begun a series of very thorough tests on Depth-Charges Marks 6 and 9. From these we have already learned that there is definitely something hexing these weapons and NMEF means to find out what it is and correct it.

What worries us is the fact that there are plenty of Fleet activities named by NAVORD INSTRUCTION 8500.7 as Rudminde participants who are depending on these defective weapons, but who have yet to send in their first Rudminde.

Our records prove this fact beyond doubt, and we think it's a sure sign of typical American peacetime lethargy . . . proof that we're more prone to talk about warfare readiness than to get on the stick and do something about it.

Remember, you men out on the ships that carry depth-charges, and you who handle mines too, that the whole purpose of Rudminde is to keep those weapons ready for war. How's about getting with it?

The other side of the coin

So much for the inactive Rudminde activities. Here, on the pages that follow, are some new tables of defects which those of you at the active activities have reported to NMEF.

Send a Rudminde on a Pub?

If so, you'll probably find it listed in PUB-S-CRAWLIN' beginning on page 18. Even if you reported troubles with hardware, if our analysis shows it was really your pub that was at fault we'd list it with pub errors, not with component defects.

DEFECTS REPORT

ITEM	USED WITH	REPORTED DEFECT	REMARKS
Anchor Mk 6-5	Mine Mk 6-0, 4, 14	Too many defects reported to list all here. We're working on answers. Meanwhile every activity that assembles Mines Mk 6-0, 4, 14 must inspect carefully.	
Arming Wire Mk 2-0	Aircraft-Laid Mines	Eyes too big for solenoids on Aero 7A ejection racks	Real trouble is orientation of Aero 7A's solenoids. We're working on an easy solution.
Arming Wire Safety-Lock (DWG 385484)	Mines Mk 10-9; 25-0, 1, 2; 36-1, 2, 3	1. Safety-lock frozen to extender's piston rod 2. Safety-lock's bottom plate jammed under piston rod	Don't remove safety-locks from containers until you're ready to install them. Discard any lock that has a loose retainer or is in any way questionable. By all means study NAVORD INST. 8551, 25 Jun 58, if your job calls for handling safety-locks.
Battery BA-205/U	Mines Mk 6-0, 4, 7, 8, 10 & 11; 16-1; 25-0, 1; 36-2; 49-0, 1	Terminal nuts counter-bored too deep; convex tops prevent installation in Mine Mk 25-1	NOL is presently reviewing BA-205/U specs. We've reported these defects to them.
Battery BA-239/U	Mines Mk 25-0; 49-0	Passed test on Test Set Mk 127-3 but load voltage too low when installed in Mine	Probably too old. See NAVORD INST. 8500.4A, also article on batteries, this issue.
Battery BA-248/U	Mine Mk 39-0	Failed test using Test Set 41-1	NMEF has asked QEL/Oahu to do post-mortem analyses.
Booster-Extender Mk 6-0, 1	Depth-Charges Mks 6 & 9 all mods; 16-0	Failure to hold air pressure during tests	NMEF is investigating a variety of defects in Depth-Charges Mks 6 & 9; this one will be included.
Bushing, Insulating, Fiber, 12-Z-7907-1	Extenders Mk 12-3, 4; 14-0, 1, 2. Clock Starters Mk 1-3, 4, 5, 6, 9	When torqued to 16-20 lb-ft, black ones break but grey ones do not	We've tested all colors, found no troubles at 16-20 lb-ft when dry. Exception: greenish gray washers have undersize holes.
Cable M6P Code 199-35130-G	Controlled Mine System Mks 1-0 & 2-0 (Mine Mk 51-0, 1)	Electrolytic erosion in turks head where cable attaches to mine.	Samples sent to NOL, where this problem is being studied.
Cap, DWG 416741 (No Revision)	Firing Mechanism A-5 Mod 2	Cap won't fit over mechanism	NMEF has recommended BUORD drop this cap from stock. Use caps stamped 416741 Rev. A.
Case, Depth-Charge, Mk 9-2, 3	Depth-Charge Mk 9-0, 2, 3, 4	Seam weld leaks	No action yet; will investigate if Rudminde show more of same.
Case Mk 36-2	Mine Mk 36-1, 2, 3	Ten different types of defect reported in Case 36-2. We're investigating many of these, also looking for safe way to remove frozen screws from explosive-loaded cases. Watch future T-SHOOTERS for more scoop.	
Clock Delay CD 12 Mod 0	Mines Mk 25-0, 1 & 2; 27-2, 3, 4, 5; 36-1, 2, 3; 49-0, 1, 2	Clock cable CA-23 cut during installation of tail plate on Mines Mk 36-2	Clock cables in 36-3 may need to be re-routed; watch for the word in future T-SHOOTERS.
Clock Delay CD-14 Mod 6	Mines Mk 25-0, 1, 2; 27-3, 5; 36-1, 2; 39-0; 49-0, 1, 2; 50-0	An assortment of defects continue to be reported. No conclusive action on them yet but we're watching all CD-14 failures closely. Continue checking carefully as per OP 1452 and RUDMINDE all defectives.	
Cover Assembly, tail DWG 343162-3 or 386134	Mine Mk 36 Mod 1	Gasket buffer (centering lip) out of round	We're checking extent of defect in stocks of the issue activity.

ROUGH RUDMINDE

ITEM	USED WITH	REPORTED DEFECT	REMARKS
Cover, search coil tube DWG 452531	Mine Mk 25 Mod 1	According to ODs, Cover 452531 is used on Mine Mk 25-1 but not 25-0 or 2. Why?	Mines Mk 25-0, 2 have search coil bushings so can use plain cover. Mine Mk 25-1 has not, so uses Cover 452531 with gasket buffer machined on its inner face.
Cover Weldment, tail DWG 416536	Mine Mk 25-1; 49-1	Sensitivity switch mounting plate welded on tail plate assembly in wrong position	Manufacturers have made these up at least two different ways but all we've seen so far are okay to use.
Drill Kit Mk 4 or 5	Drill Mines Mk 25-0; Mk 36 (All Mods)	Bent 3/4" bolt-seals (used in tail-plate packing gland)	Probably aluminum. The seals to use are OSTD 12-Z-9012-17, cadmium plated steel.
Extender Mk 14 Mods 0, 1, 2	All service mines except Mk 6-4; 39-0; 50-0	Terminal Blocks chipped and cracked	Spare TBs for extenders may soon be stocked.
Firing Mechanism A-4 Mod 0	Depth-Charge Mk 14-0	Failure to fire during shop tests	No answer yet. We're collecting more fleet info on these.
Firing Mechanism A-5 Mod 2	Mines Mk 25-1; 36-2; 49-1	Several types of electrical failure have been reported on this mechanism - NMEF is having rejects shipped in for direct analysis.	
Firing Mechanism A-6 Mod 1	Mines Mk 25-2; 49-2	Leaky pipe connections	All A-6 Mod 1 mechs will soon be converted to Mod 3—will be screened for bad pipe connections at that time. Remember these need careful handling—see "Tenderness" in MILLIE'S BRIEFS.
Firing Mechanism A-8 Mod 0	Mines Mk 27-3, 5; 36-3	All A-8 Mods 0 will soon be converted to Mod 1—will be screened for variety of reported mechanical defects at that time. If you've been reporting broken contacts in the MD-9, see "Reverse Polarity" on page 22.	
Firing Mechanism K-4 Mod 0	Mines Mk 6-0, 4, 7, 8, 10, 11; 16-1	Low insulation resistance at cork spacer in "A" assembly	NOL still has cog of the K-4; we've referred this matter to them. Watch for scoop in subsequent T-Shooters.
Firing Mechanism M-9 Mod 1	Mines Mk 27-2, 4; 36-1	Low insulation resistance in CT&E mechanisms checked with Test Set Mk 9-1	Insulation resistance in mines is a debatable subject right now. NMEF is presently making a study of requirements in all mine components.
Instrument Rack	Mine Case Mk 50-0	Almost impossible not to pinch cables when installing the rack	This may get a design change.
Microphone MI-4	Mines Mk 25-1; 36-2; 49-1	Diaphragms cracked, microphones leak on assembled mines in open storage	Far too many assembled mines are stored without the necessary protection. See MOISTURE BARRIERS in this issue.
Multimeter AN/PSM-4A	All Mines	Pointer will not zero when test probes are shorted	This trouble is widespread. We've recommended BUORD have these meters screened Navy-wide.
Parachute Pack Mk 9 Mod 1	Mines Mk 25-0; 36-1, 2, 3	Parachute streamed but did not open	These are restricted from issue pending NOL investigation. Meanwhile use Parachute Pack Mk 1 Mod 2.
Parachute Pack Mk 18 Mod 0	Mines Mk 25-0; 36-All Mods	Static Lines chafed through during flight	See "How Long" in MILLIE'S BRIEFS, this issue.
Pistol Mk 6-0, 2	Depth-Charges Mks 6 & 9 all mods; 16-0	Failure to hold air pressure during tests	See remarks for Booster-Extender above.

Defects reported through Rudminde, continued

ITEM	USED WITH	REPORTED DEFECT	REMARKS
Pistol Mk 12-0	Depth-Charge Mk 14-0; 16-1	1. Detonator leads improperly connected 2. Milliammeter stays in red with Test Set Mk 69 selector at F	1. This trouble is widespread; for correction see inside back cover. 2. We'll investigate if trouble continues to turn up via Rudminde.
Plug Assembly (DWG 1402238)	Test Set Mk 269-0 Connection Box	Key on center post breaks when removed from test set's box	Reporting activity suggested tool to correct but we need to know if others are having same trouble. Are you?
Plummet Spool	Mines Mk 6-0, 4, 10, 11, 14; Mk 16-1	Plummet spool barrels not welded to flanges, but secured by tabs	NMEF recommending to BUORD that plummet spools be screened at time of issue, and those having the reported discrepancy be set aside for disposition.
Release Mechanism Mk 7 Mod 0	Mine Mk 25-0; 36-1, 2, 3	Supplied without lock-washers on clamp bolts	They're not needed. OP 1684 (2d Rev.) calls for them but this is corrected in the forthcoming 3d Rev. of this book.
Retainer Assembly (DWG 451863)	Firing Mechanism A-5 Mod 0	Felt pad, wood spacer, and screw missing	We've recommended these be screened for this defect at time of issue.
SE Mechanism SE-3 Mod 2	Firing Mechanism A-5-2	Grounded between Det. 2 and mine case	NMEF will change installation instructions in OPs 1797, 1798, & 1808. Meanwhile be extra careful to avoid electrical contact between the SE-3's terminal lugs and its grounding plate.
Search Coil SC-7 Mod 0	Mine Mk 36-1, 3	Bakelite end-disc broken	Use universal cap DWG 402763-1. Watch for complete scoop in HOT STUFF next issue.
Search Coil SC-20 Mod 1	Mines Mk 25-0, 2; 27-2, 3, 4, 5; 49-0, 2	End cap screws too short when anti-rotation bracket is installed	NMEF has recommended longer screws
Sensitivity Switch Mk 3 Mod 0	Mine Mk 25-1; 36-2; 49-1	1. Failed pressure test 2. CA-520s have angular AN connectors 3. Bent & broken parts 4. Tube fittings leak	1. We've recommended faulty switches be scrapped. 2. We know of no troubles caused by this. If you have any, report via Rudminde. 3. & 4. This is bad. See "Tenderness" in MILLIE'S BRIEFS.
Tail Plate, Part of Firing Mechanism A-8 Mod 0	Drill Mine Mk 36-3	Can't reach gland-nut with torque wrench to get specified 13-17 lb-ft.	See "Couldn't be Done" in HOT STUFF, this issue.
Terminal Block TB-27 Mod 1	Mine Mk 36-2	Holes in TB-27 won't line up with case brackets in specified position	Looks like some case brackets may be welded in wrong position. Watch for answer on this one in future issue.
Test Sets	All mines & depth-charges	Test-set cables worn beyond repair cannot be replaced; have to procure new test sets	We've recommended that spare cables be stocked. More word on this later.
Test Set Mk 61 Mod 2	Tests A-5 Mods 0, 1, & 2; and MI-4 Microphone	Couldn't calibrate transducer using OS 3729 for Test Set 61-1. No OS for Set 61-2 available	BUORD DWG 1170734 gives the calibrating instructions for Test Set Mk 61 Mod 2. If these won't do the job, report via Rudminde.
Test Set Mk 195 Mod 0	Firing Mechanism Mk 19-0 & Microphone MI-7	Battery-test instructions with test set different from those in OP 2352	Take your choice. Both are okay.

SOUNDINGS

The Changing Scene In Undersea Warfare

MINES IN THE NEWS:

Credit where credit is due

According to releases from Washington, detailed operations analyses have recently shown that in World War II, mines were the most effective anti-ship weapons used by United States aircraft. It was also stated that our losses of planes per killed enemy ship were lower than for other forms of attack.

Both Navy and Air Force planes were used by the U. S. in World War II to lay mines.

New weapons unveiled

Three new anti-submarine weapons were introduced at the Navy League's 1959 Seapower Symposium held at the Sheraton Park Hotel in Washington, D. C.

Attended by some 1200 Navy Leaguers, and their guests, the two-day briefing was highlighted by a typical ASW battle problem conducted with considerable realism on the floor of the hotel's

main ballroom, which had been made to simulate a sizeable section of the Atlantic.

The Soviet submarine threat was emphasized in opening remarks by ADM Arleigh Burke, Chief of Naval Operations, and later by ADM Jerauld Wright, Commander-in-Chief, Atlantic, VADM Robert B. Pirie, Deputy CNO (Air), and VADM W. G. Cooper, Commander, Anti-Submarine Force, Atlantic. The part played in ASW by the Destroyer Force was explained by RADM E. B. Taylor.

One of the new weapons shown was the small but versatile Torpedo Mark 44. "This lightweight underwater missile," explained RADM Paul D. Stroop, Chief, BUORD, "has improved characteristics over others now in the Fleet and is capable of attacking faster targets at greater depths."

Two aircraft-launched mines—the Mark 52 and the Mark 55—completed the new ASW weapons trio. As RADM Stroop pointed out, both can be launched from our latest high-speed aircraft at extremely

high altitudes and with extreme accuracy.

The Mine Mk 52 has already been approved for service use and is in full production at the Naval Gun Factory, Washington. The Mine Mk 55 is scheduled for fleet evaluation next fall and is expected to become operational about January, 1960. Prototypes are now in production at NGF.

Both new mines were designed by the Naval Ordnance Laboratory.

ASW NOTES:

'Copter escapes knife

In spite of the general cutback in DOD contracts with the aircraft industry mentioned above, the Navy is standing pat on a new \$17 million deal with the Sikorsky Division of United Aircraft for production of new HSS-2 helicopters.

Powered by twin gas turbines, the new ships have flying-boat hulls and all-weather flight capabilities, and are said to be a substantial advance

Cure For Premature Float Release in 36-1

If you're one of the many who—through Rudmines and PSMTF reports—have been complaining about premature float release in Drill Mines Mk 36-1, we think a couple of our NMEF wizards may have come up with an answer for you.

To make sure the prematures were for real we assembled 24 mines very carefully in our own shop, then had VAHM 13 air-drop them in our York River test range. Sure enough, we started getting floats on the surface about an hour after planting, just as so many of you in the Fleet had reported. This provided us with samples for analysis.

The explanation turns out to be something of a weirdie. What seems to happen is that closure of the CD-10's Switch-A makes a spark that induces a radio-frequency current in the float cutter's explosive fitting leads. The leads then function as a transmission line to this RF pulse, causing enough current-flow through

the cutter's explosive fitting to blow it. Tests in our lab showed that this will happen about 15 percent of the time, but that induced current in the signal's explosive-fitting circuit—apparently because of a difference in capacitance—is always slightly less. This, of course, would account for the fact that the signals have not been firing prematurely.

From what we know now, it seems pretty certain that premature float-release can be eliminated by adding 0.1-mfd capacitance across the CD-10's SW-A. In all probability you'll soon be getting a NAVORD INSTRUCTION calling for installation of a 0.1-mfd, 200-volt capacitor (NS 5910-112-7142 or equal) between the Positive (+) and "G" terminals in the CD section of the Drill Mine 36-1's TB-8 Mod 0.

Recently we planted 25 mines with 0.1-mike capacitors so installed. There were no float-release prematures.

over the HSS-1 which has been used by the Navy for antisubmarine work and by the Army and Marine Corps for a variety of tasks.

Production of the HSS-2 follows \$15 million worth of design, mock-up, and initial building work performed under Navy contract by Sikorsky.

Underwater grenades?

One of the newest things on the drawing boards at NOL is an "atomic grenade" which destroyers could fire as a depth-charge, from conventional 5-inch guns. As the think-boys see it, this startling nuclear weapon would have an effective blast range of 5 miles or more.

A good idea, but...

Depth-Charges Mark 15 Mod 13 were launched from submarine signal-tubes during some tests by Submarine Development Group Two. Trajectories, unfortunately, appear to have been unsatisfactory.

Caught in the squeeze

Recent cancellation of the Navy's \$178 million Regulus II contract was only one outgrowth of the Defense Department's current struggle to live within its budget. Also hit was

the \$290 million contract for P6M Seamasters, the new Martin-built multijets reported in this column, last issue. Originally calling for 24 of these jet age mine-layers, the contract has been pared down to 14 planes.

What next?

One of the newest projects under consideration in the Pentagon is a tiny pilotless helicopter that could locate an enemy submarine, then drop a nuclear depth-charge for the kill.

New lease on life

Boston Naval Shipyard has been selected to modernize the Perry, a 2,400-ton Gearing-class destroyer. The face-lifting, which is expected to cost \$7.7 million, will involve stripping some of her conventional armament to make way for up-to-date weapons and new electronic equipment planned to increase her effectiveness in antisubmarine warfare.

One of several World War II destroyers that are approaching obsolescence, the Perry is being refitted as part of a continuing program designed to modernize this type of vessel for service with newer ships.

MINE MATERIEL:

New clock-delays

Breadboard models of experimental clock delays XE-17A and XE-18A have now been tested, with the result that engineering models of both are now in the mill. Both mechanisms are planned for ultimate use not only in new mines, but also in several in-service types.

Pinger travelling first-class

A contract has been let to Minneapolis-Honeywell Company to develop a new Receiver Mark 10 Mod 0, and finish development of Transmitter Mk 46 Mod 0 — official name assigned to the NMEF-designed Pinger. Together these will comprise a complete ultrasonic mine-locating system, for which M-H will also furnish complete design disclosure and draft an appropriate OP.

The pingers now in use, in case you didn't know, are prototypes that were hand-made by NMEF. Fifty M-H pilot models will be delivered early in 1960 to NMEF's Test Engineering Department for the tests and evaluation that must precede release to production.

Calling all mines

Another example of NOL magic is an underwater broadcasting system that transmits messages via sound waves.

Purpose of this unique system is to make known what's going on inside a mine when it's being approached by a target ship. Consisting of a small transmitter inside each mine, a central receiver (hydrophone) on the bottom in the middle of the mine-field, and cable connection from the receiver to shore, the system signals each mine firing mechanism's reaction to an approaching ship.

The system is actually a telemetering application developed not for use in actual warfare, but to monitor the response of moored mines during development, evaluation, and tests.



Let's talk...

about those *Dry Batteries*



Dr. A. G. Hellfritzsch, head of the Naval Ordnance Laboratory's Electrochemical Division and one of the nation's top battery experts.

IT IS COMMON KNOWLEDGE in military circles that . . . dry batteries are quite perishable. Many batteries currently used in military operations cannot be counted upon to perform reliably after one year of storage at 70°F. These facts pose serious questions and problems for the maintenance of a mobilization stockpile, the shipping, storing, and handling of dry batteries, and for predicting the reliability of performance of military operations in time of war."

That, friends, is a direct quote from a speech delivered to a recent research and development conference at the Army's Signal Engineering Laboratories by Dr. A. G. Hellfritzsch. Dr. Hellfritzsch heads the Naval Ordnance Lab's Electrochemistry Division and is one of the nation's top battery experts. When this man says we've got battery problems you can be sure it's a fact.

But, you say, dry cells are quite inexpensive and in peacetime we're certainly not using them up fast . . .

The truth is that such a response would be perfectly logical if it were not for several inescapable facts:

► Military use of dry-batteries is increasing; from mines and depth-

charges to the latest in transistorized monitor circuits, they are an all important source of self-contained electric energy.

► Manufacturer's output and the supply system are geared to peacetime requirements; this means we have to keep battery stockpiles big enough to handle wartime needs until wartime production could be stepped up.

► The stockpile wouldn't be much good all in one place; we have to keep reasonable stocks of good batteries ready in the right places all over the world.

► We don't have to use the batteries in order to deplete stocks; they deteriorate continuously during ordinary storage.

► There is no reliable, accurate test that tells how much life is left in a dry battery that doesn't also destroy the battery.

So there you have it. A year of storage in temperatures of 70° destroys the batteries' reliability. When we consider how much time can get lost in handling from manufacturers to depots to ports to the man who hands them to you, it's easy to see how some of you in the global suburbs would be getting bat-

teries just in time to give them the heave.

A southern exposure

One of the reasons for indomitable Rear Admiral Richard E. Byrd's expeditions to the south polar region was *not* to find out what effect cold would have on dry-cells. This could have been learned in a laboratory. In fact, batteries were frozen by the Carnegie Institution in 1921, and probably by numerous others since the mid eighteen hundreds when Monsieur Georges Leclanche' improved on the earlier work of Senor Alessandro Volta (Mr. Volt) and became father of the modern dry-cell.

The reason for such experiments, however, was not to determine the effects of freezing, but to study changes in output at low temperatures. It was of course found that freezing had no damaging after-effects. But apparently no one thought of keeping dry-cells frozen long enough to yield any data on long-term effects.

Fortunately one of Byrd's party chanced to leave behind a pair of dry batteries that remained exposed to the sub-zero temperatures until

7½ years later when Byrd returned to the Antarctic. Tests were subsequently run on the two batteries, and compared with like tests that had been run on a new battery of the same brand which had been manufactured in the same year.

The comparison after 7½ frozen years was so encouraging that BUORD called for new emphasis in investigations which were already underway at NOL under Dr. Hellfritzch. Soon the battery storage facilities at Naval Ammunition Depot, Hawthorne, and Naval Mine Depot, Yorktown—which for some time had been held at 35 degrees above zero as a result of NOL's earlier work—were modified to provide storage at 30 degrees below. At the same time (1951) Dr. Hellfritzch commenced a study to determine how long various batteries could be kept at various temperatures and still have enough usable life to meet the operational requirements of various weapons.

When the study is complete, which will not be before 1967, some 40,000 battery specimens will have been tested including not only batteries used in present weapons, but all the cell sizes, discharge rates, and end-voltages likely to appear in future BUORD weapon developments!

Now hear this...

Fortunately it is unnecessary to wait until 1967 to benefit from NOL's work. It has produced a con-

tinuous stream of new knowledge, and it will be worth-while to consider a couple of concrete examples right here and now.

One finding has already been mentioned—the fact that 30° below zero is the most effective storage temperature for standard dry-cells. This fact alone is credited with savings of well over a million dollars each year.

Then, since there is no practicable test to tell you how much life is left in a battery, the tables on pages 101 and 102 of OP 1452 have been worth their weight in gold. With a mine battery's storage history, minemen have been able to use these tables to predict whether the battery will keep a mine lethal in water of a given average temperature long enough to meet the mine-field planning officer's needs.

The tables have also been used to determine when to give over-age batteries the heave. This makes it doubly important for you to know that recent findings have caused the tables to be revised.

Pending a forthcoming revision to OP 1452 (the 3d) NAVORD NOTICE 8500 of 17 Oct. 1958 includes the revised tables and complete instructions for using them.

The difference in battery life as reflected by the new and old tables is shown in the graph we've printed on this page. Of course the change applies only to batteries that have had some time in frozen storage (-20° or colder) but nearly all mine

and depth-charge batteries have, so our graph shows that batteries which would normally be disposed of in 12 months may be good for up to 3 months more.

This means that BUORD can cut back new-battery buying and channel the savings elsewhere—but only if battery-handlers start using the new tables right now. The moral? If all you have is the old table, write to Naval Gun Factory (Code 754), Washington 25, D. C., and ask for copies of that NavOrd Notice once.

... And especially this

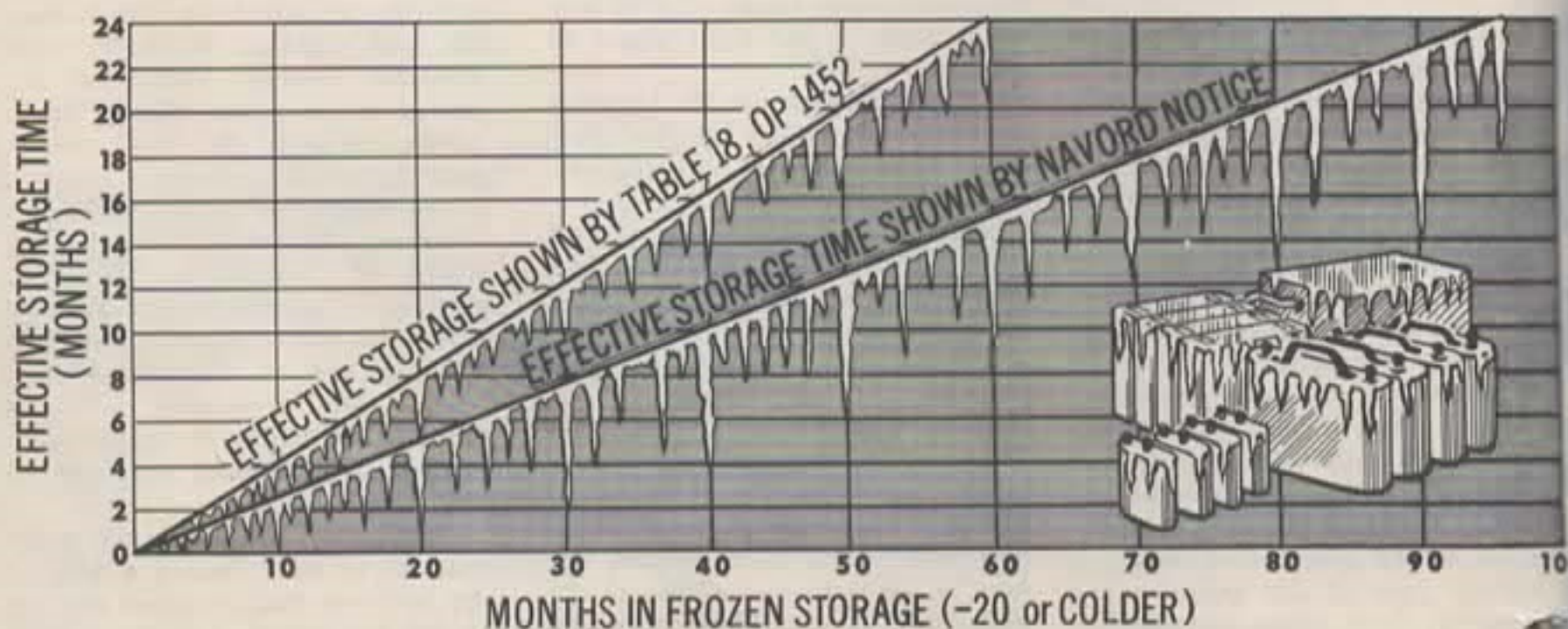
From what's already been said, you can see that BUORD is more than a little interested in the high cost of our battery stocks.

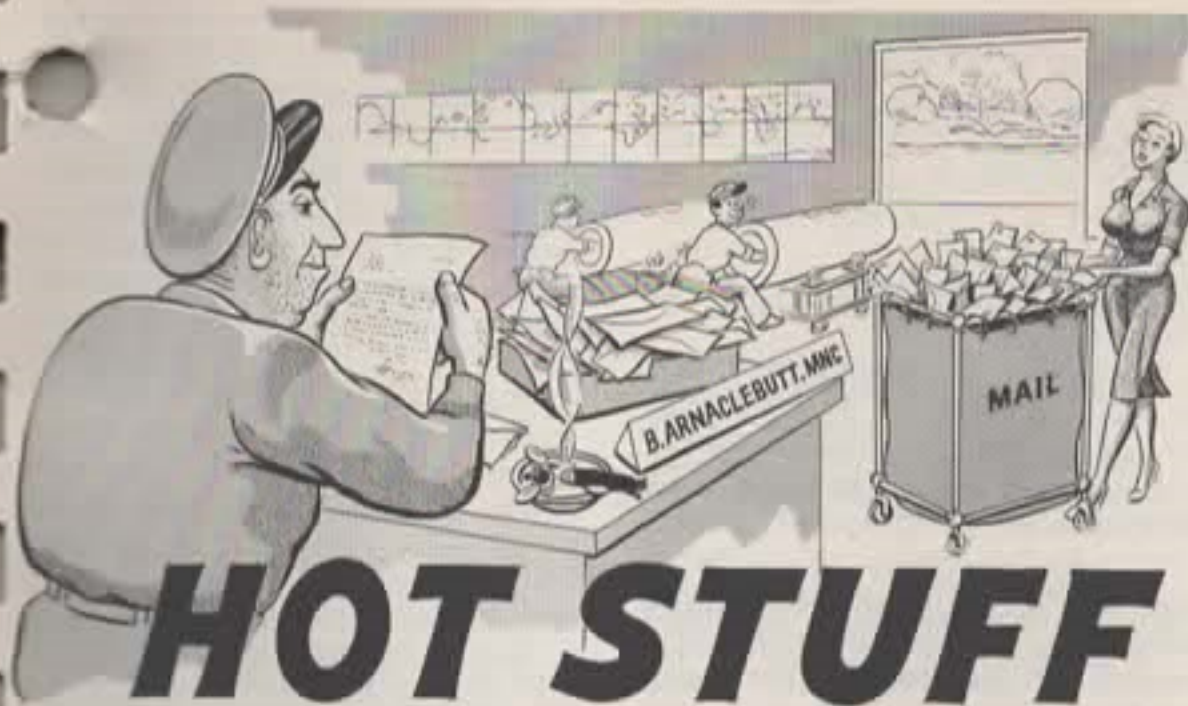
But that doesn't mean we'd want to risk lives, planes, or ships planting duds, which is exactly what will happen in wartime if those of you who receive, pack, ship, and store batteries cover up the fact that those for which you've been responsible have had less than ideal care.

Consider the man who moves a summer shipment of batteries to a refrigerator from an unventilated warehouse in which daytime temperature gets as high as 109°.

Sure, they were only there as a temporary thing. They were unloaded from a freight car on a Friday, and the man who'd normally make a place for them in cold

continued on page 20





HOT STUFF

Make mine blue ribbon

Dear B-Butt,

There's a cockeyed metal strap that holds the bleeder resistor and SD-4 in Mine Mk 25-2, but it's not listed in CD 7304. What the CD does list is a bleeder assembly, and the drawing for this (1620873) shows a strap that looks like just what we need.

The only hitch is that whenever we order, all we get is 5600-ohm bleeder resistors. Got a good number to try on the next go-around?

Confused.

Dear Confused,

A month ago you had a right to be, but today I drew a complete Bleeder Assy 1620873 (Stock No. 684-30510) from Yorktown stocks with no sweat. Guys who've been trying to get 'em for years will now shake their heads and say the old chief has done flipped, but the dingus is right here on my desk so I know they're in the system at last. They include a 5600-ohm bleeder resistor installed on a terminal block 12-Z-7002-777, which in turn is mounted on the very strap you're talking about. This means you'll be in like Flynn when you order them for use in Mines Mk 25-2; 27-2, 3, 4, 5; 36-1, 3; and 49-2.

The strap alone (without the extra hardware that makes it a bleeder assy) is DWG 1825884. For mines do not use a bleeder there are

also several other straps in stock. In Mines Mk 25-1; 36-2; or 49-1 you can use 542179, 496048, 1417795, or 1825884. For mines 25-0 or 49-0 get strap 452550 (which the drawing calls a "mounting plate"). In the Mine Mk 39-0, Strap 1558534 (official name: "mount assembly") will do the job fine.

From this you can see there's no shortage of straps. What's your choice?

B. Arnaclebutt

Calibration modification

Dear B. Arnaclebutt,

Checking calibration of our Test Set Mk 75 Mod 1, I found its full-scale reading for CD-14-6s to be 300 milliamps. To me this means our set passes bum clocks. What should we do?

L.O.S., MNC

Dear Chief,

Your full-scale reading of 300 milliamps means that a reading at the beginning of the red sector of that meter's scale would be 270. Since a drain of only 250 milliamps is the most you should accept for CD-14 Mods 3 or 6, your set will indeed give a clean bill of health to defectives among both of these mods. But that isn't all.

To learn more, we dug out the calibration instructions for your set

(DWG 399009) and found that 250 milliamps is the specified full-scale calibration with the CD-14-0/CD-14-2 switch in its CD-14-2 position. This means that even calibrated right, your set would be almost as bad. For while it would no longer be accepting clocks with excess current-drain, it would then reject perfectly good ones that draw 225-250 milliamps.

The key to this pretty paradox lies in the selection of your set's Resistor R15. It should be chosen so the meter (M1) will indicate 250 milliamps at the *beginning* (left edge) of the red sector of its scale, rather than at the right end (full-scale) as the instructions now say.

We'll have the blooper in DWG 399009 corrected by the time you read this but that's all I'll say about the Test Set Mk 75 Mod 1 for now. Mod 2 will be available everywhere soon, and a fast check of the drawings for this one indicates its calibration will be okay.

B. Arnaclebutt

Black (& white) magic

Dear Barnacles,

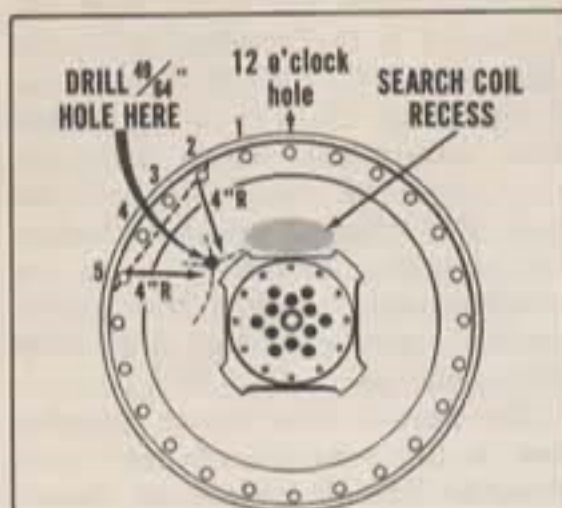
OP 1684 says on page 28 to install a TB-21 in the Mine Mk 36-1. Then on the very next page it says to perform a continuity test of the CD-14's DA switches, which is something even Houdini couldn't do with that TB in place. Just to keep the records straight, hows about getting this operation turned around right?

W.H., MNC

Dear Bill,

Having seen him perform I'd put my dough on Houdini, but for us ordinary guys the advance copy of the forthcoming 3d revision to 1684 is the key. What it does is eliminate the current-drain and continuity tests of the CD-14s in Mine Mk 36-1. Like this, you too can do tricks!

B. Arnaclebutt



Note: To find centers from which to draw 4-in. arcs, scribe a center-line between holes 2 & 5. Draw arcs with stationary foot of compass on this line, as close to holes 2 & 5 as possible.

Suggested relocation of the gland-hole in tail-plate of Drill Mine Mk 36-3

*They said
it couldn't be done*

Dear Barnacles,

Around here we give a solid thumbs-up to The Troubleshooter. For guys like us it's the best thing to happen since they began to can beer. But we already found something wrong.

That article on drill components in #1-58 was great but it said that instead of measuring the gap as required by OP 1816, we should torque the CA-958's gland-plug to 14-17 lb-ft. We tried this in some Drill 36-3s using a crowfoot just like the article said. But there's not enough room for a torque wrench.

Of course we made out all right by using a regular end-wrench and tightening by feel. Just thought you'd like to know the 36-3 should have been mentioned as an exception.

W.B.B., MNC

Dear W. B. B.,

To paraphrase the great George M. Cohan — my O-in-C thanks you, my editor thanks you, and I thank you. It's just such plugs that put Cohan on top, and to stay in this business we need all we can get from good men like you. But now to the plug you're worried about — the one in the gland.

No sooner had the Fleet got hold of #1-58 than a flock of Rapid Rudmines came back saying there's no room for a torque wrench on the gland-plug in the Drill 36-3 and that NAVORD INST. 8551 should be changed.

Trouble is, the malfunction rate is just too high for by-guess-and-by-God tactics. So instead, we're suggesting a change in the gland's location.

With the gland-hole in the 36-3's tail-plate drilled in the location we show here, the crowfoot and torque wrench will definitely fit. The forthcoming revision to OP 1816 will probably also show it like this.

One more tip. The 3/8-inch Crowfoot GS 5120-541-4071 is fine for this job, just like our article said. Now — for those of you who haven't been able to get it — I've just discovered another. This one is Attachment, Crowfoot, Socket-Wrench, 3/8-inch, GS 5120-181-6765. Maybe asking for this one you'll have better luck.

B. Amadebutt
CD OP!

Dear Butts,

Page 20 of OP 1684, 2d Rev. says to check resistance between the CD-10 Mod 1's Red & White lead and its Red lead, and also between the Red & White lead and the Orange lead. Shouldn't the ohmmeter show an "open" across the Red & White and the Orange? The book says no.

P.O.L., MN2

Dear P. O. L.,

The book says wrong! When the CD-10 is in Armed position, as it is for this test, its Switch A is open. When you remember that Red & White to Orange gives a check across Switch A, you can see that an open is exactly what you should get.

Advance copies of the forthcoming 3d revision to OP 1684 get around this mixup nicely by omitting a continuity check of the short-time clocks, which is fine except it means there'd be no pre-assembly CD-10 test anywhere along the line. OP

1452 looks like the logical place for such a test, but until something firms up on this you really should check those clocks like in 1684 2d Rev. — making sure you get an open, of course, across the Red & White and Orange leads.

B. Amadebutt

All hands hear this

Dear Butts,

Trying to track troubles in a Mine Mk 25-0 that failed the OP 956 operational test, I discovered a short to ground through the E lead of the Circuit Break Mk 1 Mod 0. Since that CB had just passed every check in OP 681 using Test Set 96-1, I was really shook.

First we replaced the CB. The mine then checked out fine. Next we hooked up a 96-1 and repeated the CB test on the bench. To the surprise of us all, the circuit break that had failed in the mine checked out perfect again in every respect! Finally I went back to the ohmmeter. When it showed up a short via lead E, I opened up the CB.

Right away I noticed that the lead from Sw-3 of the shielded relay (RE 20) was pinched between its case and the setting plug's insulator (the fiber mounting block). This, of course, might have got by if it hadn't been for the fact that the self-tapping screws that secure the mounting-plate cover were an eighth-inch too long. Maybe this doesn't seem like much. But it was enough to make contact with the shielded circuit's case and jam it against the fiber insulator so tight that the case not only pinched the Sw-3 lead, but cut through its insulation. That closed the circuit to ground and completed the short.

I don't know how many more you've found like this. But I strongly urge modifying the test set so that short circuits can't possibly get by.

J.M.D.

Dear Dick,

It's not every day we hear from guys who really sleuth the complaints and analyze 'em like that. Reminds me of a teacher who lectured me for three whole years about something he called *stick-to-iveness*. If he hadn't died when

dit I'm pretty certain he'd have a up on me. But he sure would have loved you!

Anyhow, there's no need to modify the set as long as there's a faster and cheaper way out . . . provided all ye far-flung minemakers make use of it. First, though, let's clear the ground.

Dick's shorted CB, fellers, is definitely not the only one of its kind. Nor are shorts the only CB 1-0 trouble that's being reported. We're constantly hearing woes about balancing them with Firing Mechs M-11 Mod 4, and we'll hit that problem too. Sooner or later most of you are going to meet both, so dig you well the beat of this jazz —

Obviously the shorting and pinching is something that's been thrown in for free during manufacture. To take care of this we've called for shorter leads in DWG 416527, changed DWG 384407 so the leads'll be properly dressed, and revised MIL-C-21932 to require an insulation resistance test of the operate circuit. That should cure the misery in any future procurement.

As for components already in stock, we're asking for an insulation resistance test on all CB 1-0s in OP 2567 (a new book to cover all firing mechanisms) which is now in the mill at NOL. Meanwhile in the corner where you are, I suggest that as of today you make it SOP to tie all the CB's leads together, and check resistance between them and the case with a megger. Save yourself juggling components by doing it before installation in the mine, and if you read less than 100 megohms at 500 volts, reject the CB. And now to the business of balancing.

The fact that your CB 1-0 and Firing Mech M-11-4 don't balance after installation isn't too important . . . we live with this complaint with other firing mechanisms too. What is important is that they balance as a matched pair on the bench. Here, before installation, you can keep switching M-11s until you hit a right combination. The brand new OP 956 (3d Rev.) now specifies doing it this way for Mine Mk 25-0.

Some old hands will be reluctant to buy this, but maybe that's why they're called old hands. Juggling

those mechs in and out of the mines, think of the wear and tear on their knuckles!

B. Amickbutt

Gaskets or caskets?

Dear B-Butt,

Noticing what looked like a rotted filling-hole gasket, I pulled the cover and am sending a photograph of the sad sight we found. Naturally we replaced with a gasket from stock, but it seems like maybe you guys should do something about making a pre-plant gasket-check SOP on all marks & mods.

G.A.H., MNC

Dear Chief,

I sure appreciate your communique, your interest, and your pic. But the fact is that we need more Rudmines from minemen wherever they are, and the SOP you're suggesting might get some of 'em transferred to an address from which I don't think we can be reached!

In other words, Chief, the experts tell me there's always a fair chance that playing footsie with filling-hole covers could touch off explosive-loaded mines. True, guys have gotten away with it . . . or was your idea to pull gasket-checks only on drill mines. In either case, look at it like this:

There's nothing but some plaster to get wet in the lethal cavity of a drill mine, and the only thing salt water will do in a live one is form a gas that'll seep out where the water

seeped in. The brains say the bang would be just as big, so why form a habit that would interrupt the flow of my fan mail if carried over to the real thing? For once, then, I'm not arguing with the experts — maybe because of a soft place in my heart for all MN rates.

Instead I say tell every last one of 'em never to lay a wrench on those filling-hole fastenings. Let's make this practice SOP.

B. Amickbutt

More slack in the rack

Dear Chief,

Is there an approved way to adapt Mine Mk 50-0 to planes that have AERO 7A ejector racks?

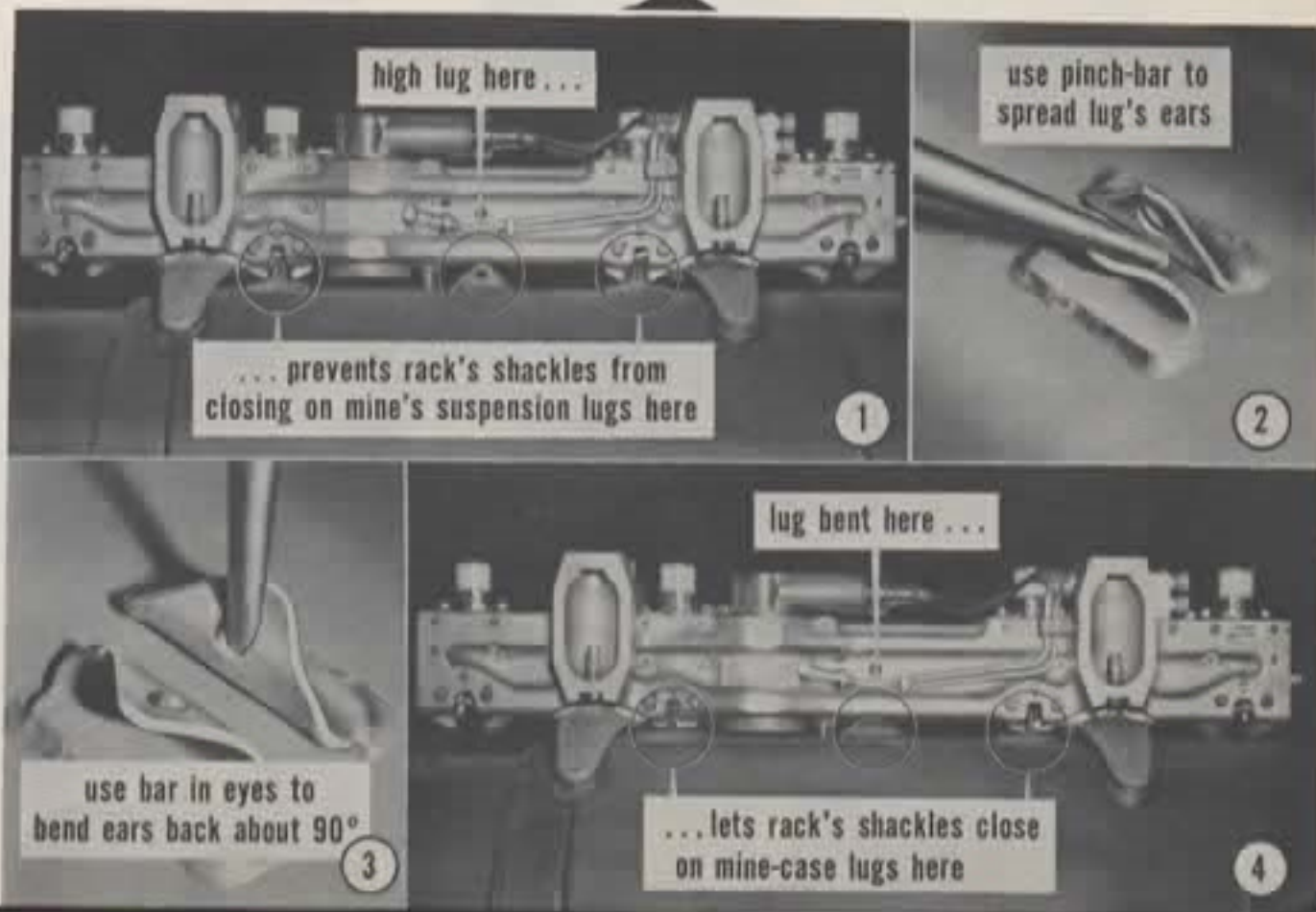
H.M.D., MN3

Dear H. M. D.,

New 50-0 cases will not have the lug that gets in the way. Meanwhile you can get by nicely by bending the lug's ears back about 90° like we show on this page. The tool we use is the 24-inch pinch bar from the Basic Tool Kit for Mines, and there's been no static from the brass even though the pinch bar is steel.

Naturally an antispark tool would be best, but one small enough to fit the lug's eyes would be so weak it'd bend instead of the lug. The moral: don't go hog wild and start hammering and pounding on explosive-loaded cases and you'll make out okay.

B. Amickbutt





Mine School Move

AFTER EIGHTEEN YEARS of doing business at the same old stand, the Mine Warfare School has moved . . . not to Dahlgren Va., as hinted in T-Shooter 1-58, but to Charleston, South Carolina.

The official announcement came late last December and proved an unwelcome Yuletide message to the population of tiny Yorktown, Virginia, where the school had been in operation since 1941. Appeals to reconsider were promptly voiced to Virginia's Senator Harry F. Byrd and to Assistant Secretary of the Navy Fred A. Blantz. In return the Navy explained that upkeep of the 175 building facility at Yorktown was out of proportion to peacetime needs for training in mining technology. Pointing to an expected savings of \$357,430 per year, the Navy listed other advantages as follows:

► Charleston is the established center of the Atlantic Fleet's mine warfare operations. Housing, messing, etc., for the school were available at the mincraft base there.

► Mincraft needed for training activities are based at Charleston. The fact that facilities to service them are also available there means lower cost when such support is required by the school.

► Travel costs for students would be less. A study of past school records showed that 25 per cent of the students came to Yorktown from Charleston, and that 50 per cent of the graduates were subsequently assigned to duty at Charleston. It was also stated that more courses would be available to more mineman-students as a result of the move.





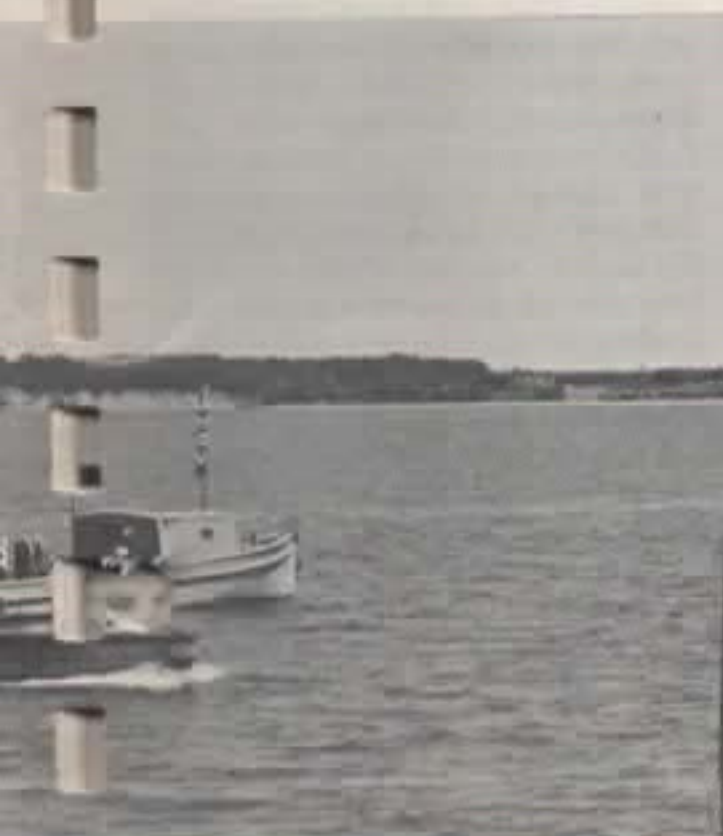
To Charleston, S. C.

Staffing needs would be reduced. It took 25 officers and 186 enlisted men to maintain the operation at Yorktown. Only 13 officers and 48 enlisted men were believed necessary in Charleston.

So that's how the cookie crumbles, as they now say in Yorktown. One of these days we'll try to round up some pix of the new setup in Charleston, where ye editor occasionally used to tie up his converted shrimp boat in the local yacht basin for an evening devoted to splicing the main brace.

That, of course, was in the halcyon days before T-Shooters and ulcers. Right now we're hoisting mostly homogenized Grade A. And instead of being surrounded by water and sky, we're hemmed in by a potpourri of pix taken by a wandering photographer for the Newport News DAILY PRESS as the gang at Yorktown packed up the school's gear and took their official departure. We haven't got space to tell what's going on in each shot. But if you look around you'll see R. E. Thorsen proving that a Mineman First can also do tricks with a crane . . . LT Don Innes closing the door to operational planning . . . MN1 Roger Janke charading Aldous Huxley's fine novel ("Time Must Have A Stop") . . . CAPT E. B. Orr (commandant) spelling last details to CDR S. E. Clark . . . and Charles Paris and Bill Johnson juggling crates of the school's eighteen-year accumulation of equipment.

Those meticulous hands working over the dial on a safe belong to mine warfare instructor LT Carl Gebhardt. His head is cut off by a scene minemen are not likely to see soon again—the York River dock where the school's sweepers used to be berthed.



Millie Amps'

BRIEFS



Hi!

Can a gal like me get with these depth-charges and mines? You just bet that she can, especially if her name happens to be Millie Amps. And no kidding, that's me! Besides, what I lack in brains I can make up for anytime with my special kind of, uh . . . "brawn!"

Anyhow, I work hard in the office where this T-Shooting publication is written, and I've kept insisting that plenty of you would definitely be interested in some of my briefs. So gang, here you are! If you want more, though, you'll have to put it in writing. Old Big-Foot B-Butt says I can't do any more columns unless enough of you fellows insist. So won't you please send us a letter or card?

Probably you'll just forget. No matter what happens, though, remember—I just love typing copy for all of you MEN!

How long
has this been going on?

When some P5M aircraft touched down for fuel on their way to a mine-drop in yonder Pacific, sharp-eyed LT Bill Wagner noticed that the static lines on some Parapaks Mk 18 Mod 0 had almost completely chafed through at their clips.

The mines, of course, were externally mounted. They'd also had several hours air time at 150 knots. Nevertheless these are normal service conditions, and those static lines are known to have been tight just before takeoff. This could mean that the slipstream had worked them loose enough so they could whip.

This situation suggests a two-part remedy, and—what with the many Fleet-service-mine-test duds that have lately been blamed on the air-delivery system—both parts should become SOP. The first is extra care when attaching static lines to planes: 1) make sure the

point of attachment is within the cone of limitations shown in the appropriate OP or in NAVORD NOTICE 8551, 26 Feb. 1959; 2) make sure there's no slack left in the line; 3) take two snug half-hitches against the adjustment buckle, then wrap the whole knotted section with tape and cut off any excess line.

The second part of the cure is for plane crews, when delivering mines, to be on the alert for any signs of static lines whipping or chafing in flight. If the condition persists in spite of the extra care during installation, some prompt reports from you boys via Rudminde might be grounds for a change in the design of this gear. After all, who can say how many duds this condition has caused? If it hadn't been necessary to refuel . . . if it hadn't been for Eagle-Eye Wagner . . . ?

If you who install and fly the mines don't take full advantage of this coincidence, some of our men could end up risking their lives flying crucial wartime mining missions

that would have no more effect on the enemy than if they'd been dry runs.

What a way to waste mines, money, and big husky MEN!

What's your technique?

Some of you are still asking for clarification of the operational test procedure involving the Microphone MI-4 in OPs 1797 and 1798. We-all thought that had been cleared up last October after Rudminde from R. D. Airhart of MDAU 0324, J. M. Dickison of NAD/Hawthorne, and J. R. Pouliot of Navy 3923 resulted in a BUORD speedletter explaining that you can't get a firing indication if you only rub the MI-4's diaphragm long enough to produce a voltmeter reading of 20.

Anyhow, the troublemaker is a typographical error in par. 55b of OP 1797 and par. 57b of OP 1798, where the specified voltmeter reaction should be a steady rise up to 60 instead of only to 20. Of course

must still continue to rub gently, keeping the needle up at 60 for at least 3 seconds just as both books now say. If you haven't received OP changes that make the "60" reading official, they'll be along soon.

Chief B-Butt (the jerk) says I should point out that according to the Mk 97-1 test-set instructions you can also get a proper rise on the meter by tapping. Personally I'll stick with the OP. I like the idea of rubbing much better.

— Don't you?

This could happen to you

If you should find yourself short of SE-3 ship-counters, there's no longer any need to hold up mine assembly until you can get more. Of course they're only used in certain mines, but you'll find good scoop on how to assemble without them in NAVORD INSTRUCTION 08550.20 dated 15 October 1958. And some good clear illustrations too.

Even if you're not short of SE-3s, there's any chance you'll be assembling mines that require them you'd better make sure you'll have this Instruction on hand just in case. NSC Oakland or Norfolk, or the Supply Department of NGF, Washington 25, D. C. will send copies at your request.

The brush

W. J. Mehard of NAS Norfolk gave us the brush, but not the way you think.

He says his shop prepares a lot of Mk 15 floats for re-issue. He says that after some time in the briny, they come back with an abundance of sea-growth and corrosion. Cleaning them up can be somewhat of a chore, especially in the cutter housing where you have to get the bore spotless but mustn't scar or scratch the machined surface or threads.

Mineman Mehard says a standard bronze .50-caliber bore-cleaning brush is easy to get and cleans the housing just right. The Federal Stock No. is Z1005-550-4037.

Thanks loads, Bill.

Please—

Let's not get too deep!

Underwater tests of Signals Mk 26 Mod 0 prove that 150 feet (25 fathoms) is just too darn deep to plant drill mines that use them. These include all mods of the Drill Mine Mk 6, the Mk 10 Mod 3, and the 16-1, 49-0, 1, & 2, and 51-0 & 1.

What happened in the tests—which were run on samples of the 4000 Mk 26 signals manufactured by Ordnance Products Company under NOrd 16935—was a 44% failure-rate among those actuated at 150 feet, mostly because the fiberglass sleeves collapsed under so much pressure. Tests were also run at 100 and 125 feet, with the result that BUORD has set 125 feet as a new maximum planting depth when this signal is used.

All planning, preparing, and planting people please note!

List lists wrong list

After consulting NAVORD LIST 24036 of 11 March 1957—which lists assembly and replacement (re-use) parts, tools, and accessories for Drill Mines 25-0, 1, & 2 and 36-1, 2, & 3—Chief Willie Brooks of Navy 3002 called our attention to the fact that tool sets should be drawn in accordance with NAVORD LIST 24155, not NAVORD LIST 22501 as page 3 of the aforementioned NAVORD LIST 24036 says to do.

While all this referencing of lists in lists already seems utterly confusing, I've got to risk making it even worse by pointing out that while Chief Brooks is absolutely right, you can't get copies of NAVORD LIST 24155. That's because it's being revised. It will be distributed in August this year.

You can get NAVORD LIST 24036, though. You can get it right now, and I know from Rudmines and talking to fleet-test observers that plenty of you fellows have never even seen it. This is the list I mentioned first, that gives item allowances for 25s and 36s. Every activity that assembles these mines needs this list, which can be had for the asking from the Ordnance Supply Office at Mechanicsburg,

Pennsylvania. (P. S. Just imagine having lists that list lists of lists! Isn't this the absolute most?)

Try a little tenderness



I'm not nearly as old as that song. Honest. But mere age doesn't always tell the whole story. For instance, if some of you brutes gave me the same kind of treatment you've been giving some of those delicate components, I too would now be in Code 9!

Let's face it . . . here at NMEF we know you could search the whole pea-picking Navy and not find a bunch as good at doing a delicate job right as you mineman rates. I know that you know what a little tenderness can do, and I'm referring to the way you handle mine components and not what some of you think! This means it's the exceptions to the rule I'm talking to now—the few goof-offs who've been piling expensive mechanisms in trucks and trailers too high and too fast, jogging them at high speed over big ruts and bumps, and bouncing them on concrete aprons and even shop floors. What's more, this Code 9 bit is no laughing matter. Any day could be the very day when Uncle will need every last piece of that hardware he can get.

So gee, guys, I hate to sound like a cranky old witch. But lately our record is bad . . . and I said it and I'm glad, glad, GLAD.

Maybe this way you'll remember. Maybe now when you're handling those delicate components, you'll think about me. Maybe like this you wouldn't forget to be tender.

— Hmmmmmmm?

Willie Brooks

CONTRIBUTIONS

. . . FROM THE

ANYONE WHO THINKS all the country's idea-men work on Madison Avenue just doesn't know much about Uncle Sam's Mine Force.

Consider, for instance, the nifty puller for clock-starters and extenders shown below — sent in as a Benny Sugg by Mineman First Paul Leonard of MDAU 0305.

To understand what it does, think back to the last time you opened up some mines for post-recovery analysis after they'd been underwater for a week or two. To prevent galvanic action between clock-starters, extenders, and mine cases, a fiber washer had been installed under the nut on each stud during mine assembly. Then — just before planting — each nut had been torqued to 18-20 lb-ft like the OPs say to do. Tightening compressed the washers into the grooves in the components' flanges and also into the threads of the studs. Then, sub-

merged, the washers soaked up some water and swelled making the fit even tighter.

In wartime, when planted mines must remain lethal for a very long time, this is all to the good. But it's a headache in peacetime.

As Mineman Leonard and every other minemaker knows, it's like pulling teeth to get the clock-starters and extenders out of exercise mines. In most there's no room to get in and pry them loose with a tool, so about the only way you can move them is to make a gadget out of an old paint-scraper or screwdriver with which to dig each washer out of the threads piece by piece. Not only does this routine waste countless man-hours, but it also burrs the studs' threads and contributes to the storehouse of words we can't print!

With Leonard's brainchild, however, the story is different. After

removing the nuts and the extender's plastic cap, you screw the tool's adapter-end in where the cap came out. Next you move the round weight toward the extender (the weight slides on the rod) then ram it back smartly against the long hex nut on the rod's outboard end.

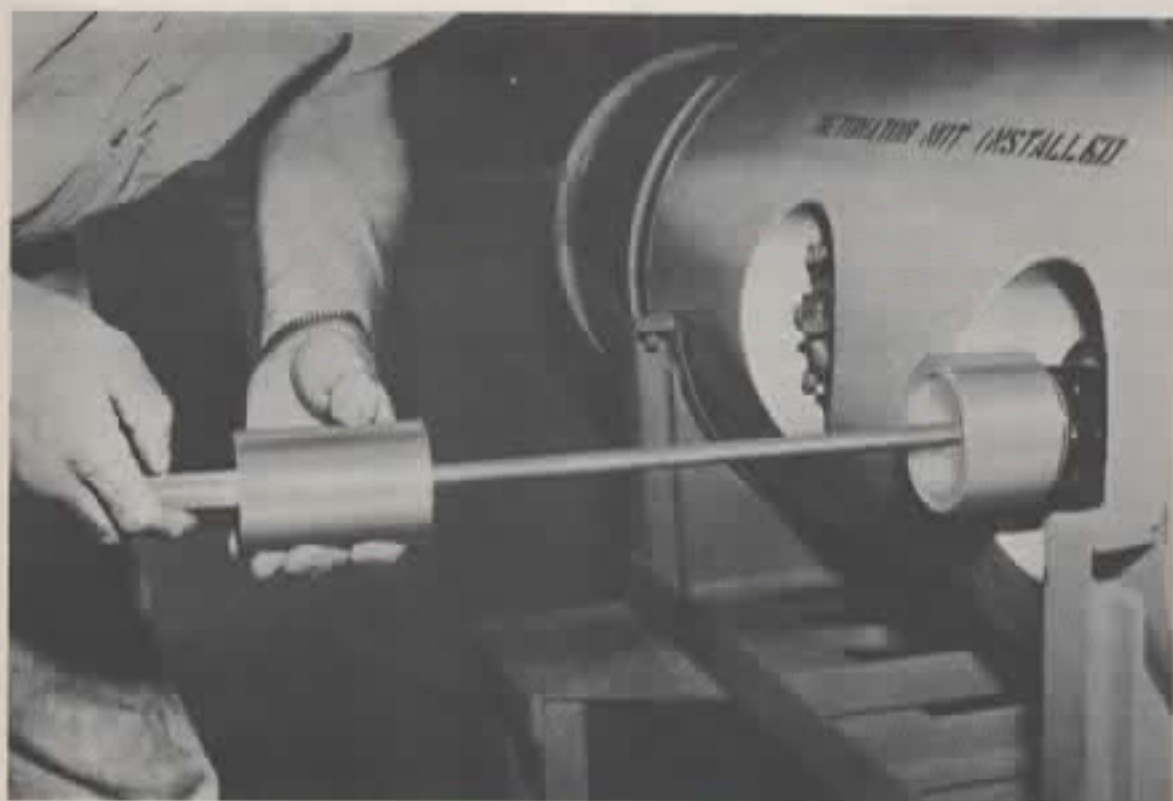
If it's a clock-starter you want to extract, you simply reverse the adapter on the rod and repeat. Either way the fiber washers break loose pronto without any threads being hurt.

At BUORD this puller is considered so slick that it may soon be made part of every mine shop's Basic Tool Kit. *First, though, the question whether it's safe to use on extenders that contain live detonators has got to be settled.* Leonard suggests backing the nuts only a few turns, using the tool to break the extender loose, then disconnecting the tool and removing the extender by hand if it contains a live det. Whether the Bureau will buy this or not remains to be seen, but we'll let you know fast when the word becomes firm.

Meanwhile our hats are off to you, Paul, and to all the men at MDAU 0305 who helped.

THE SAD LOOKING ITEMS in the first two pictures on the next page may not make life easier for anyone (except maybe the crew of an enemy sub) but they prove that dreaming up new gadgets and gil-hickies isn't the only way a T-Shooter reader can show he's right on the ball.

Taken by Torpedoman First J. Trears, Jr. and printed here untouched, the top photo shows some A-4 mechanisms *exactly as they*



FLEET

came from the ready service locker of a US destroyer active in the Pacific.

The middle photo shows some 12-0 depth-charge pistols which were also assumed to be "ready." Of them Torpedoman Trears writes as follows: "The detonators were improperly installed . . . leads had insulation left on the wire under the terminal-screw heads (no electrical contact) . . . had also been spliced if one or two half-hitches can be called an electrical splice!"

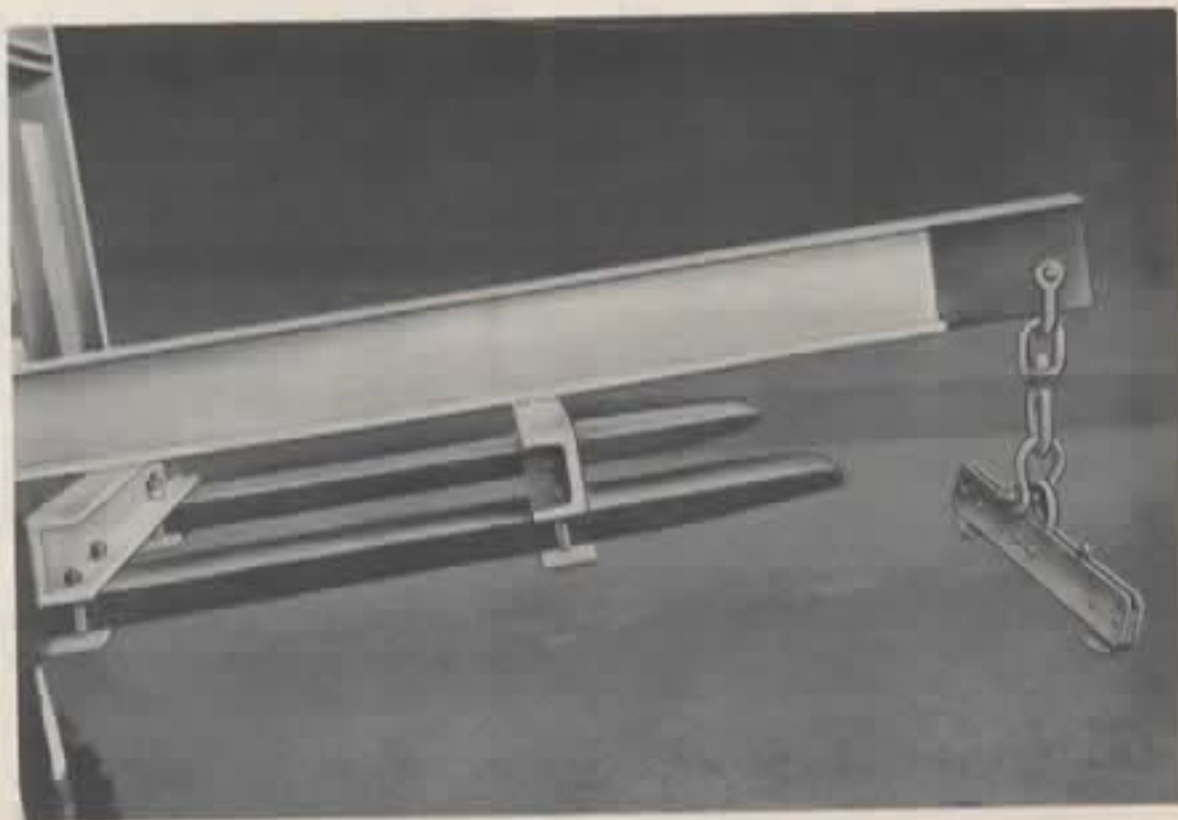
Needless to say, this is hardly the kind of hardware that wins wars and we wonder what kind of men let their fighting gear get into any such shape as this.

We hope the scoop on page 25 will help get those 12-0 det installations done right from now on. But even with that written up we have trouble getting to sleep wondering how many more anti-sub weapon components are ready, but only for scrap. How about yours?

— Better check.

OUR EDITORIAL HAT also comes off to C. E. Petit, MNC, who has been sending an abundance of helpful Rudmines and points out that any unit caught short of mine-handling gear can get a lot of use out of a fork-lift adapter rig like the one he and his crew concocted at MDAU 0303.

Petit's pic (bottom photo) is so good it doesn't need explanation except to point out that the gadget shackled to the swivel which in turn is shackled to the I-beam is a Bomb Carrier Mk 4-0 (J943-C-761) rated to handle 2000 pounds.



PUB-S-CRAWLIN'



with
Clark Starter, MN 2

EVERY ONCE IN A WHILE you come across a piece of writing that says something just right. An editorial in DIESEL POWER MAGAZINE struck us this way. And it not only covers its subject, but shows that men in and out of uniform are brothers under the cloth after all.

So we're reprinting it here hardly changing a word. When you get through reading it you are cordially invited to share it with the one you select as most likely to succeed in stashing your facts away!

—Concerning Instruction Manuals

"Anyone in the technical writing business knows the labor and travail that goes into the preparation of an instruction manual. Perhaps to others it is not so apparent.

"The text is carefully written, checked, rewritten, re-checked, and finally polished. Illustrations are carefully selected to show just the points that are meant to be emphasized, the pictures are retouched, carefully sized, engraved, and captioned. Text and pictures are printed and bound.

"Finally, our instruction manual is brought forth after great pains and labor. It is ready to go out into the world in all its pristine beauty. Then what happens; it falls into the hands of people.

"Some sage once remarked, 'It takes all kinds of people to make a world.' Let's see what might befall our unsullied manual.

"It might fall into the clutches of a man with a 'work of art' or 'treasure' complex. This manual is too nice a thing to be left around

where it might get into someone's dirty hands and get smudged up. So he carefully puts it away out of sight—and too frequently out of mind.

"The years pass; the hardware is worn out or sold; and someone finds our manual on a top shelf somewhere or behind a lot of things in an old cabinet. 'What's this junk?' he remarks as he beats the dust from it and finally tosses it in the rubbish. So our manual leaves this world after a completely useless life.

"A variation of this is the man with the 'inferiority' or 'I've-got-to-be-smartest' complex. He snags on to the manual and hides it away in his desk. Then if someone in the shop wants some answers they have to come to him. He can then peek, pass along the info—sometimes garbled—and play the part of the 'big brain.'

"This fellow is usually afraid that someone in the shop may learn something for himself and shoot for his job. Who's he kidding?

"Or perhaps our manual will fall into the grimy paws of the 'know-it-all' psychotic.

"To him all manufacturers are dumb; don't know a thing. He is the type that promoted this comment heard at an AERA meeting: 'All instruction manuals should have gasket material covers; then the guys in the shop would at least get some use out of them.'

"If our manual falls into these hands, it's a dead duck; no chance to be useful here. It will wind up unread and unhonored. And someone is stung.

"Yet there is a bright side. Do you know that there are people who

yearn for these manuals just as orphans yearn for a likely prospect on visiting day? We have a letter from a man in Australia on our desk beseeching us to get him some—not for himself alone, but so that he can use his meager store of texts to help a great many others that come to him for information.

"Then there is the man that digests the information in the manual when he gets it with the hardware. He applies the information intelligently to fit his own application and keeps the manual handy for reference whenever there is a job to be done.

"This manual bears the scars of a useful, active life. But then, who doesn't? That's the way it is supposed to be. Technical manuals are to be used. They represent a lot of time and money spent . . . to make sure you get your money's worth out of the product. If this is accomplished . . . our manual serves its purpose.

"When an engineer needs some help on a formula, he is liable to go to a well-thumbed Kent or Marks Handbook. When your wife makes that extra-special dish, she gets out the recipe. Well, your best recipe when you have to do a job on your hardware is the instruction manual.

"Where do you fit in this picture? Think it over."

B. P. E.

Editor's Note—Could any of these horrible things be happening to copies of *The T-Shooter* which some people claim they didn't get? We sure hope not. Anyhow, here are the pub errors you Rudminders have picked up since our last issue—

PUBLICATIONS ERRORS REPORTED THROUGH RUDMINDE

PUBLICATION	USED WITH	REPORTED DISCREPANCY	REMARKS
NAVORD INSTRUCTION 8500.3A	All mines	Lacks code for material to be used for training or school purposes	NAVORD INSTRUCTION 8500.8 gives the word on this.
NAVORD LIST 24036	Drill Mines Mk 25-0, 1, 2; Mk 36-1, 2, 3	1. Omits Test Chamber Mk 4 Mod 0 2. Is material listed in column 2 for only 3 actuations per 25 mines?	1. Use Test Chamber Mk 4 Mod 1 in NAVORD LIST 22501 Rev. E. 2. No. Replacements in this list are for 5 actuations, will not soon be changed. Also see "Lists" in MILLIE'S BRIEFS this issue.
NAVORD LIST 22501	"Mine Test Sets, Tools & Equipment"	Omits Test Chamber Mk 1 Mod 0	Revision E dated 29 Apr '58 has now been released. It includes this item.
OD 7302, Vol. 1, 3d Rev.	Mine Mk 25-0	1. CA-959 should not be listed for use in Drill Mine Mk 25-0 2. Does not list Firing condenser as a line item under Firing Mechanism M-11 Mod 4	1. Being deleted from next revision. 2. It's item 223.0. But use no firing condensers except those marked AEROVOX, No. 5 POS. Scrap all others as per NAVORD INST. 8550.23.
OD 7304, Vol. 1, 2d Rev.	Mine Mk 25-2	1. CA-959 should not be listed for use in Drill Mine Mk 25-2 2. CA-30 should be listed as used with items 202.0 and 203.0, not 271.0	1. Being deleted from next revision. 2. Right. Next change will correct.
OD 7306, Vol. 1, 3d Rev.	Mine Mk 36-1	1. CA-959 should not be listed for use in Drill Mine Mk 36-1 2. Item 240, Orienting Key, should be listed as used with item 233.0, not 232.0	Your book is out of date. Get new (4th) revision, which corrects both.
OD 7318, 1st Rev.	Mine Mk 10-3	Doesn't list item 230.0, Firing Mechanisms M-5 Mod 1 (Red) for operational assembly 04	It should. Next change will correct.
OD 7331, Vol. 1, 2d Rev.	Mine Mk 36-2	1. Item 200.0, Adapter, should be listed as used with Item 275.0 not 274.0 2. CA-718 should be listed as used with operational assemblies 01, 04, 07, 13, 14, and 15, not all OAs	1. Your book is out of date. This error was corrected in 3d Revision. 2. Right. Third revision also shows this. Next change will correct in both Vol. 1 and Vol. 2.
OD 7332, Vol. 1, 2d Rev.	Mine Mk 36-3	CA-959 should not be listed for use with Drill Mine Mk 36-3	Right. Next change will correct.

Errors reported through Rudminde, continued

PUBLICATION	USED WITH	REPORTED DISCREPANCY	REMARKS
OD 9169	Firing Mechanism Mk 22-0	Steps 32 & 35 on page 29 disagree with Test Set Mk 265-0's instructions; specify switch 2 in positions 17 and 18	Use Switch 2 in positions 12 and 13. Steps 32 and 35 of OD 9169 will be changed to agree.
OD 9350	Mine Mk 53-0	1. Sheet 4b specifies stenciling with white paint 2. Item 105.0 is OP 1118. Isn't this obsolete?	1. Should be yellow. OP 2238 is your authority on stenciling. Next revision of OD 9350 will not contain stenciling instructions. 2. OP 1118 is obsolete; current instructions for mine installation in aircraft are in NAVORD NOTICE 08551, 27 June '57. Look for the first revision to OP 1118 soon.
OD 12067-G	All Mines	Contains many typographical errors and inaccuracies	It does. BUORD is cognizant agency for this book and is aware of its inadequacies. Although immediate revision is not planned, RUDMINDES on errors will ultimately be valuable. Keep them coming...and keep them specific.
OP 605, 2d Rev.	Firing Mechanism K-3 Mods 0 and 1; K-4 Mods 0, 1 and 2	Page 1, par. 5 describes copper contact plate and serrated crown	Advance copy of 3d Rev. correctly describes them as steel.
OP 948, 1st Rev.	Mine Mk 10-3	Page 59, par. 56b calls for zero-ohms reading. Par. 56d says reading should change to 10 ohms when AR-1 switch is closed	In par. 56b your ohmmeter should show about 10 ohms, not zero. Next change will correct; will also tell you to ignore par. 56d which will be deleted from future revisions.
OP 956, 3d Rev.	Mine Mk 25-0	1. Instructions in par. 37, page 40, disagree with fig. 13 2. Following instructions in par. 49, page 51, causes test set's meter to reverse	1. Fig. 13 is right. Spacer-ends without padding should be at the top of the M-11. 2. Connect test set's "+" lead to D and its "-" lead to the disconnected clock lead that goes on terminal D. Next change to OP 956 will take care of this.
OP 1452, 2d Rev.	Accessories, All Mines	CD-12 timing tolerances are vague; table 21 omits cables in Accessory Kit Mk 1-0, some batteries with which Test Set Mk 127 can be used	We've recommended action on both of these. NMEF is not the cognizant agency for this pub yet.
OP 1684, 2d Rev.	Mine Mk 36-1	1. Par. 11j, page 16, should read "in line with the arrow" instead of "next to the arrow." 2. Test in par. 15, page 20, calls for closed circuits through CD-10	1. Right. Advance copy of 3d Revision corrects this. 2. See "CD OP" in HOT STUFF this issue.
OP 1765, 1st Rev.	Mine Mk 25-2	Does not list Firing Mechanism A-6 Mod 3 as the preferred item	It's listed in OP 1765, 2d Revision which is the manual you should be using.

Errors reported through Rudminde, continued

PUBLICATION	USED WITH	REPORTED DISCREPANCY	REMARKS
OP 1797, 2d Rev.	Mine Mk 25-1	1. Fig. 13 shows 10-24NC 2x3/8" screw securing Sensitivity Switch 2. Par. 60d, page 63, specifies tail-cover gasket 1227597	1. Use 10-32NF 2Ax3/8" pending change. In text, stock number should be MS 3527-61, also in OPs 1798 and 1808. 2. Use DWG 369032-1 until a new gasket (1509758) becomes available. See NAVORD INST. 8550.13 for details on this. Also see "Technique" in MILLIE'S BRIEFS for more correction to this OP.
OP 1798, 2d Rev.	Mine Mk 36-2	1. This book specifies attaching terminal lugs before anchoring stress loops 2. Securing A-5's mounting plate to the adapter studs first, as instructed in par. d, page 52, means remaining bolts won't reach the right-hand battery bracket	1. Before or after—take your choice. 2. Longer cap-screws make this procedure okay. Use MS 35297-68; next change will specify these.
OP 1811	Mine Mk 50-0	1. Page 17, col. 2 calls for lockwashers on case openings that have O-rings 2. Page 37 "jettisoning" refers to use of arming-wire safety-locks	1. Don't use them. Next change will delete this. 2. Not with this mine. Next change will delete this reference.
OP 1816	Drill Mines Mk 25-0, 1, 2; 36-1, 2, 3	Page 17 omits electrical connection of the signal's explosive fitting	Advance copy of forthcoming 1st Revision left this out too. Naturally that fitting must be connected; figs. 4 and 5 of 1816 show how. Also see "Couldn't Be Done" in HOT STUFF for important change to this OP.
OP 1844, 1st Rev.	Firing Mechanisms A-6 Mods 0, 1 & 2; A-8 Mod 0	Does not list Firing Mechanisms A-6 Mod 3 and A-8 Mod 1 as the preferred items	They are. This will be brought up to date.
OP 1860	Mine and Depth-Charge Test Sets	Test Set Mk 95 Mod 2 is not listed	A complete rewrite of OP 1860 is in the mill right now. It will be far more thorough; far more complete.
OP 1892, 1st Rev.	Mine Mk 36-3	Does not list Firing Mechanism A-8 Mod 1 as preferred item	It should. Next change will fix.
OP 1905, 1st Rev.	Firing Mechanism Mk 5-1	Figure 20 shows suspension cable securing bolts with nuts inboard. DWG 384414 shows reversed	Inboard or outboard—take your choice.
OP 2281 (Prelim.)	Mine Mk 52-0	Doesn't specify whether spacer should be used to fill empty space in battery section of mine	The debate on this one is ended. No spacers are needed.



THEORETICALLY this business of assembling a mine is straightforward and simple. You take an armload of tested components and connect them up inside the case like the OP wiring diagram shows. Then you run a few tests to make sure your handiwork — when approached by a ship — will do the job like a good mine should.

Simple? Sure. Yet in actual practice there seems to be no end to the things than can go wrong, including plenty of chances to get your wires crossed in such a way that battery-current gets to all the right places but its direction of flow to and from them is wrong. When this happens, you've got reversed polarity.

Of course, if you were dealing with everyday house-wiring the current would be alternating (AC) so you wouldn't have to worry about direction of flow. Trouble is, COM-OPDEVFOR hasn't approved any mines that plug into the wall!

Instead, mines depend on direct current (DC) from their self-contained batteries. This means that in quite a few marks and mods you've got to maintain a positive-to-positive and negative-to-negative hookup all the way through. Right now, though, we're not concerned with the difference between AC and DC. If you don't understand it, you can bone up on the electron theory of current flow in chapters 2 and 3 of NAVPERS 10622-B, your Basic Electricity Handbook.

Our concern here is the number of devilish, costly, and temper-wrecking tricks reported in shops where the mine-makers don't take time to make sure the hookup is right. Wherever

the components discussed here are used, it'll really pay to make sure before you throw the switch for a test.

Firing Mechanisms A-6 & A-8

Reversed polarity spells misery anywhere a DC electric motor is used, and the A-6 and A-8 both have them. In fact there's no functional difference in these mechanisms; in both you have a motor that drives three cams which operate leaf-type switches.

Since the drive is through a gear-train that gives considerable speed-reduction, a surprising amount of torque is developed in this compact little rig. As long as everything's hooked up okay this is all to the good, but reverse the polarity of the current-supply and the DC motor will start up in reverse. This, of course, rotates the cams backwards. The cams hang up on their followers, and promptly bend the followers and leaf-switches into fancy but ineffectual shapes.

So what's to do? Well, when things cool down somebody's got to track down the trouble, then install a new firing mechanism and start over again. Not only that, each time it happens the Bureau of Ordnance is stuck with a \$234.00 investment in junk! This can happen in Mines Mk 25-2 and 49-2 both of which use the A-6, and in Mines 27-2, 3, & 5 and 36-3, all of which use the A-8.

Control Boxes Mk 13 & 15

These are used in the same mines as the mechanisms mentioned above

... Box Mk 13 in Mines Mk 25-2 and 49-2, and Box Mk 15 in Mines Mk 27-2, 3, & 5 and 36-3.

Like the Firing Mechanisms A-6 and A-8, each control box contains switches operated by a pair of cams driven by a small DC motor. Therefore the results of reverse polarity are the same — the motor turns backwards rotating cams against leaf-switches, twisting them into shapes such as would make the hair of the men who designed them stand on end.

In addition to the lost time in assembly, add 74 bucks to the \$234 cost of the firing mechanism to get the grand total cost of a reverse hookup in any of the mines mentioned above — \$308.00 each time you're wrong.

Clock Delay CD-14

Here's another case where a DC motor comes out second best. Remember, reverse polarity means the motor runs backwards.

In the CD-14 the winding motor is started and stopped by a switch that rides a gear-driven rotary contact designed for operation in one direction only. When the contact is turned backwards — as happens when the motor runs in reverse — a switch-contact follower-pin is jammed in the cam's track.

When the pin jams, the rotary contact's plastic drive-gear splits or jams. More often than not the gear splits, but in any case it adds up to the same thing — a \$14.50 clock-delay gets the deep six.

When the CD-14 is used in Mines Mk 25, 27, 36, 39, and 49, the a

Assembly instructions include polarity checks which — if not overlooked — will show up a reverse hookup before any damage is done.

The only other application of the CD-14 is in the Drill Mine Mk 18, and this is one to watch out for. The fact that polarity is of no importance in the Service Mine Mk 18 may lead you astray, especially if you assemble the drill mine using the assembly manual for the service mine (OP 902).

The possibility of ruining the clock is further increased by the fact that in the Drill 18 it is not part of the firing circuit. This means you could give it a reverse jolt when you throw the switch for the operational test of the mine, yet the mine would still check out okay. *In fact, you'd never find out that the CD-14 was defunct except by checking continuity in the explosive-fitting circuits after successful completion of what in all other mines is the final test.*

Step-by-step use of Drill Mine Mk 18 assembly instructions is the answer to this dilemma. They'll be included in a forthcoming 3d revision to OP 902, but with procurement of standard drill components for the Mine Mk 18 imminent, you may want the instructions before the new revision is available.

You can get them (while they last) by addressing your request to THE TROUBLESHOOTER. In fact we'd appreciate your checking them out and giving us the benefit of your comments before the new book gets into print.

Firing Mechanism M-5

This baby comes high — to be exact, \$408.00 a copy! Fortunately the M-5 is not likely to be ruined if the polarity of its current-supply is temporarily reversed, nor will the condition evade detection during the normal testing routine for Mines Mk 10-3, 7, & 9 in which the M-5 is used.

What does happen when the polarity is reversed is a trick which causes assemblymen who are not in the know to reject and tag mechanisms for rework. Not only is this completely unnecessary, but the cost to the Navy can be plenty high.

To understand exactly what happens you must remember that it

isn't enough for the M-5's firing switch to close in response to a look — *that switch has to stay closed for at least 3½ seconds in order to fire the detonator.*

Now reversed polarity will not keep the mine from receiving a look, nor will it keep the firing switch from closing precisely when it should. What it will do is reverse the action of the mechanism's hold-on coil, and this is the very gadget that makes the M-5 fire the mine. Normally the hold-on coil acts as a magnet and holds the switch needle closed for the necessary 3½ seconds — provided, of course, the target is right.

But when the polarity is reversed, the coil repels instead of attracts. The needle keeps bouncing open and closed as long as the look is being received.

So now you know what the M-5's reaction to reverse polarity is. When you find yourself face-to-face with a firing switch that keeps bouncing open and closed, be sure to back-track on your hookup before you start exchanging those mechanisms.

Sterilizer SD-4

If you take the effect of reverse polarity in these critters lightly there may really be trouble.

Of course, we'll admit that a backwards hookup would be pretty hard to manage. But it can be done, and when it is it won't show up in your operational tests. In fact, we doubt that any mine would be a dud merely because polarity across its SD-4 were reversed. So why all the fuss?

First, because the SD-4 is used in so many mines — 26 marks and mods in all — and second because the SD would never sterilize a mine with its polarity reversed. When you remember that a prime reason for sterilizing is to treat friendly ships to safe passage through a mined area when the time is right, you can see where doing the job wrong could mean giving our own ships and men a treatment instead of a treat.

What insures that your hookup is right is the SD current-drain test that precedes the operational tests of the mine. Our reason for emphasizing the point here is that

minemen are assembling mostly drill mines — *usually drill mines based on operational assemblies that do not include sterilizers.*

All we ask is that if ever you find yourselves putting together a lineup of the Real McCoys, you won't overlook the current-drain test in the OPs when your Assembly Order calls for SD-4s.

The future is brighter

So much for polarity in mines. If you've assembled any of the new Mark 52s, you've had a glimpse into the future when all our mine components will be manufactured with color-coded plug-in connectors. You won't be able to hook them up backwards no matter how hard you try.

Right now, though, we're not predicting when that happy day will arrive.

All we know for sure is that there'll be plenty of the existing types assembled between now and then . . . more than enough to make remembering these hints on reverse polarity well worth your while.

DO YOU KNOW WHAT YOU WANT?

Several "Like-n-Gripe" sheets were folded inside the back cover of this issue. Filling one out may be more important than you think.

Editors of commercial books like LIFE or LOOK have sales records to tell them when their customers like what they get, but the management of a "freebie" like the T-Shooter has to have plenty of straight-from-the-shoulder pro and con comments from readers in order to decide what features to keep in and which to throw out.

So don't be afraid to be first. And don't fluff it off assuming everyone else will have the same opinions as you. If there's a feature you like or don't like, say so on that sheet.

If you think the T-Shooter is needed and want to keep it coming, better make sure others in your outfit fill 'em out too.

BATTERIES

continued from page 8

storage was on leave. Naturally, then, they were set aside in the warehouse over the week-end, and by the time anyone got around to doing anything about them, ten days had slipped by.

Sound familiar? To be quite honest, we all know this sort of thing happens. When it does, though, there's nothing anyone can do to cancel out its effect on the life of the batteries . . . so there is no justification for making an error of omission on the battery card.

Lifo? Fifo?

There are two common ways in which perishable items can be taken from stock for distribution or sale: FIFO which stands for first-in, first-out; and LIFO which means last-in, first-out.

Most minemen know that BUORD prescribes the LIFO system for batteries, but the usual explanation we hear when the economy of this method is questioned is that while LIFO wastes more batteries, it has to be followed in order to be sure those requisitioned for use in fleet exercises will be fresh. An equally popular belief is that as long as LIFO stays in effect, it makes much less difference whether you're really careful about refrigerated storage and history cards.

Neither of these notions comes close to the truth. So, having had our say about refrigeration, let's look at LIFO and FIFO from the

Don't Overlook This

It's not unusual to have to broach a large container of batteries to fill a small requisition, especially at main supply points. So what happens to the battery history cards?

What you *should* do is fill out a new card to accompany the small shipment. Make sure it shows the batteries' complete history to date, just as it appears on the card that stays with the larger container.

All battery-shippers please note.

down-to-earth standpoint of bakers and bread.

Suppose a baker, for example, sells 450 to 490 loaves a day. He knows that if you make several trips to his shop to get bread only to be told he's sold out, you'll soon be making your trips to a shop that bakes more and sells less. The answer to this one is simple: the baker bakes 500 loaves a day, and prices them so that over a period of time he'll recover the cost of whatever he's had to throw out. Let's say for now that our baker has found that his daily waste averages 20 loaves.

Now he has a choice of LIFO or FIFO. If he's not very shrewd he'll sell his first 20 customers today the 20 loaves he didn't sell yesterday. This would be FIFO — first-in, first-out — and the reason it wouldn't be very shrewd is that knowing an average of 20 loaves will be thrown away every day, he reserves 20 loaves of today's bread for customers that may never come, while selling 20 loaves of yesterday's bread to the good people who do.

Clearly, then, this is a case where a policy of last-baked, first-sold (LIFO) would be best. Not only would the customers always be getting fresher bread — bread which would keep longer on their own pantry shelves — but whatever had to be thrown out at the bakery would always be less good than that which was sold.

Where the ratio of consumed items to items kept in stock is far less (as in peacetime stockpiles of batteries) LIFO means we get the rather small proportion of batteries we requisition for use in the prime of their lives. Under FIFO we'd still be discarding the same number of batteries, but the ones we'd be using from stock would always have one foot in the electronic grave.

Must we always freeze dry-cells?

The Naval Ordnance Laboratory says, "No!" Scientists Monroe B. Goldberg and Herbert B. Reed have what they think might someday be an answer to dry battery problems — a dry-cell that has electrodes of silver-oxide and lead, and uses an electrolytic solution of potassium hydroxide.

Are You Stymied**By The History Mystery?**

We haven't received any direct criticism, but the grapevine tells us there are plenty of complaints about the new battery history cards.

One story is that the instructions on the card are more than a proverbial Philadelphia Lawyer can figure out. Another is that the whole idea is all wrong — so many blanks that the accumulated data only adds to the confusion.

Is this *your* story? If so, don't waste it in the corner where you are.

Write NMEF your gripes. Tell us how you think battery histories should be kept and we'll put your ideas to work. How about it?

Not only can this unique dry battery be re-charged when it runs down, but it can also be stored uncharged and without costly re-generation, perhaps for a very long time. On the basis of tests thus far, a useable life of 10 years or more is expected, which means it will prove ideal to power portable radios, walkie-talkies, intercom systems, hearing-aids, and similar miniature electronic circuits. In fact, the battery would probably outlast the other equipment including even transistors.

So when do we get them for weapons? That's hard to say. The early models have been single cells about the size of a man's wrist watch, delivering .9-volt as compared with 1.5 volts for the more familiar dry-cell.

Of course it would be no trick to combine such cells to provide any needed output, but the watt-hours-output-per-pound is still only about a quarter of that supplied by the common (Leclanche'-type) dry-cell.

When there is any new word we'll let you know fast. Meanwhile it's freezing, careful handling, and accurate history cards that will add up to a dependable battery stockpile ready for the day when the butt gets pressed.

Do You do this Job Right?

When things get so bad that a man screens 44 Mk 12-0 depth-charge pistols without finding a good one, something's just got to give.

And that's exactly what happened to Chief E. H. Milanowski at Oahu. What's more, the good Chief is not alone. We've had a lot of Rudmines reporting Mk 12-0 pistols with detonator leads grounded on the guns, and plenty more reporting that the leads had been sheared.

Either way, the charges in which these pistols are used wouldn't give a sub any more trouble than ants make for alligators. So let's rehearse the *right* way to install Detonators Mk 35-1 in Depth-Charge Pistols Mk 12 Mod 0. First, though, a word to the wise:

WARNING

Don't install detonators unless you're qualified: don't do it except in a properly grounded work-area with a shatterproof glass or plastic shield between you and the det. Use only anti-spark tools.

Now here's how...

1. Set the safety latch on **SAFE** and make sure the safety fork is locked in its slot.
2. Remove the nuts that hold the brass case on the pistol and slide the case all the way back on its cable.
3. Back out the detonator terminal screws part way and check their washers; if you find they are cup-shaped sheetmetal stampings, replace them with the new type washer which is solid brass with a groove cut out for the lead. (The new one is DWG 1509095; see illustration.)
4. Remove the detonator's retaining nut. Then install the detonator in the gun, thread the retaining nut over the detonator's leads, and set it up finger-tight just like the one shown.
5. Snip the det leads off *exactly* $1\frac{1}{4}$ " from the top of the det's retaining nut, then skin *exactly* $\frac{7}{16}$ " in-

sulation from the end of each lead. Follow these measurements closely: no more, no less.

6. Form the skinned det-lead ends around the terminal screws. Make a neat job every time, making sure the skinned part of the lead will lay fair in the slot of its washer — between washer and screw-head — with the insulation snug against the heads of the screws. When the leads are set up neat and close, bend them so they hug the detonator gun and can't snag when the gun swings the det into firing position.

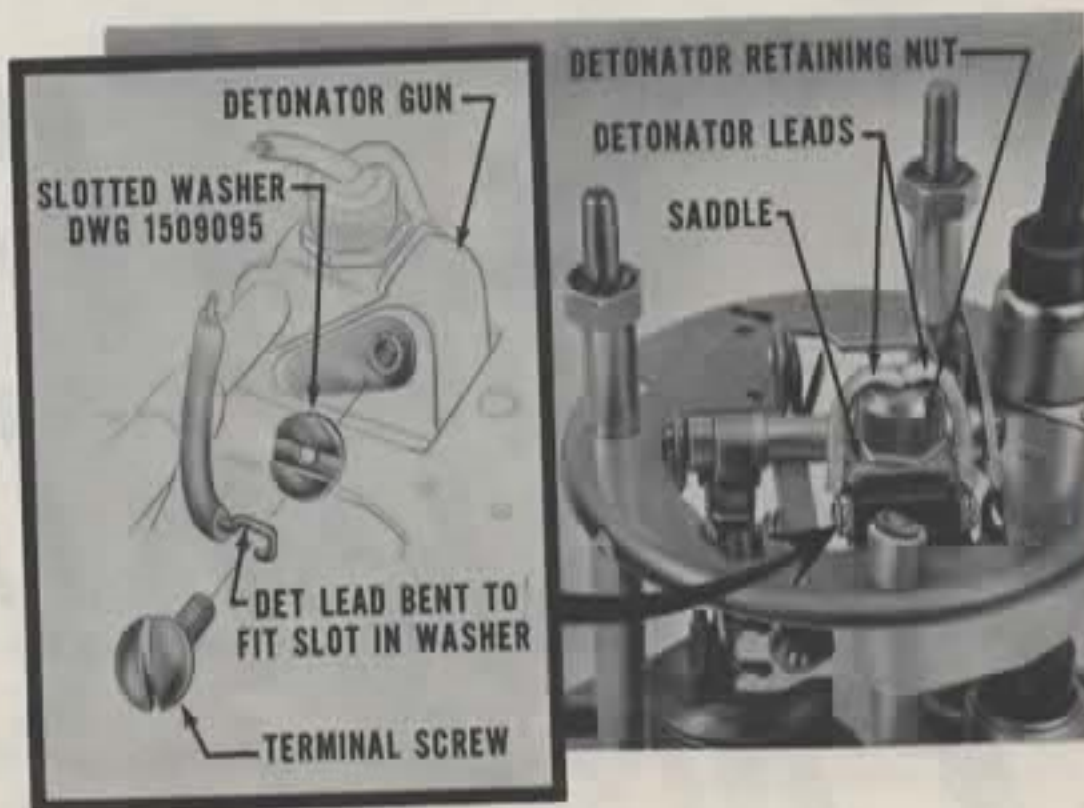
It's as simple as that

If you do this job exactly as we say, your product will look exactly like the one shown here: enough wire to make your connections with no trouble yet nothing pinched, no exposed bare wire to make contact with ground, and no excess to snag or jam when it's time for the pistol to work. With that done, there's just one more step —

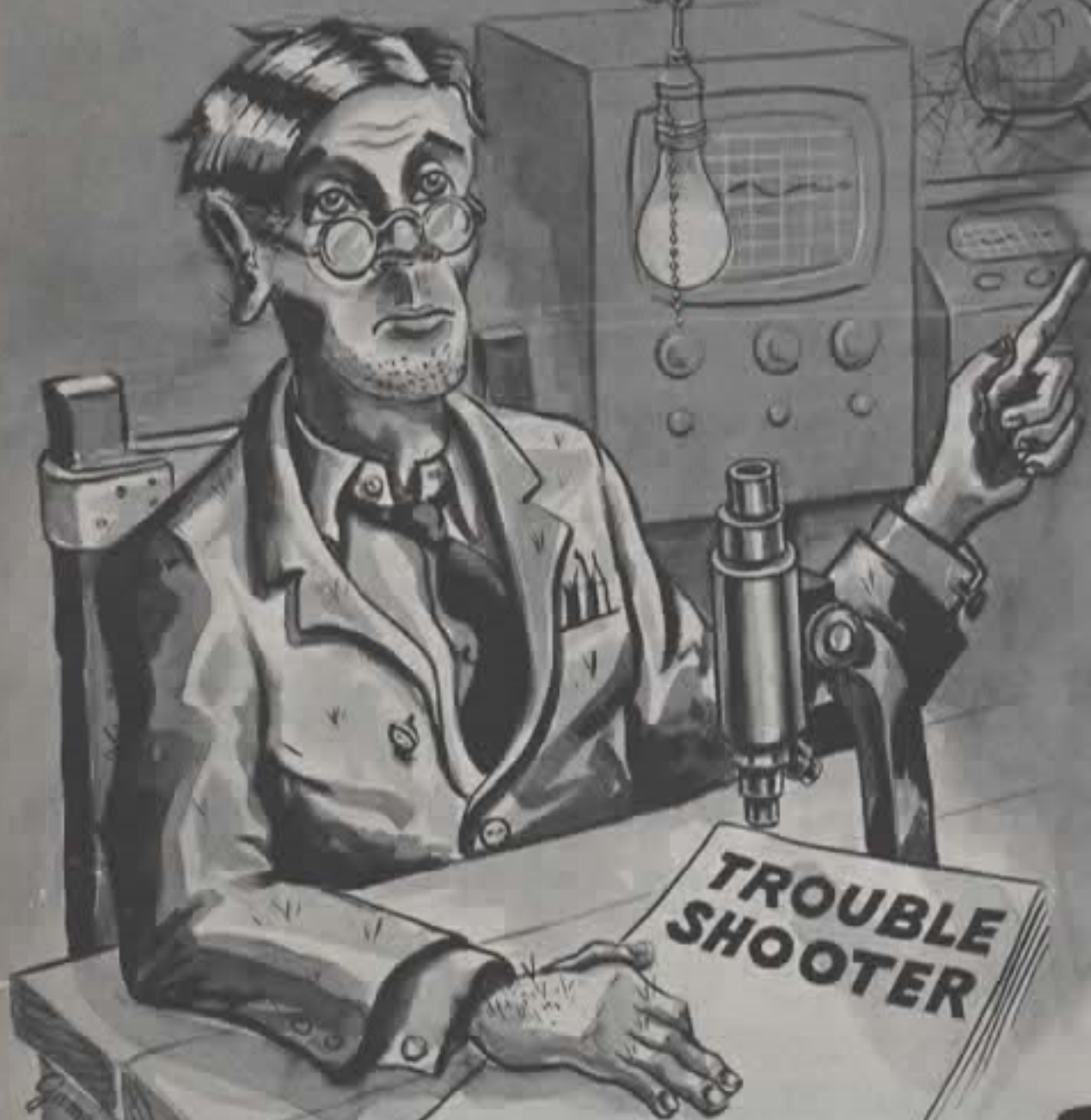
Put the case back in place and secure its three nuts, then paint out the word **NOT** where it says *Detonator Not Installed*.

Too many guys are forgetting to do this. It could cost one of your buddies his face.

B. Arncliffe



Laboratory Tests Prove...



YES, PERSONNEL—

... whether you're reporting defects,
firing questions at B-Butt or Millie,
suggesting improvements,
or just dropping a line to
air your views—from us
you'll get no red tape,
no snow-job, and
less than 1% chicken!
So why wait any longer?
Get those defects logged
in on Rudmines.
GOSSAKES, DO IT TODAY!

Less than 1% Chicken!!



Now with a drinking man's