



# DOLLARS AND SENSE



**A**ESOP, that fecund brain of the fifth century B.C., once gave vent to this gem—"Self-conceit may lead to self-destruction."

On hearing that moral, Grampaw Pettibone and his cohorts in the Flight Safety Branch of the office of the Deputy Chief of Naval Operations for Air, stand, face east and salute the memory of that wise man.

However, a much younger hand with the quill, William Shakespeare, had one of his characters in the play *King Henry V* say, "I would give all my fame for a pot of ale and safety."

For that illogical line, the Flight Safety Branch gives the bard of Avon the cheer associated with a borough of New York City.

Shakespeare can be forgiven, however, for in his day the fastest vehicle ridden was equine-powered. If one were inclined to nod one's head on a morning-after, the only result would be a homing orientation on the part of the unguided beast.

Casualties involving the human spirit occupied Aesop and Shakespeare, mainly because those of the body, instead of the mind, were limited to hand-to-hand combat, occasional runaway horses and ship sinkings.

Only since the industrial revolution began in the latter part of the 18th century has the Machine complicated the life of man. The early steam engines ex-

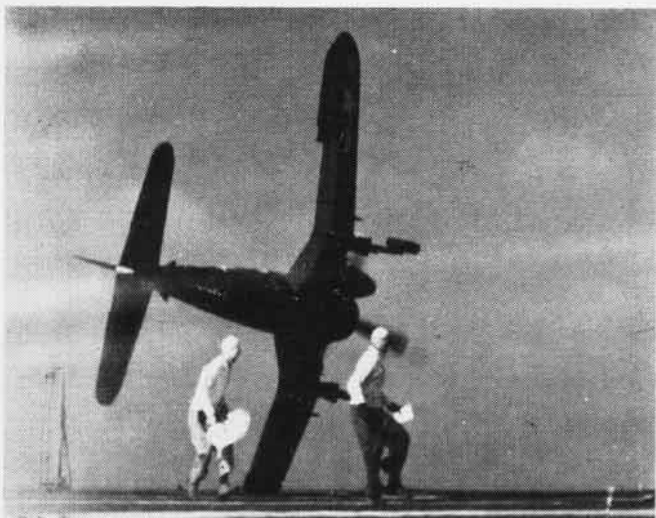
ploded occasionally; weaving machines gobbled the fingers of their hapless operators; railroad trains jumped their tracks. Man, after eons of battling nature, was suddenly confronted with the Machine.

Advent of the automobile placed more responsibility on the human operator. In the highly mechanized United States, the slaughter caused by automobiles puts war to shame.

Carnage-producing enough on the surface of the earth, the moving vehicle took to the air. The airplane has made the greatest demands on human skill of any Machine. Operation of aircraft, which involves mechanical perfection, battles with the elements, plus reactions of a complex bundle of nerves—man—has produced one of the challenges of the machine age.

All civilian and governmental agencies concerned with surface vehicle and aircraft operation spend much time and money in guaranteeing their movement in a safe and efficient manner.

The military services which operate aircraft have mapped huge programs along those lines. So it is with the Navy. Under the guidance of Cdr. W. G. von Bracht, representing DCNO(Air), the Flight Safety Branch reviews all aircraft accidents, no matter how small, with the purpose of discovering and recommending means to reduce their frequency and severity.



**A** QUICK GLANCE at the Navy's flight safety program reveals results which save lives and dollars.

Naval Aviation must exist as an efficient fighting force. Continual effort in saving lives and money through accident prevention accomplishes this end.

Directives galore exist concerning the Navy's flight safety program. From central promulgating letters down through the letters of the Bureau of Aeronautics and the operating commands ashore and in the fleet, the word on putting the program over is disseminated. This is not going to be a rehash of those directives, but a quick glance at what happens to all the data which comes from every activity which operates aircraft and the organization which receives and interprets it.

Every operating unit has a Safety Officer, usually the Flight Officer, third senior in the unit. He has assistants for material safety and flight safety, plus a flight surgeon working with him. Each safety officer abides by a manual of instructions, and it is his responsibility to initiate accident investigation as well as handle the safety program.

When a major accident occurs, a preliminary dispatch is sent to the Chief of Naval Operations, and within two

weeks an Aircraft Accident Report (AAR) is submitted via the chain of command. Copies of AAR's, however, go direct to the Flight Safety Branch. Endorsements added along the chain of command amplify, indicate corrective action taken, and may contain additional recommendations.

It must be emphasized that AAR's have no legal bearing on an aircraft accident. They are inadmissible as evidence in a court martial or legal investigating body. They are for the information of DCNO (Air), for comparison in improving the safety of operation of aircraft. Thus they are a private matter within the organization.

The AAR is designed and intended to contain no threat to the individual. It is desired that it be a frank document, containing a factual account of all factors involved.

**A**NY BOARD of investigation, court of inquiry or court martial must seek its information independently concerning the disciplinary aspects of an aircraft accident, from the witnesses available, such as pilots, crewmen, flight officers, maintenance officers and tower operators or other controllers.

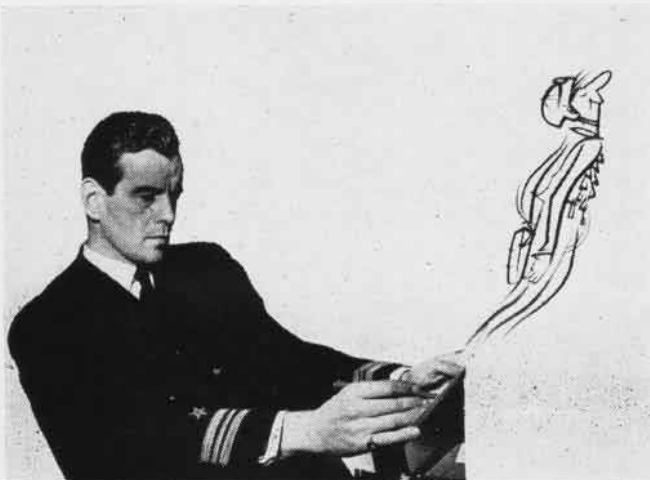
Although a collateral duty of the

branch is the review of some Boards of Investigation for the Judge Advocate General, for the purpose of reviewing aviation aspects of the case, and assist in drafting endorsements.

In every accident involving personnel injury, the local flight surgeon makes a separate medical report for the Bureau of Medicine and Surgery. A copy of this report goes to Op-531 direct. For anybody but a doctor some of them make mighty gruesome reading.

Dispatch reports on accidents are received by the aircraft accident records section of the branch. They are sent when damage involves replacement of a major assembly of the aircraft or serious injury or death to personnel. They do not include combat losses. The dispatches are logged to provide a quick source of information when inquiries are made about a specific accident. A weekly summary of this log is mimeographed and sent to all aviation activities. The log also serves as a tickler. If 30 days pass without an AAR being submitted, a reminding letter is sent to the command concerned. When the AAR is received, the log is completed.

Upon arrival the AAR's and medical reports start on a journey through a



number of hands. Each officer digs into some phase of the accident or prepares the material for analysis—to find the cause of each accident, and the cure for future operations.

An AAR is as complete a record of an accident as it is possible to gather. It includes background material on the pilot plus many enclosures. These may be statements of witnesses, pilot's statement and photographs.

Upon arrival in Op-531, the AAR goes to a naval aviator assigned as accident evaluator. He summarizes the report on the face of a special information card called the McBee Key-Sort card. This information filing system accomplishes the same job as other punch-card systems. The naval aviator "codes" the accident, by nature, specific type and cause. This isn't a job for any inexperienced person. The coding system is designed to present accident records in such a way that persons who are to take action on them along preventive lines can readily use them.

ABOUT THIS point the pilot who nosed up an F8F while taxiing might ask, "Why in the world must my little nose-up job be sent in? I was at fault. I was taxiing too fast."

True, that one nose-up in itself indicated nothing but pilot error. But, suppose that there were a number of F8F nose-ups. The reports all come to a central clearing house—Op-531. At some point in the receipt of these reports, one of the analysts or evaluators will notice a pattern. He suggests an investigation of the phenomenon.

But how are you going to pick out this type of accident from the thousands on file? That's where the key-sort card comes into its own.

After coding, the cards go to one of



the girls in the office who punches notches along the border of each card according to the coding instructions. The cards, which are standard 8" x 10½" size, are then filed in cabinet drawers. All the cards for a specific quarter of a year are of a different color.

The combination of notches on the cards and the colors make it possible to pull that information in a matter of seconds from the drawers. In the instance mentioned above, the F8F nose-ups, suppose that information is desired for the previous three-quarters of a year. Long pins are inserted through the borders of the cards at points where only F8F nose-up accidents will be withdrawn. That is where the coding and punching pay off. All accidents due to any given cause factor for any given period can be pulled quickly.

This basic key-sort file is in demand by many different activities. Flight Safety itself uses it in making studies. Requests come from many other naval, governmental and civilian activities, however. For instance, one recent request was for a resume of all accidents involving engine fires in multi-engine aircraft; their frequency and causes.

That information was sifted from the files and sent along.

Cross files are maintained which include accidents reported by the CAA and the Air Force.

Aircraft accidents in other fields, military and civilian, are also checked, and in one instance, produced from a lead which came from outside the Navy. A DC-6 crashed in Pennsylvania. The investigation of that accident led to the conclusion that both pilots were unconscious from carbon dioxide gas in the cockpit, caused by a faulty fire extinguishing system.

THAT LED to the discovery by Flight Safety that CO<sub>2</sub> gas had once escaped into the cockpit of an F4U when the line had broken which supplied that gas under pressure for forcing landing gear down in an emergency. The plane had crashed after the pilot had said he was using emergency procedure with his gear. He hadn't opened his canopy, and his wing mate followed him down with no response to radio calls. Correspondence regarding the civil accident had led a probable Navy casualty.

When information such as that above is discovered, Op-531 checks with a desk in the Bureau of Aeronautics, or other activity concerned with a "fix" in the material that has proved faulty. With the F4U's the situation was remedied material-wise by BUAER, while Flight Safety issued instructions that cockpit canopies were to be open when attempting emergency lowering of Corsair landing gear.

Another file is maintained in the Op-531 office. This one, described in the past by *Grampaw Pettibone*, is on each individual naval aviator. When a pilot has his first accident a card is made up for him. On it is recorded the date of the accident, its nature, activity to which





he is attached and the nature of the damage and injury. Additional accidents of that pilot are entered on the card. When he has a second accident his card receives a blue tab. With the third one it receives a red tab. Thus it is possible to pull multiple accident pilots from the file. This file, separated for USN, USMC, USNR (Inactive), USMCR (Inactive), and deceased pilots, goes back to 1946 for all accidents, and to the 1920's for all major accidents.

Other files in the branch break down accidents according to classes, causes, fatal accidents, injuries and bail-outs.

Perhaps the best way to describe the work of Op-531 is that it compiles statistics, analyzes accidents, and within personnel limitations does research in human engineering. Inevitably, many of the questions boil down to how the human mind works in solving mechanical problems. Analysis of AAR's sheds light on the cause of accidents. The cure must depend on the decisions of experts who have done the analyzing.

The branch is in a position to spot items which cause accidents mainly because it is a clearing house. On its own, it undertakes many projects. On the other hand, many requests come from the Bureau of Aeronautics where material malfunction is involved. A recent study conducted by the section included accidents occurring in AD *Skyraiders* during dives. Much of the work in that type plane is dive bombing, so the human and material failures in dives assume great importance in the operation of the plane.

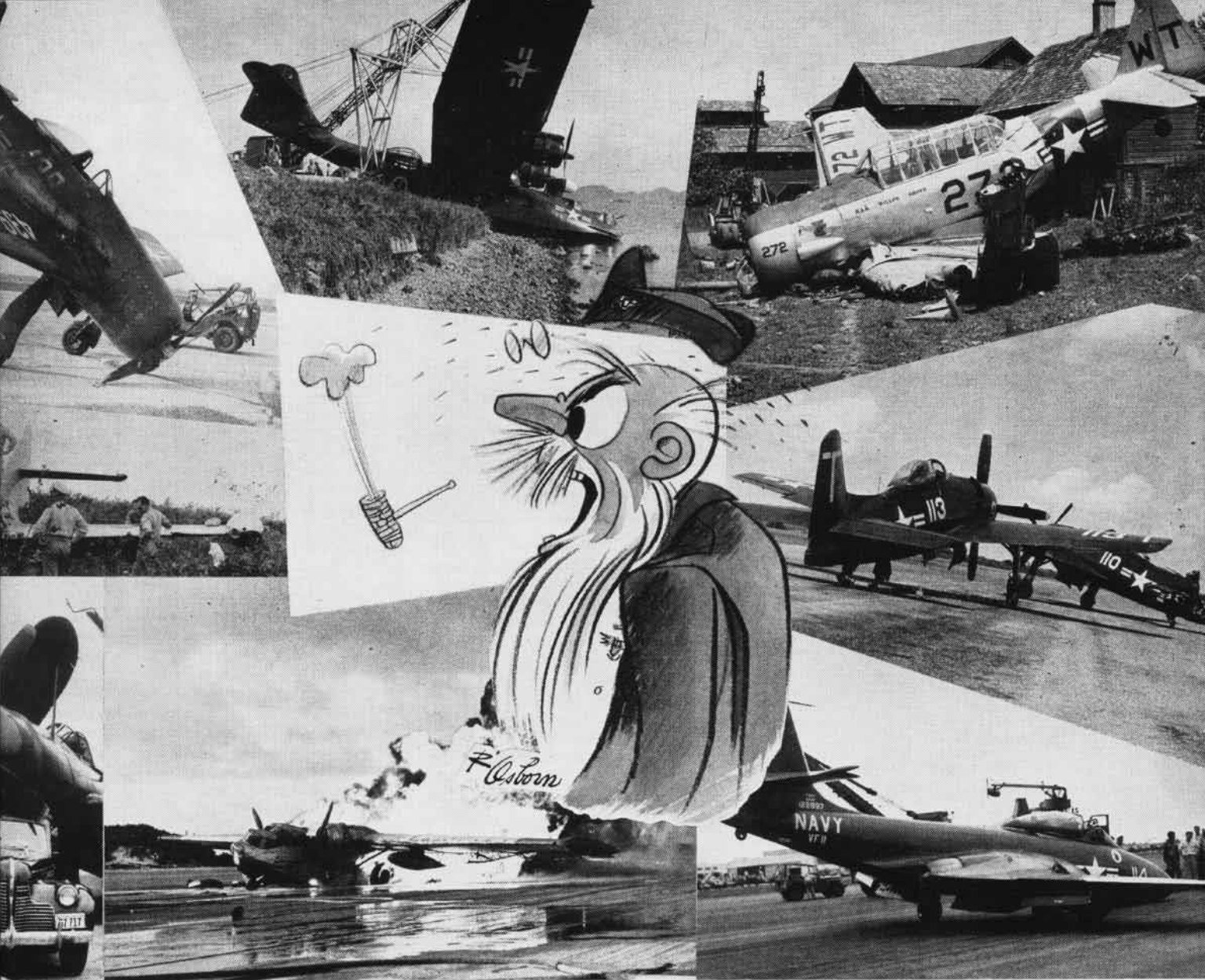
The Flight Safety panel in Op-531 includes a flight surgeon. Assisted by a chief hospital corpsman, his job is to review all medical reports received on accidents. Some of the questions he has in mind are: What caused the injury? Was it the situation or was there a protrusion in the cockpit? How did the safety equipment, such as shoulder harness, ventilation, etc., work? How did the physiological aids work? (Anti-G suit, exposure suit, oxygen mask.) When

an accident is caused by pilot error the flight surgeon is interested in the causes, particularly the pilot's emotional background—domestic difficulties, squadron relationships, and personality.

The surgeon considers problems from two aspects. First is situation-wise, where the remedy will be found in fleet operational procedures or the construction and quality of material. For example, some cockpits invite accidents.

**SECOND ASPECT** is one of phase. The idea is to look at the whole picture. Accidents are analyzed by pattern. Sometimes problems are presented concerning items of equipment. For instance, should a pilot wear his shoulder harness when ditching an F8F? To answer that question would involve investigation not only of past accidents but working with operating units to obtain expert opinions and research.

By studying types of crashes over a number of years Op-531 has determined that aircraft afford a certain amount of



protection to the pilot and crew. They know to what limits that protection is given. In reciprocating engine planes, a crash up to 30° with the ground is usually non-fatal. The engine sitting up front absorbs a lot of the punishment and force of deceleration. There haven't been enough jet plane crashes yet to make a comparison. One thing the surgeon knows, however. There isn't much middleground in fighter plane injuries. They either get up and walk away or they are carried away in a basket.

You may ask, "Now that all those reports have gone into the Flight Safety branch, how can I, as a pilot or crewman benefit by the system?"

Tangible results from this type of statistical research are often hard to see. A few of the labors of the branch are readily available to every crewman, however. About two years ago the branch contracted with the National Research Council to talk to 500 pilots at various operational stations. Result was a sort of aeronautical "Kinsey Report" as to

their likes and dislikes in flight safety media.

THE SURVEY revealed some sort of record in reading habits, for 88.2% of the pilots interviewed said they never failed to read NAVAL AVIATION NEWS' crusty old character, *Grampaw Pettibone*, who holds forth in a dark, dusty corner of the Flight Safety Branch. Another 10.8% of the pilots read *Grampaw* occasionally and only 1% said they seldom looked at the page. The cartoons of LCdr. Robert Osborn (Inactive), who is pictured on page two, have helped popularize *Grampaw* on these pages.

The branch also publishes quarterly the U. S. Navy Aircraft Accident Reports (Rest.).

Other visible products of the branch are the posters called the WRECKord, Flight Safety Bulletins, BUAER Technical Orders (with BUAER), Flight Safety page of NANews, and *Dilbert* posters. For relative value in cutting down accidents, the pilots rated the

items in the order listed above.

Op-531 is small in size, yet its operation is a big one. Each member of the branch has piles of AAR's stacked in front of him which he could probably wade through easily enough if it weren't for the many sidelines connected with the business.

One of the officers sits on—take a deep breath—the subcommittee for Search and Rescue of the Air Coordinating Committee of the International Civil Aeronautics Organization of the United Nations. He also has a finger in the helicopter development program. Another officer is the Navy representative with the Guggenheim Aviation Safety Center. Other extra-office activities take much time.

One idea the branch wants to put across unequivocally is that the quality of the work it does is completely dependent on the quality of the reports it receives from squadrons which have accidents. Good investigating and reporting mean topnotch prevention.