Sick Bay

By Ron Ucovich, Docent USS Hornet

The first thing people ask is, "Why does the Navy call a hospital a **Sick Bay**?"

In navigational terms, the word **bay** refers to an inlet of the sea, as in **San Francisco Bay,** but in architectural terms it refers to a niche or nook built off to the side, as in **storage bay** or **bay window.** Our hangar deck is divided into three sections, and each one is called a **Hangar Bay.** You may have also heard the term **Med Bay**, but that term was never used by our Navy. It was created in Hollywood during the 1960s when the TV show *Star Trek* was popular. You may recall Dr. McCoy yelling to Captain Kirk, "We need to get this guy to Med Bay right away, or he is going to die within 2 minutes and 15 seconds!"

As we walk through Sick Bay, I like to talk about how hospitals have changed during the service life of the Hornet, and I emphasize the medical advancements made between the 1940s and the 1970s.

When entering Sick Bay from the starboard passage, the first compartment you will see on your right is assigned to the **medical officer.** His job is to oversee all procedures done in this department. He must keep this department well supplied and trained for any medical eventuality which may occur at sea. He is also in charge of the male nurses, which on a ship are called **corpsmen.** At the back of this room you will find a safe with a combination lock. This safe provides a place to store narcotics and opioids, and keep them away from sticky fingers.

The next room is the pharmacy. There was one earthshaking discovery made in 1944: the introduction of antibiotics. They discovered that **penicillin** could be used in various forms to combat many types of bacterial infection. Throughout history, civilizations have been decimated by rampant epidemics of pneumonia, malaria, leprosy, scarlet fever, and polio. Historically, the only way to control the spread of these diseases was to separate these victims from society. We have all heard of *leper colonies,* where victims of leprosy were separated from society by isolating them on an island and leaving them there where they could not infect others. Tuberculosis was also considered a fatal disease, and patients were often sent to the deserts of Arizona, because the warm, dry air made them feel more comfortable while they waited to die. We remember the polio epidemic of the 1930s and 1940s. The next huge breakthrough in medicine came in the 1950s with the introduction of vaccinations.

The next room is the **Blood Chemistry Laboratory**. Here, a skilled technician could take a drop of blood, and examine it under the microscope to classify the blood type, look for infectious diseases, or identify dietary deficiencies. For centuries, we have known that if we want to stay healthy, our blood has to be healthy, and it makes sense that if a person becomes ill, we should put healthy blood into his veins, but when they tried that back in the 19th Century, it often killed the patient. In the 1920s, scientists used a centrifuge to spin the blood and separate it into three categories: red cells, platelets, and plasma. Then in 1930, scientists learned to classify blood into 4 categories: #1 has a protein called A, #2 has a protein called B, #3 has both A and B, and #4 has neither A nor B. So the four categories of blood are A, B, AB, and O. This worked well, and blood transfusions became popular, and the first blood bank was created in 1932. The Rh Factor was discovered in 1940, but it was only a problem for pregnant women, and not a concern on this ship.

The next two rooms are called **Medical Records Department.** Here, there is a medical file on every person onboard. Each file contains basic data about each patient, such as blood type, prescribed medications, allergies, and history of past illnesses, injuries, and surgeries. It also includes other documents such as lab reports, or charts for patients who have been hospitalized. This area also serves as a reference library for doctors to research medical problems.

The next room is called **Radiology.** During WWII, wounded sailors could be tested for broken bones or metal fragments under the skin, by using a primitive x-ray machine. Notice that it is made of metal, unlike the plastic machines we use today. The radiation level was low, and it took over a minute of exposure to get a clear image. Before WWII, x-ray machines were considered dangerous, not because of radiation exposure, but rather because of the risk of electrocution, but by 1945, scientists had developed a shockproof radiology machine. The machine we see here was designed during the 1960s. The x-rays are taken at a higher frequency, which makes the image faster and clearer than the earlier model. You also see the lead apron which was used to shield the part of the body which was not being studied. By the 1960s, it was known that excessive amounts of radiation can cause burns, bone disease, or radiation poisoning. This danger was brought to light in 1934 when Madame Curie, the scientist who dedicated her life to studying the practical uses of x-rays, at the age of 66 unexpectedly died of blood cancer.

Now we cross the hall to find the **Examination Room.** To your immediate right, you will find a brown box which was originally called an Electro Kardia Graph. These are Greek words meaning "electric record of your heartbeat." In English we call it an **electrocardiograph** machine, and although we spell *cardio* with a -**C**-**,** this device is still called an **EKG** unit. This particular device is a portable unit used by the Army in the battlefields during WWII. If you look at the printout of this patient's heartbeat, you will see that he has undergone a procedure called a **cardiac ablation**. The surgeon used an electric shock to stop the heartbeat, then a flatline showing that the heart is not beating, then another shocks the heart to restore the signal, and finally, the patient regains a healthy heartbeat. Next to this, you will see an EKG unit which would be used on this ship. This one has oscilloscope readout in addition to the inkjet printout of the heartbeat.

The scale you see here is called a balance scale. Think of two boys sitting on a seesaw. If both boys weigh the same, the seesaw will be level, but if one boy weighs more than the other, you will be able to know his weight by seeing how far you need to move the fulcrum to get them back in balance. This type of scale has been used by doctors for many years, but not many people had one at home. Spring scales for home use became popular in the 1930s, but they were not accurate enough for medical use, and the old -fashion balance scale remained in use until the digital age.

In most physical examinations, the doctor will also take your temperature, which might detect an early infection. During WWII, this involved an invasive procedure with an oral or rectal thermometer. Oral thermometers were preferable except with patients who suffered from weakness, vomiting, or coughing. Both thermometers look the same except for the tip. The oral thermometer has a long, thin prod which fits comfortably under the tongue and will not gag the patient. The rectal thermometer has a short, bulbous tip to get a very accurate reading. There is one other difference between an oral and a rectal thermometer… the taste.

Along the aft wall of this room, you will find an old-fashioned blood pressure cuff. Its medical name is ***Mercurius sphygmomanometer,*** which means that it uses mercury to read your blood pressure. Air was pumped into a cuff fitted onto your upper arm, and the doctor would use a stethoscope to listen to your pulse, and when he couldn't hear a pulse anymore, he recorded the readout on the Hg tube (Hg is the chemical symbol for mercury). This device only measured your high blood pressure (systolic), and not your low blood pressure (diastolic).

It was during the WWII era that the ***aneroid sphygmomanometer*** was invented. *Aneroid* means that it uses air instead of mercury to measure the pressure, but the greatest feature is that it shows both systolic and diastolic readings. Strangely, although we no longer use mercury today, blood pressure readings are still recorded in Hg units.

Our next room is called **Audiology.** This is where pilots had their hearing tested. During WWII, hearing was not tested by a doctor. It was suggested that pilots use ear protection, but it wasn't required. For ear protection, pilots could wear large earmuffs that looked like the Mickey Mouse ears you can buy at Disneyland, or you could opt for earplugs like you use for skin diving, but these were the only protection devices available at that time. The testing facility you see here dates back to the 1960s. At that time, jet planes were flying faster, missions were extending farther, and engines were getting louder. Radio reception was very scratchy and garbled and hard to understand without excellent hearing. It was crucial that pilots be able to hear and understand every message. Pilots had to be tested every 6 months, and if the pilot was not able to pass the test, he would be removed from active combat.

The next room we will visit is the **X-ray Dark Room**. During WWII, developing x-rays was a slow and tedious 5-step "dip and dunk" process:

DEVELOPER -- Lower the film in the developer for about 6 minutes, shaking it from side to side to release air bubbles that have formed.

STOP BATH -- Immerse the film in an acid bath to prevent the silver coating from becoming too dense.

FIXER – Dip the film in the fixing solution to harden the emulsion.

WASHING – Dip the film in clean water to remove residual chemicals.

DRYING – Hang the film using film clips, and allow it to dry in warm circulating air for about 15 minutes.

Now, let's follow the next passage going aft. The first room we see is **General Surgery,** and first thing that we notice is that nothing is made of plastic. Notice that the emesis basins and urinals were made of stainless steel, and intravenous drip bottles and the hypodermic syringes were made of glass. After these things were used, they were washed and sterilized, and used over and over. The use of plastic was first introduced to the public at the 1939 World's Fair, and it was considered a marvel of the future. Before plastics, rain slickers used to be made of canvas coated in rubber and colored yellow to make

pedestrians more visible. At the World's Fair, women fantasized about wearing a clear-plastic raincoat where everyone could admire her stylish colorful dress in the rain. During the 1950s, the use of petroleum-based plastic grew exponentially, and you saw it everywhere, in the surgery room, in home kitchens, in the pharmacy, in dentistry, and in the automotive industry.

Something else that was introduced at the 1939 World's Fair is synthetic rubber. Natural rubber (called *latex* in Latin) comes from the rubber tree, which doesn't grow anywhere but the tropics. The greatest producer of rubber was Singapore, which use to produce 90% of the World's supply. In 1941 Japan conquered Singapore and commandeered the rubber industry to fortify the Axis powers in WWII. Fortunately for us, at that time, Standard Oil had created a synthetic oil called **Butyl,** which was cheaper and more durable than latex rubber. This rubber was invaluable to the Navy for military clothing, boots, and equipment. It was essential for manufacturing planes, tanks, battleships, trucks, and aircraft carriers. Here in Sick Bay we see two bag respirators, one has a rubber mask made in the 1940s, and the other one has a plastic one made in the 1950s. The plastic one is more efficient because it allows the medic to see if the patient is vomiting or bleeding and couldn't be resuscitated by this means.

Under the operating table we see a stainless steel receptacle called a **kick bucket.** This device is used to collect any debris that accumulates during surgery. When surgery is done on vital organs, a corpsman will keep a written record of everything going into and coming out of the body during the operation. Before the patient is sutured, the corpsman will cite the number of sponges, cotton balls, padding, or gauze that went into the body, and compare this with the number that came out. If the numbers didn't match, the corpsman had to inventory all the blood-soaked items in the bucket to make sure that nothing got left behind. This is one procedure which hasn't changed at all since WWII.

On a bedside stand near the operating table, you will find a circular saw which many people assume is for amputations. This saw is not for cutting bones, but rather for cutting open a plaster cast. During WWII, the old-fashioned plaster of Paris cast was used to immobilize any type of fracture you had. During the 1950s, light-weight splints replaced the cumbersome plaster ones, but they could only be used for minor fractures. Then, during the 1970s, fiberglass replaced the plaster. These casts were faster drying, lighter weight, and were water resistant. There is only one advantage that the plaster casts had over the fiberglass ones… you could sign them. There was a fun tradition kids used to practice in the olden days. Kids wearing a cast could show off the signatures and encouraging messages of all their family members, friends, and well-wishers.

Now, let's look at the surgery instruments in the next cabinet. We find many instruments that look like tools for carpentry instead of for surgery. We see saws, hammers, chisels, drills, and rib spreaders. These instruments were placed here for demonstration only. Tools would not be stored here permanently. They were stored in the **Sterilization Room** next door. Before an operation, only the tools necessary for that particular type of surgery would be selected, then they would be thoroughly sterilized, and then they were laid out in the surgery room. Let's take a look at how this is done.

We enter the **Sterilization Room** directly from the Surgery Room. On the starboard side we see many drawers and cabinets used for storing surgical instruments, and medical supplies. On the port side we see a stainless steel hand-wheel of the steam chamber. When we open the door, we find a large tray into which would be placed the surgical instruments which would be sanitized before an operation. The tray is large enough to sanitize bedpans, urinals, IV drip bottles, syringes, and anything else which needs to be sterilized. In the olden days, doctors used to sterilize their instruments in a pot of water boiling at 212^{o}F, which is hot enough to kill most germs, but viruses and resilient types of bacteria need up to 250^{o}F to be killed. Notice that Hornet's steam supply is 300^{o}F, which is sufficient to kill all microorganisms. Discovering this in the 1940s was an important health breakthrough.

We'll exit the Sterilization Room into the aft surgery room. This room is especially designed for surgery involving vital organs. If you looked at the ceiling in forward surgery, you saw all types of pipes, hoses, tubing, and wiring, which had many functions. This room has the same plumbing and wiring, but they are hidden behind plywood sheeting. Before doing open surgery on vital organs, the entire room must be scrubbed and sanitized, and this protective sheeting allows for that.

Another great discovery at this time in history was in the area of anesthetics. The use of inhalation anesthesia goes back to the early 1800s when nitrous oxide was first discovered. Nitrous oxide was then called **laughing gas,** and it was used as an intoxicant for recreational entertainment.

People would charge admission for the townspeople to witness a volunteer try to perform trivial tasks while intoxicated. The host would select a volunteer from the audience and give him a snort from a balloon filled with laughing gas, and then might ask him to put mustard on a hot dog, and then eat it with his eyes closed. This type of pleasantry was the sole use of laughing gas for many years.

One day, a doctor who was in the audience witnessed a contestant fall off a chair and injure his knee. The doctor tried to attend to the man who was bleeding profusely, but the contestant kept laughing and insisting that he didn't feel a thing. This gave the doctor an idea. He decided to try laughing gas to do general surgery, but later found that the effects of laughing gas were too brief and ineffective for serious operations.

Doctors tried **chloroform,** and **cocaine,** but both were found to be addictive. **Ether** was used effectively for many years, but when the patient woke up after surgery he experienced severe nausea. An earthshaking breakthrough was made in 1949. Doctors discovered that a cocaine derivative could be injected into a part of the body and make that area numb without affecting the rest of the body. This was the birth of **local anesthesia.** The drug was called **lidocaine,** and since that time, other drugs were mixed with lidocaine to achieve a variety of other benefits (e.g. xylocaine, procaine, benzocaine, and novocain).

Now, let's cross the hall and see the Optometry Room. During WWII, the Hornet did not have an Optometry Department. Pilots were given a rudimentary vision test that showed that they had 20/20 vision while wearing corrective glasses. The test was as unscientific as the vision test you take at the DMV when getting your driver's license. But times change, and planes were getting faster, dog fights were more intense, and taking off and landing were getting more dangerous. Wearing eyeglasses was becoming hazardous because the vibration of the plane, perspiration from the pilot's brow, and stressful g-forces made it easy for glasses to fly off leaving the pilot unfit to maneuver the plane. During the Korean War Era, fighter pilots were required to have 20/20 vision without corrective lenses. Contact lenses were becoming popular, but the first hard contacts did not allow oxygen to get to the cornea, and this caused a number of adverse side effects. In 1959 soft contact lenses were manufactured. These new lenses were oxygen permeable and had no adverse side effects. From that point onward, fighter pilots were able to fly as long as they had 20/20 vision wearing contact lenses.

The next room we enter is **Pantry** where food is prepared according to the dietary needs of each patient. The food comes from **Officers Galley,** not from **Enlisted Galley.** The Officer's Galley prepared customized orders for the Captain's Pantry, Admiral's Pantry, First-Class Pantry, Chief Petty Officer's Pantry, Sick Bay Pantry, and Flight Suit Mess.

Our next room is **Rehab Room.** This room is for injured patients or patients recovering from surgery. This room has not changed much since WWII, except for one major improvement. Other ships in our flotilla have a Sick Bay, but they do not have a Surgery Room. During the WWII Era, if someone from a support ship required emergency services, he would have to be transported to the Hornet by means of a **boatswain's chair** (now called a **boson's chair**). Making a ship-to-ship transfer was a treacherous ordeal. First of all, the two ships had to break formation and get the support ship close to the Hornet without stopping. The Hornet would shoot a line to the other ship and send them a chair. The patient would be secured to it and be hoisted back as both ships are pitching and rolling with the waves. Sometimes, the patient would find himself getting dunked in the ocean mid-transfer. Other times, the patient was too ill or wounded to use the chair, and he would have to be transferred in a **Stokes litter**, which was even more traumatic for the patient.

Go to Hangar Bay 2, and over the door to Security you will see an antique bosun's chair, and below it you will find the solution to this patient-transport problem. Between 1949 and 1954, the Piasecki Company manufactured the HUP Retriever helicopter built specifically to transport injured or wounded patients to the aircraft carrier. It featured twin overlapping tandem rotors which made it very maneuverable in tight spaces, and it had rotor blades which could be folded back for storage on a ship. No longer did accident victims need to be transported in a boson's chair.

With the use of a helicopter, there was one other significant change on the Hornet during WWII. When they enlisted, sailors were asked how they would like to have their body disposed of in the event of a combat casualty. They could opt for a burial at sea, which was a practical choice for sailors who might be grossly disfigured, or for sailors who had no family to return to, or for sailors where the ship was their home and his shipmates were their only family. If they did not opt for this alternative, their remains had to be preserved in the cold-storage morgue, which is located on 4th deck directly below the aft emergency generator. With modern helicopters which could transport bodies quickly, burials at sea are no longer practiced.

Next we see the **Isolation Room**, used to quarantine patients suspected of having a contagious disease, or to give intensive care to seriously injured patients. The metal framework we see on these beds is for patients who have suffered a 3rd degree burn. The tent is to hold the blankets away from the skin and keep the skin open to the air to help it heal faster. The big breakthrough in this department was the invention of the Jacuzzi bath. In 1968, the Jacuzzi Brothers designed a hydrotherapy tank which combined a hot tub with an air jet massager. It provided pain relief for spasms and muscle strain.

Its best use was for burn victims to debride dead skin, and to kill bacteria which could minimize the risk of infection. If we look behind the blue door in the Rehab Head, you will see an example of a Jacuzzi bath.

Timeline of medical breakthroughs during the WWII Era:

1932 transfusions became safe because blood type could be classified.

1940 petroleum-based plastics were introduced.

1940 petroleum-based rubber was introduced.

1940 medical instrument sterilization was done with high-pressure steam.

1944 penicillin was introduced to combat bacterial infections.

1945 shock-proof x-ray machines were created.

1945 a device was created that could measure both high and low blood pressure.

1949 local anesthesia was made possible for minor surgeries.

1949 rescue helicopters were manufactured to transport wounded victims.

1950 vaccination was discovered to prevent fatal bacterial infections.

1959 contact lenses were invented which allowed pilots with vision impairment to fly.

1960 ear mufflers were invented to prevent hearing loss for pilots.

1968 hydrotherapy was made possible by the invention of the Jacuzzi bath.

1970 heavy plaster casts were replaced by light-weight fiberglass.