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The Atlantic Passage
By John Gallagher
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Crewing Up

It's been a long time since the events that follow took place. I feel fairly confident that some of them are correct because I still have a batch of faded and dusty files containing orders shipping me here, there, and yon. For the rest it's just memory slightly warped by the passage of time and probably also bent by my own tendency to make my role in things turn out well. Well, it was 59 years ago when all of this took place.

I graduated as a 2nd Lieutenant from the US. Army Air Corps Navigation School at Selman Field, Monroe, Louisiana on January 15, 1944. When I graduated I was still 18. I would be 19 on March 22. My assignment was to report to 3rd Air Force Replacement Depot, Plant Park, Tampa, Florida. I was allowed a delay en route and scheduled to report to Plant Park on January 29. The delay en route was terrific. I hitchhiked home by air and made it to Concord, Massachusetts in two days. It was great seeing my folks at home, sporting my new uniform around town to see old friends, and particularly to see Connie O'Neill, my high school girl friend. I also went down to the high school to see a teacher I was fond of and found that my showing up as a 2nd lieutenant just 9 months after leaving my senior class created a considerable stir. I think that a couple of the male teachers that I talked to exhibited either anger or jealousy. I enjoyed myself enormously but was also very anxious to get on with my journey to the war. I left in what I thought was plenty of time to get to Plant Park before Jan. 29 but found the waiting lists at military airfields jammed with troops of all sorts. I made it, but just about an hour before I would have been AWOL.

Plant Park was a replacement depot that moved people to other Air Corps bases that specialized in assigning qualified crew members to combat crews for combat in a variety of different theatres of war. It seemed highly disorganized to me. It was located in what appeared to be a large athletic field with stadium and other ancillary buildings. It was quite difficult to find such odds and ends of information as: to whom you reported, where you were to sleep, where toilet and bathing facilities were located, etc. It was impossible to find anyone who knew how long you would be there, or where you were likely to be sent. As it turned out, it didn't matter. In less than a week I received orders sending me to Drew Field, also in Tampa, Florida, reporting February 4. In this way I learned for the first time that I would be flying in a B-17, the great Flying Fortress that had been carrying the war to the enemy in Europe since the fall of 1942. I knew this because we all knew that Drew Field was a B-17 base, its planes were constantly overhead. This was mighty exciting news. I was convinced that this war was the largest and most important thing that would ever happen in my life and I wanted desperately to become a part of it. I was beginning to think the war would end before I ever got into it, now it appeared that might not happen.

After 10 days at Drew field, I was no closer to being placed on a crew. Most of the potential crewmembers I met were ambivalent about getting crewed up in a hurry. It was well known that England was filled to the brim with GI's waiting for the invasion of Europe. Many thought the war would end very quickly once an invasion took place and were not anxious to just arrive overseas as the war ended and have their service time extended in order to be part of an occupying force. It was felt that once the end was in sight, those of us in the states would all receive discharges and head home. It was, of course, also true that I might not be sent to Europe but to the Pacific Theatre instead. Somehow I tended to discount that possibility. I decided it might help if someone in the business of making assignments knew I was anxious to get over before the war ended. I located and visited the office charged with assignments to crews and told them I was very anxious to get crewed up and sent overseas. They said they would keep me in mind. In two days I had my assignment. I was assigned to a crew whose Navigator had to be removed for medical reasons. The crew had been together for some time and I was told there would be only a few more training missions at Drew before we left.

I was very nervous about my initial meeting with the members of my new crew. As it turned out, there was no need for concern. We met in a group just before being briefed for my first training mission with the crew. Bob Horn, the pilot, introduced himself to me first, and in the process told me how pleased he was to have finally been assigned a new navigator, and said he thought the rest of the crew would feel the same way. Horn and the nucleus of his crew had been together for some time and had repeatedly been held back from proceeding overseas by illness and accidents. Horn introduced me to the other crewmembers, all of whom were very pleasant but seemed to be somewhat reserved and certainly less than overwhelming in their welcome. I decided that they had a perfect right to feel that way and assumed they simply wanted an opportunity to evaluate for themselves my ability as a navigator, and whatever other qualities they thought would make me an acceptable crew mate.

The training mission assigned would take us on a series of short runs to an I.P. (Initial Point for a bomb run), then to a target (generally located in one of the towns or cities in the area) then to the next I.P. I was to provide information to the bombardier on wind direction and speed at each I.P. prior to the bomb run. An instructor bombardier was present to observe the activities of Bob Alker, our crew's bombardier, and would evaluate his procedures on the practice bomb runs and those of all other crewmembers also involved in the runs. Needless to say, no bombs were dropped on these flights, the bombardier instructor evaluated bomb run techniques and formed his estimation of the abilities of our bombardier and those of us on the crew who worked with him during a bomb run.

After take off, since it was my first ride in a B-17, I was given some time to get familiar with the equipment locations, the general intercom procedures, oxygen check procedures, and other items. When I had my desk set up with required maps and navigation instruments in position, had removed the covers from the compass and the drift meter, and had set the station pressure on the altimeter, I called the pilot, told him I was ready to proceed and gave him the heading from Drew Field to the first of our

scheduled IP's. We had been climbing and were already at our briefed altitude, 25,000 feet. I had put on my facemask when the pilot called for masks to be put on as we were going through 15,000 feet and was now breathing almost 100% oxygen. The pilot put the plane into a deep circle and pulled it out on the heading I gave him just before we passed over Drew Field. We were headed for the first of the IP's, a small town about 30 miles from Drew. The weather was cloudy with many small cumulous clouds building along our route. I had planned to do simple pilotage navigation, navigating by using ground features for visual checkpoints, but found that the clouds were making it difficult to find checkpoints. At our speed the first I.P. was only 12 minutes from Drew. When 8 or 9 of those minutes had elapsed I called the pilot and said something like, "Navigator to Pilot, I'm having some trouble finding check points with the clouds bunching up below us. Would you please make a 360 degree circle so I can get myself located." His only reply was, "Roger". During that circle I did find myself and when we finished the circle we were almost on top of the I.P. I gave him the heading to the first target and then called the Bombardier and gave him a quickly calculated wind, which turned out to be miraculously accurate, and a ground speed and ETA to the target. For the rest of the mission I had no more trouble, probably because I worked more rapidly and with more intensity than I had ever worked before in a plane. I soon discovered, however, that my request for a circle was about to have long-range ramifications.

When we were on the ground we went through a debriefing in which the bombardier instructor commented on the flight and the work of each of us who worked with our bombardier in making the bomb runs. He was very satisfied with what he had seen and told us that he felt we were ready for our big trip soon. When the session was over we had a general chat. Bob Horn was delighted with the mission and told me that he was pleased with my call for him to circle. He said anytime I needed help from him, to ask for it. "Never jeopardize the mission because you don't want to admit you're lost." All the rest of the crew seemed much friendlier than at our earlier meeting. This had me confused for a minute until Smitty, the radio operator, came over and said, "Sir, I hope you realize that as far as this crew is concerned, your name is Circle from now on." I just smiled and said, "Sounds like a good name to me." He was right: from that time on I was Circle to everyone on the crew. They never called me that in front of anyone not on our crew, but once the enlisted men on the crew knew that I was not offended when they called me Circle, they rarely used another name. A few days later Bob Horn asked me if I had any problems with the crew using my new nickname. The question made me wonder if he was concerned that this was an improper officer/enlisted man relationship, therefore contrary to Army regulations. I told him that I thought it was fine and seemed to have brought me much closer to the rest of the crew. He smiled and said, "I'm glad because, I think it's the best thing that's happened to this crew in months."

Like most B-17 crews at that time, our crew was composed of 10 men, 4 Officers and 6 enlisted men. These are their names and the armament they controlled:

Pilot	2 nd Lt. Horn, Robert N.	
Co-pilot	2 nd Lt. Peters, Sanford, Jr.	
Bombardier	2 nd Lt. Alker, Robert L.	Nose Turret, 2-50 cal.
Navigator	2 nd Lt. Gallagher, John, W.	2 hand held 50 cal.

Flight Engineer	S/Sgt. Walley, Oren L.	Top Turret, 2-50 cal.
Waist Gunner	Sgt. Coulter, Flake B.	1 hand held 50 cal.
Radio Operator	S/Sgt. Smith, Harold M.	
Ball Turret Gunner	Sgt. Nelson, Winton H.	Ball Turret, 2-50 cal.
Waist Gunner	Sgt. Frizell, Thomas J	1 hand held 50 cal.
Tail Gunner	Sgt. Crooks, Robert B.	Tail Turret, 2-50 cal.

One of my unpleasant memories of Drew Field is that after being assigned to a crew, the medical and dental people became very serious about our health. I found myself summoned to the medical clinic one day for a complete re-examination of my teeth. Although their records indicated many previously filled cavities with which I was having no trouble (I had dozens of fillings), a new Air Corps directive required all fillings in combat crewmembers to be replaced with fillings installed with a new liner. Apparently many aircrew members in Europe had been experiencing problems with existing fillings becoming painful at high altitudes. However, I think that only a very few ever had as many existing fillings as I.

At any rate, I spent three long days having all of the many fillings in my mouth reamed out and replaced with Air Corps approved fillings. Each day, after 3 or 4 barrels of novocain had been applied, they were unable to control the pain any longer and for the remaining hours I had a period of personal torture.

We had only two more practice missions when we were informed that we were each getting a ten day leave to start March 18. I was again disappointed at another delay, but having finally become crewed up, I thought I could sweat it out. The other crewmembers had been without leave much longer than I and certainly deserved it. I did not go home on the leave because I was very low on funds and the 10 days could mean almost no time at home if hitch hiking by air was very slow. When I had used up most of the money I had seeing the sights in Tampa and St. Petersburg, I bought some books and holed up in the BOQ reading them. After everyone had returned from their leaves, we flew a few more practice missions and in about three weeks finally received orders to ship out.

The Atlantic Crossing

On April 24 we moved from Drew Field to Combat Crew Section, 3AF Staging Wing, Hunter Field, Georgia. At Hunter we were assigned a brand new B-17 G. For the next 4 days we spent all of our time checking out the aircraft, running a variety of ground and air checks. For me, this period was spent aligning the compass and spending hours checking deviation, the affect of aircraft electric and metallic items on the compass. We also spent time calibrating the air speed indicator and the altimeters. The navigator's compartment in the nose came equipped with new navigation equipment, all of the tools and equipment needed by a navigator including a new octant. All of the other crew specialties had their own lists of checkout procedures to complete. When we were through we all felt that we had a great airplane to take us wherever we were going. We had been warned a number of times that when we got overseas, wherever that might be,

we were unlikely to have this airplane assigned to us, but probably would go through a combat checkout period of training, and then be assigned a plane when we were considered ready for combat. The scuttlebutt wisdom was that the plane we were then assigned would most likely be some old clunker that had been through the wars for quite a while. However, the future belonged to the future, we were all very pleased to have this plane for our approaching trip.

On or about April 28 our crew was ordered to fly our new plane up to Grenier Field in Manchester, NH. We were instructed to take all personal belongings in anticipation of a change of station. This was very exciting to everyone on the crew but particularly exciting to me. Manchester, NH was about 40 miles north of my hometown, Concord, Mass. I was hoping I'd get a chance to get home. I enjoyed the trip up the east coast. It was the first time I had ever been that way flying with my own crew. Bob Horn was willing to make small side trips to let any of us who wanted to see something special along the way have their chance. We all got an extended look at New York City at the lowest permitted altitude Bob felt to be safe. When we were getting into Massachusetts, I asked Bob if we could take a look at Concord. He said sure and then asked me to point out the town before we got to it. When I told him it was 5 miles dead ahead, he put the plane into a dive and dragged the town at an extremely low altitude with much changing of prop settings, which produced marvelously loud noises. After we landed at Grenier that night I made an illegal call to my folks. They said the whole town was aware of our passage that afternoon but they had not realized it was my crew. I had to tell them that I could not get home. I had found out we were restricted to the base after we landed. I couldn't tell them we were going overseas, also prohibited information. I told them it was just another training flight.

The next day, April 29th, we received our orders to proceed by air in B-17G, # 42-102651, from Grenier Field, NH via the North Atlantic route to Nuts Corners, Ireland reporting thereat to the Air Transport Command Terminal. Our first stop in this trip was Grenier Field to Gander, Newfoundland where we would receive extended briefing for the North Atlantic crossing. The trip from Grenier to Gander was uneventful but long. At Gander we were given quarters and told to report to an 8 a.m. briefing in the morning.

We went through a number of briefings at Gander. The entire crew had lectures on radio procedures, on new enemy aircraft and enemy boat recognition photos which were provided to each crew member, lectures by a number of different officers and enlisted men on bailout procedures over land and sea, procedures to be followed in the event of landing in enemy occupied territory, and evasion procedures.

The navigators were briefed separately on weather, enemy radio jamming, and coastal features of Ireland, England, and France. Navigators were warned of the possibility of enemy ships, presumably subs, located along our route with equipment capable of jamming high powered, commercial radio broadcasting stations in order to distort the readings on our direction finding equipment. These were the stations we would normally use for radio fixes. We were cautioned not to use any of the national or

commercial radio stations in the British Isles, France, Iceland, or Ireland to home toward or to establish position fixes. We were also briefed on methods to establish "points of no return", i.e. the point at which wind at the altitude we were flying would have carried our aircraft beyond a point at which it's gas supply would be adequate to permit return to a safe landing, which might be against the same winds that had helped us on the way out. We received a refresher lecture on making visual determinations of wind direction and force by observation of wave movement and direction with the navigator's drift meter. I felt that this technique might be useful in some emergencies, but required some dangerous assumptions. I was very confident of my celestial ability and in fact was looking forward to using celestial navigation again after so long a time.

We were told that the North Atlantic route had just opened. It was closed during the winter months. We were to keep a careful lookout for any ships, subs, planes, or other equipment noted during our passage.

We were also provided a number of horror stories by each of the speakers about flights of single aircraft and multiple aircraft becoming lost on the crossing and ultimately landing in France or other occupied countries and receiving a friendly welcome from the Germans, which included loss of their aircraft, and imprisonment as prisoners of war. At that time, I thought those stories were manufactured to increase our awareness of the dangers lurking, eventually I learned that they were all true.

Our briefing from the meteorologists was extensive and as thorough as they could make it. We were given predicted winds for the altitudes at which we would fly and the predicted changes in wind direction and speed as we progressed across the North Atlantic, with the oft-repeated warning that these were only predictions and that we must use the methods we had available to us (celestial navigation and dead reckoning) to pin point our location frequently enough to get good winds. We called the winds from meteorologists "metro winds" in contrast to the winds established by any of the navigators methods. The following day, during the morning and early afternoon prior to our afternoon take-off, the base navigation and meteorological people provided me with their latest predicted wind information and worked with me on an initial point of no return determination based on those winds. This was revised several times prior to our designated take-off time to accommodate changing wind information. When we taxied out to take off a landing gear problem was discovered and we were stood down for another day while that was corrected.

The years have blurred some of the particulars of our Atlantic crossing in my mind but I believe that what follows is generally correct. I think we were briefed to fly at about 10,000 or 12,000 feet. I know it was at an altitude that did not require us to be on oxygen. We took off at about 4 p.m. with clear weather conditions. This meant that we had about two hours before sunset during which I took a number of sun shots. With our generally northeast heading the sun was at our southwest and gave us excellent speed lines. The line of position on the earth of a celestial shot is perpendicular to the bearing from the sextant to the object being shot, in this case, the sun. Therefore the sun lines I was getting were roughly perpendicular to our northeast heading and provided a good

indication of our groundspeed. I was quite pleased because the groundspeeds I was calculating were very close to the groundspeeds I'd predicted using the metro winds I'd received at Gander. I was running a continuous Air Plot (keeping a continuous plot of true heading by applying corrections for variation and deviation to the compass indicated headings for the time intervals they were maintained, and a continuous plot of true air speed by applying altitude and temperature corrections to the air speed indicator readings). In this manner, whenever I could get a fix, the vector from my air position at the time of the fix to the ground location of the fix would give me a wind direction and velocity for the elapsed time since my last known earth position, in this case Gander Field.

I continued using metro winds and the resultant compass headings until well after sunset. I wanted the best display of stars I could get, and after they were visible, spent some time choosing the ones I would use for my first fix in order to get the best course lines and speed lines I could achieve. When I was ready I moved my head up into the navigator's dome and prepared to take a shot at Polaris, which should give me a good course line, a line parallel to my intended course. Although Polaris is not a very bright star, I was able to see it well through the octant. I discovered, however, that one other ingredient in shooting a night shot was missing. I could not see the bubble in my octant. In an averaging aircraft octant, the star is placed in the center of an air bubble whose perimeter is lightly illuminated. The navigator holds the octant so that the star is positioned in the center of the air bubble and the air bubble is maintained in a level position while he presses continuously with one finger on a stylus that applies marks to a waxed paper disk for a designated period of time. The average of the altitudes of the star, in degrees and minutes, indicated by those marks and the center point of the time lapse over which they were taken gives an average altitude corrected for the roll of the aircraft. Most aircraft move through the air with a forward roll much like a sine curve. The averaging process assists in minimizing the affect of this roll on celestial shots. I stayed in the dome for some time trying to understand why I could not see the bubble. I finally assumed that when I took the sun shots earlier, I was able to see the perimeter of the bubble because of the ambient sunlight. Now without some perimeter illumination I could not see the bubble at all.

The navigator's dome in the roof of the nose of the B-17 is directly in front of the pilot's window. This means that the pilot can see the navigator's head pop up into the dome, can see it as long as its there, and can see it as it leaves. When I got down from the dome and back to my desk, Bob Horn called and said he thought I was in the dome for quite a while and asked if everything was all right. I didn't want to concern him at this point, in my mind there was still ample time to turn back, if necessary, before reaching the point of no return and I felt the bubble light problem should be a simple thing to fix. I told him I was just evaluating which stars would make the most effective fix, and that I would be taking the fix shortly.

At my desk I worked for a long time trying to understand what was happening. My new octant came in a case with no reference book or back up material. It looked like the same model I had used all the way through training. There were no switches, places

for the insertion of a plug, access doors for battery placement or removal, or any other devices I could see on the exterior of the octant that might provide illumination of the bubble. I had never before thought through the question of how the bubble was lighted. I was sure there was no battery device used because no one had ever mentioned one and because I had used my octant during training frequently over a number of months with no bubble lighting failure. I tried to find a way to open the octant to see if a view of the interior would shed any light. I could find no way to open it.

From time to time I climbed up into the dome and acted out the process of shooting a star. After one of these, the pilot called again and asked how everything was going. I told him that we seemed to be doing just what the metro winds had predicted. I told him that I was having some trouble with some of my equipment and wondered if he would ask Oren Walley, our flight engineer, to come down for a moment. He said sure.

When Oren showed up I explained my problem. Together he and I worked for a considerable time trying to find an answer to the mystery. I had very little mechanical aptitude and I figured that if anyone could find the answer to this problem it was Oren. We probed into every corner of the surface of that impenetrable octant. At some point I looked at my watch and realized that we were already well beyond the point of no return.

I sent Oren back to his position telling him there was no reason for concern because we had plenty of navigation options. I also asked him to say nothing about my octant problems to the pilot or any one else on the crew, because it would just needlessly worry them.

After he left, I again climbed into the navigator's dome and acted out my performance of shooting the stars for the benefit of the pilot. I spoke to the pilot several times, twice giving him small heading corrections that would have been required if the metro winds were still as predicted. I continued to maintain my charting of air positions to maintain our theoretical air position with no wind and also plotted a ground position course based on the metro winds. When the new day broke I was delighted to see the sun rise. I took my first sun shot and hurried to plot its location. I found it crossed more or less perpendicular to our path very close to where I thought it should be based on the metro winds and provided a ground speed very close to that yielded by the metro winds. I was pleased with that and felt quite confident about the distance we had traveled but was still very concerned that we had no course information. All that I really knew was that we were somewhere on that line of position from the sun. We could be dead on course or hundreds of miles off course.

I spent some time trying to pick up a wind by observing the wave movements with the drift meter. I found that I could get a very good reading of wind direction but had no faith in the wind speeds I found. When we were about 350 miles from the Irish coast I decided that it would have to be a brave enemy sub to take up a position that close to the British Isles and that I could probably safely take a radio fix. At least I felt I could take one and then evaluate whether it was something I could rely on or not. I picked up a good course line from a commercial station in Dublin, Ireland, then crossed it with a

good speed line from Reykjavik, Iceland. When plotted the fix looked excellent, just slightly south of my position calculated with metro winds. I decided to try for a third station and found one that sounded like a commercial station coming from the southeast. The needle had moved strongly to the station and remained rigidly fixed. I thought at first that it might be Paris or Brest, France but then realized that it wasn't French I was listening to and it wasn't Spanish, I finally concluded it was Portuguese, and at a station break heard the word Lisbon. I plotted it on the chart and ran it back with my current groundspeed and found that, even though it was almost 25 minutes since I had taken my Reykjavik line, I had drawn a very small triangle.

I decided that the fix was good, worked out the wind, using my air position, and plotted a new course and an ETA for the pilot. I called him and gave him the new heading, which was a minor correction, and the ETA. He called back and said he thought it was very close to our original ETA. I told him that we must have had excellent metro information.

In about 30 minutes I tried for another radio fix and to my dismay found nothing seemed to be working. I could find no response at the frequencies I had used for the Dublin, Reykjavik, or Lisbon lines of position. I continued to shoot sun lines and continued to find that the groundspeeds I calculated were very close to the groundspeeds I had predicted. Once again I was getting very nervous about my lack of good course data. I wanted some verification of that radio fix. I decided to try checking the ocean waves with drift meter again but once again was very uncomfortable with the results.

I was mulling about all of this when the Bob Alker called and said that he could see land of some sort off to the southeast. I looked to where he was pointing then went back to my charts. I decided that we were looking at the northern end of Mullet Peninsula off the coast of County Mayo, coming toward us just where it belonged, slightly south of our intended course. Plotting that visual bearing with the astro compass and another from Malinmore Head just outside the entrance to Donegal Bay gave me a quick fix. I gave the pilot a corrected heading with my old wind and when I had a new wind worked out from the visual fix found that my old ETA was still good. We sailed up Donegal Bay, past Ballyshannon and into Northern Ireland. When the pilot had Nuts Corners, our destination airfield, which was also the Belfast municipal airport, on his radio direction finder, I collapsed in my chair, totally exhausted. We came in over Nuts Corners just 2 minutes before my ETA.

I was very tired but my mind would not rest. I remembered Bob Horn's remark following that first training mission, "Whenever you need help, just ask for it. Never jeopardize a mission because you don't want to admit you're lost." Had I been guilty of exactly that, not wanting to admit I was lost? Had I taken responsibility for violating the point of no return on my own shoulders without alerting Bob of my problems with the octant? I rationalized that I was always quite sure that our metro winds were excellent, my sun lines had given fine confirming groundspeeds for a few hours after takeoff and again for a few hours before landfall. I never thought I was lost.

Why had I become so comfortable after taking a radio fix from very distant stations that I had been cautioned to avoid? That again opened endless mental conjecture. Why had the first radio fix been so easy and felt so correct and why had the second attempt produced nothing? Some fluke in the airwaves that permitted clear reception from such long distances for the first and renewed jamming or bad airwaves for the second? My mind went back and forth over these issues endlessly until I suddenly realized that the small space in the nose of the plane was full of people. Bob Horn was there with his hand out, Bob Alker was leaning over my desk on the other side with his hand out, the plane was silent. We had landed and I was being congratulated on what the crew considered to be an excellent navigation job.

Long after we had finished our tours, when I quite happily discovered that he was a pilot chauffeur of B-17's for radar student bombardiers at Boca Raton in Florida and I was assigned as a radar instructor teaching those same students, I told Bob the whole story of that North Atlantic crossing. When I finished he looked at me quietly for a few moments and said, "I knew." I couldn't believe he had said that.

"How," I asked, "How could you ever know?"

"You spent so much time in the dome for each night shot, without really getting a shot. I've carried enough navigators to know that when you're taking shots for a fix, you have to be constantly writing results. You weren't doing that. In fact you did nothing but concentrate on that octant of yours. If you were shooting stars, even one star, let alone three, you were carrying more information in your head than I think you or anybody else I know is capable of."

"Why didn't you say something?" I asked.

"Hell, I didn't want to turn back. You'd been a good navigator from your first training mission with us. I just knew you'd work it out."

I think the answer is to combine good metro winds with dumb Irish luck.

Author's Note: When I started to write about this Atlantic crossing I checked on the internet to see if I could clarify why I had no bubble illumination. I found the Navigation Foundation who referred my query to The Navigator's Newsletter. I received a quick response from the Newsletter saying that an old instrument manual in their possession contained the following: In the Type A-7 bubble octant, the bubble and field of view were illuminated by a radioactive material painted on the metal ring surrounding the bubble. A copy of the Navigator's Information File, later received from a friend who was also an Air Corps Navigator, confirmed this, calling it a luminous coating. It cautioned, however, that, "If the sextant has not been out of its carrying case during daylight you must introduce some light into the bubble chamber from another source, suggesting shining a flash light into the prisms for a few minutes. Later models had exterior battery packs, some had a self contained lamp assembly, some had electrical connections using the aircraft 28 volt power supply. Since I did use my instrument during daylight hours, I've concluded that the brand new octant in my brand new airplane was an A-7, the same model I used throughout training, but one in which someone neglected to paint the radioactive material on that metal ring surrounding the bubble.