"Go in close, and when you think you are too close, go in closer": Finding Historical Records of Downed U.S. Naval Aircraft

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Introduction

One of the difficult aspects of conducting archaeological and historical research on downed WWII US naval aircraft is their identification. What type and which one? This question is basic, and some would argue even particularist; however, it is often a prerequisite for asking "questions that count."[1] The first half of the identification question, "what type?," is typically answered with archaeology. Archaeologists survey and record a site, look for specific features that match types and tease out the details of aerials, hatches or turret types and configurations to narrow in on the model. Conversely, the latter half of the identification question, "which one?," requires a combination of both historical and archaeological research, and often remains a mystery. The reason is simple – aircraft fall from the sky and land where they land. Last known locations are rarely precise and the luck of finding a bureau number on site is just that. This paper outlines the process of conducting historical research on a naval aircraft and in particular a US naval aircraft related to WWII operations in the Pacific. Lost in Tanapag Lagoon, Saipan, the remains of the aircraft, a PB2Y Coronado, have remained a mystery until recent investigations into the archaeological and historical record shed light on its identification and potential demise (Figure 1).[2] What follows is a narrative of the process of archival and historical naval aircraft research with examples specific to the Saipan Coronado research. This process can be summed up with the words of one of one of the most decorated combat pilots of WWII, "Go in close, and when you think you are too close, go in closer." (Major Thomas B. 'Tommy' McGuire, USAAF).

Figure 1. Archaeologist recording the PB2Y Coronado wreck in Tanapag Lagoon, Saipan (Photo: Jon Carpenter).

Naval Aviation Research

According to David Whipple in his 1995 publication on naval aircraft, there were nearly 3,000 combat losses of US naval aircraft in the Pacific alone.[3] That number has grown with research and the last published total is 4,200 with 12,000 worldwide.[4] In 2014, the database exceeded 14,000 known worldwide with research indicating that a large number of unknown losses may still exist. [5] When conducting archaeological and historical research on a specific downed aircraft, the process begins with narrowing down the suspects based on geography (location) and type (aircraft). The historical

documentation of naval aircraft abounds; however, knowing *what* to look for and *where* to look for it, remain as challenging as it was in 1995. Whipple relates: "It was hoped that a document could be found in the National Archives, Naval Historical Center Operational Archives, or NHC Aviation History branch that identified by bureau number the location and status of aircraft in a given period…Unfortunately, a report with such a format has yet to be located and will probably have to be compiled from other documents."[6] The situation for identifying wrecked aircraft has not changed in twenty years. Researchers are still required to travel to multiple archives and sift through countless primary sources, crosschecking facts and drawing on secondary sources. Furthermore, it is useful if the researcher holds some form of knowledge about aircraft and aviation, as they are different to the majority of typical maritime heritage types (i.e. shipwrecks) encountered, even down to the way they are named.[7]

Aircraft make/model naming scheme

The mass-produced nature of aircraft meant that they needed to be assigned names systematically. Although the system used changed throughout the years, aircraft were designated by a series of letters and numbers representing their manufacturer, type, and model. Any number of aircraft could thus have the same designation; for example, Grumman produced 4,423 F6F-3 Hellcats between 1942 and 1944.[8] To distinguish between individual units, each aircraft was additionally assigned a unique bureau number.

From the very beginning of naval aviation in 1911, the Navy used unique designation systems to name its aircraft.[9] To date, four different systems have been used to accomplish this with the earliest systems utilizing a variety of letters and numbers to represent manufacturer and order of procurement (1911–1914 system) or aircraft type and sequence of procurement within a type (1914–1916 system). Chaos reigned between 1917 and 1922, when manufacturers named planes under their own schemes and the Navy retained those names. This changed again in 1922, when the Navy reorganized its aviation component under the Bureau of Aeronautics (BuAer). BuAer revamped its naming system, which was subsequently used until 1962 when a joint Army-Navy-Air Force regulation established a uniform aircraft designation system across the forces.[10] An updated form of this system remains in effect today.[11]

The 1922 naming system as implemented by BuAer is perhaps the most commonly encountered for historic naval aircraft. This system designated aircraft using a series of letters and numbers, determined by the following sequence: [(Type or Class) (Manufacturer Type Sequence) (Manufacturer) – (Aircraft Configuration Sequence)].[12] For example, the first two prototypes for the Navy's four-engine flying boat patrol bomber were designated XPBS-1 and XPB2Y-1.[13] The initial "X" stands for experimental, while the following letters and numbers are determined using the system: PB means "Patrol Bomber," while "S" is the manufacturer code for Sikorsky.[14] Consolidated was assigned the manufacturer code "Y," since "C" was already in use for Curtiss Aircraft.[15] Thus, XPBS-1 was Sikorsky's first prototype patrol bomber, first configuration, while XPB2Y-1 was Consolidated's second prototype patrol bomber (the first being the PBY Catalina), first configuration.

In addition to receiving a designation as described above, each naval aircraft was also assigned a serial number, called a bureau number (BuNo). This system evolved with the naming schemes. Early aircraft were assigned BuNo A-51 through A-9206. The "A" was then dropped, and the series continued as 9207–9999. Upon reaching 9999, a second series of four digit numbers was assigned, from 0001–7303. Beginning in 1941, a five-digit number became standard (00001–99999). A sixth digit was then added (100000) and this series is still in use.[16]

Bureau numbers, also called tail numbers because of the practice of painting them on an aircraft's vertical stabilizer, precisely identify an aircraft (Figure 2). All records pertaining to an aircraft, such as Aircraft History Cards (recording maintenance and ownership) or Aircraft Accident Reports, were filed according to the aircraft's bureau number. Identifying an aircraft's bureau number on an archaeological site would allow a researcher to research specific information about that aircraft, including its assignments, history, and loss.

Figure 2. Bureau, or tail number, on a XPB2Y-1 Coronado's vertical stabilizer (NHHC Archives).

Sources

When conducting research on naval aircraft, there are numerous types of sources and materials available. Archaeological sources include published and unpublished archaeological or cultural resource management reports, otherwise known as grey literature. These reports can be traced to an individual researcher or organization, but knowledge about their existence typically only comes from making contacts and sharing information within the discipline. Secondary sources such as naval historical journals, including *Naval Aviation News* and *Naval History*, contain articles detailing the use and history of different models of aircraft. Other secondary sources, usually compilations of primary source data, range from general aircraft reference books to histories of aircraft models. A comprehensive list of secondary sources up to 1998 can be found in the "Recommended Sources" section of the Guidelines for Evaluating and Documenting Historic Aviation Properties.[17] Primary sources are the most abundant, as

every aspect of the development and use of naval aircraft was carefully documented. These records are housed at a variety of archives which allow public access. Finally, websites and museums are yet another source of information with websites containing both secondary and primary records as well as personal memoirs, and museums containing extant collections as well as libraries.

Archaeological and management sources

Sources for researching downed naval aircraft begin with a close inspection of archaeological literature which covers both naval and non-naval submerged aircraft. A growing corpus of research and knowledge about submerged aircraft exists including sources related to specific projects, management of submerged aircraft and theoretical contributions, many of which are discussed below in chronological order. Discussions about aviation archaeology and aircraft wreck sites as heritage in the US began in the early 1990s, and were linked to the need for managing these sites. However a survey of several Pacific islands conducted by the National Park Service Submerged Resources Center (SRC) from 1981-1988 was the first to archaeologically record submerged aircraft sites.[18] This survey was followed by articles in the National Park Service journal *Cultural Resource Management* which included discussions by Diebold,[19] Foster,[20] and Whipple[21] on the management of such sites. *Guidelines for Evaluating and Documenting Historic Aviation Properties* were published in 1998.[22] Site specific publications on submerged aircraft were produced in the early 1990s. The first few reports and publications were authored by Dirk H.R. Spennemann, an archaeologist for the Marshall Islands Historic Preservation Office. Spennemann conducted at least two surveys: one of a Grumman TBF Avenger and another on a Consolidated B-24 "Liberator."[23] These surveys and publications were largely a result of management related concerns. Also in the Pacific, Rodgers et al. produced a journal article on a 1994 project in Kaneohe Bay, Oahu on a sunken PBY Catalina.[24] The article focused on the identification and history of the aircraft under consideration. Management and theoretical approaches were of utmost concern in Cooper's article that examined the state of aviation resources and what can be learnt from investigating such sites.[25]

Aircraft studies in Australia began as early as 1996 with Silvano Jung's first publication on US PBY Catalina wrecks sunk in Darwin Harbor, Northern Territory. Jung's research is the result of academic pursuit and incorporated a range of publications from journal articles to theses. Jung developed a model for locating, identifying and understanding the site formation of aircraft sites and applied this model to flying boats wrecked in Roebuck Bay, Broome, Western Australia.[26]

Although no publications resulted, a project conducted by the Naval Historical Center Underwater Archaeology Branch (NHHC-UAB) in Puerto Rico and a second project which recovered a portion of a Martin PBM Mariner in Lake Washington both took place in 1996.[27]

Moving to the Pacific, a recreational scuba diver contributed "phase II archaeology reconnaissance survey" reports conducted in Majuro and Kwajalein (Marshall Islands) in 1998, 2000, and 2003. These surveys identified several sunken aircraft including a B-24

for the purposes of tourism opportunities.[28] In 2001 a contract archaeologist with the NHHC examined the threats specific to US Navy aircraft sites in the Pacific.[29] The journal article Produced as a result of this project was theoretical in nature; however, it considered the real and practical threats to such sites in the region. One year later a second publication by Coble discussed specifically the management of naval shipwrecks and aircraft wrecks.[30]

In Britain, another theoretical article considering the merits of studying airfields and aircraft focused on British aircraft.[31] The following year, English Heritage published a report offering guidance on research and management of aircraft crash sites.[32] English Heritage later commissioned a report by Wessex Archaeology that focused on identifying the gaps in knowledge related to submerged aircraft wrecks.[33]

A high-profile US National Park Service Submerged Resources Center (SRC) project on a crashed B-29 in Lake Mead was conducted in 2003. Discovered by local divers in August 2001, SRC mapped and documented the site, producing a site plan and interpretive brochure which are both available on their website as well as a National Register nomination.[34]

Western Australia Maritime Museum Curator Michael McCarthy contributed an article to the growing corpus which discussed aircraft as site types and how their investigation is akin to those conducted by aircraft crash investigators, touching upon some for the more theoretical aspects of the study.[35] At the same time a Master's student produced a thesis specific to the survey of lost aircraft in the state of Victoria, Australia.[36] Australian researchers Bill Jeffery and Ian MacLeod both conducted research on eight aircraft in the Pacific at Chuuk Lagoon; MacLeod's research focused on corrosion studies, while Jeffery's focused on the values and use of such sites.[37]

The International Group for Historic Aircraft Recovery (TIGHAR), an avocational organization, conducted surveys of WWII-era crash sites in 2004, 2006, and 2007.[38] The 2004 and 2006 seasons were centered on TBD Devastator aircraft wreck sites in Jaluit lagoon, Republic of the Marshall Islands. Conducted in partnership with the US Navy, Texas A&M University, the University of Hawaii, and Woods Hole Oceanographic Institution, the project's goals were to survey sites within the lagoon (in 2004), then evaluate the TBD Devastator sites as candidates for recovery and preservation (in 2006). The 2007 project surveyed a Lockheed P-38 Lightning fighter aircraft revealed by shifting sands on a beach in Wales with the intent to recover and restore the aircraft.

An archaeological survey of submerged WWII sites in Saipan, Commonwealth of the Northern Mariana Islands began in 2009, and investigated four nearly intact sunken aircraft and several discrete disarticulated sections of aircraft.[39] This project has been reported upon in several formats including reports, journal articles, book chapters, and public interpretation products with material ranging from simple site descriptions, to management, to ethics. As part of this larger project, a Master's thesis was written on site formation processes of three aircraft[40] and another on the site formation of a different aircraft.[41] In addition, corrosion studies were conducted on all four of the aircraft.[42]

A Canadian project was conducted in 2012 on a Catalina OA-10 (PBY-5A) sunk in Longue-Pointe-de-Mingan, Quebec and the work was presented and published via conference proceedings.[43] Salvage operation of human remains were conducted on the site by the US Joint POW-MIA Accounting Command. At the same conference a paper was presented by a NHHC-UAB employee who theorized about the values of aircraft wrecks.[44]

In Australia, the most recent publication related to available information on aircraft sites was published in 2012.[45] Finally, an Honor's thesis addressed aviation archaeology sites in Australia and the Marshall Islands from a legislative management perspective.[46]

Secondary Sources

The quantity of secondary sources of information varies by aircraft and topic. For example, there is a great amount written about the Consolidated PBY Catalina, while only two books about the PB2Y Coronado are available. General historic aircraft references are widely published. One such example is Tony Holmes's *Jane's Vintage Aircraft Recognition Guide.*[47] This is an easy to use reference containing photographs and a concise description for military aircraft from a variety of nations from WWI into the 1980s.

Slightly more targeted is Swanborough & Bowers's *United States Navy Aircraft Since 1911*.[48] Examining only naval aircraft, this book provides more technical details of each aircraft, including helicopters, balloons, and airships. This book also includes a brief history of naval aviation and a thorough explanation of the naming systems as well as the various markings and color schemes used by the Navy. While the second edition is sufficient for research on the WWII-era PB2Y Coronado, an updated third edition was published in 1990. For a more detailed study of naval aviation history, *United States Naval Aviation 1910–1970 (NAVAIR 00-80P-1)* is invaluable. Starting in 1910, this book examines significant events in naval aviation history that occurred each month. In addition, the extensive appendices include such information as bureau numbers for all naval aircraft to date (1970) and all Medal of Honor awards given to naval aviators.

For aircraft-specific information, Ginter Books publishes a number of volumes in its Naval Fighter Series. One of these, Richard Hoffman's *Consolidated PB2Y Coronado,* is the only book written exclusively about the PB2Y Coronado.[49] Extensively researched, the book is an excellent reference about the Coronado. The only difficulty with this source is that the author was a pilot and engineer, not a historian; therefore, while it includes incredible insight, no footnotes or citations are provided.

Finally, several indices of bureau numbers, and information from Aircraft Accident Cards (AARs) or "crash cards", are available. A list of bureau numbers by group, complete to 1970, can be found in *United States Naval Aviation 1910–1970 (NAVAIR 00-80P-1).*[50] Individual bureau number assignments to PB2Y Coronados, as well as summaries of all accident reports, are found in Hoffman's book.[51] In addition to those resources, Douglas Campbell published an extensive set of all Navy, Marine Corps, and Coast Guard aircraft

lost during WWII. The four volumes each contain the same data, albeit organized differently. Organization schemes involve lists by bureau number,[52] ship attached,[53] squadron,[54] and aircraft type. [55]

Primary Sources

Two main repositories of primary sources are available: the US National Archives & Records Administration (NARA) Archives II in College Park, Maryland, and the Naval History & Heritage Command (NHHC) archives in Washington Naval Yard, Washington, DC.

The NHHC archives house specific aircraft, unit, and ship histories including the important AARs or "crash cards" contained on microfilm and Aircraft History Cards (AHCs) (Figure 3). AARs are the official reports submitted after an accident, and contain information such as date, time, aircraft number, squadron, location of accident, names and ranks of crewmembers, cause of accident, accident description, level of damage, severity of personnel injuries, and other details.

Aircraft History Cards (AHCs) are the logistical record of aircraft. Each individual aircraft is issued its own card, which includes the aircraft's squadron, dates of issuance or transfer, dates of maintenance, and finally the date when the aircraft was stricken from official record. These provide a cross-reference to the accident cards, and also can uncover aircraft that were lost, but do not have a corresponding accident report.

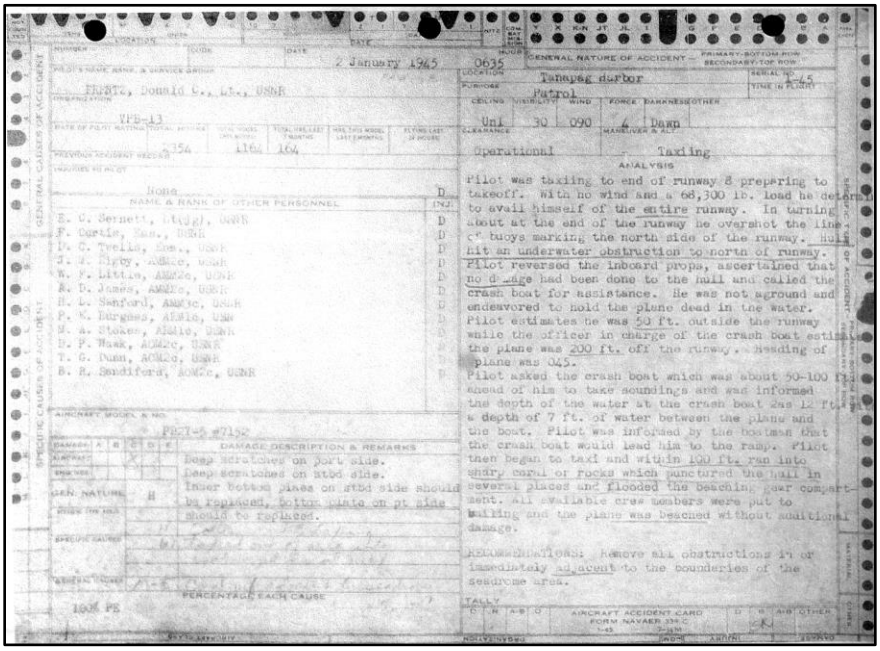
2 January 1945 0635
Tanapag Harbor
Patrol
Uni 30 090 4 Damp
Operational Taxiing
ANALYSIS
Pilot was taxiing to end of runway 8 preparing to takeoff. With no wind and a 66,300 lb. load he decided to avail himself of the entire runway. In turning about at the end of the runway he overshot the line of buoys marking the north side of the runway. Hull hit an underwater obstruction to north of runway. Pilot reversed the inboard props, ascertained that no damage had been done to the hull and called the crash boat for assistance. He was not aground and endeavored to hold the plane dead in the water. Pilot estimates he was 50 ft. outside the runway while the officer in charge of the crash boat estimates the plane was 200 ft. off the runway, heading of plane was 045.
Pilot asked the crash boat which was about 50-100 ft ahead of him to take soundings and was informed the depth of the water at the crash boat was 12 ft., a depth of 7 ft. of water between the plane and the boat. Pilot was informed by the boatman that the crash boat would lead him to the ramp. Pilot then began to taxi and within 100 ft. ran into sharp coral or rocks which punctured the hull in several places and flooded the beaching gear compartment. All available crew members were put to bailing and the plane was beached without additional damage.
RECOMMENDATIONS: Remove all obstructions in or immediately adjacent to the boundaries of the seadrome area.
Deep scratches on port side.
Deep scratches on stbd side.
Inner bottom plate on stbd side should be replaced. Bottom plate on pt side should to replaced.
AIRCRAFT ACCIDENT CARD FORM NAVAER 339-C

Figure 3. Crash card for a PB2Y lost in Tanapag Lagoon, Saipan (NHHC Archives).

Additionally, unit histories can be studied for those units known to have flown specific aircraft such as PB2Y Coronados. The NHHC archives houses narrative histories for these squadrons. These histories are more akin to journalism than detailed historical records, containing only significant or unusual events. However they are useful as they record squadron base movements, deployments, and the loss of aircraft. In some cases, the information contained in these narrative histories is more detailed or more accurate than that in accident reports, suggesting that someone intimately involved with the squadron may have written the narrative history.

NHHC archives also houses ships' histories. The Dictionary of American Naval Fighting Ships (DANFS) can be consulted to determine which salvage vessels operated in the area of study such as the Northern Mariana Islands during and shortly after the Battle of Saipan.[56] The history of each of these vessels can be examined for any mention of either salvage or activity of specific aircraft.

Finally, the NHHC archives' aviation history section includes files on aircraft models. These contain information pertaining to an aircraft's development and performance. For example, the PB2Y file was extensively studied, as it contains correspondence between the US Navy and Consolidated Aircraft Corporation pertaining to the development of the PB2Y Coronado, especially the changes and upgrades to the different variants. These files also contain original photographs of the aircraft, both for internal and public use. Copies of published journal articles, as well as Hoffman's book, are also included in these files.

NARA II in College Park, Maryland houses records that originate after 1900 in civilian and military departments of the Executive branch of government.[57] Staff can be consulted to determine where to search for specific information; however, with each consultation there may be a different line of query or record group based on the staff member's knowledge of the collection. Nevertheless, NARA provides Reference Information Papers that are useful for narrowing in on WWII research including: Paper 70, *A Finding Aid to Audiovisual Records in the National Archives of the United States Relating to WWII*;[58] Paper 78, *Records Relating to Personal Participation in World War II: "The American Soldier" Surveys*;[59] Paper 79, *World War II Records in the Cartographic and Architectural Branch of the National Archives* ;[60] Paper 80, *Records Relating to Personal Participation in World War II: American Prisoners of War and Civilian Internees*;[61] and Paper 82, *Records Relating to Personal Participation in World War II: American Military Casualties and Burials*.[62]

Record Group 38 (RG38), Records of the Office of the Chief of Naval Operations, is perhaps the most useful record group. Of particular interest in RG38 is the subgroup "Records Relating to Naval Activity During World War II." This subgroup contains a variety of records created by the US Navy during WWII. Of these, two series are most useful: "War Diaries" and "Action and Operational Reports."

The War Diaries series of RG38 houses the monthly "war diary" report that each unit submitted to its fleet commander during the war. For aircraft squadrons, these reports contain detailed information on flights conducted, flight hours accumulated, ordnance expended, injuries, and aircraft gained, damaged, and lost. The war diary of each squadron that operated a specific aircraft can be examined. Entries of aircraft damaged or lost, as well as squadron transfers and deployments, are useful information. In this fashion, it is possible to create a timeline of each, to determine which squadron had aircraft based at or deployed to specific geographic regions or islands throughout the war.

War diaries are useful since they recorded when aircraft were lost both in accidents and otherwise, making it possible to verify the data contained in AARs. The war diaries also illuminate those aircraft that did not have an AAR submitted. It can be conjectured that these aircraft were nonoperational losses, and did not require an AAR as they were not crewed at the time of loss. Such accidents included losses due to fire, storms, and collisions.

Finally, the war diary of the specific commands can be consulted. For example, the diary of the Saipan Island Commander was consulted for an overview of activities on Saipan after it was established as a US base. This war diary contains entries related to base development, troop movement, and operational status. While it does not contain any specific information on aircraft lost or salvage missions conducted, it does instill a general perspective of US activities on Saipan in 1944 and 1945.

Also located in RG38 are Action and Operational Reports, contained in the "WWII Action and Operational Reports" series. As with the war diaries, these reports are also grouped by squadron. They contain all pertinent information about an individual encounter with an enemy by an aircraft. Filed by the aircrew, the report specifies where and when the encounter took place and gives details about enemy vessels (both aircraft and ships). It also includes a narrative of the encounter and actions taken by both sides. Ordnance expended, as well as damage sustained by both is listed and often photographs are attached. These Action and Operational Reports can be cross-referenced to information contained in squadron narrative histories and war diaries. The Action and Operational Reports are yet another way to verify both that an AAR is present for each aircraft lost in action, as well as the information contained in its AAR.

The World War II Casualty Lists and Related Records series of the Casualty Branch subgroup, contained in Record Group 24 (RG24) Records of the Bureau of Naval Personnel, contains correspondence between squadrons and officials in Naval Personnel concerning personnel casualties. The records of each squadron can be studied for any details about the loss of crewmembers, especially any recovery or salvage operations.

Record Group 72 (RG72), Records of the Bureau of Aeronautics (BuAer), is also a useful group. The General Correspondence subgroup for the years 1943 to 1945 is separated into aircraft type and then organized using the *Navy Filing Manual*. At the advice of NARA staff, the records most likely to contain information pertaining to the loss of aircraft or subsequent salvage efforts are filed under A9, Reports and Statistics, and L11-1, Casualties and Salvage.[63] RG72 also contains blueprints of aircraft on microfilm, with the Coronado prints comprising 15 sets of microfilm. These may prove to be too technical for general research of aircraft, although they could aid in the identification of individual components found on an archaeological site.

The last record group to be discussed is Record Group 313 (RG313), Records of Naval Operating Forces. Specific to the PB2Y Coronado, of particular interest are the records generated by the Trust Territory of the Pacific Islands, which officially administered Saipan from 1947 until 1978.[64] These records also contain files generated before 1947,

when the island was still occupied by the US military. Filed according to the *Navy Filing Manual*, each record examined during research also contained a "Red" designation number, marking them as records from commands that oversaw large geographic areas or operational theatres.[65] Because of the broad nature of records found within this group, and the organization by a now-antiquated system, finding relevant information can prove challenging. Records such as postwar base development could hold information about postwar salvage and harbor development.

The Cartographic and Architectural Section at NARA II can be searched for specific charts related to the areas of interest. Charts of Saipan Harbor can be found within this section, ranging from the US Navy's original 1945 chart (#6062) to NOAA's latest updated chart (#81076). These can be studied to understand how the boundaries of the seaplane base at Tanapag Lagoon, including the runway and anchorage areas, changed over time. They also provide information relating to the inclusion or removal of wreck or submerged obstruction symbols, possibly indicating the awareness and/or salvage of such sites. Finally, harbor development projects shown on the charts, such as dredging or wire-dragging activities might be useful as well.

Museums

Another source of information are the variety of naval museums that often have collections of whole aircraft, parts of aircraft, archives, photographs and an assortment of related memorabilia. Museums of the US Navy include: the National Museum of the US Navy (Washington, DC); the Great Lakes Naval Museum (North Chicago, Illinois); the Hampton Roads Naval Museum (Norfolk, Virginia); the National Naval Aviation Museum (Pensacola, Florida); the Naval Museum Northwest – Naval Undersea Museum (Keyport, Washington); the Naval Museum Northwest – Puget Sound (Bremerton, Washington); the Naval War College Museum (Newport, Rhode Island); the US Navy Seabee Museum (Port Hueneme, California); the Submarine Force Museum & Historic Ship Nautilus (Groton, Connecticut); the US Naval Academy Museum (Annapolis, Maryland); and the NHHC Detachment Boston – USS Constitution (Boston, Massachusetts). Other national and private museums with naval collections include, but are not limited to, the Smithsonian National Air and Space Museum, the San Diego Air and Space Museum in California, The National WWII Museum in New Orleans, the National Museum of the Pacific War in Fredericksburg, Texas and the Pacific Aviation Museum at Pearl Harbor, Hawaii.

For the Saipan Coronado research the National Naval Aviation Museum (NNAM) in Pensacola, Florida, was a useful source as it houses several aircraft and aircraft parts, including the last remaining PB2Y Coronado. Additionally NNAM holds photographs related to the restoration of the aircraft. The aircraft and photographs can be particularly helpful, as they can be used to locate specific parts and even the location of manufacturer's data plates. In addition, the archives house a variety of information about the PB2Y Coronado, including operation and maintenance manuals.

The Smithsonian National Air and Space Museum is another avenue for research. Specific to the PB2Y Coronado, the museum's collection included a Pratt & Whitney

Twin Wasp R-1830-92 engine which is the same model engine installed on PB2Y-5 model aircraft. The Steven F. Udvar-Hazy Center in Chantilly, VA is the Smithsonian National Air and Space Museum's annex. This center houses a collection of aircraft as well as records; however, most are taken from both the Naval and National Archives, as well as technical data such as blueprints and manuals.

The San Diego Air and Space Museum has an extensive archive devoted to aviation and space history and technology. It boasts one of the largest collections of air and space-related books and archival materials in the country. The museum's focus is aviation-related materials with an emphasis on the geographical area of San Diego. Because of this local emphasis, the collection contains a substantial amount of information on the Consolidated Aircraft Corporation (later Convair), which was based in San Diego.

The National WWII Museum in New Orleans has an excellent collection of personal primary sources. Besides artifact collections, the museum's archives house a number of photographs, letters, and oral histories. The museum has digitized a large number of its oral histories and interviews with veterans. In addition, the Boeing Center in the US Freedom Pavilion has a collection of restorations of the most symbolic US WWII aircraft.

Similar to the National WWII Museum yet focusing mostly on the Pacific theater, the National Museum of the Pacific War in Fredericksburg, Texas, also maintains an archival repository. Located in the Nimitz Education and Research Center (NERC), the archives house manuscripts, official documents, photographs, and recorded interviews with veterans. Also like the National WWII Museum, the National Museum of the Pacific War has begun to digitize its oral histories, photographs, and other items, which will be an invaluable online resource in the future.

Websites

Websites and message boards can provide a community-driven source of information and expertise that may otherwise be unavailable. Some websites, such as http://vpnavy.org, began as veterans' initiatives to disseminate information to the public. These sites generally host relevant information provided by other interested parties, such as other service members, veterans, or their families. Research on such sites may uncover information including newspaper clippings, personal letters, and personal correspondence from knowledgeable persons. For the Saipan Coronado project, research on vpnavy.org revealed a number of articles and short memoirs written by former PB2Y Coronado pilots and crewmembers, which added a more human touch than the official correspondence found in archival repositories.

Online message boards are another source of community-driven information. Although many unfortunately focus on finding and recovering wrecks for souvenirs and parts for repair or restoration of working aircraft, some of the members are quite knowledgeable. Message boards are noteworthy in that researchers can ask questions that might be answered by avocational aircraft specialists. These sites are especially useful for identification of aircraft or parts; researchers can post a photograph and question and garner community responses as to the identification of that aircraft or part.

Conclusion

As with all historical and archival research there are limitations and obstacles from the beginning of the process to the very end. Some of these are bypassed or facilitated with the help of archival staff at reference desks, while on the other hand, one's research may also be influenced by that same staff's breadth of knowledge of the records. As mentioned above, errors and omissions within specific record groups can often be rectified through cross-referencing and crosschecking various groups and sources. This proved an invaluable process when researching the Saipan Coronado, as even the number of crashed PB2Y Coronados conflicted amongst several records. Fortunately, archaeology provides yet another set of data through which researchers can gain "simultaneous access to the past."[66] Identifying specific naval aircraft, however, is by no means required to understand the relevance of these heritage sites to our past and present, and we must move beyond this, sometimes seemingly impossible to achieve, starting point in our efforts to answer those "questions that count."[67]

Notes

[1] Kathleen A. Deagan, "Neither History nor Prehistory: The Questions That Count in Historical Archaeology," *Historical Archaeology* 22, no. 1 (1988): 7–12.
[2] James R. Pruitt, "PB2Y Coronado Flying Boat Archaeology and Site Formation Studies, Tanapag Lagoon, Saipan" (Master of Arts, East Carolina University, 2015).
[3] David B. Whipple, "Aircraft as Cultural Resources: The Navy Approach," *Cultural Resource Management* 18, no. 2 (1995): 10.
[4] Wendy Coble, "The Navy and the Protection of Pacific Cultural Resources: A Unique Challenge," *Cultural Resource Management* 24, no. 1 (2001): 27–29.
[5] Alexis Catsambis, personal communication, June 3, 2014.
[6] Whipple, "Aircraft as Cultural Resources: The Navy Approach," 10.
[7] Paul C. Diebold, "Aircraft as Cultural Resources: The Indiana Approach," *CRM* 16, no. 10 (1993): 3.
[8] Gordon Swanborough and Peter Bowers, *United States Navy Aircraft since 1911*, 2nd ed. (Annapolis, Md.: Naval Institute Press, 1976), 217–218.
[9] US Navy, *United States Naval Aviation 1910 -1970. NAVAIR 00-80P-1.* (Department of the Navy, 1970), 1,4.
[10] Swanborough and Bowers, *United States Navy Aircraft since 1911*, 4–5.
[11] US Navy, *United States Naval Aviation 1910 -1970. NAVAIR 00-80P-1*, 241; USAF, "Air Force Joint Instruction 16-401, Army Regulation 70-50, NAVAIRINST 8800.3B, Designating and Naming Defense Military Aerospace Vehicles" (Department of the Air Force, 2005).
[12] Swanborough and Bowers, *United States Navy Aircraft since 1911*, 8.
[13] Richard Alden Hoffman, *Consolidated PB2Y Coronado* (Simi Valley, Calif.: S. Ginter, 2009), 1.
[14] Swanborough and Bowers, *United States Navy Aircraft since 1911*, 12–14.

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