

MIDWAY/YORKTOWN PRESENTATION by Chuck Haberlein

1. Yorktown photo (80-G-5132)

Twenty-one years ago, I had the great experience of helping find and explore the aircraft carrier *Yorktown*'s wreck, off the Midway Islands, in salt water more than three miles deep.

2. Yorktown bridge video (20-05-98c23-1a.mp4 > 26")

Today, I'll take you on a tour of the ship as she was in May 1998, starting with brief discussions of how she was lost and how we went about locating and examining her. ...

{Since, every Tertulia gathering seems to need a few words from a certain statesman,} I'll begin with a description of the war situation at the beginning of June 1942, taken from the book "The Hinge of Fate":

3. Pearl Harbor Arizona (80-G-19942)

"... the first phase of the Japanese war plan had achieved a success so complete that it surprised even its authors. ... Japanese exultation was at its zenith.

4. Japanese victory celebration on Bataan (no #)

"... at this moment ... no one could be sure that Germany would not break Russia, ... and then ... come back and invade Britain; or ... join hands with the Japanese ... in India. To put things right ... there needed to be a decisive naval victory by the United States, carrying with it the predominance in the Pacific

5. George Gay with newspaper (80-G-17678)

... This victory was not denied us." ...

Winston S. Churchill, "The Hinge of Fate", pages 238-241

6. Crop of Gay's newspaper (from 80-G-17678)

That's how Winston Churchill introduced the Battle of Midway which, on June 4th, 1942, brought Japan's Pacific offensive to an abrupt end, allowing the United States and its allies to begin the long and bloody slog to total victory.

...

Rather than describe the battle and its consequences in detail, I'll focus only on those aspects that directly concern USS *Yorktown*.

7. Hiryu burning (NH 73064)

Suffice it to say, when it was over, Japan had lost four of its six first-line aircraft carriers, while the United States still had four in service, enough to begin offensive operations.

...

8. Yorktown abandoned (80-G-17061)

But, the Battle of Midway could easily have gone the other way. Imagine how things would have changed if the Japanese fleet had gotten in the first blow! As it was, the single enemy carrier that was still, briefly, in operation, delivered a bomb and torpedo attack that left *Yorktown* with seemingly fatal damage.

However, she remained afloat.

9. Yorktown abandoned (80-G-21666)

A salvage party was making real progress when a Japanese submarine struck. Two more torpedoes sealed her fate and at dawn on June 7th 1942, *Yorktown* rolled over

10. Yorktown capsized (NH 95576)

and sank stern first. ...

11. Yorktown sinks (NH 106011)

12. Bob Ballard video (MT1-c12-1.mp4 > 17")

Fifty-Six years later, a National Geographic Society expedition led by Robert Ballard (seen here on the right), with considerable assistance from the U.S. Navy, set out to find and examine *Yorktown*'s remains. I was part of the Navy's contribution.

13. First view of Yorktown video (19-05-98-c4-1 > 35")

At 7:37AM on May 19th, 1998, our remotely-operated submersible's cameras once again revealed *Yorktown* to human eyes.

Finding her had taken a good deal of work. ...

Plotting positions reported by ships accompanying *Yorktown* had produced a lot of ambiguity. Eventually, though, a pattern emerged, showing what looked somewhat like a circular anti-submarine screen centered about ten nautical miles South-southeast from the officially accepted position of *Yorktown*'s loss.

14. Laney Chouest video (MT1-c2-1.mp4 > 18")

Meanwhile, Ballard, National Geographic Television, the University of Hawaii and the Navy's Deep Submergence Group had gathered resources, placing them on board the exploration ship *Laney Chouest*, and sent them out to Midway, more than a thousand miles northwest of Honolulu.

15. Surgi & Ferrier video (MT1-c12-2.mp4 > 20”)

With the expedition were two American veterans of the Battle, Bill Surgi (on the left) and Harry Ferrier (on the right).

Bill was an old friend from Rockville who had swum away from *Yorktown* when she was abandoned.

...

16. Ferrier’s plane (80-G-17063)

Harry was one of two survivors of the only Torpedo Squadron Eight plane to survive after attacking the Japanese fleet. ...

17. Gooney Birds video (MT1-c4-1.mp4 > 20”)

Midway is now run by the Fish and Wildlife Service, which is responsible for the welfare of a vast population of birds, most notably the Laysan albatross, or “Gooney Bird”. During the breeding season they are everywhere on the islands, so dense that you must take care not to step on the fluffy grey chicks.

...

18. Heading out to sea video (MT1-c13-1.mp4 > 14”)

We put to sea as May began, heading for an area 160 miles North-northeast of Midway, where *Yorktown* reportedly sank. Since our preliminary research results were not very precise, we deployed

19. Sonar deployed video (MT1-c15-1a.mp4 > 35”)

a towed sonar to build a picture of the sea floor over a 300 square mile area. A few days later, we had a whole lot of ship-sized contacts on a small mountain, exactly where official reports placed our quarry. We also had one very promising contact out on flat ground, oddly enough only a mile or two from where our historical research placed that presumed sonar screen.

Searching each of the mountain’s ship-sized sonar images would have been a nightmare, so we picked the flat ground contact for the first dive

20. Launching ATV video (DT1-c6-1.mp4 > 22”)

of our remotely-operated submersible, the Navy’s Advanced Tethered Vehicle, or ATV. Connected to the ship by a long electronic cable, ATV descended slowly toward the contact, 16,650 feet below. However, several accidents intervened, requiring hauling it up for repairs after each one.

21. Albatross by ATV video (DT1-c3-1.mp4 >18”)

Every time ATV prepared to dive, albatrosses landed nearby. Then we'd have one of those accidents! Half convinced that they were jinxing our efforts, I obtained a Laysan Albatross stuffie to give us a good luck charm. Nicknamed “Larry”, he did his job well.

22. Night ATV launch video (DT1-c7-1a.mp4 >16”)

On May 19th, we finally had a successful dive, and our goal came into view. With additional dives, on May 20th and 24th, we were able to photograph about half of *Yorktown*'s wreck, enough to provide a good picture of the ship's condition.

23. Yorktown Wreck drawing – Front (Yorktown wreck-1)

Each of you should have a sheet of drawings, with *Yorktown*'s flight deck plan and midships' section on the front and her port and starboard sides on the back. Major features are identified, with the areas of the ship that we actually saw colored green. The cross-section shows *Yorktown*'s aspect in relation to the sea floor.

24. Yorktown Wreck drawing – Back (Yorktown wreck-2)

On the side views, the hull below-ground is shaded. .

We'll start our *Yorktown* tour where we first saw her, on the starboard side at her stern. We'll then move forward along the port side to the bow, cross over to starboard and go to the large island in the middle of the ship. ...

25. Yorktown Wreck drawing – cross section (Yorktown wreck-3)

At the end of her long fall, *Yorktown* hit the bottom hard enough to bury her lower hull, leaning twenty-five degrees to starboard. Her port side amidships is visible nearly to the turn of the bilge. Bow and stern are somewhat deeper than her normal waterline, while her starboard side is deeply buried to about half-way up the hangar side.

26. First View of Yorktown video (19-05-98-c4-2a > 18”)

ATV first moved in on the target's starboard stern. Our initial view was of a fragment of deck-edge catwalk, hanging down from where the aftermost twenty feet of flight deck ripped away as *Yorktown* plunged to the bottom. Much torn wreckage shows the force involved

27. Yorktown starboard stern photo (NH 51821-cropped)

This pre-war photo shows the area seen in this video, including the part of the flight deck that was torn off.

28. Yorktown stern video (DT7-24-05-98-c1-1 > 20”)

In case anyone wants proof of identity, the stern still wore the ship's name, of which the letters “Y-O-R-“ can be seen here.

Her painted hull number “5” was visible at both bow and stern.

29. Hull side showing degaussing cables and camouflage (DT7-24-05-98-c3-1 > 32”)

Moving around to the port side, we see degaussing cables, a defense against magnetically-triggered mines. They run completely around the ship at the hangar deck level.

There is also Measure 12 camouflage, a horizontal scheme giving some visual concealment and deception. Below hangar deck level is Sea Blue, a dark purple-grey. Above it is the somewhat lighter Ocean Gray. Paint appears to be fairly intact on most parts of the ship, retarding corrosion, though rust does show through in really close-up images.

30. 5” Gun video (DT7-24-05-98-c3-2 > 26”)

Immediately above, we encountered the ship’s after port battery of two 5-inch dual-purpose guns. There was a pair of these guns on each side near the bow and stern. Splinter shields’ middle sections have been removed, probably in preparation for jettisoning the guns to reduce topside weights during the June 6th 1942 salvage effort. We’ll see more evidence of this work near *Yorktown*’s bow.

31. Looking into Hangar Deck (24-05-98-c3-2a > 18”)

Large openings in the hangar sides permitted warming up aircraft engines before the planes were brought to the flight deck. The openings could be closed with roller doors, but were all open when *Yorktown* sank, allowing ATV to look into the hangar at several port side locations.

32. Yorktown torpedoed - photo (80-G-414423)

One of the most dramatic elements of *Yorktown*’s wreck is the large hole in her side made by two Japanese aerial torpedoes. The first of these probably made the forward part of the hole, causing an immediate list to port. The second torpedo then struck behind and above the first.

33. Yorktown torpedoed - photo (80-G-17062)

The ship’s port side boiler rooms immediately flooded and she was left immobile and without steam and electrical power.

34. On board listing Yorktown- photo (80-G-14384)

As her list increased to the point where it seemed she would capsize, *Yorktown*’s commanding officer reluctantly ordered the crew to abandon ship.

35. Torpedo damage sketch (Torpedo Hole Sketch)

This sketch shows the extent of the damage.

The torpedoes created an opening more than sixty feet long in her midships’ hull, reaching from nearly the turn of the bilge to well above the water line. About forty-five feet of side armor plate was broken away, and a large piece of side plating was bent back.

36. Torpedo Hole - rear (DT7-24-05-98-c6-1 > 11”)

This is the bent-back piece of hull side plating at the after end of the torpedo damage. The plate's lower edge was at the ship's normal waterline.

37. Torpedo Hole - middle (DT7-24-05-98-c6-2 > 15")

The torpedo hole's middle area has the sharp edge of *Yorktown*'s side armor on the right and large pieces of debris in the remains of her hull's outboard compartments, toward the left.

A gap between the sea bottom and the ship's port side allowed us

38. Torpedo Hole – with ground (DT7-24-05-98-c6-3 > 16")

to see the torpedo hole's lower area. This gap probably resulted from the shock of *Yorktown*'s impact, and a strong push to starboard as she dug into the ocean floor. The outer edge of the gap is at the bottom, along with silt stirred up by ATV's thrusters.

39. Torpedo Hole - front (20-05-98-c5-1 > 15")

Torn hull side plating and the other edge of the ship's side armor can be seen near the torpedo hole's front end. The dark area on the torn plate is black boot topping paint, defining *Yorktown*'s normal waterline.

40. Torpedo Hole – Catwalk Damage (DT7-24-05-98-c6-4 > 15")

Near the flight deck, the deck-edge catwalk was broken away or distorted by the torpedoes exploding below. The walkway outside the Commanding Officer's cabin was bent up by the blast. Note that his cabin door is open. ...

41. Catwalk damage - photo (80-G-21604)

This photo, taken shortly before *Yorktown* was abandoned, shows the distorted catwalk, as well as one of the many arresting gear and barrier wires that were strung across the flight deck. ...

42. Distant view of Island - (DT7-24-05-98-c7-1 > 15")

Rising above the flight deck edge, we caught a glimpse of the island, eighty feet away near *Yorktown*'s starboard side. The water clarity in this part of the ocean was simply amazing. We'll get back to the island later. ...

43. Arresting Gear Sheave - (20-05-98-c11-1 > 14")

Aircraft arresting gear wires had round sheaves at the flight deck sides, like that seen here. *Yorktown* had full sets of arresting gear and barriers at each end, so planes could land either over the stern or over the bow.

44. Flight Deck Silt - (20-05-98-c16-1 > 13")

Nearly all those wires had mounds of silt over them, making it easy to see where they were, as well as requiring careful operation to avoid raising clouds of silt. Sometimes we got the clouds, anyway.

45. Flight Deck Expansion Joint - (20-05-98-c9-1 > 20")

Expansion joints crossed the flight deck in several places, to allow for minor structural movement in operation. These all appeared to be essentially as installed, indicating that *Yorktown* had not suffered any significant bending or twisting, despite all the abuse she had suffered from enemy weapons and impact with the ocean floor.

46. Starboard Side torpedo hole – photo (NH 106003-cropped)

The absence of major hull distortion is particularly surprising, considering the serious structural weakening from having large torpedo holes nearly opposite each other on both sides amidships. You have already seen the port side hole, but here's the one caused by submarine torpedoes on her starboard side.

...

47. 20mm Gun Gallery - (20-05-98-c10-1 > 17")

The forward port side 20mm machine gun gallery is empty of both guns and sections of their protective splinter shielding. All were removed and pushed over into the sea as the salvage party worked to lighten *Yorktown*'s port side on June 6th, 1942.

48. 20mm guns – photo (80-G-21929)

This is the same five-gun gallery in the spring of 1942, a few months after the ship's anti-aircraft defenses were increased.

49. Port Forward 5" Gun- (20-05-98-c10-2 > 28")

The nearby 5" battery's after gun was also jettisoned, a significantly bigger task than removing the relatively small machine guns. The salvage party was in the process of loosening the mounting bolts of the battery's forward gun when they were rudely interrupted by the Japanese submarine. Their job was left unfinished when *Yorktown* was abandoned for a second time, and the gun is still in place.

50. Port Forward .50cal Machine Gun- (20-05-98-c13-1 > 17")

At the port side flight deck's front corner, we found a Fifty-caliber machine gun, with its rubber water-cooling hoses still intact. These obsolete guns had been superseded by the new 20mm type, but were retained to enhance the carrier's anti-aircraft firepower.

51. Crumpled bow- (20-05-98-c12-1 > 36")

On the hull below that machine gun, the bow is bent down and twisted to port by implosion forces. These video clips show the resulting creases in her steel plating and rust peeping through

paint. Implosion happened immediately after *Yorktown*'s air-filled bow disappeared below the ocean surface, as water pressure increased faster than the air could escape.

We also see the hull number "five" visible amid the bent plating, and cracked sea floor near the ship's waterline black boot topping.

52. 20mm bow tub- (20-05-98-c17-1 > 23")

The degree of bow twisting is apparent in this scene of the 20mm machine gun tub mounted between the flight deck and the carrier's forecastle deck. Note the pair of fairleads at the front of the latter. As the old tug *Vireo* fruitlessly tried to pull *Yorktown* out of the battle area on June 5th and 6th, the towline ran through these fittings.

53. Yorktown drydock photo - photo (80-G-13065)

These features are visible on the right in this photo taken just nine days before she sank. The flight deck, gun tub and forecastle deck were nice and parallel at that time.

54. 20mm gun closeup showing eye cup- (20-05-98-c17-2 > 16")

An interesting detail of those bow 20mm guns is the survival of the white rubber eye cups at the rear of the guns' open sights. Apparently, rubber, like leather, resists the deteriorating effects of prolonged deep sea submersion.

55. Starboard Anchor- (24-05-98-c18-1 > 13")

As we turn the corner to start exploring *Yorktown*'s starboard side, we'll take a quick peek at that side's anchor. The port side anchor is missing, probably jettisoned during the salvage effort.

56. Starboard 5" Guns - photo (80-G-312019)

About a hundred feet aft of the starboard anchor was another pair of five-inch guns. This photo shows them during the Midway battle. The ship in the distance is the cruiser *Astoria*, which would be lost a little more than two months later.

57. Starboard 5" Guns - (20-05-98-c19-1 > 21")

And here are those same two guns fifty-six years later, still trained on the starboard broadside. The first scene shows the after gun, then the forward gun appears in a second clip. Apparently, its splinter shield plating was removed, though there would have been no reason for jettisoning weights from the ship's starboard side.

58. Flight deck inboard of 5" guns photo (80-G-312018-crop1)

This photo shows the flight deck, just inboard from that pair of guns. Arresting gear sheaves can be seen in the middle, with slats of a "palisade" wind-break in the right foreground. In the upper right, a sailor hammers a temporary repair plate over a bomb entry hole near the forward aircraft elevator.

59. Flight deck palisade & elevator (20-05-98-c19-2 > 21”)

We see the “palisade” slats in the same place in this May 1998 video. The edge of the forward aircraft elevator also makes an appearance. However, we saw no sign of the bomb hole. Possibly that temporary plate is still present, though covered with silt.

60. Island seen from ahead - photo (80-G-312018-crop2)

...

We’ve now arrived at *Yorktown*’s island, seen here during the battle. We’ll visit the two heavy machine gun mounts just in front of the island, then go up to look at the pilot house, whose windows are visible in the middle of the photo. We’ll also examine the gun director on top of the pilot house. However, the large tripod mast beyond the director came off as the ship sank, and we didn’t find it.

61. 1.1” MG - photo (1-1-inchMGcrop)

During the war’s first year, the quadruple 1.1-inch was the Navy’s standard heavy anti-aircraft machine gun. Overly complicated, unreliable and too small for effective defense against modern aircraft, it was later replaced. However inadequate, it was all that was available in June 1942. *Yorktown* had four of them, two at each end of the island.

62. Forward 1.1” MG mounts (20-05-98-c21-1 > 31”)

Here are the 1.1-inch gun mounts at the forward end of the island. The first is trained a little ahead of the starboard side, with the barrels partially elevated.

...

The second points vertically. A heavy cable has fallen across both mounts and goes aft to wrap around some of the island. It may be what remains of the line used to try to tow *Yorktown* to safety.

...

63. Pilothouse video scenes # 1 (PilotHouse-1a > 25”)

This series of video scenes starts at the front of *Yorktown*’s Pilot House, just beyond the second 1.1-inch gun mount, then moves toward the right and up. As we go along, note the collapsing walkway in front of the pilot house. ...

Also notice the windows, some with round clearview inserts

And the bell, mounted below the projection above the windows

64. Pilothouse video scenes # 2 (PilotHouse-2 > 11”)

On the port side, a peloris is mounted on an open wing, near the pilothouse door.

65. Pilothouse video scenes # 4 (PilotHouse-4 > 23”)

Closeup views of the window area show a mound of dirt, perhaps thrown up by *Yorktown*'s impact with the sea floor, only to fall back onto the ship. We catch a glimpse of the pilothouse interior and see rusty areas where paint is failing.

...

66. Air Officer's Booth (Flight Control Booth > 22”)

A prominent feature of the island's port side is a booth behind the pilothouse, from which the Air Officer and his staff could observe and control flight deck operations.

.50-caliber anti-aircraft machine guns mounted above that booth had a good field of fire over *Yorktown*'s port side.

67. Forward Mark 33 Gun Director (19-05-98-c9-1 > 22”)

Above the pilothouse and Air Officer's booth is a Mark 33 director, which controlled the ship's 5-inch guns. Its rangefinder can be seen across its after end. The director had a covering of light metal, which is badly deteriorated.

68. .50 Caliber Machine Gun & Mast Leg bases (DT7-24-05-98-c24-1 > 17”)

Other .50 caliber machine guns were on the island's starboard side. The black-topped bases for the missing tripod mast's rear legs can be seen inboard of this one, with the signal shack at left. Farther left, just beyond the shack, is the ship's large smokestack.

69. Horn, Damaged Smokestack Plating and Searchlight Platform. (Stack Damage > 31”)

A massive foghorn occupies the port side top front of *Yorktown*'s smokestack.

...

Below and behind it, large holes in the stack's plating are evidence of uptake fires caused by a dive bomber hit during the first Japanese air attack. ...

Amid this devastation is a platform for two large searchlights. There was another of these platforms on the stack's starboard side.

70. Yorktown Afire – photo (80-G-32301)

In this photo, *Yorktown* has stopped, as fire surges through her uptakes and smokestack. Skillful work by damage control and fireroom crews had her underway again in about an hour, but the second Japanese air attack soon arrived, bringing torpedoes.

71. Aft Uptake (DT7-24-05-98-c19-1 >13”)

Though fire damage is evident on most of the smokestack, its after section has no surviving exterior plating at all. Only the rear uptake tube remains.

72. After Director and Island Rear (DT7-24-05-98-c20-1 >17")

The central core is all that survives of the after gun director. Its surrounding light metal structure and rangefinder have all fallen away.

Below the director, the platforms at the island's back end are collapsing.

73. Aft end of Yorktown's Island – photo (80-G-21610)

This June 4th 1942 photo of the rear of *Yorktown's* island shows that director, one of the platforms, and the now-missing plating around her after smokestack uptake.

74. Crane (Flight Deck Crane > 27")

A large crane stood at the aftermost end of the island. The first scene shows its upright post, seen from the port side, along with some of the island's collapsed platforms. ...

The second scene, taken from starboard, shows the crane's boom, which has fallen on top of 1.1-inch machine gun mount Number Three. ...

75. Bomb Hole in Flight Deck – photo (80-G-312020)

The attack that produced fires in *Yorktown's* smokestack made another hit just aft of the midships' aircraft elevator. This bomb exploded on impact, blowing a hole in the flight deck. A plate was spiked over the hole, permitting resumed flight operations once the ship was underway again.

76. Bomb Hole in Flight Deck (20-05-98-c29-1a > 11")

This is the same bomb hole on May 20th 1998, looking much as it did on June 4th 1942. Of the covering plate, no evidence remained.

77. Last View of Yorktown, June 7th 1942 – photo (NH 106015)

Yorktown has twice been lost to human eyes. The first time was when her bow disappeared below the ocean surface at dawn on June 7th 1942.

78. Last View of Yorktown, May 24th 1998 (DT7-24-05-98-C25-> 12")

She was lost to our eyes again when ATV lifted away from her smokestack front on May 24th 1998.

Yorktown has undoubtedly undergone some changes since then, but nobody has returned to do a more recent examination.

78. BLANK SLIDE. Marking the end of the main presentation.

In addition to the main presentation, there are about ten minutes of supplemental videos and photos that may be of interest. First are some views of the sea floor in the vicinity of *Yorktown*'s wreck:

SUPPLEMENTAL SLIDES – 1. Sea Floor:

80. Broken Clay near Wreck (20-05-98-c31-1 > 27”)

After falling three miles through the water, the force of *Yorktown*'s impact sent out shock waves and a great deal of mud, rupturing the clay-like bottom and covering the sea floor's abundant mineral nodules. Fifty-six years later, the broken clay was still so sharp-edged that it looked like a result of a very recent event.

81. Undisturbed Sea Floor Nodules (20-05-98-c32--2 > 15”)

This is an example of the undisturbed sea floor. The nodules may be manganese. A once highly-classified deep sea Cold War mission in this approximate vicinity used manganese mining as a cover story.

82. Depth Charge (20-05-98-c32-1 > 19”)

After leaving *Yorktown* during our May 20th dive, we ran ATV to the North-north-east, in hopes of finding the wreck of the destroyer *Hammann*, sunk by those Japanese submarine torpedoes on June 6th 1942. While we didn't find her, we did discover this depth charge. It may be one of those expelled from *Hammann* as she sank, or it may be a relic of the submarine chase that followed the torpedo attack.

83. BLANK SLIDE. Marking the end of the 1st group of Supplemental Slides.

SUPPLEMENTAL SLIDES – 2. Marine Life:

84. Anemone, Flapper & Eel (critters > 38“)

Here is some of the sea life we saw while exploring *Yorktown*: A couple of sea anemones on her bridge

a little guy I call a “Flapper” over her port side deck edge...

... and an eel-like fish near her forward gun director.

85. BLANK SLIDE. Marking the end of the 2nd group of Supplemental Slides.

SUPPLEMENTAL SLIDES – 3. Midway ships recently found:

In the past few months, the Late Paul Allen's exploration ship *Petrel* has located two of the Japanese aircraft carriers sunk during the Battle of Midway.

86. Kaga - photo (NH 73060)

The first one found was *Kaga*. In 1999, a year after our expedition, the Nauticos group located a small piece of this ship, but finding the rest of her had to wait until this past September. Photographs of her battered remains can be readily seen on *Petrel's* FaceBook page.

87. Akagi – photo (NH 73059)

About a month later, the *Petrel* team also found *Akagi*, flagship of the Japanese carrier striking force.

88. Akagi at Midway – photo (USAF 57576-crop)

This photo of *Akagi* was taken from a B-17 heavy bomber shortly before she was successfully attacked by USS *Enterprise* planes.

89. BLANK SLIDE. Marking the end of the 3rd group of Supplemental Slides.

SUPPLEMENTAL SLIDES – 4. Midway ships not yet found:

Four ships sunk in the Battle of Midway have not yet been located, though it is possible that *Petrel* has them on her "To Do" list:

90. Hammann - photo (NH 96828)

The only U.S. Navy ship on the search list is the destroyer *Hammann*, which should not be terribly distant from *Yorktown's* wreck.

91. Hammann - photo (80-G-32320)

She sank quickly after being hit by the same submarine torpedo salvo that gave *Yorktown* a death blow. This photo, taken by Navy Photographer's Mate William Roy from the carrier's starboard forecastle, shows *Hammann's* stern disappearing beneath the waves.

92. Soryu - photo (NH 73061)

The Japanese aircraft carrier *Soryu* ought to be in the vicinity of *Kaga* and *Akagi*.

93. Soryu at Midway - photo (USAF ID 4845-crop)

Here is *Soryu* as seen from a B-17 on June 4th 1942. As was normal for high-level bombers, hitting a maneuvering ship was vastly more difficult than photographing it.

94. Hiryu - photo (NH 73063)

Finding the Japanese aircraft carrier *Hiryu* will require searching well to the north of the other three.

95. *Hiryu at Midway - photo (USAF 75712 AC)*

Here's a B-17 photo of *Hiryu* on June 4th. To assist their aviators, the Japanese painted the first character of a carrier's name on the port quarter of her flight deck. In this case, "*Hi*" is clearly visible, looking like a squared-off letter "C" facing the ship's center line.

96. *Hiryu at Midway - photo (NH 73065)*

In the early morning of June 5th, the small Japanese carrier *Hosho* sent a scout plane to look for *Hiryu*. It found her afire and seemingly abandoned, and took this photograph. After the plane left, several unseen surviving crewmen escaped in one of their ship's boats and later became prisoners of war.

97. *Mikuma - photo (NH 73032)*

The cruiser *Mikuma*, sunk by planes from the U.S. carriers *Enterprise* and *Hornet*, will be quite some distance from the rest of Midway's wrecks.

98. *Mikuma with Hornet SBDs - photo (80-G-17054)*

Since she was sunk on June 6th, when there was no Japanese air opposition, *Mikuma*'s burning wreck was photographed by the U.S. planes. Here, two of *Hornet*'s SBD scout bombers fly over her.

99. *Mikuma burning- photo (NH 82405)*

Here's a relatively distant view of the smoking ruin of *Mikuma*.

100. *Mikuma burning- photo (80-G-457861)*

This photo is closer, and shows more detail.

101. *Mikuma burning- photo (80-G-414422)*

And this view of *Mikuma* is very close, indeed.

One of my first tasks after starting work with the Navy's historical office was proving to my boss, Rear Admiral Ernest Eller, that this photograph really showed *Mikuma*, and not her sister ship, *Mogami*.

102. *TBD in Yorktown's Hangar Deck - photo (NH 95578)*

Other objects that might be found include the remains of many aircraft, most crash-damaged but a few intact. A couple of F4F fighters and this TBD torpedo plane were jettisoned from *Yorktown* on June 6th by the salvage party and ought to be intact. They are probably not far from *Hammann*'s remains, as are the guns and other items pushed over the side on that day.

103. *BLANK SLIDE. Marking the end of the 4th group of Supplemental Slides.*

SUPPLEMENTAL SLIDES – 5. Elevator Well Mural:

Here's a little test for those with sharp eyes:

104. Mural on Elevator Bulkhead - photo (ElevatorMural-crop)

Yorktown 's midships' elevator well had a decorative mural painted on its starboard bulkhead. Featuring a globe flanked by searchlight beams, it is partially visible on the left in this photograph, taken during a shipboard party in the Coral Sea on April 10th 1942.

105. Midships' Elevator Well (20-05-98-c29-2a > 16")

You MAY be able to see traces of that mural in this rather dim video of the carrier's midships' elevator well, taken on May 20th 1998.

106. BLANK SLIDE. Marking the end of the 5th group of Supplemental Slides.

Here are a couple of interesting souvenirs:

107. Bill Surgi with cups (DT1-c10a > 49")

A standard Deep Submergence Group keepsake shows what happens when a six-ounce Styrofoam coffee cup is exposed to the deep sea's immense water pressure. Bill Surgi, one of our team's Battle of Midway veterans, decorated cups for every expedition member. He shows them off here, just after they came up from a dive.

The larger cup went along on one of our unsuccessful dives, to about 5000 feet.

The little one went all the way down to Yorktown, over three miles deep. It's about the size of a one-ounce shot glass.

108. Yorktown photo (80-G-21627)

I've can't offer to sell and autograph any books for you, as I haven't written any. However, there are a couple of good books by others that might interest you. Though both are out of print, they are readily available through Amazon.

"*That Gallant Ship*", by my old friend Bob Cressman, is a heavily illustrated biography of USS *Yorktown*. , telling her story from beginning to end. Since it was published before our expedition, the "end" is June 7th 1942.

"*Return to Midway*" is Robert Ballard's book on our expedition, from the perspective of the guy who made it work. It also includes a very good discussion of the Battle of Midway, and features lots of relevant photos and artworks. Some of the latter are paintings by Ken Marschall, showing *Yorktown*'s wreck a lot more artistically than my drawings.

You're welcome to look them over, gently, but please leave them. They're mine, and I cherish them!

Oh! And National Geographic put out a television show, which was the whole point of the expedition in the first place. You can find DVDs on Amazon under its title: "The Battle for Midway ... The Discovery of the U.S.S. *Yorktown*". I can't find my copy, so have made a couple of prints of the DVD cover .