



The GOOSEBERRY

ISSUE I - February 2011

The newsletter of the archaeological survey of the artificial harbour built off Arromanches, Normandy



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Why survey the harbours?



Welcome!

Welcome to the first issue of 'The Gooseberry', a periodic newsletter intended to keep participants and other interested parties informed of progress with the proposed archaeological survey covering the remains of the artificial harbour built off Arromanches, Normandy.

The harbour, officially known as Mulberry 'B', but unofficially christened 'Port Winston', was created from pre-fabricated sections, built in Britain and then towed across the English Channel in the wake of the allied invasion force which stormed ashore across the Normandy beaches on 6th June, 1944. When the prefabricated sections arrived, they were carefully positioned to create a near instant harbour the size of Dover. This allowed the allies to supply and reinforce the troops who were ashore, and hence sustain the battle to liberate France and the other occupied nations.

So, if the harbour to be surveyed is Mulberry 'B' or 'Port Winston', why is this newsletter called 'The Gooseberry'? Simple. Mulberry was the code name for the entire harbour. However, the harbour was made up of several parts and, in the way of military operations, each part had its own code name so we had 'Phoenix', 'Bombardons', 'Whales', 'Corncobs' and 'Gooseberries'. The Gooseberries were breakwaters made by scuttling old ships, and these were the first part of the harbours to arrive and be put in place. Also, whereas there were two Mulberries (Mulberry 'A' for use by the Americans and situated off Omaha beach and Mulberry 'B' for

use by the British and located off Arromanches) there were five Gooseberries, one off each of the five invasion beaches (with two of these being incorporated into the Mulberries when they were created).

So, that's why this is called 'The Gooseberry', but what of the event, and who are the participants?

The event is a full above and below water survey of the Mulberry Harbour at Arromanches. If time allows, the survey area will be extended to cover the other Mulberry 'A' at Omaha beach, and also the remaining three Gooseberries. Where possible, wrecks and debris in the vicinity will also be covered.

The participants who have volunteered to support this event are listed on page 9 of this newsletter.

If you are interested in being kept informed or in participating in this venture, please contact the organiser at:

info@mulberrysurvey.co.uk

Offers of assistance, facts, memories or simply reminiscences are all welcome.

Chris Howlett
Editor



The Mulberry Harbours

By the time of the Normandy Landings in June 1944, the Allied Powers had considerable experience of amphibious landings and maintaining an army on an enemy shore.

This experience stretched back into the 18th and 19th centuries, but had been enhanced in the 20th century by experience in World War One (principally Gallipoli), and also by operations earlier in World War Two. This included the evacuations from Dunkirk (*Operation Dynamo*) and Crete, and the allied landings in North Western Africa in November 1942 (*Operation Torch*) and Sicily in July 1942 (*Operation Husky*).

These experiences showed the difficulties not only of landing troops on a defended shore, but also of maintaining lines of communication once ashore, to enable the stores required to supply the troops. By 1944, the necessary air and naval superiority had been established to ensure that those supplies could reach the far shore. However, once there, port facilities were needed to offload these supplies. These offloading operations

could be conducted over open beaches, and indeed had been in the past. However, experience showed that this was a slow process and, in the inclement English Channel, was at the vagaries of notorious unpredictable weather.

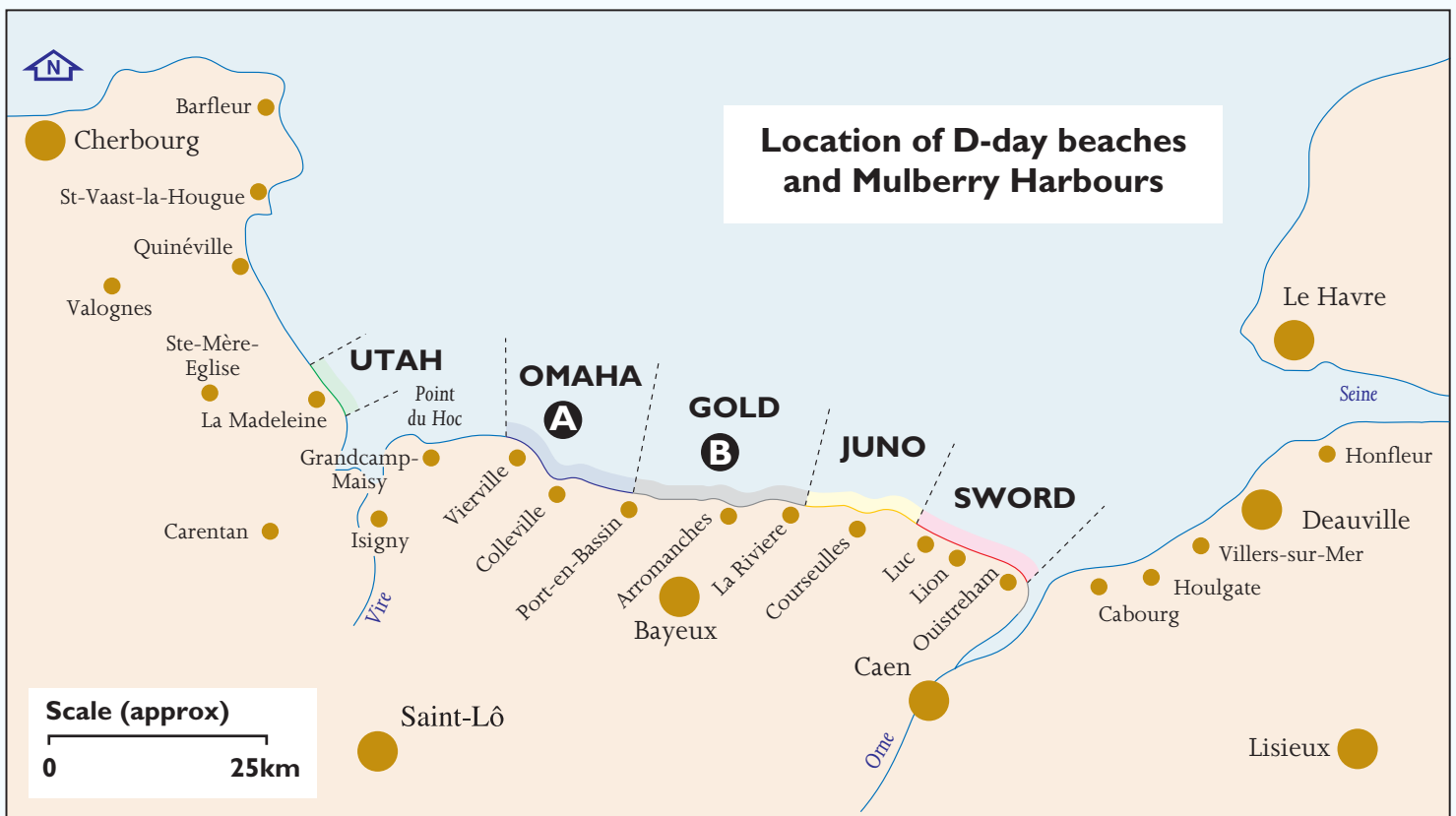
The solution was to have a port, but this was easier said than done. The Dieppe Raid of August 1942 had shown the difficulties of capturing a well defended port (those in Europe had been fortified to prevent this). The North African Campaign of 1940-43 had shown the thorough disruption to a port that could be caused by a retreating enemy, and the subsequent length of time and resources that it took to bring such a port into operation again.

Faced with these problems, the planners for the Normandy Landings provided the radical solution of building a port in the United Kingdom and taking it with them to the coast of France. This was a ground breaking event that involved many novel problems and equally novel solutions, many of which can be seen in modern port engineering. The subsequent

structures, two ports were constructed; Mulberry 'A' for US forces at Omaha Beach and Mulberry 'B' for British Forces at Arromanches. Mulberry 'A' was destroyed in a storm soon after its construction, although its wrecked site provided shelter for beach landings, Mulberry 'B' continued in use until December 1st 1944, when it was finally replaced by the captured port of Antwerp, although the pressure had been relieved in October when Le Havre and Boulogne were captured and put back into use by the British. During this time, over 1,000,000 tons of supplies, 35% of all British stores were landed through the port.

The Mulberry harbour was described as the success story of a military and naval operation unsurpassed in the history of warfare by Major General R.W Crawford of Supreme Headquarters Allied Expeditionary Force, and an idea of simple genius by Albert Speer, Germany's second world war Minister of Armaments and War Production.

The elements from which the Mulberries were constructed were massive, the largest consisted of over 6,000 tons of concrete each.



Many were lost on their way to Normandy, and after the war some units were reused and today are scattered around the coast of the UK and the Netherlands.

The size and robustness of these monuments means that they have become pre-eminent parts of the landscape that will be with us long after those that made them have passed away. The largest collection of these units is at the site of Mulberry 'B' at Arromanches, which still enclose the over two square miles of the original harbour, arguably one of the largest monuments surviving intact from the Second World War and the largest from the liberation of Europe.

The Mulberry Harbour was one of the largest and most original engineering

projects of the Second World War. Designed and constructed in a few months, and assembled in just a few days, it was also one of the fastest major engineering projects ever undertaken. Its promise, of two major ports on an enemy shore within two weeks of the original landings, gave the allied leaders the confidence to undertake the invasion of North Western Europe in 1944, and provided a safe haven in which a considerable proportion of the invading army's supplies could be landed. The resulting invasion liberated many of the nations of Europe from Nazi occupation, and eventually formed the European border of the Cold War.

Dave Parham
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Harbour elements and code names

Corncob - Block ships, scuttled to create sheltered water at the five landing beaches. Once in position the Corncocks created 'Gooseberries'.

Gooseberry - The sheltered waters created by the Corncob block ships. Two of the Gooseberries grew into *Mulberry 'A'* and *Mulberry 'B'*.

Mulberry 'A' - Assembled on Omaha beach at Saint-Laurent-sur-Mer, for use by the American invasion forces. 'A' was damaged so badly by storms during late June 1944, that assembly ceased.

Mulberry 'B' - Assembled on Gold Beach at Arromanches, for use by the British and Canadian invasion forces. It lasted much longer than *Mulberry 'A'*, and exceeded its design life.

Constituent parts of The Mulberries

Bombardons - floating outer breakwaters, made of steel.

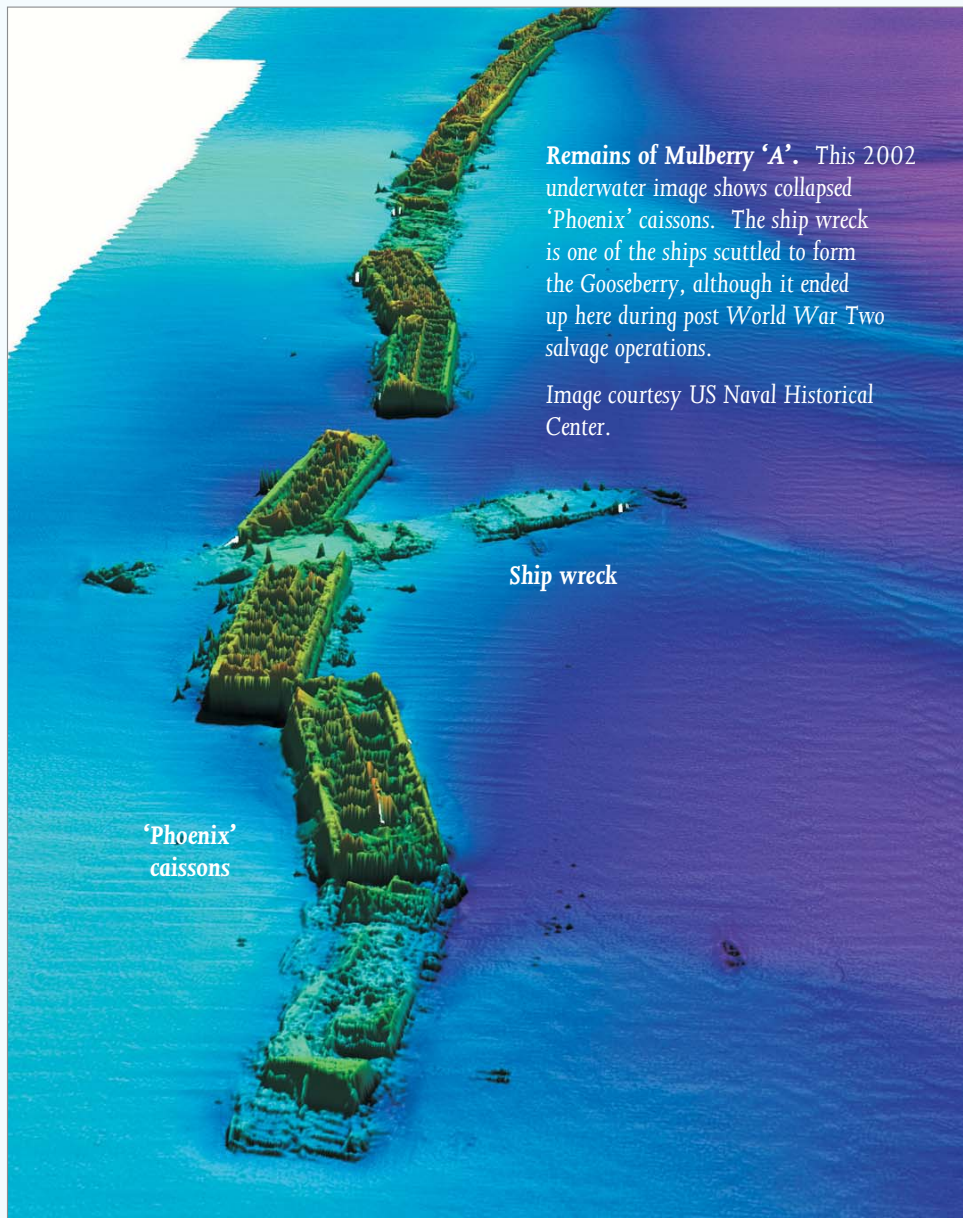
Phoenix - Reinforced concrete caissons (boxes), built in various sizes to suit different depths of water. Several of these units were later raised and used to repair breaches in the sea defences in Holland, both after WWII, and after the devastating 1953 floods.

Spud pontoons - Pier heads at which ships were unloaded. Each consisted of a pontoon with four legs (spuds) that rested on the sea bed. The pontoon was moved up and down the legs, as the tides ebbed and flowed.

Whale - harbour unit, consisting of 'Spud pontoons', 'Beetles' and roadway sections.

Many of the roadway units were re-used to repair damaged bridges in France, Belgium and Holland.

Beetles - Pontoons, built from steel or concrete, which supported the roadways.

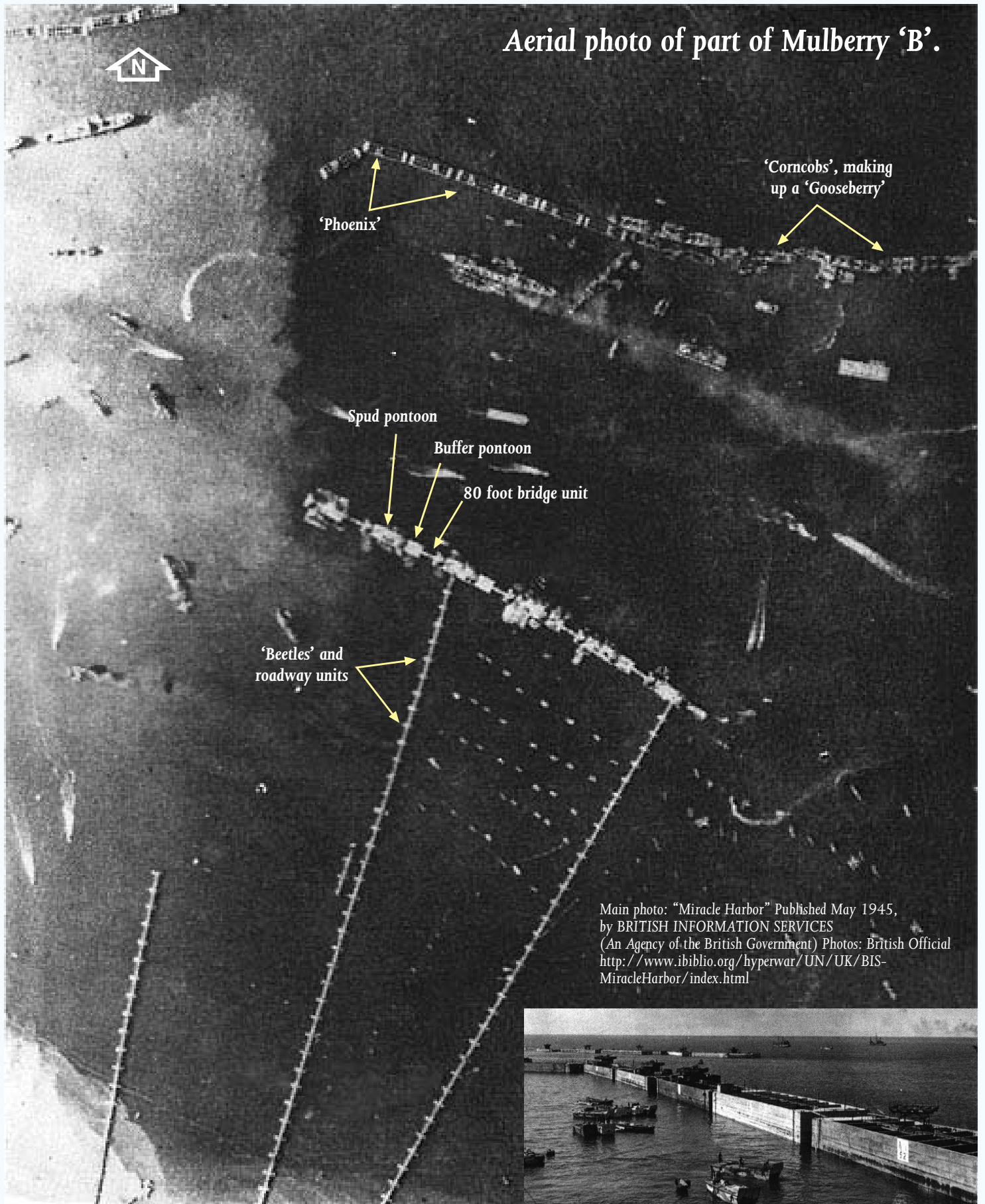


Remains of Mulberry 'A'. This 2002 underwater image shows collapsed 'Phoenix' caissons. The ship wreck is one of the ships scuttled to form the Gooseberry, although it ended up here during post World War Two salvage operations.

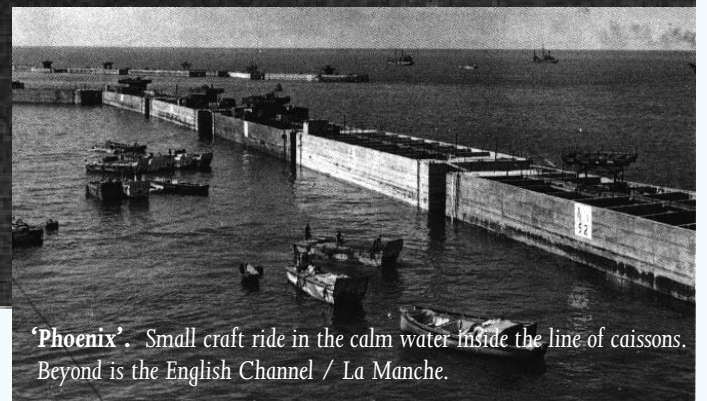
Image courtesy US Naval Historical Center.



Aerial photo of part of Mulberry 'B'.



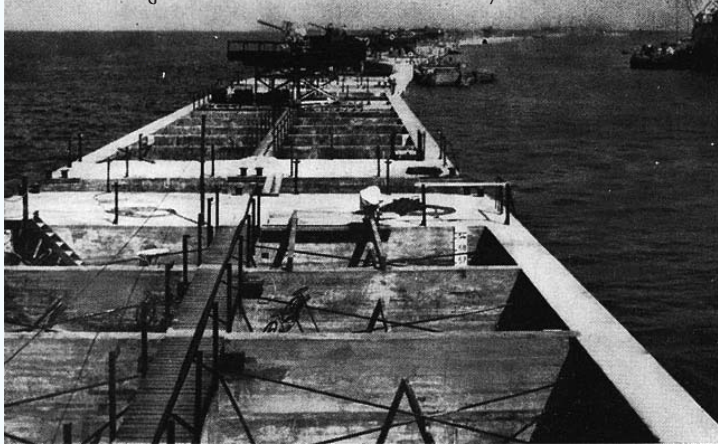
Main photo: "Miracle Harbor" Published May 1945,
by BRITISH INFORMATION SERVICES
(An Agency of the British Government) Photos: British Official
<http://www.ibiblio.org/hyperwar/UN/UK/BIS-MiracleHarbor/index.html>



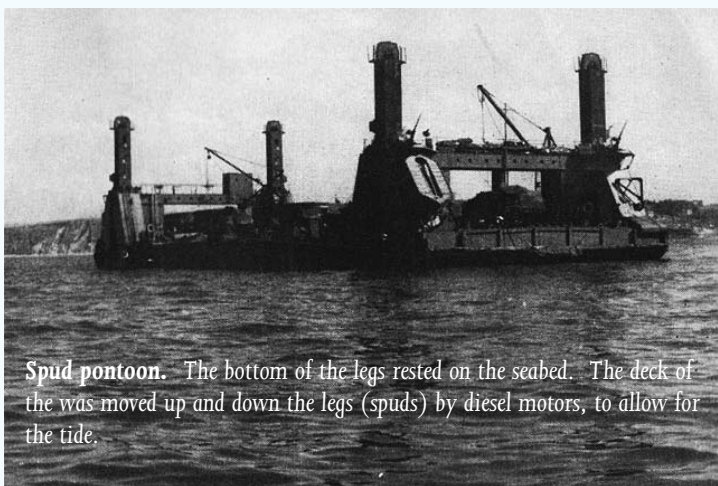
'Phoenix'. Small craft ride in the calm water inside the line of caissons. Beyond is the English Channel / La Manche.



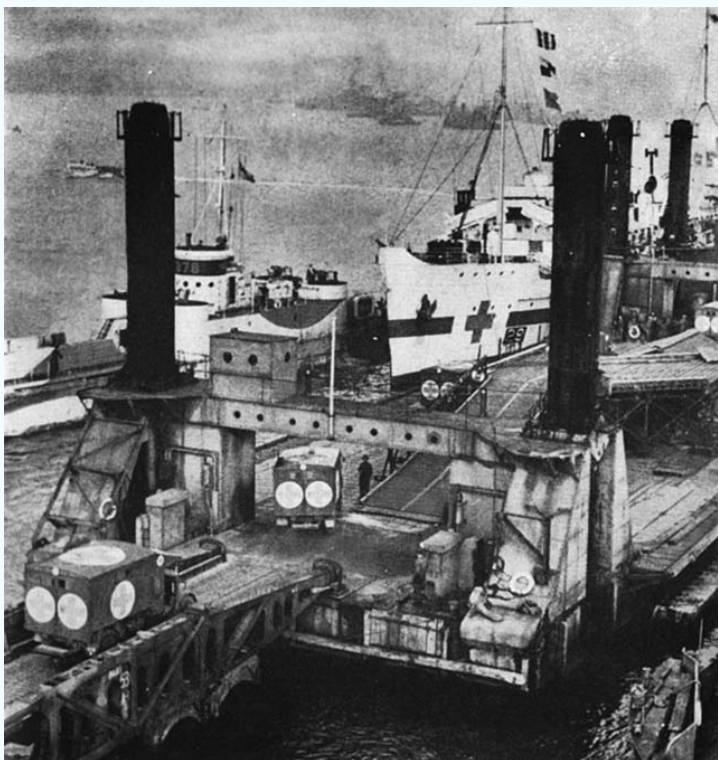
'Phoenix'. The concrete caissons did not have a continuous deck. Anti-aircraft guns were mounted on towers on many of the 'Phoenix'.



'Spuds'. The 'Spuds' were arranged in a row, roughly parallel to the shore, linked by bridge units and buffer pontoons. The roadways can seen, heading to the shore.



Spud pontoon. The bottom of the legs rested on the seabed. The deck of the was moved up and down the legs (spuds) by diesel motors, to allow for the tide.



(above)Close up of a Spud pontoon. Austin K2 ambulances deliver casualties to a hospital ship, with an infantry landing craft (possibly LCI(L)278) coming alongside.

(above) 'Beetles' and roadway units. The 'Beetles' were the pontoons which supported the roadways. There were two types of 25m (80ft) roadway units - Class 25 and Class 40, capable of carrying 25 and 40 ton loads respectively. In the foreground, is a shore ramp.

'Beetles' made of concrete were used where they would afloat all the time. 'Beetles' which might touch the bottom were made of steel, and had legs to protect them from rocks, which can be seen in the photo above.

All photos on this page from "Miracle Harbor"

Published May, 1945, by (BRITISH INFORMATION SERVICES (An Agency of the British Government)

Photos: British Official

<http://www.ibiblio.org/hyperwar/UN/UK/BIS-MiracleHarbor/index.html>

Papers from the Survey

There are 2 conferences, both in the southern hemisphere as it happens, that are at a time suitable to allow participants to present papers based on what data they have gathered, or what comparisons they have made.



The Australasian Hydrographic Society (AHS) will be hosting the 2011 annual International Hydrographic Conference Hydro2011 on behalf of the International Federation of Hydrographic Societies (IFHS).

This signature event will consist of the following:

- A three day conference with both Keynote Speakers and Concurrent Sessions presented by experts in the hydrographic field from around the world.
- Proposed off site tours.
- Pre-conference workshops and application/product training.
- An extensive exhibition during the Conference for delegates to interact with manufacturers and service providers.
- Conference Social and Partners Programme.
- Pre and Post Touring Opportunities.

Register your interest online in sponsoring, exhibiting or presenting.

Join us in Western Australia, at the former home of the America's Cup, at the Esplanade Hotel, Fremantle on 7th-10th November 2011.

<http://www.hydro2011.com/>

The call for abstracts for Hydro 2011 starts in late February. If you wish to present a paper based on your work on the Mulberry Survey, please submit the abstract, since the call will be closed by the time the survey has finished.



The Organising Committee would like to invite you to Wellington, New Zealand between the 20th and 24th February 2012, to participate in the next technical forum, exploring the latest developments in shallow water survey.

This is the first time the conference has been held in New Zealand, and it is a great honour and privilege to host such a prestigious event. Our national museum, Te Papa, is situated on the stunning waterfront of New Zealand's capital city, and is an ideal location to hold the conference.

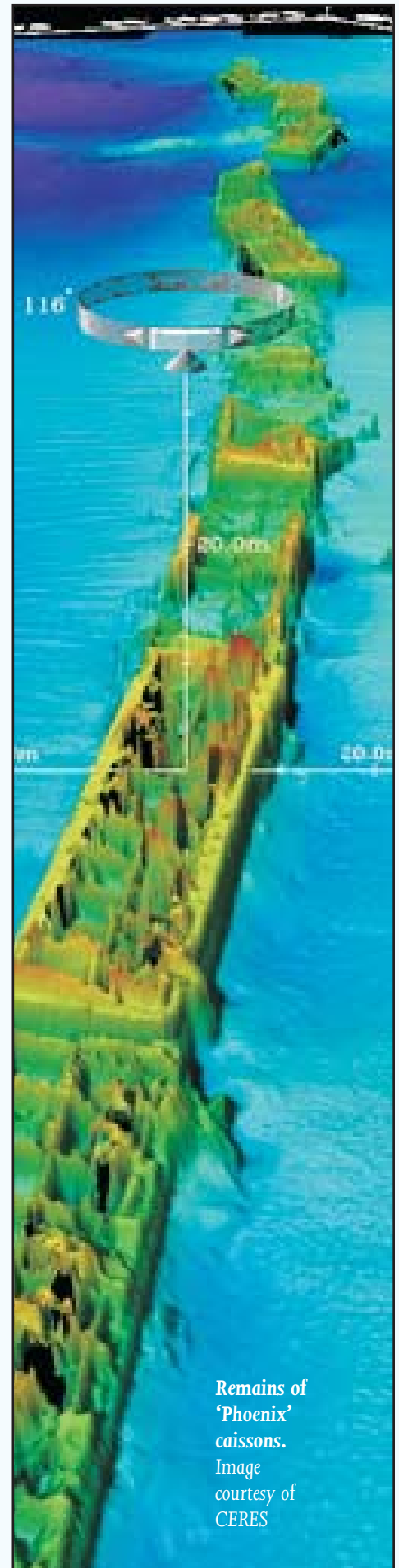
A technical programme is being developed, and will outline what you can expect each day of the event. Papers and presentations will meet the high standard set in the past and, as always, the programme will include the delivery of a Common Dataset, acquired locally in Wellington Harbour.

As well as an array of exhibitions and presentations, you'll be able to network with your peers, and explore the museum itself and the vibrant city just outside its doors.

From the PMwhiri (a traditional Mori welcome) to the Poroporoaki (closing ceremony), we truly hope you enjoy the experience of not only the conference, but the culture and sights this spectacular country has to offer.

http://www.conference.co.nz/shallow_survey

The call for abstracts for Shallow Survey 2012 will start in late February and close in June. If any participants want to present papers on the survey work to be carried out here, please submit your abstracts early, as the call for abstracts will be closed before the survey is started.



Remains of 'Phoenix' caissons.
Image courtesy of CERES



Surveying Glossary

Bathymetry - measuring the depth of the oceans.

Chart - A 'map' showing coastlines, water depths, and other information.

Lidar (*Light Detection And Ranging*) - a device which uses pulses of light from a laser to measure distances. These measurements can be built up into a 3D model of the land. Lidar can be also be used to measure the depth of shallow waters, where echo sounding boats might not be able to go.

Sounding - a measured depth of water.

Terrestrial scanning laser - shorter ranged than Lidar, but capable of higher resolution of details.

Topography - the graphical representation of the land, on a map, by the use of contour lines.

Types of echo sounding

Single Beam - Device which measures the depth of water, by sending a single beam of acoustic energy down to the seabed and detecting the pulses which it reflects. These soundings can be combined with the vessels position to create a chart.

Sidescan - An echo sounder which emits conical or fan-shaped beams across a wide angle. The reflected energy is recorded as a "slice" at right angles to the survey boat. These slices can be combined to form a detailed image of the seafloor.

Multibeam - An echo sounder that sends and receives multiple beams of sound. The reflected signals are received, processed by computer, and converted into water depths.

Data produced by Lidar and Multibeam surveys can be converted into images like the ones in this newsletter.

Why survey the harbours?

Although the harbours have great historical significance, they have never been adequately surveyed to record their state of preservation. In 2002, the US Naval Historical Centre concluded a three year study of the US landing beaches to record the extent and preservation of the wreckage. This included a survey of the US-operated Mulberry 'A'. During 2000 and 2001, the US located targets using side scan technology and then, in 2002, visited the sites with a multibeam equipped boat.

Despite the fact that 3/5th of the troops that landed on D-Day were UK or Canadian (UK had two beaches allocated to its troops, Canada had one and the US had two) no similar investigation into the remains from the invasion has been carried out by UK or Canadian organisations.

Also, despite the harbours being a British idea, were British designed, were built entirely in Britain and the fact that the British harbour survived the storm and so operated for far longer than the US operated one, it is only the US harbour that has been surveyed with modern equipment. The most recent survey of Mulberry 'B' comes from the French navy, in support of the 50th anniversary celebrations, when a survey was carried out to allow the Royal Yacht Britannia to safely enter the remains. This survey, carried out in 1993/94 with single beam

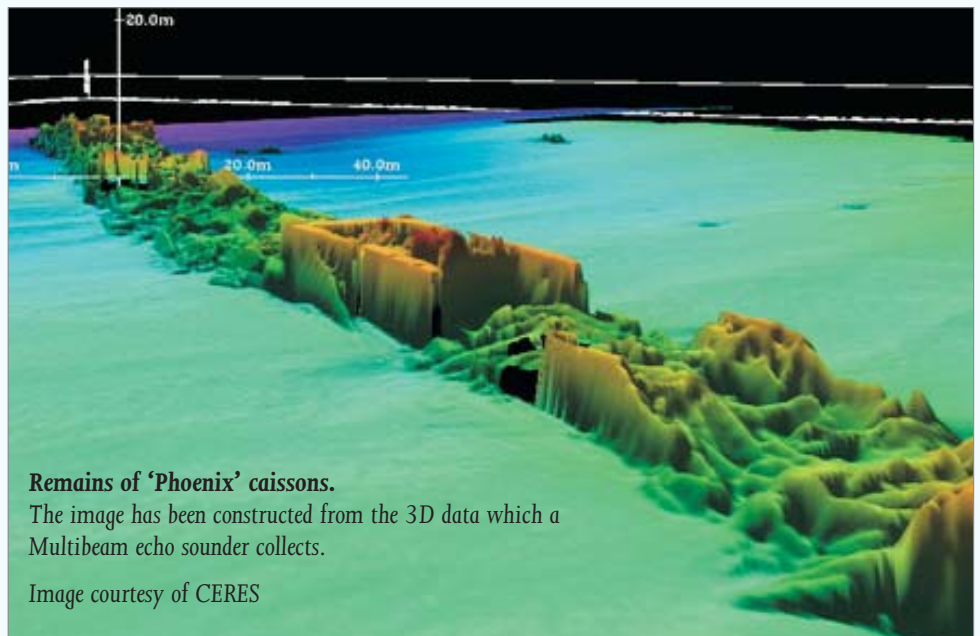
and sidescan adequately covered the inner harbour, but did not classify any of the debris. Technology has significantly improved since then, and it is time a comprehensive survey is carried out of the remains and other wreckage.

Survey Plan

A Multibeam

The planned survey of the Mulberry harbours will use a multibeam echo sounder to record the underwater remains, not only of the harbours, but also of any other debris located in the area and the other 'Gooseberries' - breakwaters made by scuttling obsolete ships. There was one 'Gooseberry' on each of the five invasion beaches numbered 1-5 with Gooseberries 2 and 3 incorporated into the larger Mulberry 'A' and B. The survey plan for the multi beam is:

- **Priority one** - Mulberry 'B' remains and related debris.
- **Priority two** - Mulberry 'A' remains to extend the work done in 2002, by the US naval Historical Center.
- **Priority three** - Gooseberries I, IV and V.
- **Priority four** - Any remaining debris/wrecks (possibly as discovered by the Lidar survey (see page 8))



Remains of 'Phoenix' caissons.

The image has been constructed from the 3D data which a Multibeam echo sounder collects.

Image courtesy of CERES



B Airborne Bathymetric / Topographic Lidar

In addition to the multibeam echo sounder, Pelydryn, a UK based Lidar company has offered two days 'on task' with their Lidar equipped plane. The survey plan for the Lidar plane is:

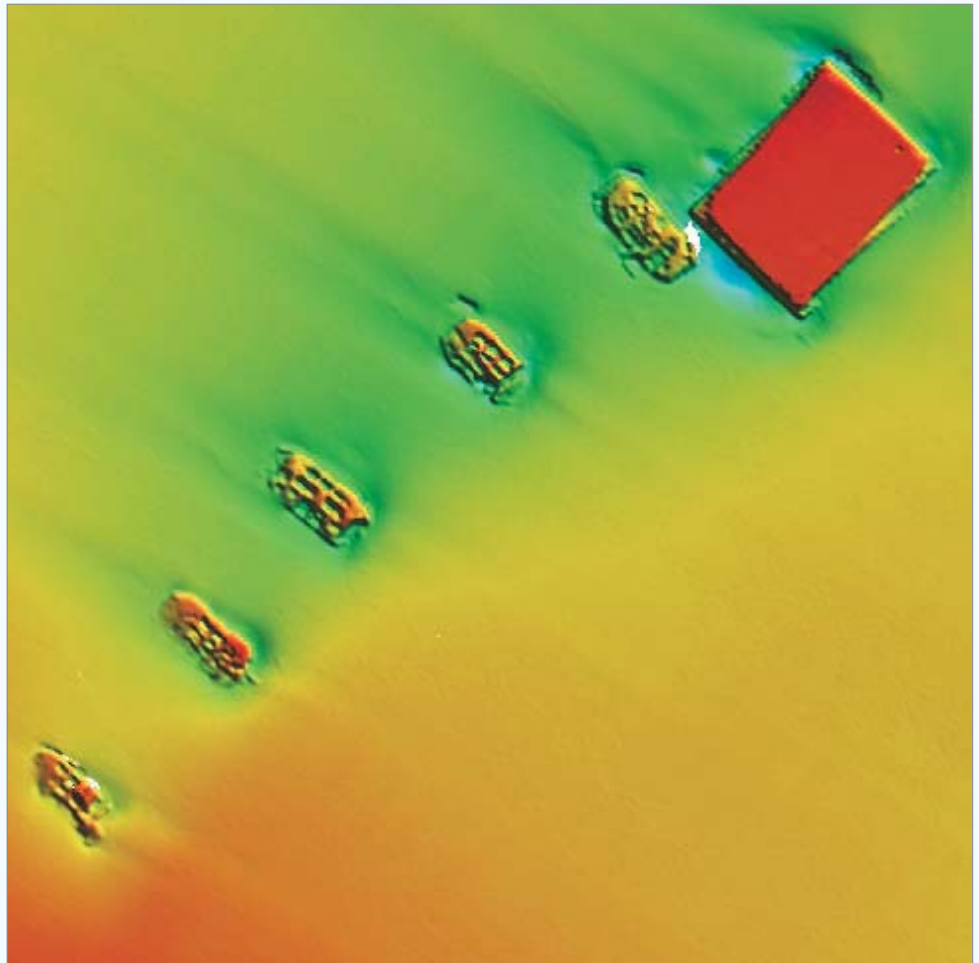
- **Priority one** - High definition coverage of Mulberry 'B'
- **Priority two** - High definition coverage of Mulberry 'A'
- **Priority three** - High definition coverage of Gooseberries I, IV and V.
- **Priority four** - Reconnaissance coverage of rest of Normandy beaches

C Terrestrial Scanning Laser

Finally, ENSTA Bretagne (a French University located in Brest) has offered their boat-mounted terrestrial scanning laser. The survey plan for the scanning laser is:

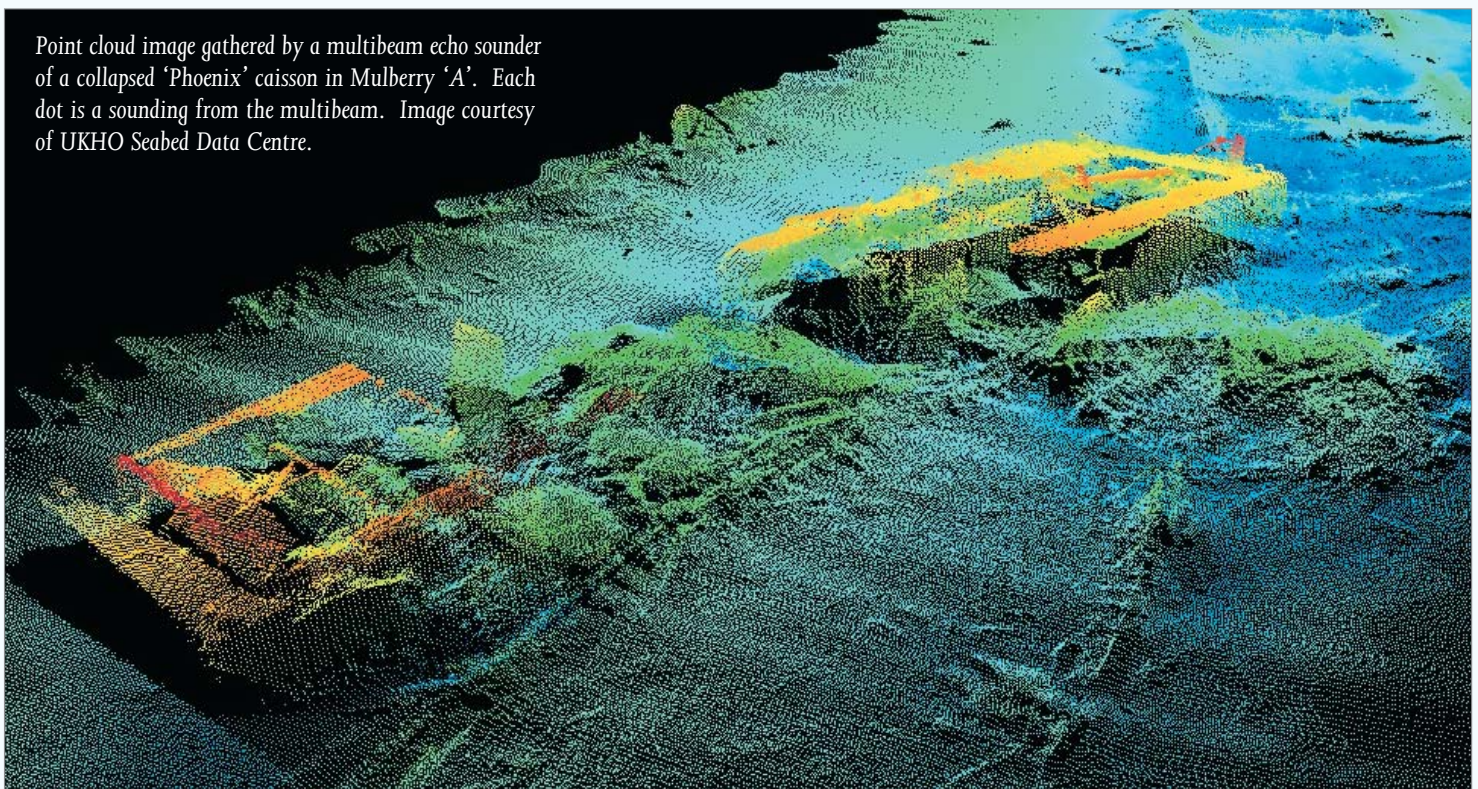
- **Priority one** - Mulberry 'B' remains
- **Priority two** - Coastline scans to overlap with any Lidar data gathered on beaches / coastal features

(Mulberry 'A' and all the Gooseberries are fully submerged, so are unsuitable for surveying with the scanning laser)



(above) **Remains of one of the floating roadways.** This image of the seafloor shows (top right, in red) an intermediate buffer pontoon, and five concrete 'Beetles' leading away from it. The steel roadway units which sat on the 'Beetles' are absent, as they were salvaged. Image courtesy UKHO Seabed Data Centre.

Point cloud image gathered by a multibeam echo sounder of a collapsed 'Phoenix' caisson in Mulberry 'A'. Each dot is a sounding from the multibeam. Image courtesy of UKHO Seabed Data Centre.





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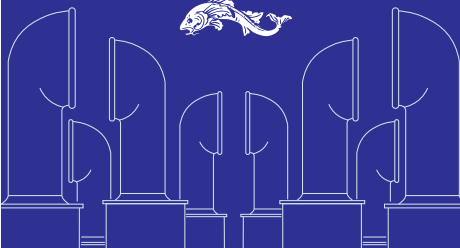
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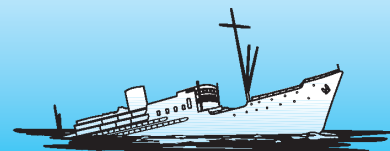
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simply reminiscences are all welcome!

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The Gooseberry as attachments to e-mail,
and **not** pasted into Word or other text
documents. Thank you.



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