

# Ocean research in Villefranche: an amazing (hi)story

**Professor Louis Legendre**

Villefranche Oceanography Laboratory  
Sorbonne Université

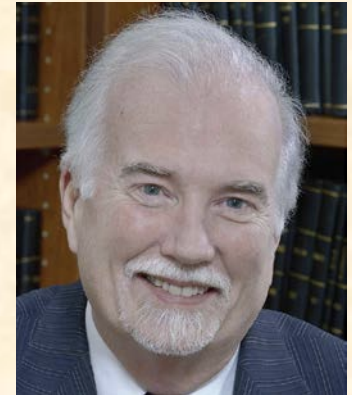
The 2018 IOCCG Summer Lecture Series

Villefranche-sur-Mer

25 June 2018

# Louis Legendre: presentation (1)

- Emeritus Professor, Sorbonne University, France
- *Studies*
  - **B.Sc.** University of Montreal, Canada
  - **Ph.D.** Dalhousie University, Halifax, Canada
  - **Postdoc** Villefranche-sur-Mer, France
- *Academic and research career*
  - **1993-2000:** Laval University, Quebec City, Canada
  - **2000-2009:** CNRS, Villefranche-sur-Mer, France
  - **2009-present:** Sorbonne University, France
  - **2001-2010:** Director, Villefranche Oceanography Laboratory (LOV)
- *Academies*
  - **Royal Society of Canada, Academy of Science**
  - **European Academy of Sciences**



# Louis Legendre: presentation (2)

- *Research fields*
  - biological oceanography
  - marine biogeochemistry
  - numerical ecology, with Pierre Legendre, Univ. Montreal
  - philosophy of sciences [Thursday's lecture]
- *Present activities*
  - Chair, Gordon Research Conference on Ocean Biogeochemistry, Hong Kong, 8-13 July 2018
  - collaborative research (France, China, and other countries) on different aspects of biological oceanography and marine biogeochemistry
  - book in preparation on how ecosystems took over the Earth system >3.5 Ga (with Philippe Bertrand, U Bordeaux)
  - planned new edition of my book on scientific research and

## Four Parts

Maritime France and French marine research  
Unique site and improbable (hi)story  
From military harbour to research institute  
The Russian and French research institutes

# Part 1

## Maritime France and French marine research

# France

Map showing the location of **France** in Europe and in the world (inset)



Is this really France?

# The French Archipelago (2)

- In fact, **France is an archipelago**
  - map shows that, in addition to **metropolitan France**, in Europe, there are **French territories** all over the world
  - because of this, the **maritime territory of France** covers 11 million km<sup>2</sup>: **second largest** in the world after that of the **USA**



# The French Archipelago (3)

- Given its very large maritime territory, France is very active in **marine research**

- **IFREMER**: French public establishment on marine research and technological development

- most French marine researchers belong to **other organisations**

- **CNRS**: French national research organisation (32 000 employees, largest research organisation in Europe)

- **IRD**: French overseas research institute

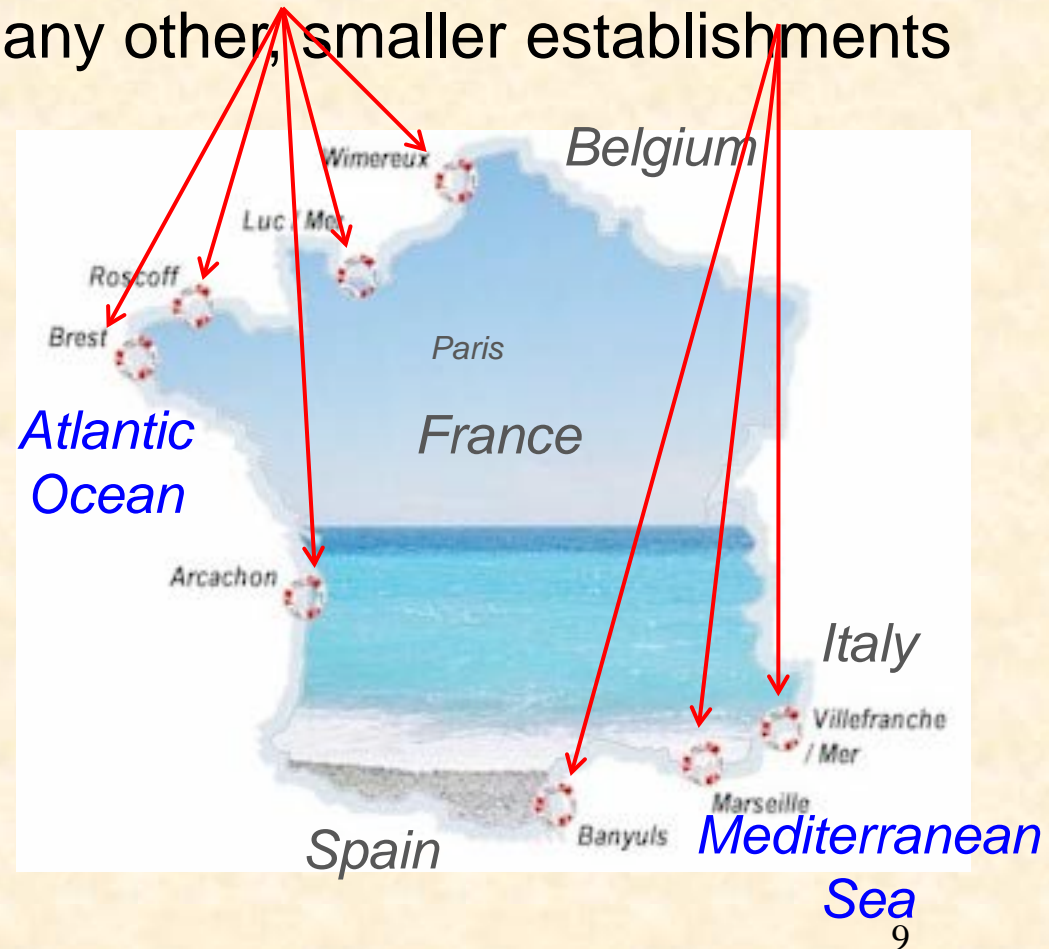
- **Universities** in both metropolitan and overseas France





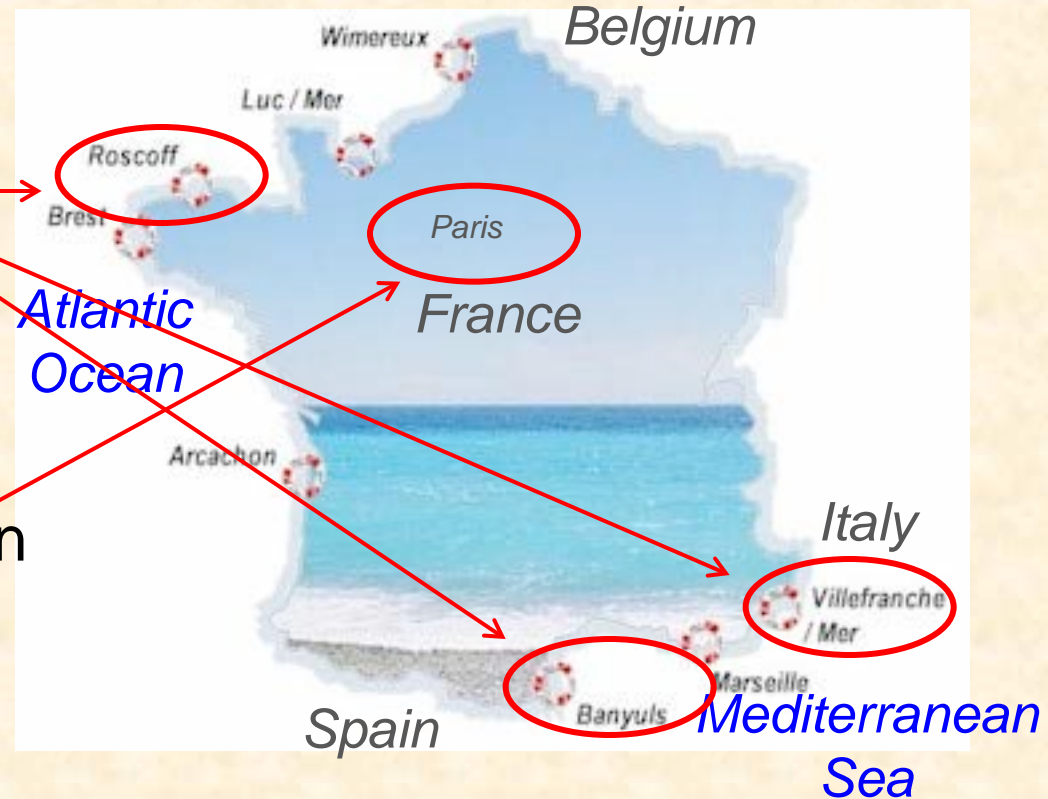
# French marine research (3)

- Several **marine stations** in metropolitan France
  - **map: 8 largest stations** (5 on the Atlantic Ocean and 3 on the Mediterranean Sea) + many other, smaller establishments



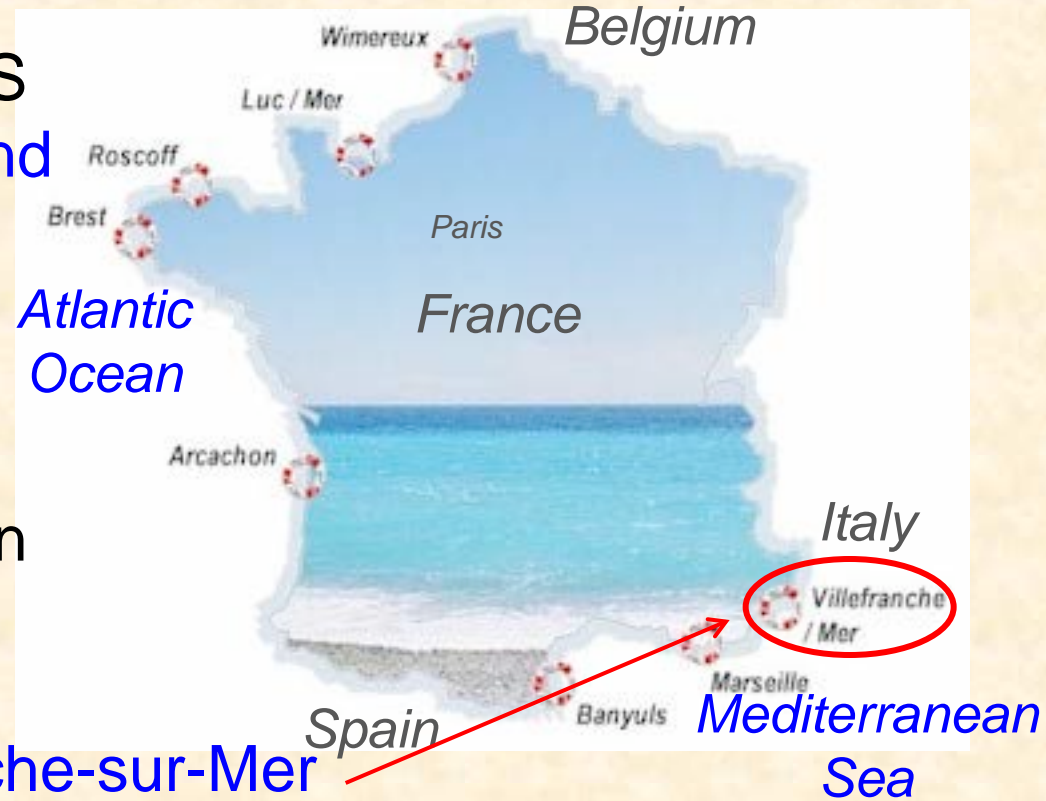
# French marine research (3)

- Several **marine stations** in metropolitan France
  - **map: 8 largest stations** (5 on the Atlantic Ocean and 3 on the Mediterranean Sea) + many other, smaller establishments
  - 3 of these 8 stations are jointly operated by the CNRS and **Sorbonne Université**
    - **largest French scientific and medical university**
    - **founded >900 years ago**
    - **main campus in Paris**, on which there are **2 other marine research units**



# French marine research (3)

- Several **marine stations** in metropolitan France
  - **map: 8 largest stations** (5 on the Atlantic Ocean and 3 on the Mediterranean Sea) + many other, smaller establishments
  - 3 of these 8 stations are jointly operated by CNRS and the **Paris 6 Pierre and Marie Curie University**
    - **largest French scientific and medical university**
    - **founded >900 years ago**
    - **main campus in Paris, on which there are 2 other marine research units**
  - focus today on **Villefranche-sur-Mer**



## Part 2

Maritime France and French marine research  
**Unique site and improbable (hi)story**

# The Bay of Villefranche

Where is the Bay of Villefranche? Map from Nice to Italy



# The Bay of Villefranche

Bay of Villefranche: general view



# The Bay of Villefranche

## Bay of Villefranche

- one of the best **natural harbours** in the Mediterranean Sea
- deep: **100 m depth at the mouth** of the bay
- well **protected from most winds**



# The Bay of Villefranche

## Bay of Villefranche

- one of the best **natural harbours** in the Mediterranean Sea
- deep: **100 m depth at the mouth** of the bay
- well **protected from most winds**  
... but there are **exceptions**





# Why is there a marine institute here?

**A** There has been a French marine institute in Villefranche since 1930 because there had been a Russian marine station in the same buildings since 1885

**Q** Why was there a *Russian* marine station here?

**A** Because of the availability in Villefranche of former military buildings from the 1700s, which the Russian Navy had used since 1858 and did not need any more

**Q** Why was the Russian Navy in Villefranche?

**A** Because of the consequence of a war Russia lost in 1856

**Q** Why was there a large military harbour in Villefranche?

**A** Because Villefranche was then the key harbour of a large country, called Savoy, that existed from 1003 to 1860

**Q** Why was Villefranche part of Savoy and not of France?

**A** Because the Nice area, to which Villefranche belonged, left France in 1388 to join Savoy

# Why is there a marine institute here?

A Because the Nice area, to which Villefranche belonged, left France in 1388 to join Savoy

Q How come that there was a city in the Bay of Villefranche?

A The town of Villefranche was created in 1295 by the Count of Provence, who wished to protect the Bay of Villefranche from pirates

Q Why were there pirates in the area at that time?

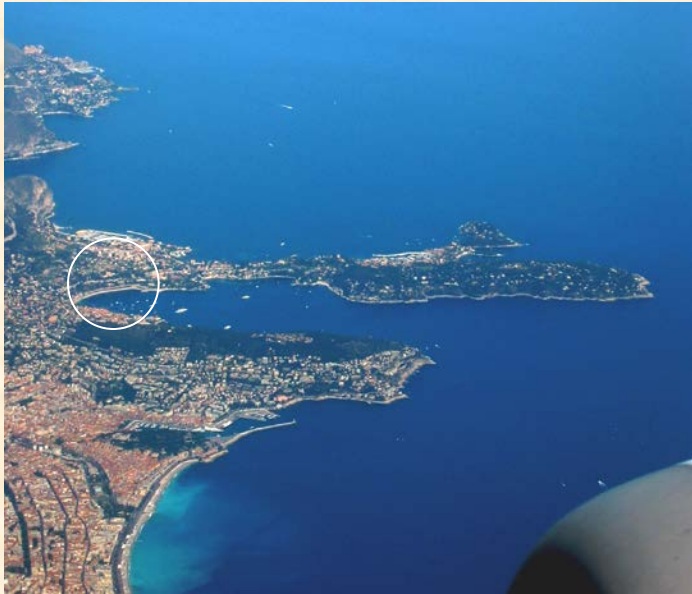
A Because of the hundreds of years of social chaos that followed the disintegration of the Roman Empire

Q Was the Villefranche area previously part of the Roman Empire?

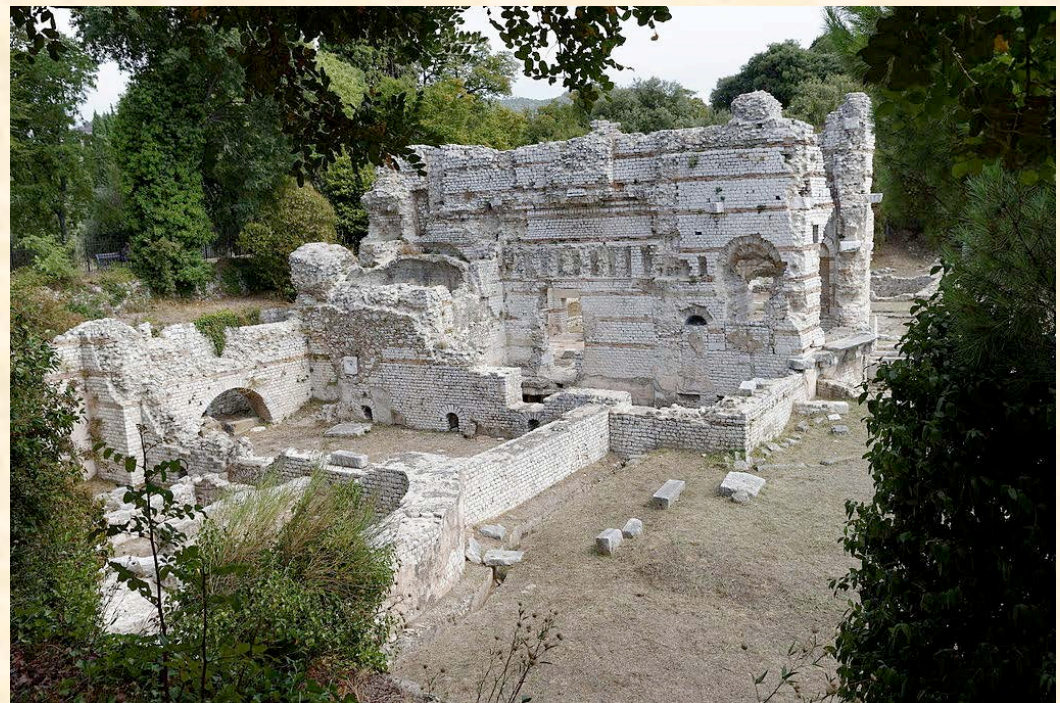
A Yes, indeed: 2000 years ago, there was a (small) Roman harbour in the well-protected Bay of Villefranche

- Let us start from that point in time, and come back from almost 2000 years ago to the present days

# From the Bay of Villefranche to the town



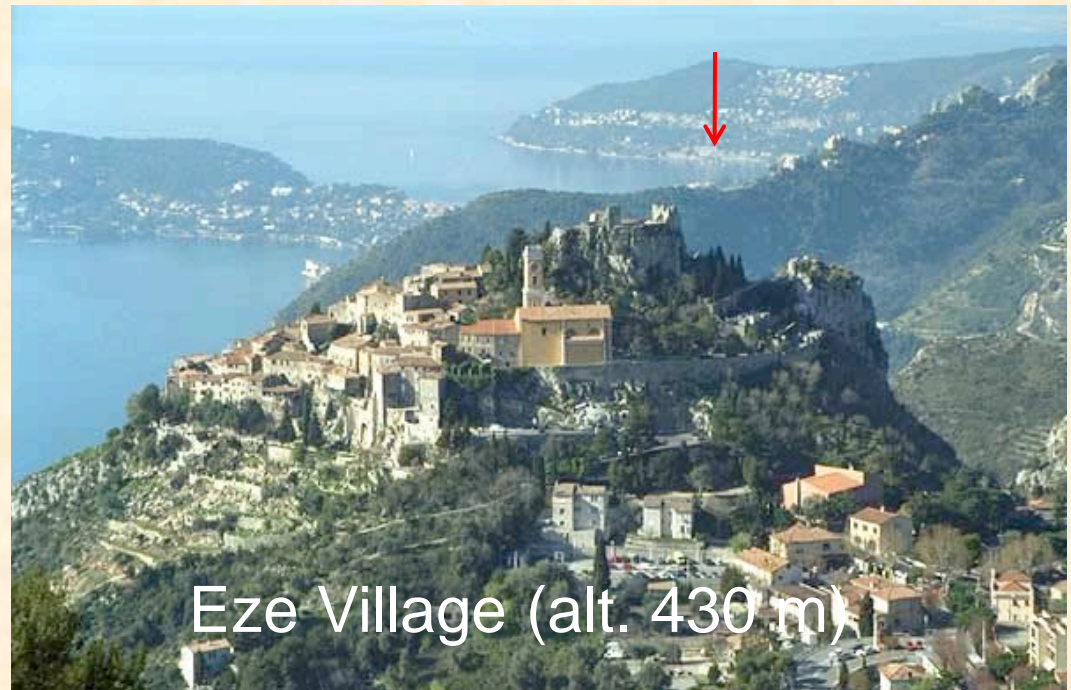
- 2000 years ago: Roman harbour in the well-protected Bay of Villefranche (*Portus Olivula*)
- no Roman ruins in Villefranche
- Roman ruins of *Cemenelum* in Cimiez (northeastern Nice)



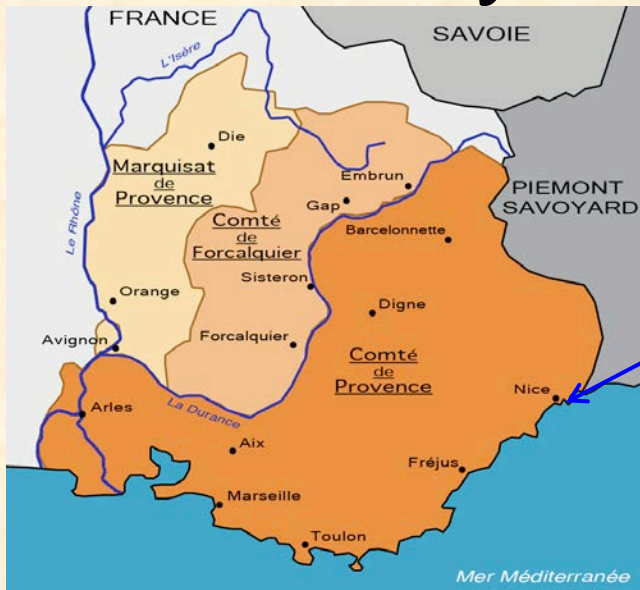
# From the Bay of Villefranche to the town



- After the fall of the Roman Empire: shores of the Mediterranean became unsafe (pirates could roam the sea freely), and people moved to nearby mountains



# From the Bay of Villefranche to the town



- In order to secure the Bay of Villefranche from pirates, the Count of Provence founded the town of **Villefranche in 1295**
- To encourage people to come to the new town, he offered the settlers the **privilege of not paying taxes**

- Meaning of the name **Villefranche-sur-Mer**
  - **ville = town, franche = free (of taxes)**
  - **sur Mer = by-the-Sea** (added later, to distinguish this town from other towns called Villefranche in France)
  - **Villefranche-sur-Mer = Freetown-by-the-Sea**
- Now: taxes!

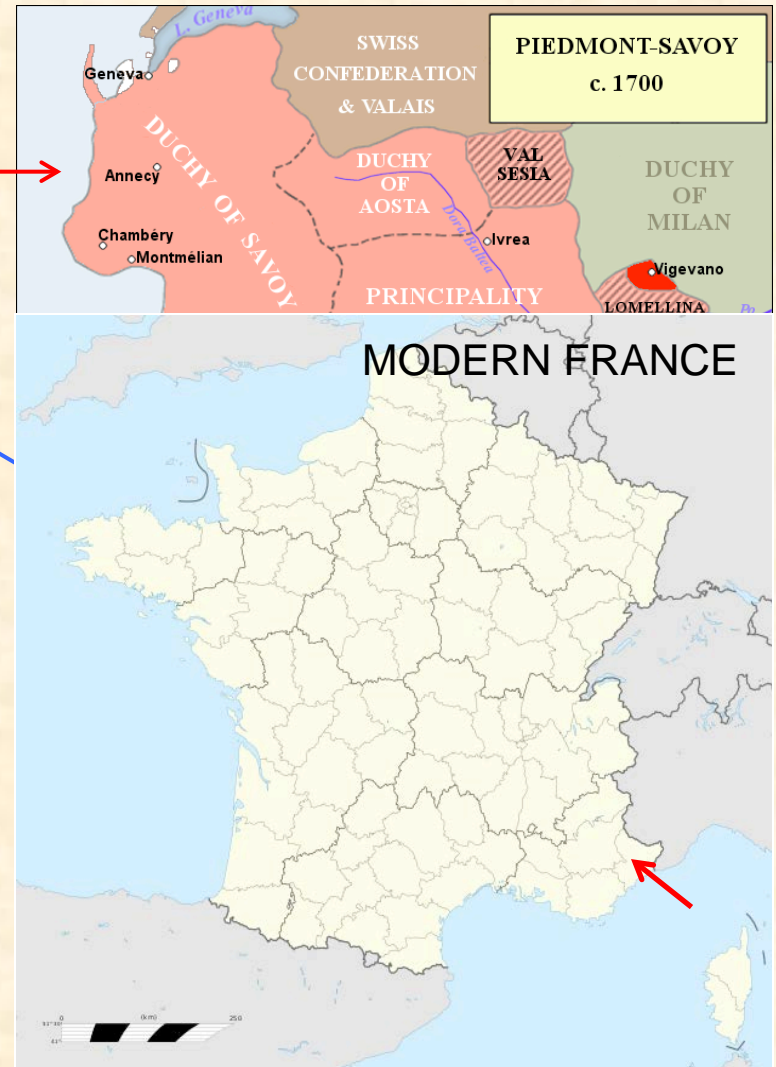
# Villefranche-sur-Mer: harbour of Savoy

- In 1388, the Nice area **joined Savoy**, a big country then located between France, Switzerland and Italian states
- Villefranche became the **key harbour of a powerful country**
- over the next 400 years, the

Key event for the future  
Villefranche research

Villefranche institute

- After a complicated history, the County of Nice **definitely joined France in 1860** (a little more than 150 years ago)
- Let us focus on **Villefranche's military harbour**



## Part 3

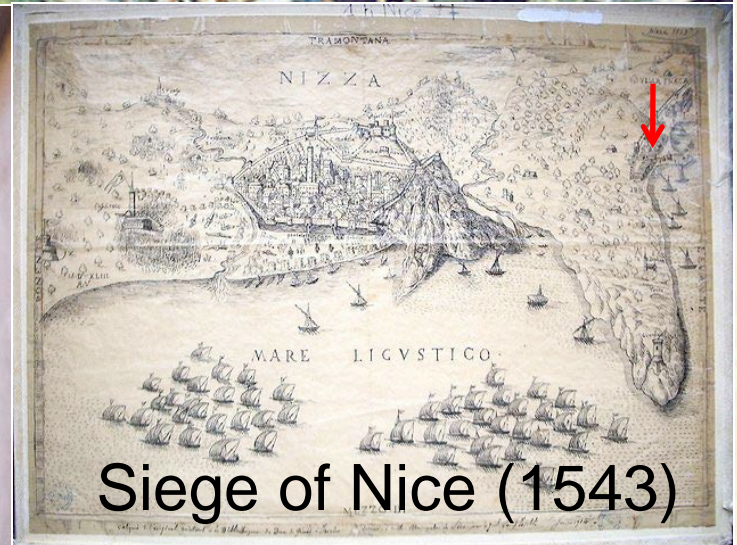
Maritime France and French marine research  
Unique site and improbable (hi)story  
**From military harbour to research institute**

# Villefranche-sur-Mer: 1543

- Villefranche in 1543 (Turkish manuscript)
  - natural harbour (1)
  - small village (2)
  - no fortress (3)
  - no major military harbour buildings (4)
- Turkish warships (5)
  - Nice besieged by 120 Turkish warships and 20,000 French soldiers
  - rescued by the Duke of Savoy



Turkish cannonball  
(Old Nice)



Siege of Nice (1543)



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- For the construction of the future fortress of Villefranche-sur-Mer, the Savoyard architect Francesco Fontana was the key event for the future of the Villefranche research institute.

# Villefranche-sur-Mer: 1909

- Bay of Villefranche in 1909: warships



# Villefranche-sur-Mer: 1946-1967

- 1946-1967: US 6th Fleet based in Villefranche (postcard)

306. Environs de Nice — VILLEFRANCHE - L'Escadre



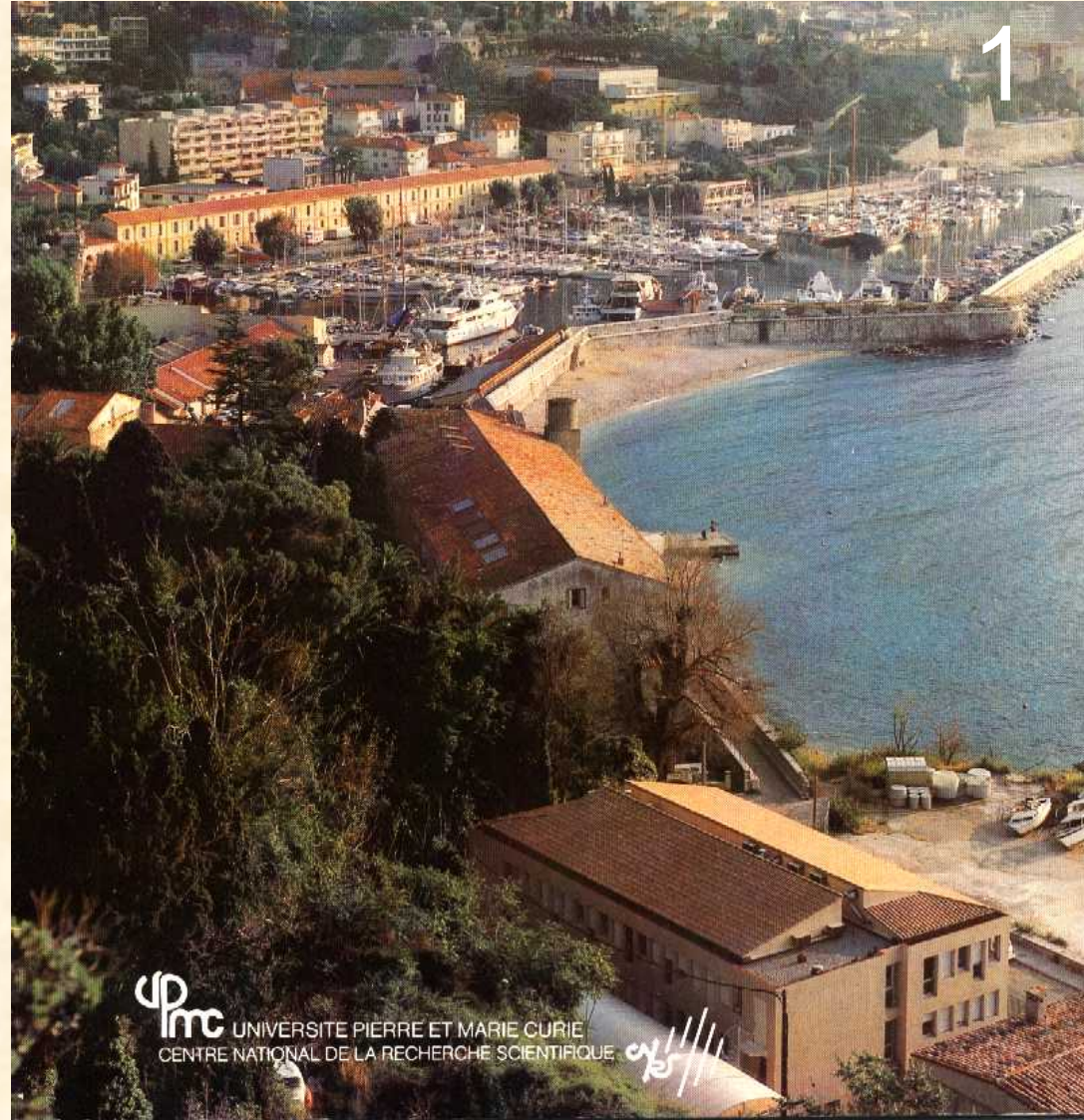
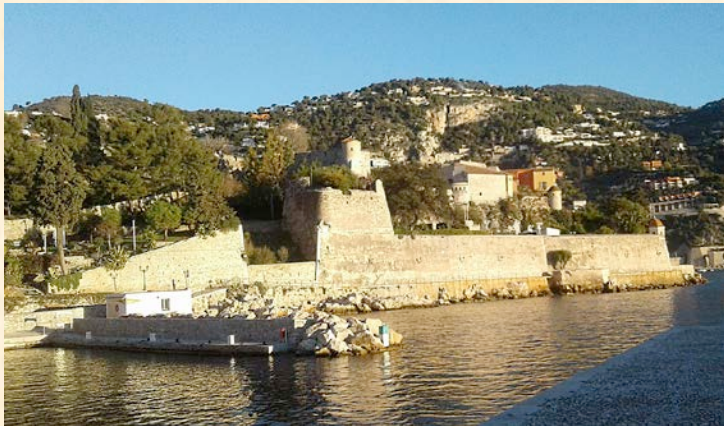
# Villefranche-sur-Mer: 2018

- 2010s: Second French harbour for cruise ships



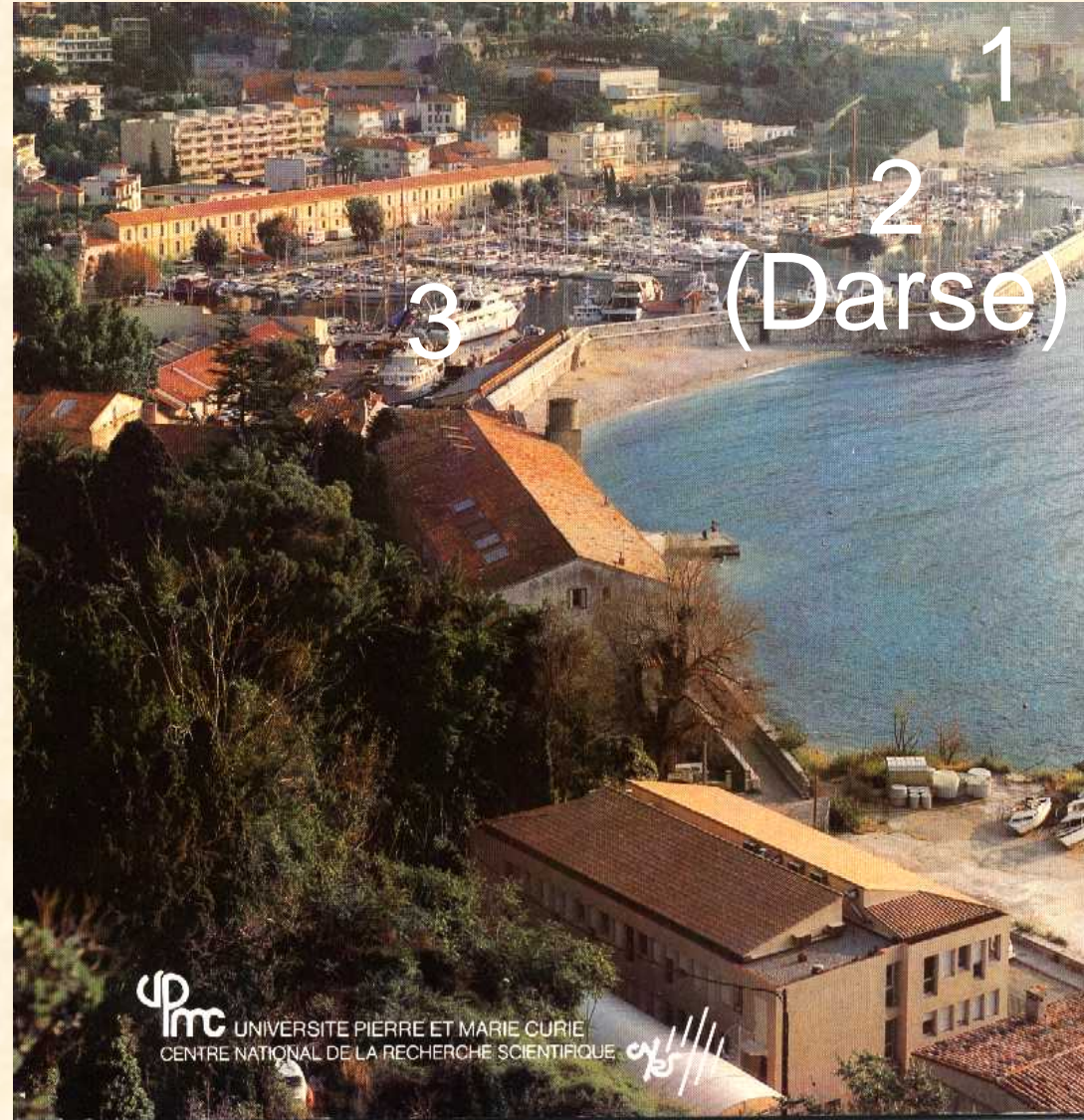
# Villefranche-sur-Mer: military harbour

- Military harbour (1700s)
- citadel (1)



# Villefranche-sur-Mer: military harbour

- Military harbour (1700s)
  - citadel (1)
  - protected basin (2)
  - dry dock (3)



# Villefranche-sur-Mer: military harbour

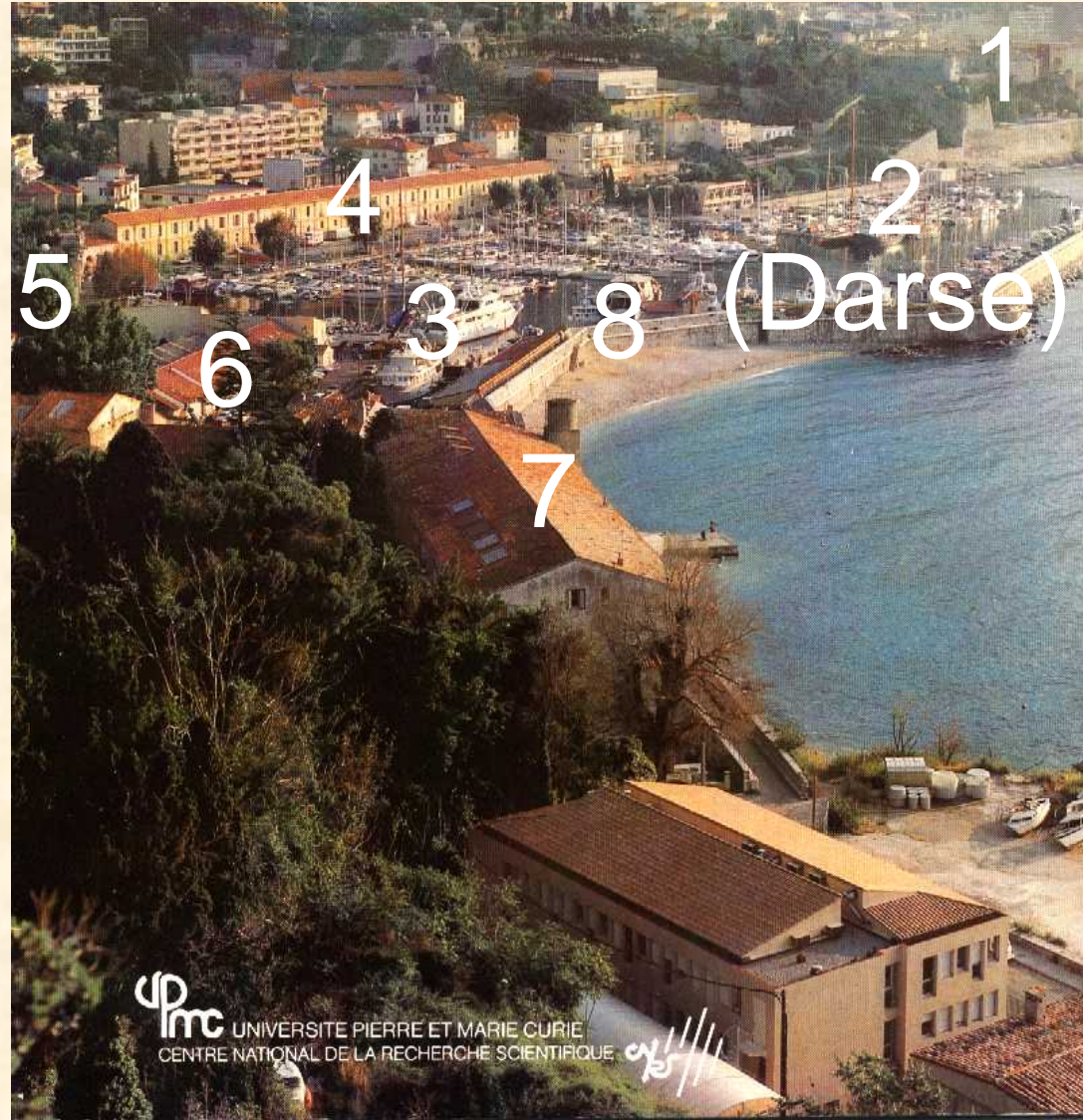
- **Military harbour (1700s)**
  - citadel (1)
  - protected basin (2)
  - dry dock (3)
  - rope factory (4 corderie)
- now: **marine optics and remote sensing + cafeteria + teaching**
- ropes were essential gears for **sailing ships**
- ropes were made in **long buildings**, where yarns were twisted into strands, and strands into ropes, along a ropewalk



# Villefranche-sur-Mer: military harbour

- **Military harbour (1700s)**

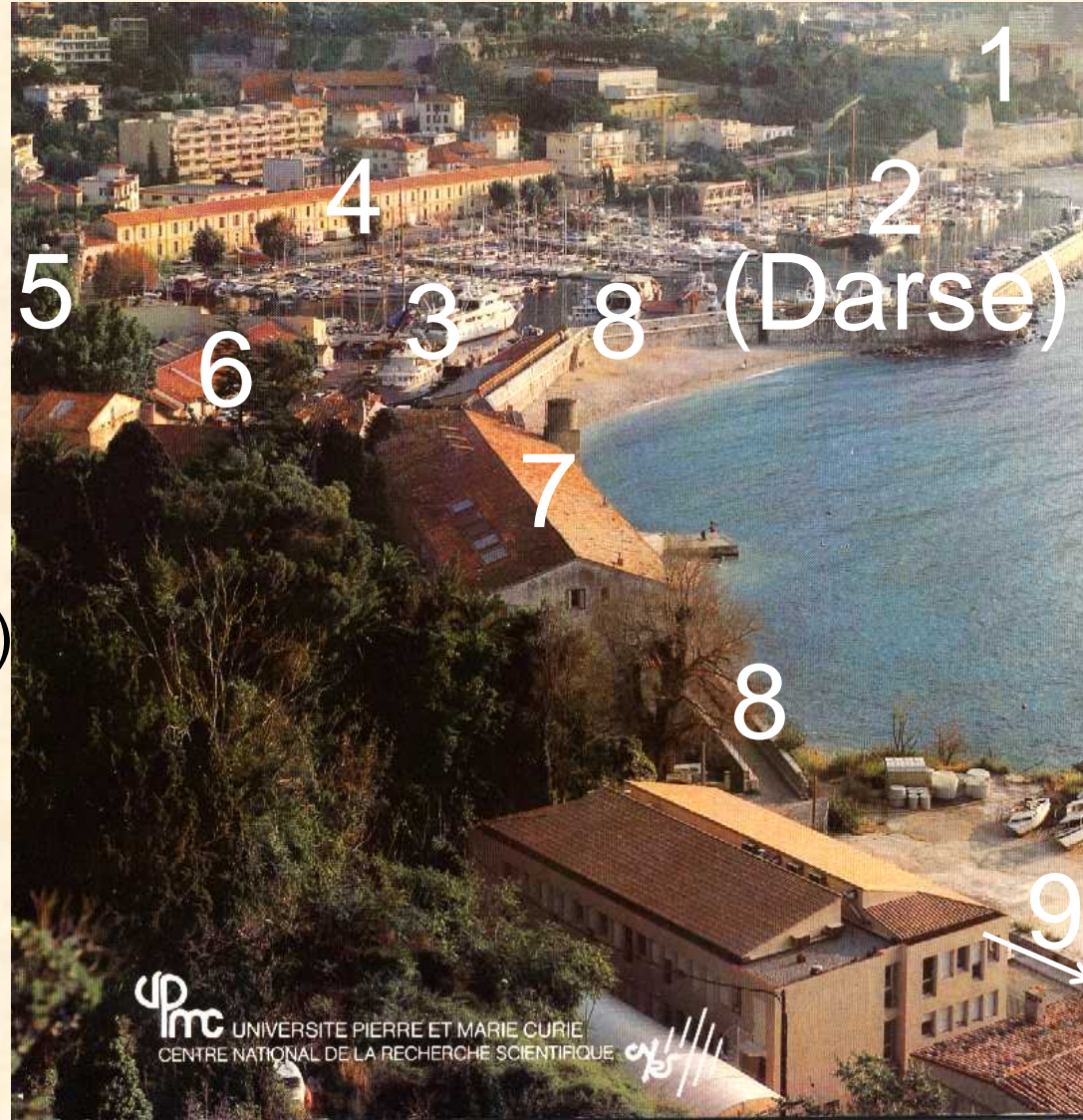
- citadel (1)
- protected basin (2)
- dry dock (3)
- rope factory (4)
- former barrack (5)
- support buildings (6)
- galley prison and hospital (7)





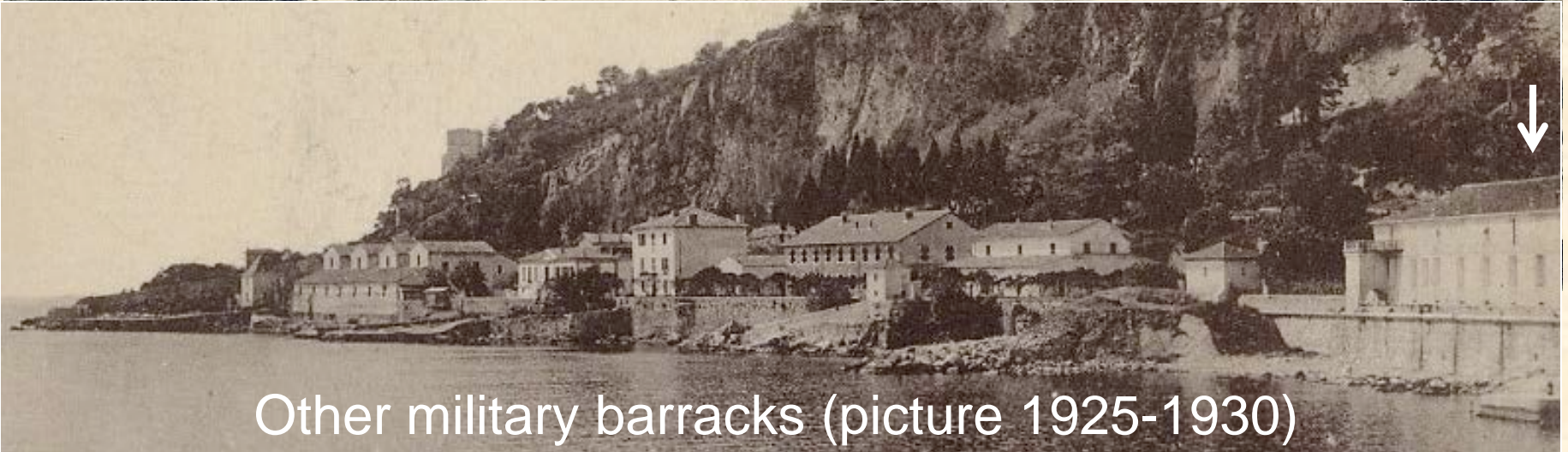
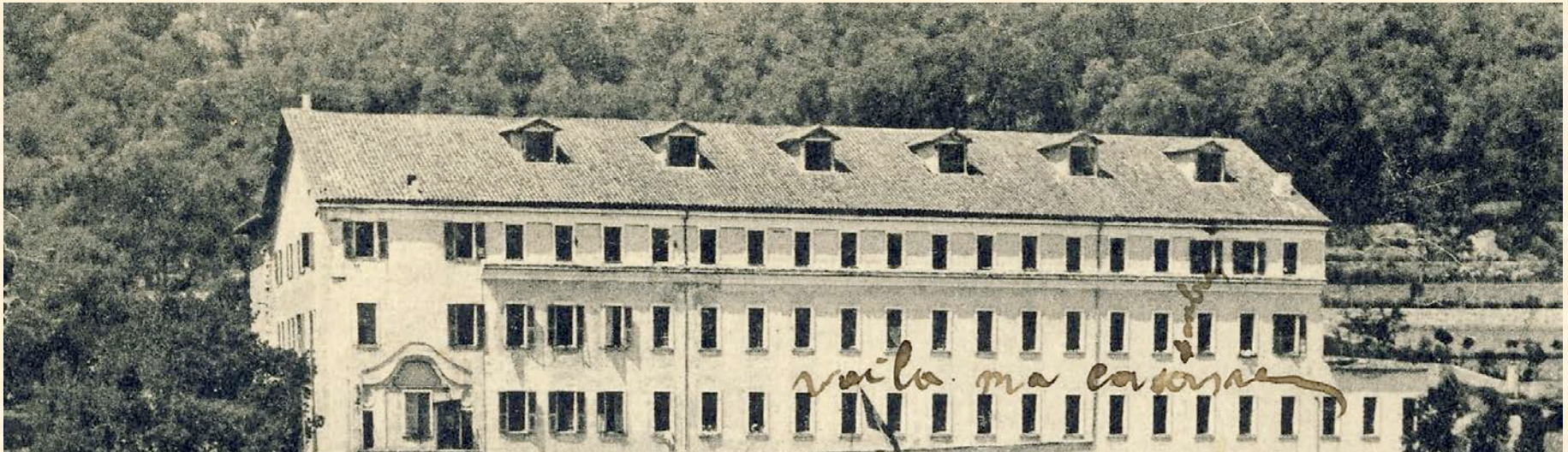
# Villefranche-sur-Mer: military harbour

- **Military harbour (1700s)**
  - citadel (1)
  - protected basin (2)
  - dry dock (3)
  - rope factory (4)
  - former barrack (5)
  - support buildings (6)
  - galley prison and hospital (7), walkway (8)
  - lazaretto (9)
- **1858-1878: used by the Russian Navy**
- **1945-1966: US Navy**  
(rope factory was an American supermarket)



# Villefranche-sur-Mer: military harbour

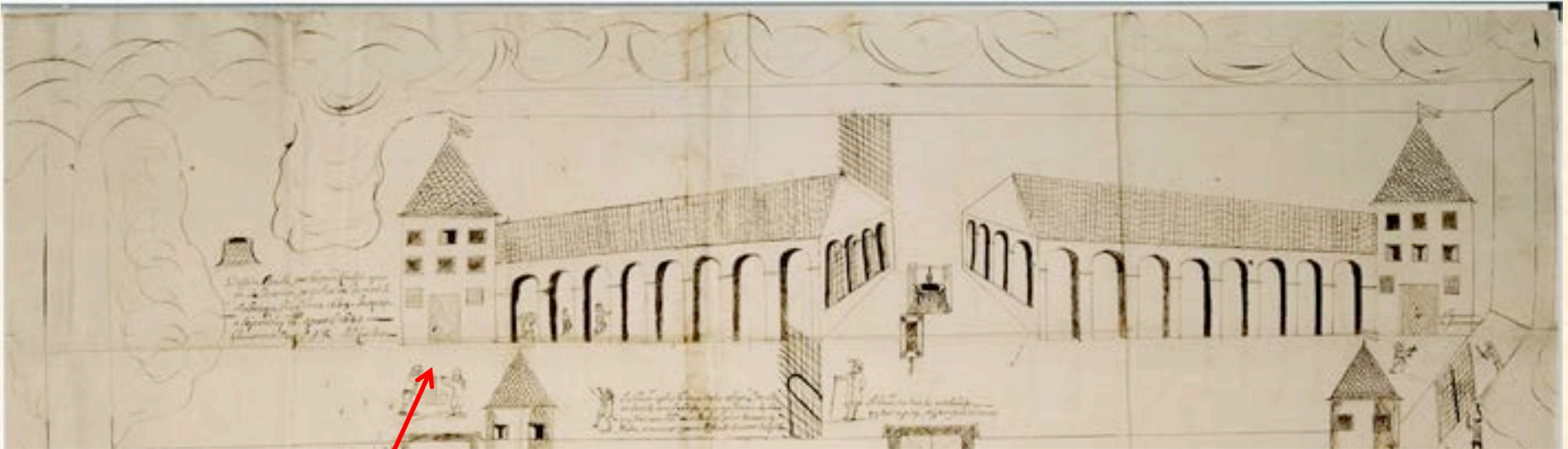
- Military harbour: buildings that do not exist any more (1)



Other military barracks (picture 1925-1930)

# Villefranche-sur-Mer: military harbour

- Military harbour: buildings that do not exist any more (2)



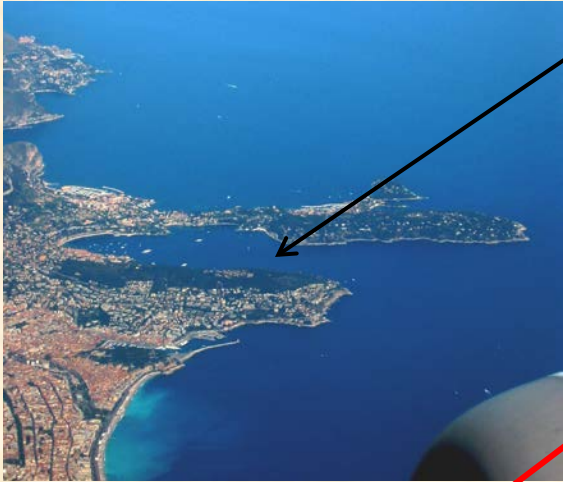
Military barracks and remaining lazaretto tower (photo 1925-1930)

# Villefranche-sur-Mer: scientific campus

- Scientific campus in 2018
  - three historical buildings: 4, 6 and 7
  - modern building (9): research + collections
  - housing facility (10): final construction stage
- Why a marine research institute in Villefranche?  
Why in the historical navy buildings?
- Answers
  - characteristics of the Bay
  - history of Villefranche

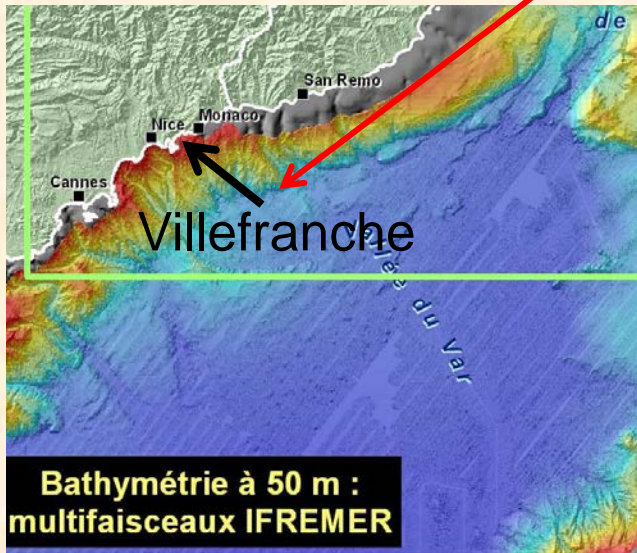


# Villefranche-sur-Mer: The bay



## Bay of Villefranche

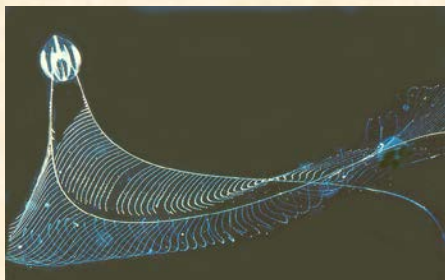
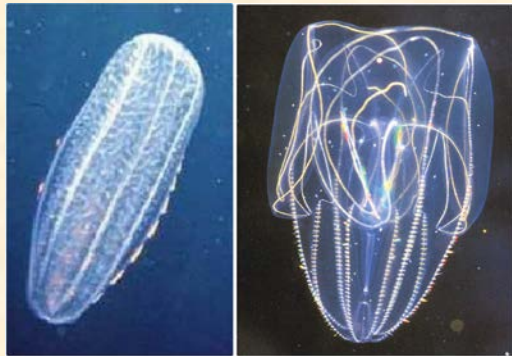
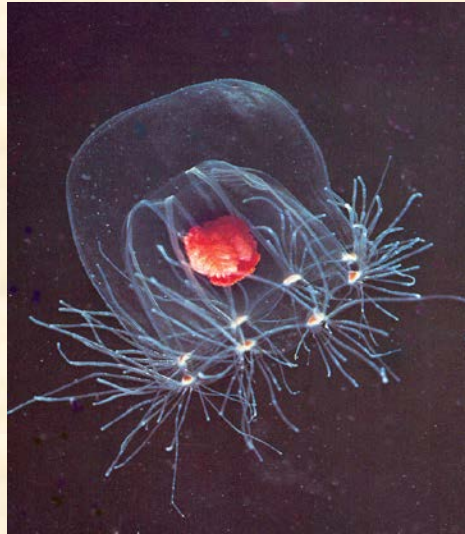
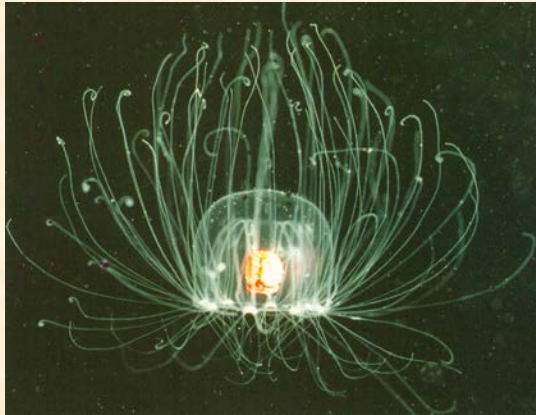
- deep: 100 m depth at the mouth of the bay
- unique access to deep waters: a few kilometres from the coast = 1000 m; 25 km offshore >2000 m
- Ideal site for studying deep, oligotrophic waters: marine biogeochemistry and oceanography,



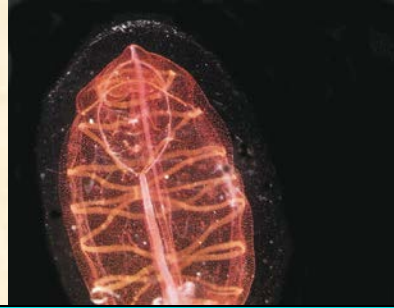
Key characteristics for the future Villefranche research institute

- -
- bay
- offshore zooplankton (often large species) are retained in the bay

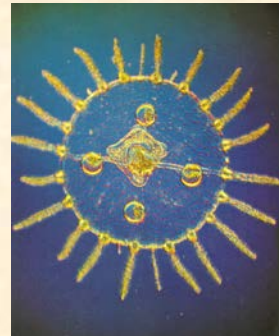
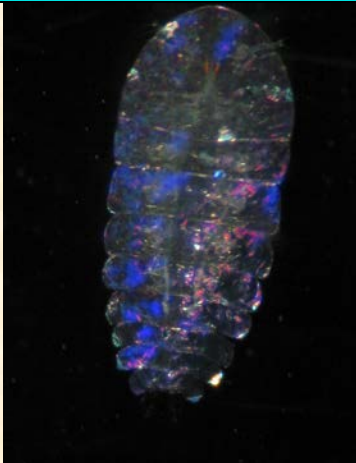
# Villefranche-sur-Mer: The plankton (1)



# Villefranche-sur-Mer: The plankton (2)



French researchers started to study these unique organisms at the beginning of the 19th century, i.e. 200 years ago



## Part 4

Maritime France and French marine research

Unique site and improbable (hi)story

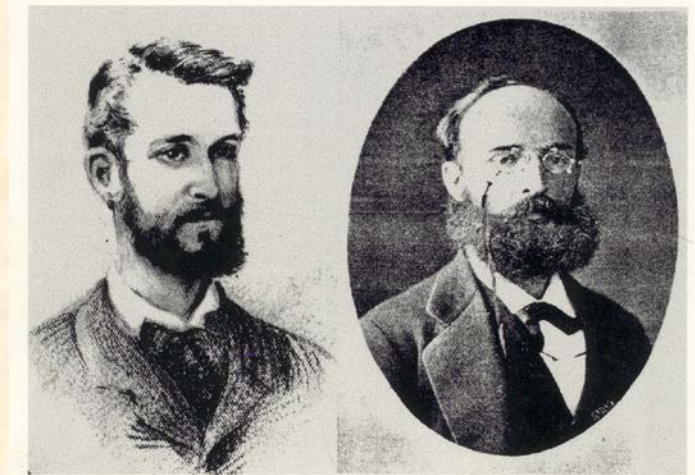
From military harbour to research institute

**The Russian and French research institutes**



# First marine laboratory in Villefranche

- Two professors created a first marine laboratory in Villefranche (*Laboratoire des Hautes Etudes*) in 1881
  - Jules Barrois, France
  - Hermann Fol, Switzerland
  - located in last remaining tower of the **Villefranche Lazaretto** (still exists, to the west of the present campus)  
[lazaretto: large building where people and goods were put in quarantine]
  - this first laboratory hosted some **Russian researchers**



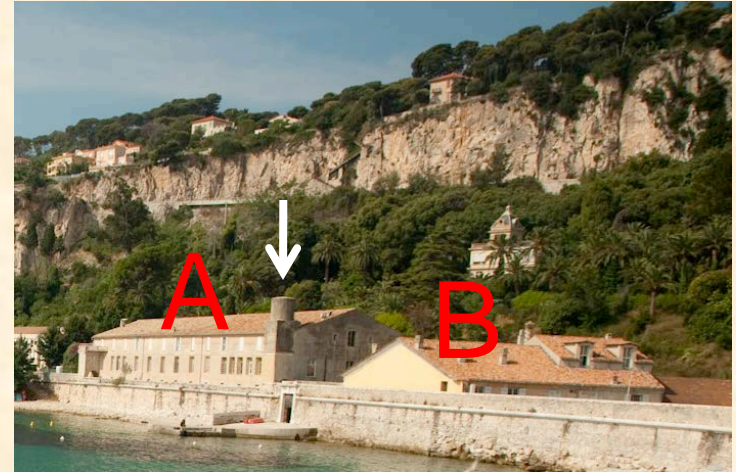
J. BARROIS

H. FOL



# From the Russian Navy to a laboratory

- **Galley prison:** building with unique architecture, with direct access to the sea
  - prison and hospital (A)
  - smithy (B)
- Buildings



- **conceded to Russia in 1858 by the King of Sardinia-Savoy (who became King of Italy in 1861), as a base for its navy, with the Galley prison (A) and the smithy (B).**
- **after the end of the Crimean War (1853-1856) and the Treaty of Paris (1856), Russia moved its navy to the Mediterranean Sea (Villefranche) and thus did not need to use Villefranche after 1878**

Key events for the future  
Villefranche research

institute

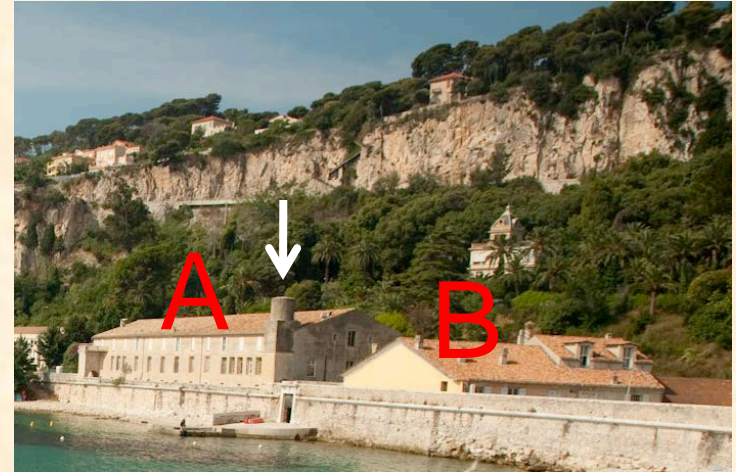
1878 – Why?

Russia), navy

1856 → Russia

# From the Russian Navy to a laboratory

- **Galley prison:** building with unique architecture, with direct access to the sea
  - prison and hospital (A)
  - smithy (B)
- Buildings
  - conceded to Russia in 1856 by the King of Sardinia-Savoy (who became King of Italy in 1861), as a base for its navy, which used the buildings until 1878
  - early 1880s: Prof. Alexis Korotneff (University of Kiev) requested from the Russian Navy permission to use the buildings
  - got the agreement although not easily

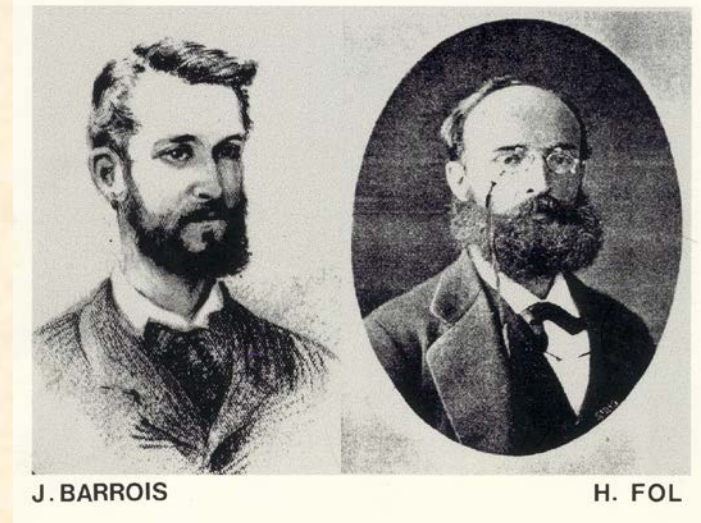
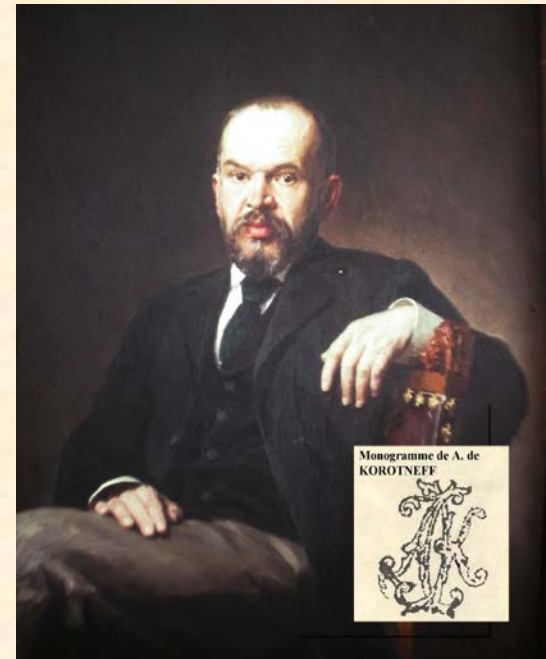


Key event for the future  
Villefranche research

institute

# The *Station zoologique*

- *Station zoologique*
  - created in 1885 by Prof. Korotneff with Profs. Jules Barrois, France, and Hermann Fol, Switzerland
  - model: Naples zoological station (created in 1872)
  - the three researchers were interested in the unusual plankton found in Villefranche
- *Station russe de Zoologie*
  - departure of Profs. Fol and Barrois in 1888
  - laboratory 100% Russian
  - remained Russian until 1932 (in spite of the 1917 revolution)





# *Station russe de Zoologie (2)*

The station (created in 1885) became rapidly well known

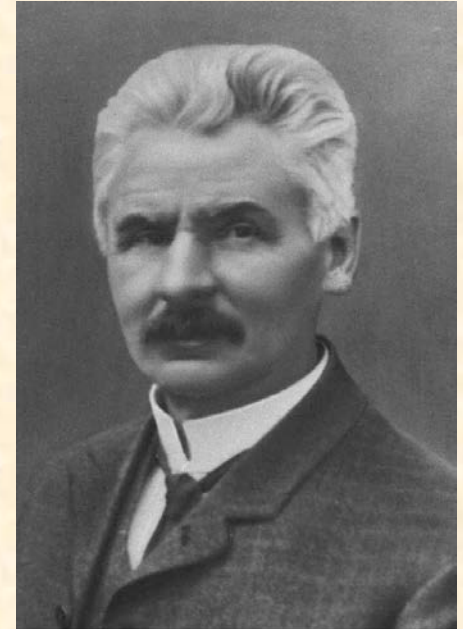
Six years later, in 1891, the Russian author [Anton Chekhov](#) wrote in his short story *The Duel*:

*“All serious zoologists work at the biological station at Naples or Villefranche.”*



# Station russe de Zoologie (3)

- Second Director: **Michel Davidoff (1916-1928)**
  - assistant of **Prof. Korotneff**
  - very good specialist of preservation of large plankton specimens: he developed the Station's **zoological collection**, and won many prizes



MICHEL DAVIDOFF Directeur de la STATION ZOOLOGIQUE (Russe) de 1915 à 1933

# Station russe de Zoologie (4)

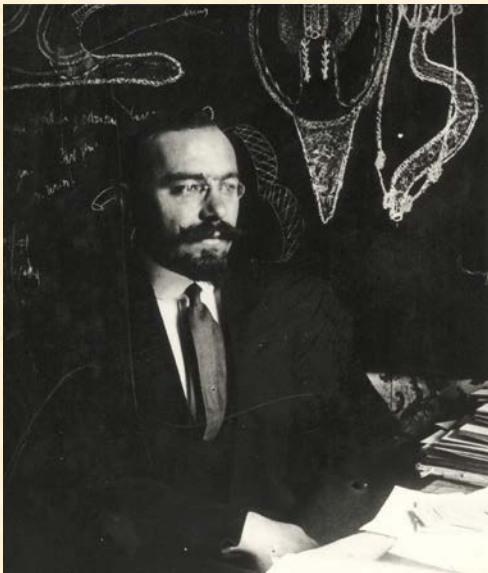
- Under second Director **Michel Davidoff**, the station
  - bought a **motor ship** (*Veillele*)
  - acquired increasingly better research equipment
  - published scientific papers





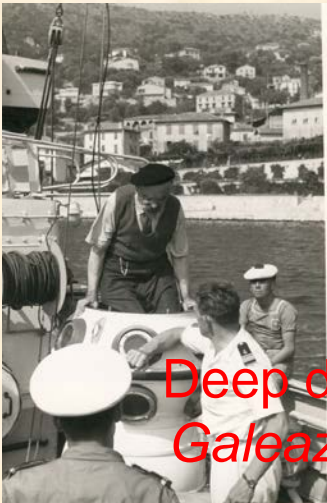
# *Station russe de Zoologie (5)*

- New assistant: **Grégoire Trégouboff**
  - arrived in 1915
  - studied medicine and biology in Kiev and Montpellier (France)
  - excellent scientist, with very high enthusiasm and energy
  - last director of the Russian station (1929-1932)

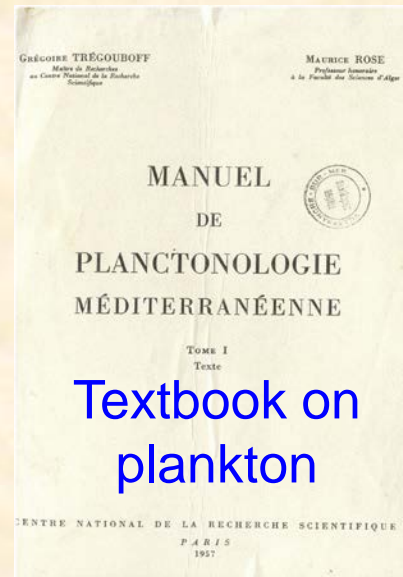
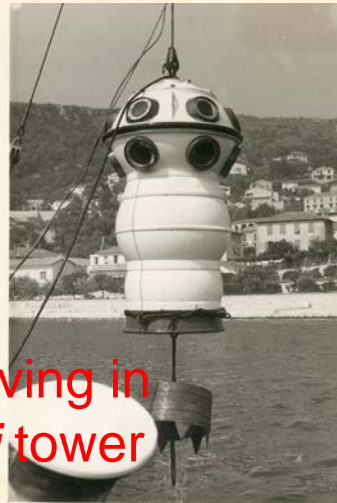


# Station zoologique (1)

- Station became French in 1932, as part of the Faculty of Sciences of the University of Paris (now: Sorbonne Université)
- directed by **Grégoire Trégoüboff**
- Trégoüboff remained very active in the institute



Deep diving in Galeazi tower



Textbook on plankton



With French explorer Jacques-Yves Cousteau

# Station zoologique (2)

- After Tregouboff's retirement (director: Paul Bougis, 1950-1982)
  - station underwent a **strong international development**
  - remembering the station's Russian origins, its first 20-m **ship was named N.O. KOROTNEFF**
- Over the years, several marine laboratories developed in Villefranche
- Since 1989, they are grouped into a single campus, now called **Institut de la Mer de Villefranche (IMEV)**



PAUL BOUGIS Directeur de la STATION ZOOLOGIQUE (Plancton) de 1957 à 1986



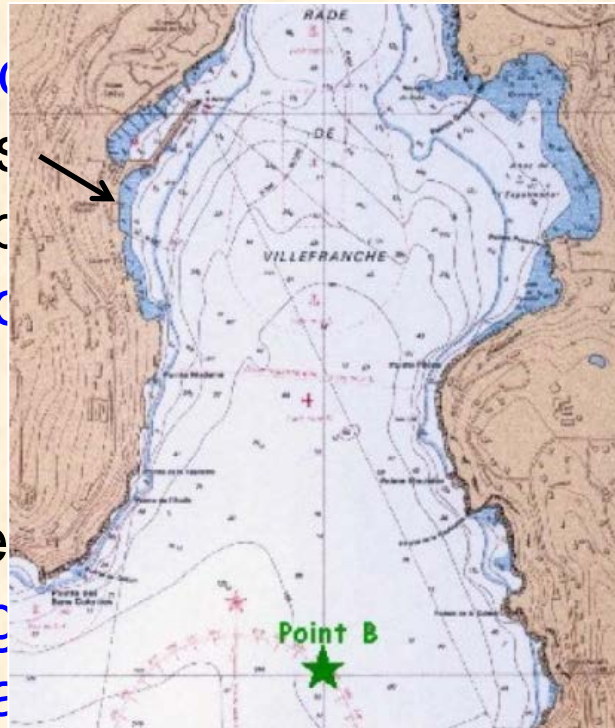
# Marine optics and remote sensing

- Marine optics (plus, later, ocean colour remote sensing) present in Villefranche since 1966
  - founder and titular director of the marine physics and chemistry unit until 1982: Prof. Alexandre Ivanoff
  - following director: Prof. André Morel
  - also Key scientist for the  
creation of the  
Villefranche research  
institute
  - World leader in optics and  
remote sensing
  - died in 2012
- All oceanographic components of the Villefranche campus were grouped into the Villefranche Oceanography Laboratory (LOV) in 2001

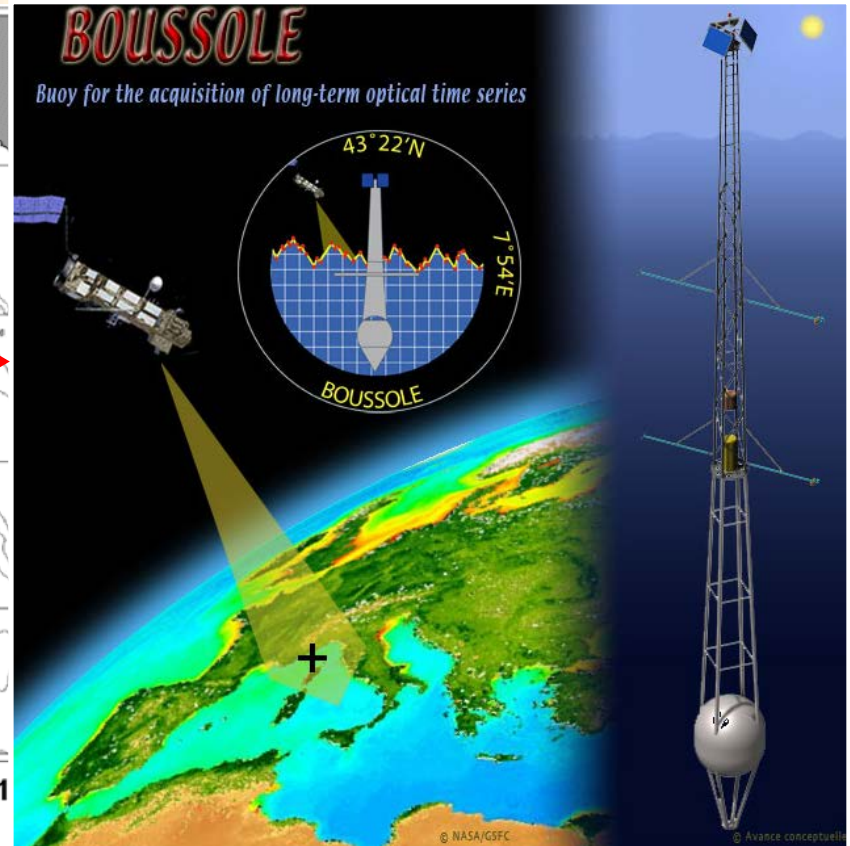
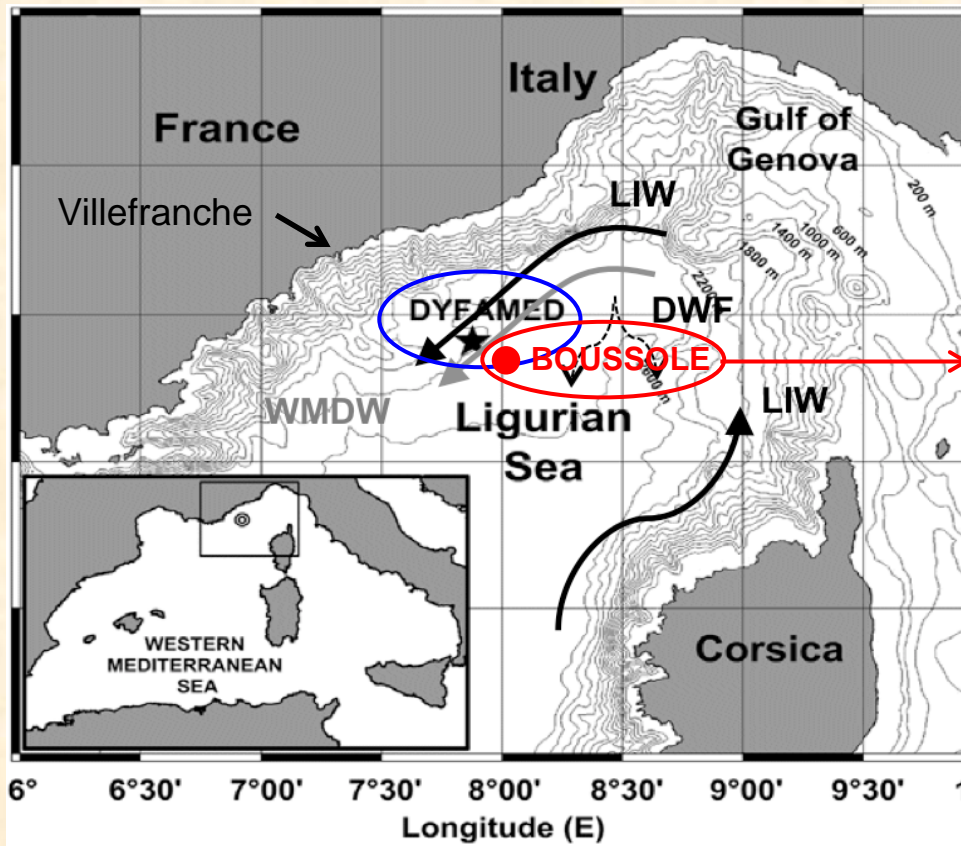


# Villefranche campus now

- Institut de la Mer (IM) people
  - two research units
    - oceanography (at Villefranche)
    - developmental biology
  - general services
- Activities
  - research: science and technology (national and European)
  - graduate teaching
  - long-term observations of the environment
  - inshore site (Point B, >90 m): since 1957, >60 years of daily observations of physical conditions and zooplankton



# Villefranche campus now



## ➤ offshore site

- DYFAMED** (2350 m): since 1989, monthly observations of physics, chemistry and biology + moored sediment traps
- BOUSSOLE** (2440 m): since 2003, optical characteristics

# Villefranche campus now

- Villefranche research institute results from the conjunction of
  - a unique marine site
  - a suite of improbable historical circumstances
  - some exceptional, imaginative people
  - lots of fun!

# Touring in Villefranche-sur-Mer

- If you have time during the week (you may be too busy) or after, you could have a look in Villefranche at
  - picturesque [old town](#)





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  - interesting [museums](#) in the citadel (entrance free of charge)



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  - picturesque [old town](#)
  - interesting [museums](#) in the citadel (entrance free of charge)
  - fishermen's chapel beautifully decorated by the French artist Jean Cocteau (entrance 3 €)



Thank you very much for your  
kind attention

Continue to enjoy Villefranche-sur-Mer  
(Freetown-by-the-Sea)

RADE DE VILLEFRANCHE

