Split – A Centre of the Adriatic Hydrography and Maritime Cartography

Significant Anniversaries of Research of Sea and Submarine Area

Exhibition in the Gliptoteka of the Croatian Academy of Science and Arts in Zagreb, April 2003

The exhibition was organized by the Hydrographic Institute of the Republic of Croatia. The following text has been prepared for the catalogue of the exhibition.

A long and fruitful maritime tradition is the pride of all Croats, and Croatian captains and sailors have been praised as seamen at all times. The people who have grown up near the sea and could guess all its tempers have been able to talk to the sea and it used to be their best friend. If they had not understand it and estimated its nature, it could have been their worst enemy, sometimes a very dangerous one. All those who take it lightly are mistaken.

1 Introduction

The history of hydrographic activities is inseparably connected with the city of Split. The Hydrographic Institute of the Republic of Croatia inherited 140 years old tradition of hydrographic activity in the area of the Eastern part of the Adriatic Sea. This is a period that many larger and richer countries would like to boast with.

Hydrographic activity is a very wide term that is very hard to bring closer to a common man because it unifies several professions *(hydrography, nautics, cartography, oceanography, and map reproduction)*. It is an exceptionally hard and comprehensive task, which is why we have decided to talk about a small segment of this activity, about its end products – sea navigation maps and publications.

The idea to make this anniversary memorable by publishing a new plan of one of the prettiest harbours in the Mediterranean and the centre of hydrographic activity in this area seemed to be the most logical and the most adequate way to do it.

2 Hydrography

Hydrographic Institute of the Republic of Croatia is the bearer of hydrographic activities at the Croatian part of the Adriatic Sea. *Hydrography* is a branch of applied science dealing with surveying and describing physical properties of the navigational parts of the Earth's surface and the corresponding coastal areas, with a special emphasis on their application in navigation. Hydrographic activity also encompasses some aspects of other scientific disciplines that are important for sea navigation safety *(e.g. physical oceanography, magnetometry, marine geodesy, and cartography)*. The purpose of the hydrographic activity is hydrographic and navigational security of navigation, protection of human life and property at sea, research, environmental protection and sea resources management. To put it simple: hydrographic activity enables the navigation security at sea and the protection of sea environment.

Hydrographic activity in the Adriatic Area is a part of global sea navigation safety system under the patronage of the *International Maritime Organisation – IMO* and *International Hydrographic Organization – IHO*.

Hydrographic activity encompasses hydrographic surveying, oceanographic measurements and marine cartography that transform the collected data into sea navigation charts or publications. The primary usage of the data collected through

Split – centar jadranske hidrografije i pomorske kartografije

Značajne obljetnice istraživanja mora i podmorja

Izložba u Gliptoteci HAZU u Zagrebu, travanj 2003.

Organizator izložbe bio je Hrvatski hidrografski institut iz Splita. Za katalog izložbe priređen je tekst koji slijedi.

Duga i plodonosna pomorska tradicija ponos je svih Hrvata, a hrvatski su kapetani i mornari oduvijek bili vrlo cijenjeni kao pomorci. Ljudi koji su odrasli uz more i znali pogoditi sve njegove ćudi, znali su pričati s morem i ono im je bilo najveći prijatelj. Kada ga nisu znali dobro razumjeti i procijeniti, more im je bilo najveći neprijatelj, katkad vrlo opasan. Griješe svi oni koji ga olako shvaćaju.

1. Uvod

Povijest hidrografskih aktivnosti neraskidivo je povezana s gradom Splitom. Hrvatski hidrografski institut nasljednik je 140 godina duge tradicije hidrografske djelatnosti na prostorima istočnog dijela Jadranskog mora. To je razdoblje kojim bi se mogle pohvaliti i mnogo veće i bogatije zemlje.

Hidrografska je djelatnost širok pojam koji je vrlo teško približiti običnom čovjeku jer ona ujedinjava nekoliko struka *(hidrografiju, nautiku, kartografiju, oceanografiju* i *kartografsku reprodukciju)*. To je iznimno teška i sveobuhvatna zadaća, zato smo se odlučili progovoriti o malom segmentu te djelatnosti, o njezinim krajnjim proizvodima – pomorskim kartama i publikacijama.

Najlogičnijom i najprimjerenijom pokazala se ideja da tu obljetnicu obilježimo izdavanjem novog plana jedne od najljepših luka na Sredozemlju i središta hidrografske aktivnosti na ovim prostorima.

2. Hidrografija

Hrvatski hidrografski institut nositelj je hidrografske djelatnosti na hrvatskom dijelu Jadranskog mora. *Hidrografija* je grana primijenjene znanosti koja se bavi izmjerom i opisivanjem fizičkih karakteristika navigacijskih dijelova Zemljine površine i pripadajućih primorskih područja, s posebnim naglaskom na njihovoj primjeni u navigaciji. Hidrografska djelatnost obuhvaća i neke aspekte drugih znanstvenih disciplina, važnih za sigurnost plovidbe morem *(npr. fizičku oceanografiju, magnetometriju, marinsku geodeziju i kartografiju)*. Svrha je te djelatnosti hidrografsko-navigacijsko osiguranje plovidbe, zaštita ljudskih života i imovine na moru, istraživanje, zaštita okoliša i gospodarenje morskim resursima, ukratko, ona omogućava sigurnost plovidbe na moru i očuvanje morskog okoliša.

Hidrografska djelatnost na Jadranu dio je globalnog sustava sigurnosti plovidbe morem i pod pokroviteljstvom je Međunarodne pomorske organizacije *(International Maritime Organization – IMO)* i Međunarodne hidrografske organizacije *(International Hydrographic Organization – IHO)*.

Hidrografska djelatnost obuhvaća hidrografsku izmjeru, oceanografska mjerenja te pomorsku kartografiju koja sakupljene podatke uobličava u pomorsku kartu ili publikaciju. Podaci sakupljeni hidrografskom i oceanografskom izmjerom upotrebljavaju se ponajprije za sastavljanje i izradu pomorskih karata i publikacija potrebnih za unapređivanje sigurne plovidbe, te za ostale djelatnosti vezane za gospodarenje morem i

hydrographic and oceanographic survey is the compilation and production of sea navigational maps and publications necessary for improving the safe navigation. The collected data is also used for other activities connected with sea and submarine area management. These are: hydro-technical works at sea and in submarine areas, marine engineering, oceanography, sea biology, sea environment protection and other economic branches. One of the most important applications of hydrographic knowledge is its usage in planning and research of sea resources, in defining the jurisdiction of sea territory and determining the borders at sea. The Hydrographic Institute of the Republic of Croatia is the institution known to wider public first of all because of numerous series of sea navigation maps at various scales and because of navigation manuals, pilots, nautical almanacs and tables.

3 Mapping of the Split Harbour

The word hydrography appeared for the first time in 1595 exactly within the process of mapping the Adriatic area. It is the matter of the sea navigation map by Willem Barents (1550-1597), a famous Dutch seaman and a polar explorer titled: "TABVLA HYDROGRAPHICA. In qua Italiae, orae maritimae; Item Venetiae, Istriae, Dalmatiae, Slauoniae, Graeciae, et orae maritimae Corfu, Chephaloniae, et adiacentium Insularum (...)". Not at all accidentally, the version made between 1637 and 1662 has been preserved only in these regions, in the Cartographic Collection of the University Library in Split. Instead of *Tabula Hydrographica* its title reads that it is TABVLA SINVS VENETICI and the rest is more or less the same. Thus, the first was *Hydrography Map*, and the other *Map of the Venetian Gulf*, as this sea used to be called during history. The reason for changing the title lies in the fact that the geographers of that time were aware of the fact that the first title was rather pretentious. This map represents namely in its middle part the Adriatic Sea. Since the focus of all navigational maps is first of all the sea, and the Adriatic Sea is oriented in the direction NorthWest-SouthEast, there was enough place along the upper right and the lower left part to insert the plans of the largest harbours at that sea. It was made so. Along the lower part there are the plans of Venice, Ancona, Brindissi and Galipolje, and along the upper part Valone, Trogir, Boka Kotorska, Dubrovnik, Rovinj and Pomena on the island of Mljet. Only Rovinj and Pomena had the depths presented, and this is the oldest mapping of any depths of this sea. Since the depths are represented on the plans of only these two harbours, they are not sufficient to

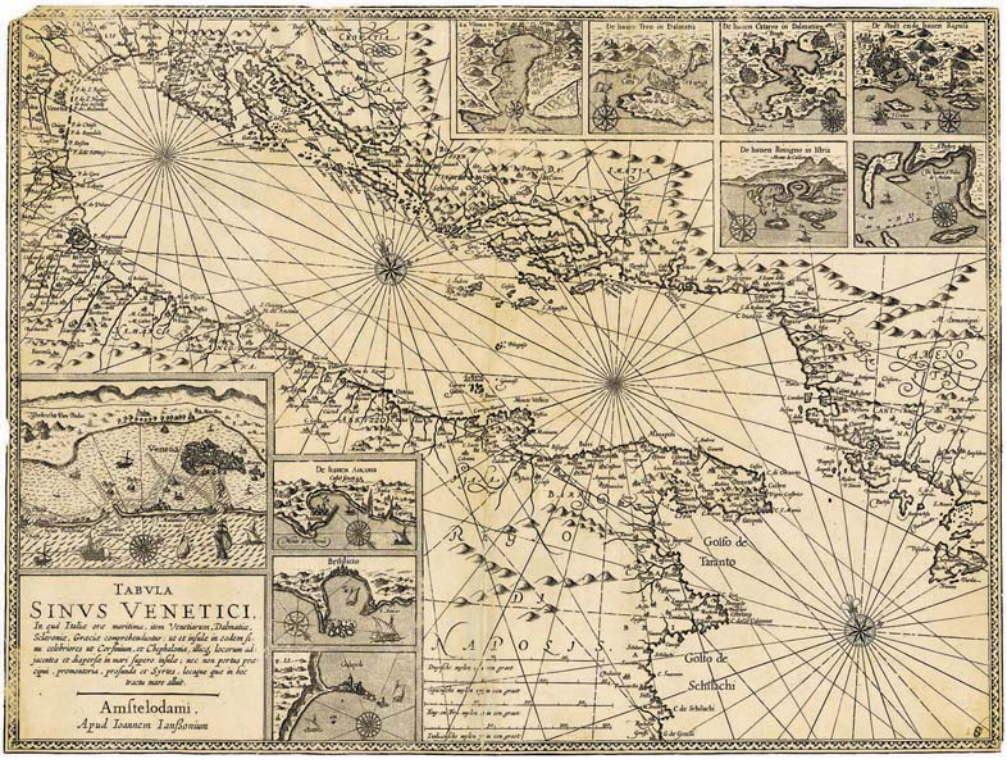

Fig. 1. Barents' map of the Adriatic area made between 1637 and 1662. The source copy is kept at the Cartographic Collection of the University Library in Split

Slika 1. Barentsova karta Jadrana izrađena između 1637. i 1662. god. Izvornik se danas čuva u Kartografskoj zbirci splitske Sveučilišne knjižnice

podmorjem: hidrotehničke radove na moru i podmorju, pomorski inženjering, oceanografiju, biologiju mora, zaštitu morskog okoliša i druge gospodarske grane. Među najvažnijim je primjenama hidrografskog znanja njegova upotreba u planiranju istraživanja i iskorištavanja morskih resursa, u određivanju jurisdikcije morskog prostora i utvrđivanju granica na moru. Hrvatski hidrografski institut poznat je široj javnosti ponajprije po mnogobrojnim serijama pomorskih karata različitih mjerila te po plovidbenim priručnicima, peljarima, nautičkim godišnjacima i tablicama.

3. Kartografiranje luke Split

Riječ hidrografija prvi se put pojavljuje već 1595. godine prilikom kartografiranja Jadrana. Riječ je o pomorskoj karti Willema Barentsa (1550–1597), znamenitoga nizozemskog pomorca i polarnog istraživača, koja u svojem naslovu donosi: TABVLA HYDROGRAPHICA. In qua Italiae, orae maritimae; Item Venetiae, Istriae, Dalmatiae, Slauoniae, Graeciae, et orae maritimae Corfu, Chephaloniae, et adiacentium Insularum (...). Nimalo slučajno, jedino se na tim stranama, u Kartografskoj zbirci splitske Sveučilišne knjižnice, očuvala njezina inačica nastala između 1637. i 1662. godine. U njezinu naslovu umjesto *Tabula Hydrographica* stoji TABVLA SINVS VENETICI, a ostalo je manje-više isto. Dakle, prvi je put to bila *Hidrografska karta*, a potom *Karta Mletačkog zaljeva*, kako se tijekom povijesti ovo more također zvalo. Razlog je izmjene naslova taj što su i tadašnji geografi bili svjesni činjenice da je prvi naslov pretenciozan. Ta je karta, naime, po sredini donosila kartografski prikaz Jadranskog mora. Kako je u žiži svih pomorskih karata ponajprije more, a Jadran je orijentiran u smjeru sjeverozapad-jugoistok, to je uz gornji desni i donji lijevi dio raspoloživog prostora bilo dovoljno mjesta za umetanje planova najvažnijih luka tog mora. Tako je i učinjeno. Uz donji dio stavljeni su planovi Venecije, Ancone, Brindisija i Gallipolija, a uz gornji planovi Valone, Trogira, Boke kotorske, Dubrovnika, Rovinja i Pomene na otoku Mljetu. Jedino su za Rovinj i Pomenu prikazane dubine, i to je najstarije kartografiranje bilo kakvih dubina na ovome moru. Budući da dubine samo na planovima tih dviju luka nisu dovoljne da bi karta mogla biti hidrografska, od naslova se uz prvo izdanje već u splitskoj inačici odustalo.

Time je istaknut pravi problem: pomorcima su vrlo važni podaci o dubinama i opisi plovidbenog puta, s time da sve to specifičnim kartografskim znakovljem bude predočeno na pomorskoj karti. Međutim, taj je iznimno zahtjevan posao mogla učiniti jedino institucija ili skupina stručnjaka bitno potpomognuta od države. Za jadranske relacije to će se dogoditi na početku 19. stoljeća, pri čemu će opet Split na stanovit način imati osebujnu ulogu. Naime, početkom tog stoljeća obala i zaleđe dolaze pod francusku vlast. Napoleon, koji je s Jadranom imao dalekosežne planove, šalje onamo svojeg najboljeg hidrografa i kartografa. To je bio *Charles François Beautemps-Beaupré* (1766–1854), koji se danas u svijetu smatra "ocem znanstveno utemeljene hidrografije". Zadaća mu je bila obaviti hidrografsku izmjeru najznačajnijih istočnojadranskih luka i morskih prolaza, pa na temelju dobivenih rezultata izraditi njihove karte, a k tomu još i cjelovito *"Izvješće"*. Dakako, sve je to trebao učiniti zato da bi Napoleon znao gdje je na istočnom Jadranu bilo najprikladnije graditi ratne luke za francusku ratnu flotu.

Beautemps-Beaupré počeo je svoju prvu kampanju 1806. godine u Piranskom zaljevu, a dramatično završio u Splitu. Kampanja je opisana u *"Prvom izvješću"*, dovršenu 1. srpnja 1807. godine u Parizu, koje se danas čuva u Kartografskoj zbirci Nacionalne i sveučilišne knjižnice u Zagrebu. Donosimo osnovne naglaske o splitskoj luci iz izvješća u hrvatskom prijevodu:

"Luka Split *(port de Spalatro)*, među pomorcima koji posjećuju Mletački zaljev (golfe de Venise), uživa ugled koji mi je nametnuo obvezu da je posjetim. Znao sam od kakve bi važnosti bilo za vladu da ima luku sposobnu da primi ratne brodove, na onom

Fig. 2. Charles François Beautemps-Beaupré (1766-1854)

Slika 2.Charles François Beautemps-Beaupré (1766–1854)

make this map a hydrographic one, so the title was abandoned in the first edition of the Split version.

The real problem was pointed out in this way: the data about the depths and the description of the navigation route are very important for the seamen, and all this is supposed to be presented on the sea navigational map by means of cartographic symbols. However, this exceptionally demanding task could be performed only by an institution or a group of experts supported by the state. In the Adriatic area it happened at the beginning of the 19th century, and Split had a special role in this process. Namely, at the beginning of this century, the coast and the hinterland came under the French authority. Napoleon who had far-reaching plans with the Adriatic Sea, sent his best hydrographer and cartographer into that area. It was *Charles François Beautemps-Beaupré* (1766.-1854.), a famous French hydrographer that is today regarded in the world as "the father of scientifically founded hydrography". His task was to make hydrographic survey of the most important Eastern Adriatic harbours and sea passages, and to produce the maps on the basis of captured data along with a complete *Report*. Of course, it was all necessary so that Napoleon could know where in the Eastern Adriatic area it is the best to build war harbours for the French war fleet since he had long-term plans with those territorial waters.

Beautemps-Beaupré started his first campaign in 1806 in the Gulf of Piran, and ended dramatically in Split. The campaign is described in the *First Report* completed on the 1st July 1807 in Paris, and today it is kept at the Cartographic Collection of the National and University Library in Zagreb. We bring the most important about the Split harbour from the report translated in English.

"The Harbour Split *(port de Spalatro)*, is respected among the seamen visiting the Gulf of Venice which made me obligated to visit it. I knew the importance it would have for the government if the harbour would be enabled to take war ships to the place in Dalmatia *(Dalmatie)* where the trade with Bosnia *(Bosnie)* is the most intensive and where it is easy to provide fresh food. (...) The Split harbour is actually the gulf 500 fathoms open and 400 fathoms deep (974,5 x 779,6 m – remark by MK), surrounded all around by flat rock with some of them under the sea, and in the bottom of that gulf there is the town Split. Hard silt that is very good for lifting anchors makes high quality bottom of this Gulf. (...)

Small ships visiting the harbour in Split find the shelter in the town, within the pier protecting them from the winds and the open sea. Those having a draught larger than 8 feet and not able to sail into this basin are exposed to the risk of being broken in the pier or against flat rock at the bottom of the harbour if their ropes should be broken.

The depth between the end points of the Split harbour is very large. Since there is enough space in the harbour and regarding the quality of the bottom, a larger war ship could be anchored there protected by the artillery defending Split from the sea. However, this is a position which I would not advise the ships to stay at if not necessary.

In the Western part of the town there are sulphur wells (...). The inhabitants of Split use the water for drinking from cisterns and wells. The town of Split is small, but well inhabited. The trade attracts a lot of small ships here, and the ruins of Diocletian's palace *(ruines du palais de Dioclétien)* attract a few curious visitors. The latitude of the Western part of the pier is 43° 29' 49". The declination of the magnetic needle is: 16° 37' 32" NorthWest.

At the moment when I prepared myself to sail to Boka kotorska *(bouches du Cattaro)*, the position that I was ordered to visit by His Excellency, Minister of Maritime Affairs, *(Son Execellence le Ministre de la marine)*, the general administrator of Dalmatia (Marmont – remark by MK) informed me on 20th September (1806 – remark by MK) that he would start hostilities with the Russians again (Russes), that an English escadre of ships (qu'une escadre anglaise) just entered the Gulf of Venice and that finally a brick *(qu'un brick)* of that very state had already searched an Austrian ship *(bâtiment autrichien)* at the cape of Ploče *(la pointe de la Planca)*. These inconvenient news made me leave Split, even the Dalmatian coast *(côte de Dalmatie)*, where I had the least hope I would usefully spend the rest of the summer period. I went to the Istrian coast in order to make a few tests that would complete the first part of my work.

I arrived in Pula on 26th September, and the next day I left this harbour the next day at dawn, and at 8 o'clock I met an English frigate sailing very close to the coast. This encounter motivated me to conclude that it was better to save the work I was lucky to have carried out in the presence of Russian ships than to start a new work in front of the very enemies just sailing into the gulf. Therefore, I went to Piran *(Pirano)* since everybody convinced that I would be able to reach Venice *(Venise)*, regardless of the number and the position of the ships cruising in the surroundings of that port."

In spite of such an inconvenient circumstance, that hydrographer and scientist made the first, really high quality navigational plan of Split, and he

mjestu u Dalmaciji *(Dalmatie)* gdje se najviše trguje s Bosnom *(Bosnie)* i gdje se najlakše opskrbiti svježom hranom. (...) Ono što se zove splitskom lukom je zapravo zaton otvora 500 i dubine 400 hvati (974,5 x 779,6 m – op. MK), sa svih je strana okružen ravnim stijenama od kojih su neke pod morem, a u dnu kojeg je smješten grad Split. Tvrdi mulj, koji izvrsno drži sidra, čini opću kakvoću dna u ovom zatonu. (...)

Mali brodovi koji posjećuju luku Split nalaze zaklon pod gradom, unutar mola koji ih štiti od vjetrova i otvorenog mora. Oni koji imaju gaz veći od 8 stopa i koji ne mogu uploviti u taj bazen, izloženi su riziku da se razbiju o mol ili o ravne stijene u dnu luke kada bi im pukli konopi.

Velika je dubina između krajnjih rtova splitske luke. Budući da u luci ima dovoljno prostora, s obzirom na dobru kakvoću dna, veći ratni brod mogao bi se usidriti pod zaštitom topovskih baterija koje brane Split s morske strane. Međutim, to je položaj na kojemu, ipak, ne savjetujem da se ostane bez potrebe.

U zapadnom dijelu grada nalaze se sumporni izvori (...). Žitelji Splita upotrebljavaju vodu za piće iz čatrnja i zdenaca. Grad Split je malen, ali dobro naseljen. Trgovina ovdje privlači velik broj malih brodova, a ruševine Dioklecijanove palače *(ruines du palais de Dioclétien)* nekolicinu znatiželjnih. Geografska širina zapadnog kraja mola je 43°29'49". Deklinacija magnetske igle: 16°37'32'' sjevero-zapadno.

U trenutku kad sam se spremio zaploviti prema Boki kotorskoj *(bouches du Cattaro)*, položaju za koji mi je Njegova Ekscelencija ministar pomorstva *(Son Execellence le Ministre de la marine)* naročito zapovjedio da posjetim, gospodin generalni providur Dalmacije (Marmont – op. MK) 20. rujna (1806. godine – op. MK) obavijestio me da će ponovno započeti neprijateljstva s Rusima (Russes), da je jedan engleski odred brodova (qu'une escadre anglaise) upravo ušao u Mletački zaljev i konačno da je jedan brik *(qu'un brick)* te iste države već pretražio jedan austrijski brod *(bâtiment autrichien)* na rtu Ploča *(la pointe de la Planca)*. Te nepovoljne novosti navele su me da odmah napustim Split, čak i dalmatinsku obalu *(côte de Dalmatie)*, gdje nisam imao ni najmanju nadu da korisno iskoristim ostatak ljetnog razdoblja. Otišao sam na istarsku obalu kako bih pokušao izvršiti nekoliko ispitivanja koja bi zaokružila prvi dio mog rada.

Stigao sam u Pulu 26. rujna; tu sam luku sutradan u cik zore napustio, a u 8 sati ujutro sreo sam jednu englesku fregatu kako plovi vrlo blizu obali. Taj me susret nagnao da ocijenim kako ću spasiti rad koji sam imao sreću izvršiti uz nazočnost ruskih brodova, bolje nego ponovno započinjati novi pred očima

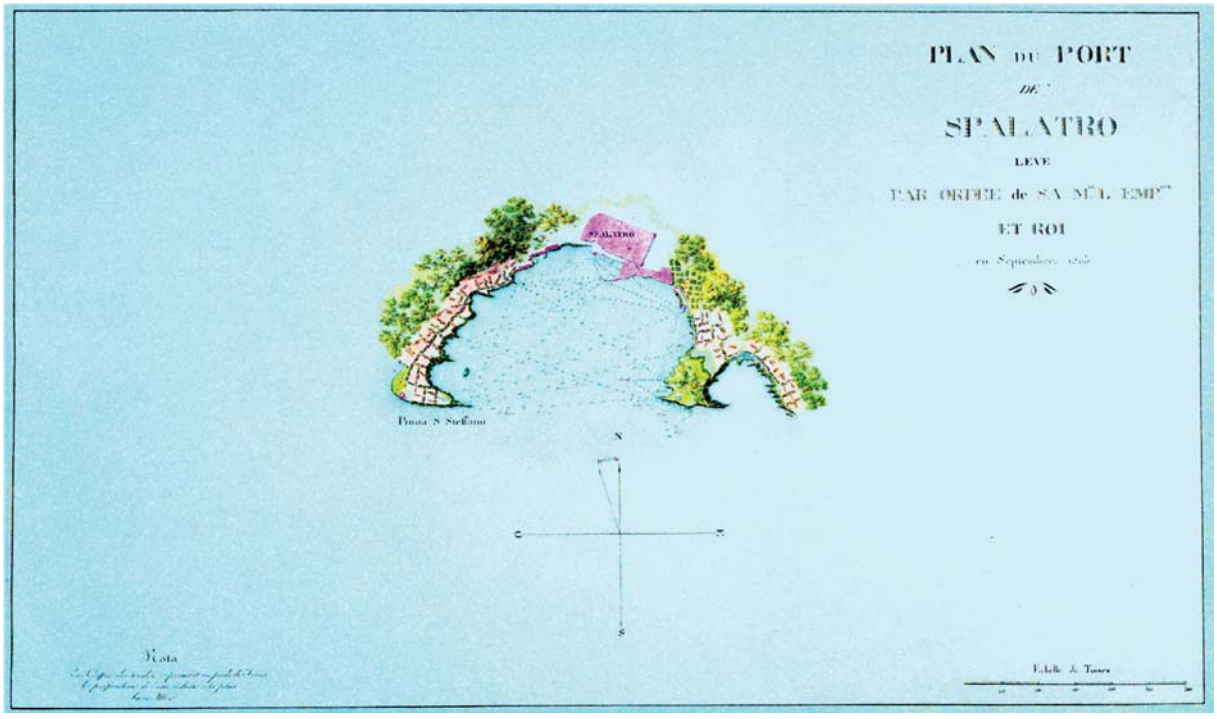

Fig. 3. Beautemps-Beaupré's plan of the Split harbour from 1806 The source in the Cartographic Collection of the National and University Library in Zagreb

Slika 3. Beautemps-Beaupréov plan luke Split iz 1806. god. Izvornik u Kartografskoj zbirci Nacionalne i sveučilišne knjižnice u Zagrebu

finished his exploration of the Eastern Adriatic area in 1808-1809 as the military and political situation was somewhat better, and he wrote the *Second Report* about it on 1st May 1810. Thus, a necessary fund was created on one hand of scientifically based hydrographic and numerous other data necessary for the production of a sea navigational chart that will be supplemented in new hydrographic campaigns. The campaign of systematic hydrographic survey of the Adriatic Sea was carried out in the twenties of the 19th century. It was a mutual campaign of Austrian, Neapolitan and English hydrographers and their research ships. The result of this monumental campaign was the *Atlas of navigation charts of the Adriatic Sea* printed in 1822-1824 (*Carta di cabottaggio del mare Adriatico*). There are 28 sheets altogether in this *Atlas*. The first sheet is the cover page, and the second presents a general map of the Adriatic Sea with the presentation of the sheet arrangement numbered I-XX with the sea navigation charts at the scale 1:175 000 presented on them, and at the end there are 7 general sheets presenting harbour panoramas, passages and difficult navigation areas. On the IXth sheet, territorial waters from Grebaštica in Šibenik to Tučepi near Makarska are presented, including all islands placed on the opposite side, and in the upper part there is a new plan of Split of better quality than the one made by Beautemps-Beaupré. In the *Atlas* there is also a panorama of Split.

All these researches will result in a high quality *Portolan of the Adriatic Sea* edited by the captain Giacomo Marieni (*Portolano del Mare Adriatico*) that will be printed twice: 1830 and 1845.

On such bases, the *Austrian Lloyd* ordered in the mid 19th century from the Trieste water-colourist Giuseppe Rieger for the purpose of its own steam ship navigation two books with panoramas of the eastern coast of the Adriatic Sea. Rieger made first the panoramas of the western coast of Istria from Trieste to Pula (*Costa occidentale dell'Istria*), and published them in 1845. Five years later he also printed the rest of the panoramas from the cape Kamenjak up to Budva (*Panorama della Costa e delle Isole di Dalmazia*).

The panoramas were printed in lithography on the 168×245 mm format. The sheets were connected to each other by means of sticking, so the uninterrupted panoramic series was made almost 12 meters long, folded and compiled into 41 sheets. Together with the first part of the Istrian panorama, it is almost 20 meters long. Both sets of panoramas are bound in cardboard covers. They accompanied the route of steam ships by the *Austrian Lloyd* Trieste – Kotor, and they had been made first of all for seamen and passengers sailing on that route.

However, further development in mapping the Adriatic Sea as a whole, and even the harbour Split, depended on new hydrographic research. The research was initiated only in 1859, but they were directed only to the territorial waters from the mouth of the river Po to the river Piave, and the whole area of the Adriatic Sea was completed during the period between 1866 and 1870. The research was organized by the Austrian war navy of that time and the administrator Thobias Oesterreicher (1831 - 1893), who was honoured with the rank of admiral at the end of his very successful career as a leading Austrian, and later on Austro-Hungarian hydrographer.

The hydrographic activity was institutionalised on 27th April 1860 after the Hydrographic Institute in Trieste (*Hydrographische Anstalt*) was founded, and in 1862 its branch was opened in Pula. Pula was

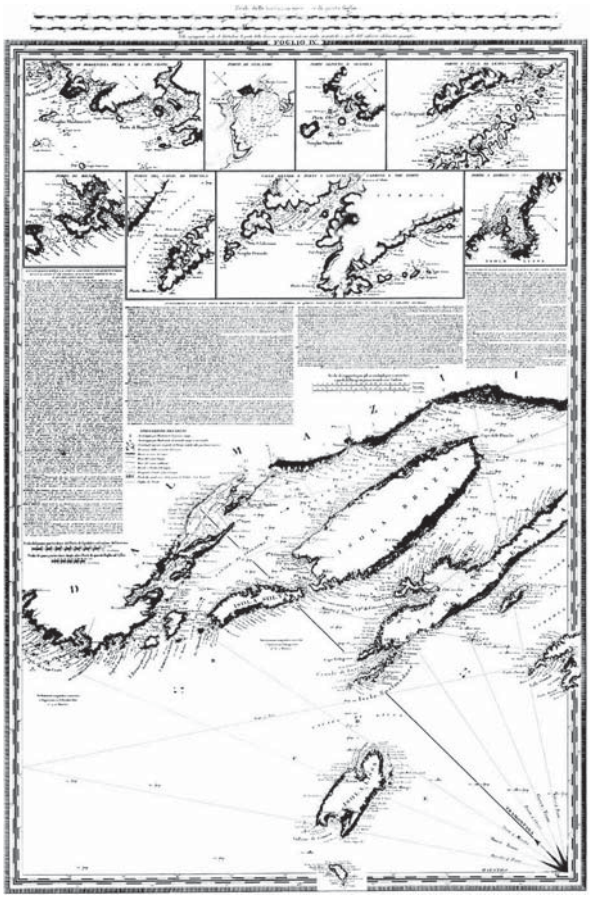

Fig. 4. The sheet IX from the atlas Carta di cabottaggio del mare Adriatico, *Milan, 1824 The source copy in the Cartographic Collection of the State Archives in Zadar*

Slika 4. List IX. iz atlasa Carta di cabottaggio del mare Adriatico, *Milano, 1824. Izvornik u Kartografskoj zbirci Državnog arhiva u Zadru*

neprijatelja, koji je upravo uplovio u zaljev. Zbog toga sam krenuo za Piran *(Pirano)* budući da su me uvjerili da ću odatle moći stići do Venecije *(Venise)*, bez obzira na broj i položaj brodova koji krstare u okolici te luke."

Unatoč takvim nepovoljnim okolnostima taj hidrograf i znanstvenik izrađuje prvi, doista kvalitetan pomorski plan Splita, a svoje istraživanje istočnog Jadrana okončava 1808–09. godine, kada se vojnopolitička situacija malo stabilizirala, pa o tome piše *"Drugo izvješće"* 1. svibnja 1810. godine. Time se stvara, s jedne strane, nužni fundus znanstveno utemeljenih hidrografskih i mnogobrojnih drugih podataka potrebnih za izradu pomorske karte, koji će se u novim hidrografskim kampanjama nadopunjavati. Sljedeća kampanja sustavne hidrografske izmjere Jadrana poduzeta je dvadesetih godina 19. stoljeća. To je zajednička kampanja austrijskih, napuljskih i engleskih hidrografa i njihovih istraživačkih brodova. Kao rezultat te kampanje pojavio se monumentalni *Atlas plovidbenih karata Jadranskog mora* tiskan 1822–24. godine *(Carta di cabottaggio del mare Adriatico)*. U tom se *Atlasu* nalazi ukupno 28 listova. Na prvom je naslovnica, na drugom generalna karta Jadrana s prikazom rasporeda listova numeriranih I–XX, na kojima su prikazane pomorske karte u mjerilu 1:175 000, a na kraju je 7 preglednih listova panorama luka, prolaza i teških navigacijskih područja. Na IX. listu predočava se akvatorij od šibenske Grebaštice do Tučepa kraj Makarske, uključujući sve nasuprotno otočje, a u gornjem dijelu, pored ostalog, donosi se novi plan Splita bolje kvalitete nego što je onaj Beautemps-Beaupréa. U *Atlasu* je donesen i panoramski izgled Splita.

Sva ta istraživanja rezultirala su i pojavom prvoga kvalitetnog *Peljara Jadrana* u redakciji kapetana Giacoma Marienija *(Portolano del Mare Adriatico)* koji će se tiskati čak dva puta: 1830. i 1845. godine.

Na takvim temeljima, sredinom 19. stoljeća Austrijski Lloyd za potrebe vlastitog parobrodarstva naručuje od tršćanskog akvarelista Giuseppea Riegera dvije knjige panorama istočne obale Jadrana. Rieger prvo izrađuje panorame zapadne obale Istre od Trsta do Pule *(Costa occidentale dell'Istria)*, pa ih izdaje 1845. godine. Pet godina poslije tiska i ostatak panorama od rta Kamenjak do Budve *(Panorama della Costa e delle Isole di Dalmazia)*.

Panorame su tiskane litografijom na formatu 168 x 245 mm. Listovi su lijepljenjem međusobno spajani, pa se dobio neprekinuti panoramski niz dug gotovo 12 metara, presavijen i složen u 41 list. Zajedno s prvim dijelom, panoramom Istre, dug je gotovo 20 metara. Oba kompleta panorama ukoričena su u kartonski uvez. Pratile su rutu parobrodske pruge Austrijskog Lloyda Trst – Kotor, a ponajprije su izrađene za potrebe pomoraca i putnika koji su plovili tom prugom.

Međutim, daljnji napredak u kartografiranju Jadrana u cjelini, pa i luke Split, ovisio je o novim hidrografskim istraživanjima. Ona se iniciraju tek 1859. godine, ali su tada bila usmjerena jedino na akvatorij od ušća rijeke Po do rijeke Piave, da bi od 1866. do 1870. godine bila obuhvaćena cjelina Jadranskog mora. Njihov je organizator bila onodobna austrijska ratna mornarica. Voditelj je bio Thobias Oesterreicher (1831–1893), koji je na kraju svoje plodne karijere kao vodeći austrijski, poslije austrougarski hidrograf, bio počašćen admiralskim zvanjem.

Hidrografska djelatnost institucionalizirana je 27. travnja 1860. godine otvaranjem Hidrografskog zavoda u Trstu *(Hydrographische Anstalt)*, a 1862. godine u Puli je otvorena njegova podružnica. Pula je sredinom XIX. stoljeća sa svojom ratnom lukom, arsenalom i brodogradilištem bila najznačajnija austrougarska luka. Zavod u Puli s vremenom postaje središte hidrografske aktivnosti na istočnoj obali Jadranskog mora. Zavod je podijeljen u 5 odjela (spremište s mehaničkom radionicom, spremište pomorskih karata i nautičkih priručnika, zvjezdarnica s astronomskim, meteorološkim, geomagnetskim i plimnim opservatorijem te mornarička knjižnica). Pomorske karte i publikacije tiskane su u Vojnogeografskom institutu u Beču. Zaposlenici zavoda postaju predavači stručnih predmeta na Mornaričkoj akademiji u Rijeci, odnosno u Puli, i to je bilo znanstveno-tehničko središte ratne flote koje je služilo za obuku stručnoga kadra za potrebe austrougarske ratne mornarice. Godine 1872. raspušten je Hidrografski zavod u Trstu i potpuno preseljen u Pulu nakon dovršenja nove zgrade u sastavu koje je bila i zvjezdarnica. Od 1866. do 1872. godine traje prva sustavna hidrografska izmjera Jadranskog mora pod vodstvom kapetana fregate Oesterreichera. U sklopu te izmjere obavljena su astronomska i geofizička mjerenja te geodetska izmjera. Na osnovi podataka izmjere 1872. godine je publicirana u Vojnogeografskom institutu u Beču serija karata.

No, kako je u Puli već počela gradnja glavne ratne luke Austro-Ugarske Monarhije, 1866. godine Hidrografski se zavod premješta iz Trsta u Pulu, da bi 1869. godine promijenio ime u Hidrografski ured *(Hydrographische Amt)*. Na temelju rezultata dotad izvršenih hidrografskih istraživanja, 1872. godine izdaju se nove pomorske karte:

the most important Austro-Hungarian harbour in the mid 19th century with its war harbour, arsenal and shipyard. The Institute in Pula gradually became the centre of hydrographic activity on the Eastern coast of the Adriatic Sea. It is divided in 5 departments (depository with mechanic workshop, depository of sea navigation maps and nautical manuals, astronomical, meteorological, geomagnetic and tide observatory, and the seamen library). The sea navigational maps and publications were printed at the Military and Geographic Institute in Vienna. The employees of the Institute became the lecturers of professional subjects at the Naval Academy in Rijeka, i.e. in Pula, and it was scientific and technical centre of the war fleet that served for training the professional personnel needed in Austro-Hungarian war navy. In 1872, the Hydrographic Institute in Trieste was dissolved and completely moved to Pula after the new building had been finished with the star observatory being its integral part. From 1866 to 1872 the first systematic hydrographic survey of the Adriatic Sea was carried out conducted by the frigate captain Oesterreicher. Astronomical and geophysical measurements as well as surveying were done also within the scope of the survey. On the basis of the surveying data from 1972 the new series of maps was published in the Military and Geographic Institute in Vienna.

But, since the war harbour of the Austro-Hungarian Monarchy was already being built in Pula, the Hydrographic Institute was moved in 1866 from Trieste to Pula, and in 1869 it changed its name to Hydrographic Office (*Hydrographische Amt*). On the basis of the results obtained in the hydrographic research made up to that moment, new sea navigation maps were published in 1872:

- general map of the Adriatic Sea at the scale of 1:1 000 000
- 4 course maps at the scale of 1:350 000
- 30 coastal maps at the scale from 1:40 000 to 1:100 000, and
- 8 plans of harbours and passages at the scale from 1:20 000 to 1:40 000.

On that occasion, a modern version of former IXth sheet from *Carta di cabottaggio del mare Adriatico* was printed, and that is as the *Coastal Map No. 16* (*Küsten-Karte No 16*). In the lower left corner of the map there is a plan of Split (*Hafen von Spalato*) and its panoramic representation. The map was signed by T. Oesterreicher who was the frigate captain and the administrator of the Hydrographic Office in Pula.

Soon after these maps had been printed, a lot of deficiencies were notice in the surveying itself, as well as in mapping of the survey data. From 1880 to 1885 the revision of the previous hydrographic survey was made, since no sufficient profile density had been achieved earlier, a relatively small number of depths had been measured, and the presentation of the sea bottom was not satisfactory. On the basis of the new survey, a few new maps and a new series of course maps at the scale of 1:180 000 were made. Between 1889 and 1890 a new geomagnetic survey of the Adriatic Sea was made. On the basis of those results, new, high quality series of sea navigation maps followed. Since the second edition of Marieni's *Pilot of the Adriatic Sea* from 1845 became unusable in spite of numerous supplementations printed by the Trieste, and then Pula Office, a new one was to be made, based on all professional and scientific research of the sea up to that time. At the same time it was the top activity of Oesterreicher's work. It was done so, and in 1893 *Segelhandbuch für das Adriatische Meer* was published in Pula, being the first real sailing manual of the Adriatic Sea. New hydrographic and other surveys of the Adriatic Sea followed during the period 1906-1910, and in the meantime, in 1906, an even higher quality manual of that sea was produced: *Segelhandbuch der Adria*, and some new sea navigation maps as well.

World War I and the disintegration of the Austro-Hungarian Monarch influenced the work of the Hydrographic Office as well. Namely, according the Rapall Treaty, the town of Pula and hydrographic office (instruments and data: survey original documents and printed original copies of sea navigation maps) belonged to Italy, and it was necessary to establish hydrographic activity in that area. On the 1st September 1922 the Hydrographic Office was reconstructed within the scope of the Preparatory School for Navy Officers in Tivat. Namely, at the territory of the state at that time, a smaller quantity of charts and publications, and naval manual was preserved at the warehouse in Tivat becoming the basis for the reconstruction of the hydrographic activity. The year after that, on 21st August, the office moved to the Naval Military Academy in Dubrovnik. During this period, the hydrographic activity was dealing only with the most elementary issues: production of printed original copies by means of copying the existing maps, maintenance of sea navigation maps, publications and manual. The first maps published by the office were 2 auxiliary maps: map of the currents in the Adriatic Sea and the Map of Forbidden Anchorages.

On the 1st October 1929, the Hydrographic Office moved to Split where it has remained up to now. In Split there was namely the Direction of Maritime Traffic, and the town is located in the middle of the

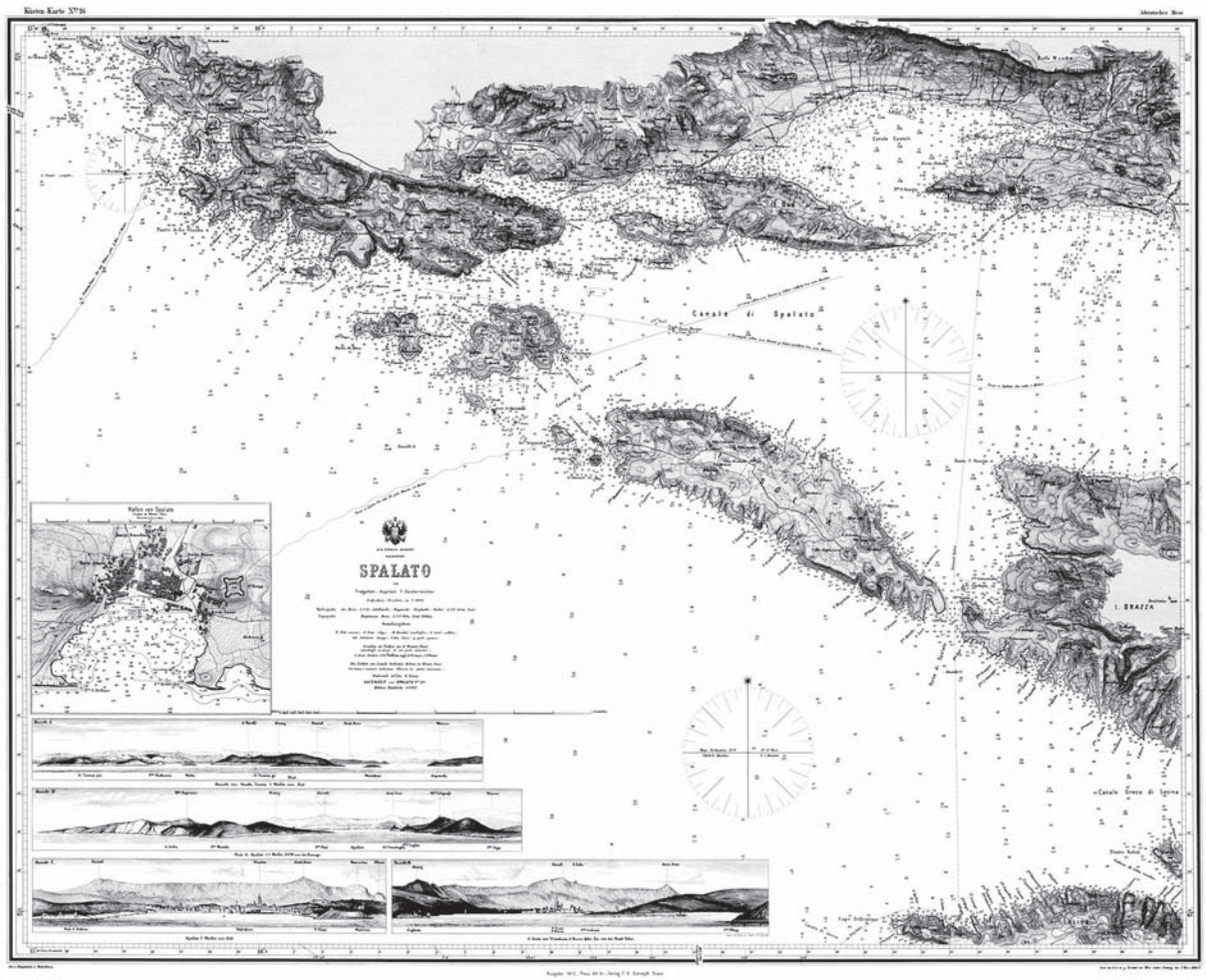

Fig. 5. Coastal sea navigational map No. 16, Vienna, 1872 Source at the Cartographic Collection of the National and University Library in Zagreb

Slika 5. Obalna pomorska karta br. 16, Beč, 1872. Izvornik u Kartografskoj zbirci Nacionalne i sveučilišne knjižnice u Zagrebu

- generalna karta Jadrana u mjerilu 1:1 000 000,
- 4 kursne karte u mjerilu 1:350 000,
- 30 obalnih karata u mjerilu 1:40 000 do 1:100 000, te
- 8 planova luka i prolaza u mjerilu 1:20 000 do 1:40 000.

Tom se prigodom za Split tiska moderna inačica nekadašnjeg IX. lista iz Carta di cabottaggio del mare Adriatico, i to kao Obalna karta br. 16 *(Küsten-Karte No 16)*. U donjem je lijevom kutu te karte plan Splita *(Hafen von Spalato)* i njegov panoramski prikaz. Kartu potpisuje T. Oesterreicher, koji je u časti kapetana fregate te ravnatelj pulskoga Hidrografskog ureda.

Ubrzo nakon tiskanja tih karata uočene su mnoge manjkavosti kako izmjere, tako i kartiranja premjerenih podataka. Od 1880. do 1885. godine obavlja se revizija prethodne hidrografske izmjere budući da se ranije nije postigla zadovoljavajuća gustoća profila, izmjereno je relativno malo dubina, a ni prikaz reljefa morskog dna nije bio na zadovoljavajućoj razini. Na osnovi nove izmjere izrađeno je nekoliko novih karata i nova serija kursnih karata u mjerilu 1:180 000. Između 1889. i 1890. godine obavlja se geomagnetska izmjera Jadrana. Na temelju tih novih rezultata slijedit će nove, kvalitetnije serije pomorskih karata. Kako je drugo izdanje Marienijeva Peljara Jadrana iz 1845. godine, unatoč mnogim dopunama koje je tiskao prvo tršćanski, a zatim pulski ured, postalo neuporabljivo, trebalo je izraditi novi, utemeljen na svim dotadašnjim stručnim i znanstvenim istraživanjima tog mora. Ujedno, to bi bila i kruna dotadašnjeg Oesterreicherova djelovanja. To se i čini, pa se u Puli 1893. godine izdaje *Segelhandbuch für das Adriatische Meer*, prvi pravi peljar Jadrana. Nove hidrografske i druge izmjere Jadrana slijede 1906–10. godine, a u međuvremenu se 1906. godine izdaje još kvalitetniji peljar tog mora: *Segelhandbuch der Adria*, te iznova nove pomorske karte.

Prvi svjetski rat i raspad Austro-Ugarske Monarhije utječe i na rad Hidrografskog ureda, naime

Adriatic coast, which makes the organizing of surveys and data distribution a lot easier. After coming to Split, the Hydrographic Institute became an independent institution having three departments: cartographic, nautical and reproduction. In the same year, the first hydrographic survey was organised and the first portable tide gauges were set, needed in hydrographic survey. The year after that, the first permanent tide gauge that was connected with the existing levelling network was set in Split.

During the work of the Hydrographic Office in Split, a lot of topographic and hydrographic surveys were made. Newly acquired data resulted in new sea navigation maps, and a new, revised edition of the maps series 200 that was used as a model by older Austro-Hungarian maps was printed. The maps were supplemented with new topographic and hydrographic surveying data, and Italian and German toponymy was replaced by the Croatian names. Thus, the following maps were printed:

- general map at the scale of 1:1 000 000
- 2 general large scale maps 1:750 000
- 2 course maps at the scale of 1:180 000
- 9 coastal maps at the scale from 1:60 000 to 1:80 000
- 5 plans at the scale from 1:3000 to 1:15 000
- 6 auxiliary sea navigation maps.

On that occasion, a modern version of the former Oesterreicher's *Coastal Map No. 16*, was made, but had different numbering (10207 Split). At the same time, as a *Sailing Manual of the Adriatic Sea*, the second Austro-Hungarian edition of that manual from 1906 will be used up to the fifties in the 20th century with numerous supplementation. The only thing done in this field between the two wars was *Description of the Adriatic Sea Coasts – the First Part*, as an internal publication for royal war navy.

The Office published a few publications: three editions of the List of Lighthouses and marine marks at the Adriatic Sea, Distance Index of the Eastern part of the Adriatic Sea, Nautical tables, and a part of text for the new Sailing Manual was written. A monthly *Announcement for Seamen* was published regularly. Meteorological Service has been located in Split since 1930, and in 1936 it became an integral part of the Hydrographic Office. The Office established 16 stations where synoptic and climatological measurements are made. Two times a day, a synoptic map is delineated, and weather forecast is emitted once a day.

In 1935, the Office received its own building in Poljud in Split, two years later it went through reorganization again and got four departments: nautical, cartographic (unifying cartographic, hydrographic, oceanographic and geomagnetic tasks, as well as the field work), meteorological and reproduction. The new working organization was renamed into Hydrographic Navy Institute.

he work of the Institute was interrupted again after the occupation of Split in 1941, and the enemy took all the instruments and cartographic material. The employees of the Observatory hid themselves and thus preserved the instruments. During the World War II the Cartographic Office was formed in 1943 having the task to make cartographic material necessary for the Navy. The office moved to Vis on the 1st January 1944 where the topographic map of the island Vis and Biševo was made at the scale of 1:25 000, and printed in Algiers. The navigation warehouse was established on Vis where the whole navigation and cartographic material was stored.

After the World War II, the hydrographic survey was continued, as well as many other scientific researches of the sea and submarine area, first of all in the eastern Adriatic Sea. On the basis of the results obtained in a few first after-war years, due to the persistency and an exceptional effort of captain Antun Botrić (1904-1983), the first two-volume, complete sailing manual of the Adriatic Sea was printed in Croatian in 1952: *Sailing Manual at the Adriatic Sea – Ist Part – Eastern Coast*, and in 1953 *Sailing Manual at the Adriatic Sea – IInd Part – Western Coast*. In the later decades, those publications were updated by better and more accurate data and printed in numerous editions. The similar situation was with cartographic production that has grown to dozens of various series of navigation maps. If we add other publications printed by the Croatian Hydrographic Institute, the institution that is a direct successor of Beautemps-Beaupré's scientific research from the beginning of the 19th century, it can be deduced that it is a respectable and scientific institution of world significance working on the advance of navigation security at the Adriatic Sea.

Hydrographic Institute JRM obtained a new building with the useful surface of 3000 m^2 on the 9th September 1979 that was built only for the purpose of hydrographic activity and it is located in the direct vicinity of the war harbour Lora in the area of Poljud.

The decree of the Government of the Republic of Croatia turned the Croatian Hydrographic Institute on the 25th October 1991 into the institution of the Republic of Croatia competent for all

Rapallskim ugovorom grad Pula a s njim i Hidrografski ured (instrumentarij i podaci: originali izmjere i tiskovni originali pomorskih karata) pripadaju Italiji, te je na tim prostorima trebalo ponovo uspostaviti hidrografsku djelatnost. Tako je 1. rujna 1922. godine obnovljen rad Hidrografskog ureda u sklopu Pripremne škole za pomorske oficire u Tivtu. Naime na teritoriju tadašnje države sačuvana je manja količina pomorskih karata i publikacija te navigacijskih priručnika u skladištu u Tivtu, pa je to postala osnova za obnavljanje hidrografske djelatnosti. Sljedeće godine, 21. kolovoza, ured seli u sastav Pomorske vojne akademije u Dubrovniku. U tom razdoblju hidrografska se djelatnost svodi na najosnovnije: izradu tiskovnih originala postupkom preslikavanja postojećih karata i tiskanje te održavanje pomorskih karata, publikacija i priručnika. Prve karte koje izdaje ured bile su 2 pomoćne karte: karta struja Jadranskog mora i Karta zabranjenih sidrišta.

Prvoga listopada 1929. godine Hidrografski ured seli se u Split, gdje ostaje do danas. U Splitu se, naime, nalazi Direkcija pomorskog saobraćaja, a grad se nalazi na sredini Jadranske obale, što umnogome olakšava organiziranje izmjere i distribucije podataka. Dolaskom u Split Hidrografski ured postaje samostalna institucija koja u svom sastavu ima tri odjela: kartografski, nautički i reprodukcijski. Te iste godine organizira se prva hidrografska izmjera i postavljaju prvi prijenosni mareografi za potrebe hidrografske izmjere. Sljedeće godine postavljen je prvi stalni mareograf u Splitu, koji se povezuje s postojećom nivelmanskom mrežom.

Za vrijeme rada Hidrografskog ureda u Splitu obavljeno je dosta topografskih i hidrografskih izmjera. Novoprikupljeni podaci rezultiraju novim pomorskim kartama, a tiska se i novo, dopunjeno izdanje serije karata 200, kojima kao predložak služe starije austrougarske karte. Karte su dopunjene novim podacima topografskih i hidrografskih izmjera, a zamijenjeni su i talijanski i njemački toponimi hrvatskim nazivljem. Tako se tiskaju:

- generalna karta u mjerilu 1:1 000 000
- 2 generalne karte krupnijeg mjerila 1:750 000,
- 2 kursne karte u mjerilu 1:180 000,
- 9 obalnih karata u mjerilu od 1:60 000 do 1:80 000,
- 5 planova u mjerilima od 1:3 000 do 1:15 000,
- 6 pomoćnih pomorskih karata.

Tom se prigodom za Split donosi moderna inačica nekadašnje Oesterreicherove *Obalne karte br. 16*, s tim što ima drukčiju numeraciju (10207 Split). Istodobno, kao Peljar Jadrana čak do pedesetih godina 20. stoljeća, koristit će se drugo austrougarsko izdanje tog priručnika iz 1906. godine s mnogobrojnim dopunama. Jedino što će se između dva rata na tom planu učiniti bit će *Opis obala Jadranskog mora - Prvi dio*, kao interna publikacija za kraljevsku ratnu mornaricu.

Ured izdaje nekoliko publikacija: tri izdanja Popisa svjetionika i pomorskih oznaka Jadranskog mora, Daljinar istočne obale Jadrana, Nautičke tablice, a napisan je i dio teksta za novi Peljar. Uz publikacije redovito izlazi i mjesečnik Oglas za pomorce. Meteorološka služba od 1930. godine nalazi se u Splitu, a od 1936. godine u sastavu je Hidrografskog ureda. Ured je ustanovio 16 postaja na kojima se obavljaju sinoptička i klimatološka mjerenja. Dva puta dnevno iscrtava se sinoptička karta, a jednom dnevno emitira se prognoza vremena.

Godine 1935. ured dobiva vlastitu zgradu u Poljudu u Splitu, a nakon dvije godine ponovo doživljava preustroj, pa tako dobiva četiri odjela: nautički, kartografski (koji ujedinjuje kartografske, hidrografske, oceanografske i geomagnetske zadatke kao i terenski dio posla), meteorološki i reprodukcijski. U novom preustroju dobiva i novi naziv Hidrografski institut mornarice.

Okupacijom Splita 1941. godine ponovo je prekinut rad instituta, a okupator odnosi čitav instrumentarij i kartografski materijal. Osoblje opservatorija sakrilo je i tako sačuvalo jedino instrumentarij. Za vrijeme Drugog svjetskog rata u studenome 1943. godine osnovan je kartografski ured sa zadaćom da za potrebe mornarice izrađuje potreban kartografski materijal. Ured 1. siječnja 1944. godine prelazi na Vis, gdje se izrađuje topografska karta otoka Visa i Biševa u mjerilu 1:25 000, te se tiska u Alžiru. Na Visu je formirano i navigacijsko skladište, u kojem je pohranjen sav sakupljeni navigacijski i kartografski materijal.

Nakon Drugog svjetskog rata nastavlja se kontinuirana hidrografska izmjera te mnoga druga znanstvena istraživanja mora i podmorja, ponajprije istočnog Jadrana. Već na temelju rezultata u prvih nekoliko poratnih godina, zahvaljujući ustrajnosti i iznimnom trudu kapetana Antuna Botrića (1904–1983) izrađuje se i tiska dvosveščani prvi sveobuhvatni peljar Jadranskog mora na hrvatskom jeziku: 1952. godine *Peljar po Jadranu – I. dio – Istočna obala*, a 1953. godine *Peljar po Jadranu – II. dio – Zapadna obala*. U idućim desetljećima ta će

hydrographic work in the area of the Adriatic Sea where Croatia has sovereignty or can realize its sovereign rights. The basic constitutional units of the Croatian Hydrographic Institute are the departments: nautical, hydrographic, cartographic, oceanographic, reproduction, information, legal and bookkeeping and financial department.

As a consequence of the war event in the Republic of Croatia, the Institute performs all its activities with the minimum of financial funds. The largest problem in its work is the lack of a research ship. Therefore, the research ship Hidra was built in the shipyard Punat in 1993 to be used by the Croatian Hydrographic Institute. It is furnished with the most sophisticated navigation equipment, and with hydrographic and oceanographic instruments. On that ship, the hydrographic and oceanographic measurements are continued making the basis for the maintenance of more than 100 sea navigation maps, plans and publications. The Croatian Hydrographic Institute is an institution that has reached the top of the world with its activities and usage of technological achievements, and it can be proud for having automated a larger part of hydrographic activity, production of sea navigation maps. The first map made in a completely automated way by means of a computer is the navigational plan of Split with the code number 47.

As the result of intensive hydrographic activity, the *Sailing Manual I – the Adriatic Sea – Eastern Coast*, was printed being the basic navigation tool for the seamen along with the sea navigation map.

The well indented Croatian coast of the Adriatic Sea and its clear sea water are a real paradise for nautical experts, and the Croatian Hydrographic Institute publishes a series of products intended for so called small ships or seamen amateurs (Small maps and Sailing Manual for small ships). Lately, one can find digital product of the Croatian Hydrographic Institute in the market proving that this institution copes with the international trends in the sea navigation safety.

The economic development of the Republic of Croatia has imposed the need for hydrographic research of the submarine area. This task could not be fulfilled with a small ship having limited navigation properties, and in 2003 the research ship Palagruža was bought for higher demands.

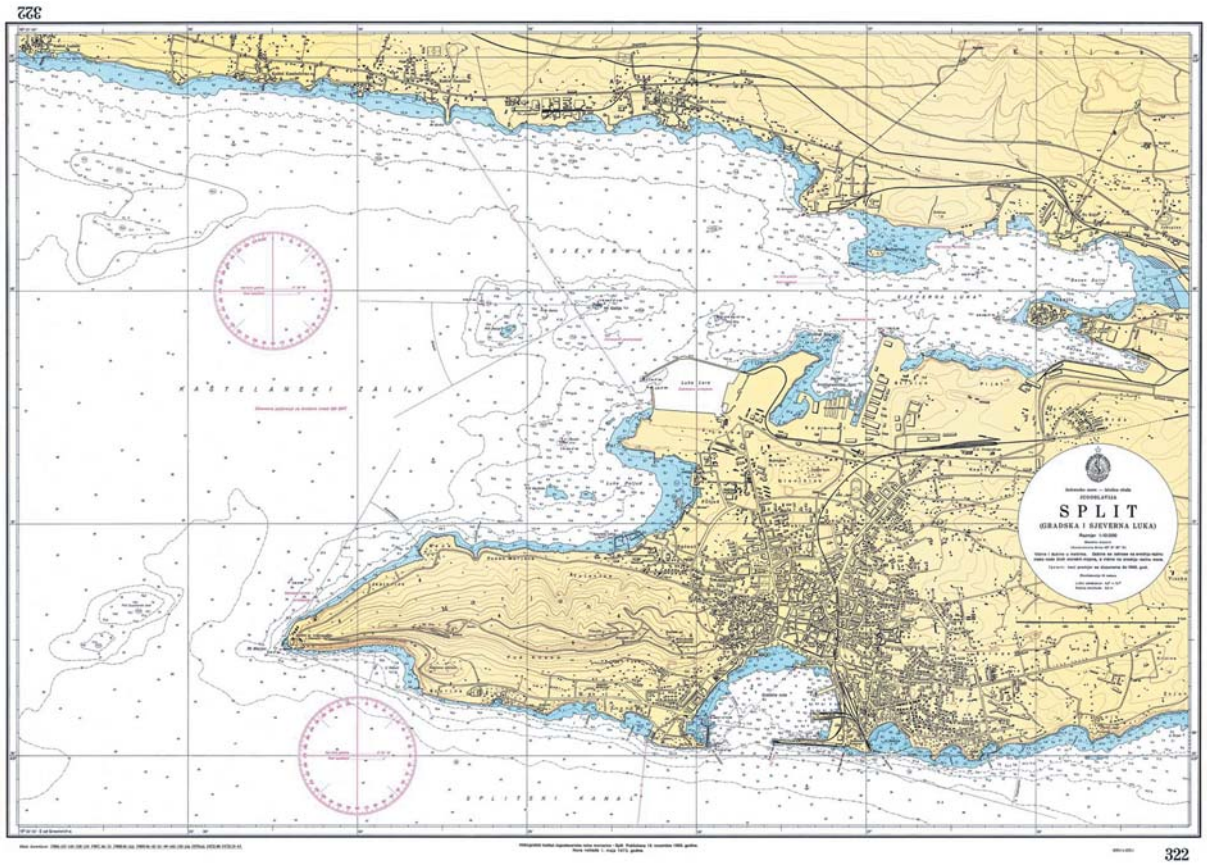

Fig. 6. Navigation plan of the Split harbour, No. 322, Split 1965
Slika 6. Pomorski plan luke Split, br 322, Split 1965.

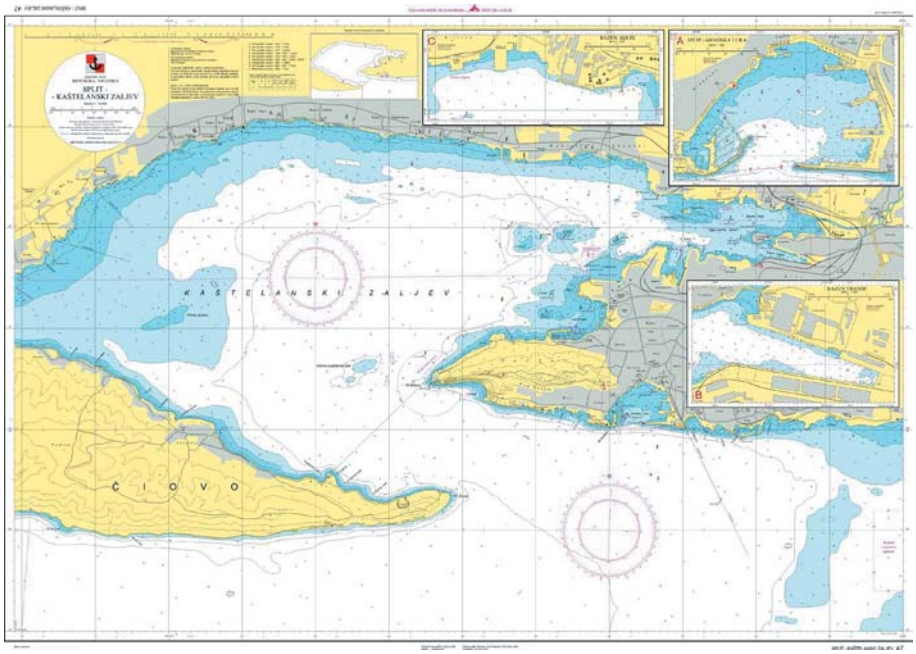

Fig. 7. Newly printed sea chart – Navigational plan 47 Split – the Gulf of Kaštela
Slika 7. Pomorski plan 47, Split – Kaštelanski zaljev

se publikacija upotpunjavati boljim i točnijim podacima, te će se tiskati u mnogobrojnim izdanjima. Slično je s kartografskom produkcijom, koja će narasti na desetke raznolikih serija plovidbenih karata. Pridruže li se tome i druge publikacije koje tiska Hrvatski hidrografski institut, ustanova koja je izravni nastavljač Beautemps-Beaupréovih znanstvenih istraživanja s početka 19. stoljeća, može se zaključiti da je to doista u svjetskim mjerilima respektabilna stručna i znanstvena ustanova za unapređivanje sigurnosti plovidbe Jadranskim morem.

Hidrografski institut JRM 9. rujna 1979. godine dobiva novu zgradu s 3000 m^2 korisne površine, koja je građena samo za potrebe hidrografske djelatnosti i nalazi se u neposrednoj blizini ratne luke Lora u predjelu Poljuda.

Odlukom Vlade Republike Hrvatske od 25. listopada 1991. godine Hrvatski hidrografski institut postaje institucija Republike Hrvatske nadležna za poslove hidrografske djelatnosti na području Jadranskog mora, u kojem Hrvatska ima suverenitet ili ostvaruje suverena prava. Osnovne organizacijske jedinice Hrvatskoga hidrografskog instituta čine odjeli: nautički, hidrografski, kartografski, oceanološki, reprodukcijski, informatički, pravni i računovodstveno-financijski.

Zbog ratnih zbivanja u Republici Hrvatskoj institut obavlja svoju redovitu djelatnost s minimumom financijskih sredstava. Najveći problem u radu bio je nedostatak istraživačkog broda. Stoga je 1993. godine u brodogradilištu Punat za potrebe Hrvatskog hidrografskog instituta izgrađen i/b Hidra. Opremljen je najsuvremenijom navigacijskom opremom te hidrografskim i oceanografskim instrumentima. S Hidrom se nastavljaju hidrografska i oceanografska mjerenja, koja čine osnovu za održavanje više od 100 pomorskih karata, planova i publikacija. Hrvatski hidrografski institut moderna je institucija koja se svojim aktivnostima i korištenjem tehnoloških dostignuća nalazi u svjetskom vrhu i može se bez lažne skromnosti pohvaliti automatizacijom većeg dijela hidrografske djelatnosti, pa tako i automatiziranom izradom pomorske navigacijske karte. Prva karta izrađena potpuno automatizirano na računalu pomorski je plan Splita s kodnim brojem 47.

Kao rezultat intenzivne hidrografske djelatnosti, 1999. godine publiciran je *Peljar I – Jadransko more – istočna obala*, koji je za pomorce uz pomorsku kartu osnovno navigacijsko pomagalo.

Hrvatska obala Jadranskog mora s razvedenom obalom i čistim morem pravi je raj za nautičare, pa Hrvatski hidrografski institut osim karata i publikacija za pomorce profesionalce izdaje i seriju proizvoda namijenjenu takozvanim malim brodovima ili pomorcima amaterima (Male karte i Peljar za male brodove). U posljednje vrijeme na tržištu se mogu naći i digitalni proizvodi Hrvatskoga hidrografskog instituta, kojima ta institucija prati međunarodne trendove u sigurnosti plovidbe morem.

Gospodarski razvoj Republike Hrvatske nametnuo je i potrebu za hidrografskim istraživanjem podmorja otvorenog mora. Ta se zadaća nije mogla ostvariti malim brodom ograničenih plovidbenih svojstava, pa je 2003. godine kupljen i/b Palagruža.

References / Literatura

Beautemps-Beaupré, C. F. (1807): Rapport sur les rades, Ports et Mouillages de la Côte Orientale du Golfe de Venise. Visites en M.DCCC.VI. Par ordre de sa Majesté l'Empereur et Roi. Sous les Ministeres de Leurs Excellences. Le Vice Amiral Decres Ministre de la Marine et des Colonies de l'Empire F(ran)çais et de général de division Caffarelli Ministre de la Guerre et de la Marine du Roy(au)me d'Italie, Paris. (Nacionalna i sveučilišna knjižnica u Zagrebu, Kartografski odjel, sign. A-III-S[18]-9).

Beautemps-Beaupré, C. F. (1849): Rapports sur les rades, ports et mouillages de la côte orientale du golfe de Venise. Visités en 1806, 1808 et 1809, par ordre de l'empereur, Annales hydrographiques, 1849, 32-121.

Botrić, A. (1952): Peljar po Jadranu. I. dio. Istočna obala. (Od Soče do sjevernog Krfskog kanala), Hidrografski institut JRM, Split.

Botrić, A. (1953): Peljar po Jadranu. II. dio. Zapadna obala. (Od rta S. Maria di Leuca do ušća Soče), Hidrografski institut JRM, Split.

Grakalić, M. (1962a): Hidrografska služba na našoj obali, Hidrografski godišnjak, 59-94.

Grakalić, M. (1962b), Hidrografska služba na našoj obali, Pomorski zornik, I, 789-808.

Kozličić, M. (1995a): Beautemps-Beaupré o Jadranu 1806. godine, Pomorski zbornik 33, 259-279.

Kozličić, M. (1995b): Kartografski spomenici hrvatskoga Jadrana, AGM, Zagreb.

Kozličić, M. (1995c): Risultati delle ricerche sull'Istria del 1806 del Beautemps-Beaupré. (Contributo alla storia della marineria e della cartografia della costa occidentale dell'Istria), Atti del Centro di ricerche storiche 25, 41-138.

Kozličić, M. (1995d): Neke naznake uz splitski primjerak Barentsove karte Jadrana, Radovi Filozofskog fakulteta u Zadru. Razdio povijesnih znanosti 34 (21), 185-198.

Kozličić, M. (1999): "Tabvula Sinvs Venetici" von W. Barents und ihre Geschichtlische und Geographische Bedeutung, Geoadria 4, 21-32.

Kozličić, M. (2000): Presentazioni panoramiche dell'Adriatico orientale nel corso della storia, Archivio Storico Italiano 158, No. 583 (1), 119-140.

Kozličić, M. (2003): Panorame Dalmacije Giuseppea Riegera, Hrvatski hidrografski institut, Split.

Lago, L. (1989): Theatrum Adriae, Edizioni Lint, Trst.

Lago, L. (1996): Stare karte Jadrana, C.A.S.H., Pula.

Lovrić, P. (1988): Opća kartografija, Sveučilišna naklada Liber, Zagreb.

Marieni, G. (1830): Portolano del Mare adriatico, Istituto geografico militare, Milano.

Marieni, G. (1845): Portolano del Mare adriatico, Istituto geografico militare, Wien.

Marković, M. (1974): O najstarijim geografskim i pomorskim kartama Jadranskog mora, Pomorski zbornik 12, 491-517.

Marković, M. (1993): Descriptio Croatiae, Naprijed, Zagreb.

Moreland, C., Bannister, D. (1989): Antique Maps, Phaidon Press Limited, London.

Narodne novine (1998): Zakon o hidrografskoj djelatnosti.

Ritchie, G. S. (1991): The History of Hydrography, International Hydrographic Rewiev LXVIII (1), 7-20.

Skupina autora (1824): Carta di cabottaggio del mare Adriatico (1924), Istituto geografico militare di Milano, pubblicata negli anni 1822 e 1824, Milano. (Državni arhiv, Zadar, Kartografska zbirka, sign. 76).

Skupina autora (1893): Segelhandbuch für das Adriatische Meer, Hydrographischer Amte der k. und k. Kriegs-Marine, Pola.

Skupina autora (1906): Segelhandbuch der Adria, Hydrographischer Amte der k. und k. Kriegsmarine, Pola.

Stajić, D. (1990): Izložba 130 godina hidrografske službe na istočnoj obali Jadranskog mora, Hidrografski institut JRM, Split.

Mithad Kozličić
Tea Duplančić Leder