U.S. COAST GUARD

The U.S. Coast Guard's Office of R&D: Its Initial Half-Life (1968-1979)

A Memoir by Dr. Charles C. Bates

Science Advisor to the Commandant, 1968-1979

Dorothy Wilkinson, Editor

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Dr. Charles C. Bates
Biography

Dr. Charles C. Bates is a recognized expert in converting pure science into applied technology. Since 1943, he has been instrumental in instigating and implementing a wide range of technological "start-ups," particularly in the field of earth and environmental science. Prior to World War II, Bates explored for oil and gas as a junior geophysicist for what is now called EXXON USA. During World War II, he was awarded the Bronze Star Medal by the Ninth Air Force for developing and putting into effect an oceanographic program which provided sea, surf, and swell forecasts for the invasion of the European continent.

Following the war, he established the first oceanographic and meteorological consulting firm for the off-shore oil industry. During this period, his doctoral dissertation on the formation of river deltas won the President's award of the American Association of Petroleum Geologists for 1953.

In 1957, Dr. Bates became the first "Environmental Surveillance Coordinator" in the newly formed Technical Analysis and Advisory Group, Office of the Chief of Naval Operations (Development), with responsibility for mapping and charting, geodesy, high altitude physics, geophysics, and meteorology / oceanography. In so doing, he served as the Navy member on the technical steering team for development of the first weather satellite (TIROS) and conceived Navy Support System S-32, Anti-Submarine Warfare Environmental Prediction System (ASWEPS).

Between 1960 and 1964, he was the first chief of the Underground Nuclear Test Detection Branch, Advanced Research Projects Agency, Office of the Secretary of Defense. This effort involved the direction and coordination of work efforts involving 14 government agencies, 30 universities, and 20 industrial contractors, plus establishment of a cooperative seismological network in 38 countries.

After serving as Scientific and Technical Director of the 2,200-person U.S. Naval Oceanographic Office in the late-1960s, Dr. Bates spent a decade as the first Science Advisor to the Commandant, U.S. Coast Guard. During this period, he was designated Commanding Officer, Research and Development Flight, Washington, D.C. Air Reserve Center, with a wartime mobilization slot located within the Air Force Office of Scientific Research at the rank of lieutenant colonel.

During the 1970s, Bates spent a record-setting nine years on the Research and Development Council of the American Management Association. He also became listed in Who's Who in America, American Men and Women of Science, and the World's Who's Who in Science.

Upon coming to Arizona in 1979, Dr. Bates was named to the Governor's Commission on the Arizona Environment, and served there until 1986. He has also written two books:

Geophysics in the Affairs of Man (Pergamon Press, Oxford) and *America's Weather Warriors, 1814-1986* (Texas A&M University Press). In 1986, he became Spectrum International Associates' vice president for research.

Bates holds three degrees: BA cum laude and Rector Scholar, De Pauw University, 1939 (geology/physics); MA, UCLA, 1943 (physics/meteorology); and PhD, Texas A&M University, 1953 (oceanography).

Prologue

Old Time is still a-flying:
And this same flower that smiles today,
Tomorrow will be dying.

Robert Herrick (1591-1674)

Prior to 1967, the multi-faceted 177-year old U. S. Coast Guard (USCG) never deemed it necessary to acquire a congressionally authorized appropriation for Research, Development, Test and Evaluation, i.e. an RDT&E account. During the early 1960's, congressional pressures built up for having the executive side of the federal government create a "Wet NASA" or even a cabinet level U. S. Department of the Oceans. Moreover, should one of these two entities actually come into being, it was highly probable that the Coast Guard with its 37,000 uniformed and 6,000 civilian personnel would be subducted into this new organization.

On the other hand the Coast Guard was scheduled as of 1 April 1967 to become the maritime component of the newly formed U. S. Department of Transportation (DOT). To help insure that the USCG would remain within the DOT framework while simultaneously demonstrating this venerable seagoing service was utilizing the latest thinking in marine science and engineering, the Coast Guard obtained its first ever RDT&E appropriation from the U. S. Congress for Fiscal Year 1969, i.e. the one starting on 1 July 1968.

To initiate the necessary groundwork, a newly frocked RADM Orvan R. Smeder (USCG Academy Class of 1939 and USCG Helicopter Pilot #13) was brought aboard by the Assistant Commandant, VADM Paul Trimble, during August 1967 to be the Assistant Chief of Staff (Research and Development) at USCG Headquarters. In the same month Commandant Willard J. Smith directed Chief of Staff RADM Mark Whalen to recruit post haste a Chief Scientific Advisor to the Commandant so his opinion could be sought prior to the Commandant "...deciding on staffing, organizational alignment or program details." This proved to be a slow process. Thus, it was not until 22 June 1968 that Dr. Charles C. Bates, the U. S. Naval Oceanographic Office's technical director, reported on board in this key role.

As a junior flag officer, Smeder fought a long and frustrating battle with entrenched office chiefs regarding acquisition of personnel and funding for the proposed Office of Research and Development. For example, on 6 September 1967, RADM C. P. Murphy, Chief of Merchant Marine Safety, advised the Chief of Staff that he was: "...quite concerned over the idea that research be centralized and vested in an Office of Research and Technology established with a larger operating staff of researchers." Nonetheless, "top side" prevailed. As a consequence Commandant Willard J. Smith publicly announced during 1 November 1968 that his Headquarters organization now included an Office of Research and Development (Code: G-D) commanded by RADM Smeder. Moreover for long-term continuity, Dr. Bates would be the deputy office chief

and chief scientist while continuing in his other role as the Commandant's Science Advisor.

Furthermore, while drawing on the external know-how of a Science Advisory Committee comprised of nationally recognized engineers and scientists, RADM Smeder would direct the National Data Buoy Project plus three new internal divisions-- Applied Sciences, Applied Technology and Human Resources. Initial staffing totaled 39 personnel - 24 officers, three enlisted men and 12 civilians. Besides the Headquarters component as of 1972 two subordinate field commands existed-- the Coast Guard R&D Center at Avery Point, Groton, CT, and a substation - the Ship Fire and Safety Test Facility at Mobile, AL.

With the passage of time the overall R&D staff totaled slightly over 200 personnel. Among their accomplishments were solar powered buoys, thin film color chromatography kits for on-scene identification of ill spill sources, airborne infra-red scanners for mapping oil slicks at night, and the demonstration of precise methods for navigating narrow ice covered shipping channels. In addition, close contacts were maintained with the Canadian Coast Guard and the Ship Research Institute of Japan. Once the United States phased out its war effort in Southern Vietnam , budget-cutting pressures built up during the late 1970s. Then during 1982 the White House directed budgetary cuts which caused the Coast Guard to reduce its RDT&E effort by 30 percent when measured in terms of either dollars or personnel. One result was that R&D function eventually comprised less than one percent of the total Coast Guard effort. Consequently in 1987 when a major command reorganization required new flag officer slots for joint task force (interdiction of migrants and drugs) and regional logistic commands, the Office of R&D was abolished. However, the modest RDT&E congressional appropriation continued to exist so its expenditure became a staff function led by a four-striper within the newly expanded Office of Engineering, Logistics and Development.

What follows below is a personal narrative describing activities during the build-up phase of the Coast Guard's Office of Research and Development (1968-1979). As it so happened this proved to be the initial half-life of a unique organization. The viewpoint expressed herein is that of the Office's Chief Scientist who served in succession four commandants and six office chiefs. Although each new commander brought about some challenge and change, these were primarily differing types of *modus operandi*. On the other hand most officers assigned to this unique duty were highly skilled and of such competence that two of the office chiefs went on to become vice admirals -Captain Ellis I. Perry, as Vice Commandant (1974-1978) and RADM James P. Stewart as Commander, Pacific Area (1981-1985). In addition, five other members of the R&D Command during its first decade of existence were also chosen to be rear admirals, namely, Marshall E. Gilbert, Richard M. Larrabee, William F. Merlin, Abe H. Siemens and Gerald F. Woolever. As for the author, his eleven years at Coast Guard Headquarters were the best of 37 years spent working for four of the nation's five armed forces (1941-1979).

Chapter One

A Sudden Need for a Coast Guard Office of Research and Development: (The Mid-1960's)

The Coast Guard's annual Birthday Ball celebrates its being the senior maritime service of the United States of America. After all, its forerunner, the U. S. Revenue Cutter Service, came into being on 4 August 1790 while the U. S. Navy was not permanently authorized by the U. S. Congress until 30 April 1798. Be that as it may, what became eventually known as the U. S. Revenue Cutter Service lasted well over a century until being melded with the U. S. Lifesaving Service during 28 January 1915 to form today's U. S. Coast Guard. If classed as a naval service --- and by law the Coast Guard is a permanent armed force --- it would comprise the world's 12th largest navy.

Following the hue and cry associated with the infamous sinking during 14 April 1912 of the SS *Titanic*, the world's largest passenger ship, the global maritime community agreed that there should be an International Ice Patrol on the Grand Banks of Newfoundland. It further agreed that the action agency should be the U. S. Revenue Cutter Service (USRCS) even though it had no specific research capability within its structure. Even so, in due course the USRC *Marion* found itself temporarily assigned to Professor Reginald Fessenden, the nation's second most prolific inventor, for testing his Iceberg Detector and Echo-Depth Sounder on the Grand Banks. Although terribly sea sick, during 27 April 1914 Fessenden clearly proved that his sonic oscillator detector device worked as claimed. By so doing this one collaborative cruise by a revenue cutter laid the basis for three new technologies of great importance, namely, detection by echo sounding (SONAR), bottom detection by echo sounding (bathymetric surveying) and seismic detection of buried commercial accumulations of petroleum and natural gas. (1.1)
As in the Fessenden development, the Coast Guard and its predecessor services were frequently among the vanguard of singly or collaboratively introducing new technologies for enhancing mission performance within the harshest of marine environment. Table I lists several of these successes.

TABLE I

SOME NOTABLE ADVANCES IN MARINE TECHNOLOGY BY THE U. S. COAST GUARD OR ITS PREDECESSORS (1797- 1968)

Time Frame	Type of Technological Improvement	Service
1797	Eclipsers installed at Cape Cod Lighthouse, making it the first in USA to provide intermittent light beam	Lighthouse Establishment
1812	Parabolic reflectors introduced at lighthouses	Lighthouse Establishment

1820	First fog bell (West Quoddy Head Lighthouse, Maine)	Lighthouse Establishment
1841	Fresnel lens from France installed at Navesink Lighthouse	Lighthouse Establishment
1840s	Eight steam vessels built with innovative machinery and propulsion systems; all had mechanical problems and were expensive to operate	Revenue Marine
1851	Fog whistle powered by horse driven air compressor installed at entrance to Narragansett Bay	Lighthouse Board
1871	USRC *Grant*, an iron-hulled, steam-powered three-masted barque placed in commission for 35 years, including Bering Sea duty.	Revenue Cutter Service
1873	Eight-man crews using self-bailing, self-righting life boats (based on British design) congressionally authorized for wherever needed.	Life-Saving Service
1877	Mineral oil (kerosene) replaces lard oil as main illuminant at lighthouses	Lighthouse Board
1881	Lighted buoy using oil gas installed off entrance to New York Bay	Lighthouse Board
1886	Arc light placed in Statue of Liberty's torch; first use of electricity in navigational aids	Lighthouse Board
1901	Marconi radio unit placed aboard Light Vessel No. 58 (Nantucket Shoals) and used to send first USCG distress signal on 10 December 1905 prior to vessel's sinking.	Lighthouse Board
1914	USRC *Seneca* makes first cruise for oceanographic studies in support of the newly created International Ice Patrol.	Revenue Cutter Service
1921	Tampa Class cutter built with first synchro-turbo electric drive for U.S. vessels	Coast Guard
1923	Oceanographi8c Unit established at Harvard University in support of International Ice Patrol; Unit moves during 1931 to Woods Hole, Massachusetts.	Coast Guard
1928	Installation of automatic radio beacons (1931: addition of radio-telephone link)	Bureau of Lighthouses
1928	USCG Headquarters Aviation Desk established to design a flying life-boat (seven amphibian aircraft purchased).	Coast Guard
1930	LCDR Edward H. Smith, USCG, awarded the first doctoral degree in physical oceanography within the U.S. by Harvard University.	Coast Guard
1934	Test of unmanned lightship utilizing radio control.	Bureau of Lighthouses

1936	Launching of the first of the 327-foot Secretary Class cutter equipped with a JF-2 amphibian aircraft.	Coast Guard
1937	RADM Edward Thiele begins 5-year study of optimal ice-breaker design, including borrowing the Soviet's 10,000 ton *Krassin* during the autumn of 1941.	Coast Guard
1938	Radio laboratory moved from Detroit, Michigan, to Baltimore, Maryland.	Bureau of Lighthouses
1940	Ocean Weather Station Program initiated in the North Atlantic Ocean.	Coast Guard
1942	Initiation of LORAN - a long-range navigation network in the North Atlantic region.	Coast Guard
1942	ADM Ernest King, Chief of Naval Operations, directs Coast Guard the Coast Guard to be his prime agent for developing maritime helicopters. LCDR Frank Erickson becomes project officer.	Coast Guard
1958	Automated Mutual-Assistance Vessel Rescue Coast Guard System (AMVER) comes on line and ultimately used by 12,000 participating ships from 143 nations.	Coast Guard
1966	Design of 387-foot Hamilton class high endurance Coast Guard cutter class featuring controllable pitch propellers driven by alternative power systems -- diesel or gas turbine, a concept used when designing the U. S. Navy's Arleigh Burke destroyer class during the mid-1980s.	Coast Guard

However, these advances never came easily or automatically for the Coast Guard and predecessors were always overworked and under-funded. Moreover, its supervising parent, the U. S. Treasury Department, considered its seafaring force to be a consumer of departmental resources rather than a major producer of revenue. Although Coast Guard ships and stations were numerous, they were small and widely separated and not conducive to giving rise to a strong political lobby. Instead, commandants chose to keep their command out of sight and out of mind. As Secretary of Transportation John Volpe later advised the Honorable Ernest F. Hollings, Chairman of the U. S. Senate's Subcommittee on Oceanography, by letter dated 9 February 1970:

> "The Coast Guard was an adjunct to the Treasury Department, attached for administration but with little in common with the objectives of the department, which were mainly concerned with fiscal and financial policy. This, despite the long association, created uncertainty as to the validity of its role."

Although lying low may have been the optimal tactic for interfacing with the Treasury Department's hierarchy, by the late 1950's other components of the Washington establishment were agitating for a much larger federal presence on the high seas. Thus, Congressman Hastings Keith, whose district included the Woods Hole Oceanographic Institution, expounded within the Congressional Record for 9 March 1959: (1.2)

> "The United States is losing to the Soviet Union the biggest and most important sea battle in mankind's history - the contest to unlock the ocean's secrets for use in peace and war ... Now that the United States has drawn alongside the Soviets in the race for outer space, it is essential that we concentrate as well on developing to the fullest our capacity for probing the oceans."

Other legislators agreed as well. (1.3) Accordingly, Warren Magnuson, a former Navy lieutenant commander and now Chairman of the U. S. Senate's Committee on Commerce, placed in the hopper S-2691, The Marine Sciences and Research Act of 1959. During hearings on this bill such diverse groups as the American Legion, the Veterans of Foreign Wars and the District of Columbia Federation of Women's Clubs placed in the record statements like "...we must encourage and support Federal and private agencies concerned with oceanography...". So at the urging of Jerome Wiesner, his fellow yachtsman and science advisor, President John F. Kennedy on 29 March 1961 sent a letter to the President of the Senate stating in part:

> "7. The Coast Guard. At present the Coast Guard's enabling legislation limits the extent to which the Coast Guard can engage in scientific research ... I recommend that the statutory limitation restricting the participation by the Coast Guard in oceanographic research be removed..."

As a direct consequence during 8 October 1961 the President signed into law S-1189 which modified Title 14, U. S. Code, in such a way that oceanographic investigations became a formal Coast Guard mission, namely:

> 94. Oceanographic research: The Coast Guard shall conduct such oceanographic research, use such equipment or instruments and collect and analyze such oceanographic data, in cooperation with other agencies of the U. S. Government, or not, as may be in the National interest.

As it so happened, this expanded charter came at a time when the deep sea ambitions of Commerce's U. S. Coast and Geodetic Survey were being vigorously two blocked by the Navy Department. (1.4) Despite this federal vacuum within marine science, Commandant Alfred Richmond (1954-1962) continued to downplay his competent Oceanographic Unit that dated back to the early days of the International Ice Patrol. (1.5)

Accordingly, as part of the Office of Operations the Unit was funded out of the Operational Expenses (OE) account. Upon Richmond's retirement, however, the Unit was able to move during 1964 from isolated Woods Hole, MA to the more visible but still highly decrepit Washington Navy Yard. But even at the new location the Unit's emphasis was primarily on outfitting some 30 ocean station vessels and six ice breakers with marine technicians and associated gear for acquiring deep sea oceanographic measurements on a routine basis. So successful was this program that by the mid-1970's it generated 34 percent of all such data being received at the much touted National Oceanographic Data Center. (1.6)

In sharp contrast to the Treasury Department which remained scientifically moribund, as early as 1959 the Secretary of the Navy's Office of Naval Research (ONR) released a wish-list blessed by the Chief of Naval Operations labeled Ten Years in Oceanography (TENOC). Then in 1963 the Navy succeeded in having the Interagency Committee of Oceanography promulgate a far more sweeping plan, Oceanography: The Ten Years Ahead. But even these rather grandiose documents did not mollify ocean -orientated activists of the U. S. Congress.

Accordingly, after six years of ferment, the aforementioned Senator Warren Magnuson and allies placed what became Public Law 98-454 on President Johnson's desk for possible signature. Although the presidential staff recommended a veto, Magnuson's new wife, Jermaine, asked Johnson, who had been the best man at their recent wedding, where he stood on the matter. Impetuous as always, LBJ replied, "Honey, for you I'll sign it!" thus causing The Marine Resources and Engineering Act of 1966 to become the law of the land as of 17 June 1966.

One of the new law's provisions required the establishment by January 1967 of a presidential appointed Commission on Marine Sciences, Engineering and Resources, its goal being to report out during early 1969 a wide ranging program that truly advanced the nation's utilization of the world's oceans. Obviously, such a report would likely call for appropriate consolidation within the twenty-two governmental agencies already involved in peaceful uses of the sea.

Although the Treasury Department's Coast Guard employed eighty percent of the federal employees currently being used in that manner, its Secretary demanded neither departmental nor agency representation on this congressionally mandated study group. In sharp contrast the Navy's spokesman on the twelve- man commission was Charles W. Baird, its Under Secretary, while Interior's was Assistant Secretary Frank Di Luzio. As for Commerce, its member was the Administrator of the Environmental Science Services Administration (ESSA), namely, the politically astute Dr Robert M. White whose brother, Theodore H. White, had written the noted insider book, *The Making of the President, 1960*. (Athenaeum House, 1961).

Once the Stratton Commission, so called because its chairman was MIT's President Emeritus, Dr. Julius Stratton, became operational during early 1967, its members could not help to note that the nucleus of any massive federal maritime agency would have to be the U. S. Coast Guard. Outsiders thought the same. Thus, in a letter of 27 November 1967 to Commissioner Robert White, Ralston Purina's Dr. Wilbert Chapman, one of the world's leading fishery specialists, advised that any such new agency should be constituted out of ESSA, Coast Guard, Bureau of Commercial Fisheries, Coastal Research Engineering Research Center, The National Oceanographic Data and Instrumentation Centers, and a few other bits and pieces. Dr. Chapman also suggested consideration should be paid to placing: all of these ocean agencies into the new Department of Transportation.

> "The Coast Guard is already there...It is a new Department still having vigor and drive and not yet hide bound with self generated institutional barriers. I would be happy to support such a move..."

As of the date of Chapman's letter, the Department to which he referred was just a year old. Its formal existence dated back to President Lyndon B. Johnson having signed off on Public Law 89-670 during 15 October 1966. Three days later VADM Paul Trimble, a 53-year old USCG whiz kid, was then designated to be chairman of an Interagency Task Force by the Director, Bureau of the Budget to: (1.7)

> "...Create the requisite organizational plans by which the U. S. Department of Transportation could become fully operational on or about 1 April 1967". (1.8)

While Trimble's team was flushing out appropriate departmental guidelines, the Federal Aviation Administration signed a major contract during 31 December 1966 with Boeing Aircraft and General Electric Corporation for the early design and advanced study phase of America's first supersonic transport (the SST). Because expenditures such as these could be highly controversial with regard to cost, business standing and environmental impact, DOT's finalized command structure called for its Assistant Secretary of Research and Technology to study inputs from the several operating administrations and then to:

> "...monitor and advise the Secretary concerning the implementation of the Department's R & D Program."

On the magical departmental implementation date of 1 April 1967, however, the Coast Guard had neither a formalized RDT&E program nor had it requested one from the U. S. Congress. Moreover, alleviation of this deficiency would have to wait while the relatively new Commandant Willard J. Smith, with the assistance of VADM Trimble and Chief of Staff Mark Whalen, synchronized the operations of their own 42,000 person work force with those being undertaken by 50,000 other employees within the Department of Transportation.

A month later, however, VADM Trimble spotted Captain Orvan E. Smeder who not only had RDT&E experience with the Naval Bureau of Ordnance but also had demonstrated interest in matters of ocean policy and technology. Thus, as soon as Captain Smeder became RADM (Lower Half) Smeder during 1 July 1967, he was ordered to Headquarters with the meaningful title of Assistant Chief of Staff for Research and Development. Nonetheless, his in-house command authority was nil. Being unbudgeted, his staff numbered four: Commander Parkhust (technical assistant), Warrant Officer Jones and Coast Guardsman Fuller (administrative aides), and a secretary, Ms. Ipsaro. Smeder's hopes for the future improved sharply during 25 August 1967. At that time Admiral Smith directed Chief of Staff RADM Whalen to promptly and effectively strengthen the Coast Guard's research and development effort by immediately recruiting a Chief Scientific Advisor to the Commandant. In addition, Whalen was to seek a separate Research and Development appropriation for Fiscal Year 1969 that could be adjusted for as follows:

"1. (e) Through the comparative transfer in the estimates procedure, take a reduction under Operating Expenses for our testing and development staffing and program, with a corresponding increase in Research and Development..."

End Notes for Chapter One

1.1 For details concerning Professor Reginald Fessenden, refer to page 10-11 in *Geophysics in the Affairs of Mankind* by L. C. Lawyer, Charles C. Bates and Robert B. Rice, 2001, Society of Exploration Geophysicists, Tulsa .

1.2 In the book, *The Age of Discontinuity*, published in 1969, the business management expert, Peter Drucker, notes that the Egyptians nearly 4,000 years ago produced two great achievements - the erection of the Pyramids and the invention of the plow. Relative to publicity campaigns of the time, he believed that Americans might find the Space Program to have been its Pyramids and ocean exploration its plow.

1.3 Among the other alarmed politicians were the esteemed Senator Robert Bartlett (Alaska) and the notable Senator Hubert Humphrey (Minnesota), with the latter becoming the nation's vice president five years later. On the House side were such notable representatives as George Miller (California), the only civil engineer in the Congress; Alton Lennon (North Carolina) and the crusading John Dingell (Michigan). For graphic details on how a multitude of individuals interacted on this subject over the next decade, peruse Edward Wenk, Jr.'s engrossing 590 page tome, The Politics of the Ocean, Seattle : University of Washington Press , 1972.

1.4 According to Admiral Jack Hayes's oral history of 1985, as a young lieutenant commander within the Coast Guard's Long Range Planning Unit, he and others proposed a power play whereby the Coast Guard with its 5,000 plus officers would absorb the minuscule U. S. Coast and Geodetic Survey with its 350 officers and a baker's dozen of sea going vessels. As might be expected the concept was deep-sixed, only to be resurrected at the presidential advisory level eight years later.

1.5 Although Dr. Floyd M. Soule eventually reached the rank of Captain within the U. S. Coast Guard Reserve while serving as the Oceanographic Unit's Chief Oceanographer between 1939 and 1962, his policy input was internal to his service. Instead, on the public Washington scene the Coast Guard's oceanographic spokesman was typically a bright personable officer certain to rotate away from oceanography in due course.

1.6 With the exception of an extensive annual oceanographic survey of the water between Newfoundland and Greenland on behalf of the International Ice Patrol, the USCG's oceanographic effort focused primarily on data acquisition. This simplistic approach was the direct apotheosis of that taught by the world's leading oceanographer, Sir Harold Sverdrup, to his students -- of which the author was one! Sverdrup's guideline: Never Sail Without a Hypothesis to Test! If the latter concept had been Coast Guard practice, the ocean stations occupied by that service between 1941 and 1976 would now be among the best-understood spots within the world ocean. But they are not!

1.7 A member of the Coast Guard Academy Class of 1936, Trimble, after four years at sea, entered the Harvard School of Business Administration during August 1940. Upon graduating with distinction and an MBA degree 16 months later, he spent the WWII years commanding patrol frigates within the Pacific Theater including being commander

of Escort Division 27. With the return of peacetime Lt. Trimble rotated between sea commands and Headquarters duty specializing in financial matters. As of July 1962 he returned to Headquarters to serve as the Deputy Chief of Staff. Two years later he assumed flag rank after becoming the Chief of Staff during January 1964. Then two years after that on 27 July 1966 he became the Assistant Commandant with the rank of Vice Admiral.

1.8. Upon Alan S. Boyd being sworn in as the initial Secretary of Transportation during 16 January 1967, VADM Trimble's Interagency Task Force immediately dissolved leaving Secretary Boyd responsible for the following agencies: U.S. Coast Guard, Federal Highway Administration, Federal Aviation Administration, Federal Railroad Administration, St. Lawrence Seaway Administration and the National Transportation Safety Board.

Chapter Two
Toil and Trouble: Establishing the Office of Research and Development (1967-1968)

By virtue of his charter and strong topside support, RADM Smeder assumed that the rest of Coast Guard Headquarters would cooperate while he created what was tentatively labeled the Office of Research and Technology. To explain the potential scope of this new entity, a Smeder memorandum was transmitted for appropriate comment to interested office chiefs by the Chief of Staff during 17 August 1967. The result was a stirred-up hornet's nest. In short order three senior rear admirals advised the Chief of Staff that Smeder should not seek from their commands staff, work assignments nor funding for his proposed empire.

First on record was RADM R. W. Goehring, Chief of Operations. In a memorandum dated 1 September 1967 he observed that although his office did contain a Marine Sciences Division (Code:OMS), in this instance semantics were meaningless. He wrote:

> "lb. The stated functions of OMS and the functions carried out do not include R & T tasks. The functions are all operational/administrative."

In other words, please look elsewhere as my staff is perfectly happy acquiring raw oceanographic data for others to analyze if and when they choose to do so.
Next on record was RADM C. P. Murphy, Chief of Merchant Marine Safety. His rebuttal of 6 September 1967 was slightly different. He certainly agreed that a Coast Guard Office of Research and Technology "...could provide the means of emphasizing the Coast Guard's research [effort]." But his next paragraph opened as follows:

> "2. However, I am quite concerned over the idea that research be centralized and vested in an Office of Research and Technology established with a large operating staff of researchers. [Yes], there is a constant and diversified research effort underway in the Office of Merchant Marine Safety [but] the mandate and argument for the new Office are stated so broadly that most of two Divisions of this Office could conceivably be drawn off. This is a disturbing prospect."

Later in his response, Murphy added:

> "There is also a list of solid accomplishments produced in this Office on such complicated matters as the transportation of grain and bulk cargo, automation, chemical and cryogenic cargo and hydrofoils and air cushion vehicles. "

However, he quickly deflated this claim by adding:

> "We are not in the business of promoting new developments for commercial purposes but only in evaluating them for their influence on safety."

Then Murphy expounded further. Although a member of the federal department spending hundreds of millions of dollars to develop the supersonic transport, his memorandum continued:

> "...I feel that in keeping with our position as a regulatory agency and maintaining the necessary relationships to parties having a proprietary interest, research in areas leading to the solution of practical commercial problems is properly left to other commercial interests involved."

Goehring's and Murphy's negative attitude was distressing. However, crusty RADM D. B. Henderson, Chief of Engineering, was downright hostile. The latter's hackles had clearly been raised earlier when the Commandant's memorandum of 25 August 1967 directed the Chief of Staff to shift upcoming FY 69 funding and staffing from Henderson's much prized Division of Testing and Development into the proposed new Office of Research and Development. To keep this transfer from taking place Henderson tried several ploys. None worked. So on 17 July 1968 he addressed a memorandum to Chief of Staff RADM Thomas R. Sargent and bluntly stated:

> "For the reasons presented below, I recommend the establishment of the proposed Office of Research be held in abeyance until such time as the acute shortage of PG engineers has been alleviated.
> .....
> However, it will take considerable time before any beneficial relief will result. Accordingly, I strongly urge that the establishment of the proposed Office of Research be deferred at this time".
>
> Signed: D. B. Henderson

Despite the negative recommendations, between September 1967 and July 1968 Smeder continued to lay the groundwork for the Coast Guard's first receipt of an annual RDT&E appropriation on or shortly after 1 October 1968. Unfortunately on 25 August 1965 President Johnson had directed that Robert McNamara's complex Plan-Program-Budget System (PPBS) be used throughout the federal government no matter if the effort being proposed were large or small. Thus, Smeder had to generate dozens of pages of paperwork justifying a year long R&D effort costing $5 million and utilizing 106 personnel (66 military and 40 civilian) for FY 69. (2.1)

Besides new starts his program would adsorb the National Data Buoy Development Project (NDBDP) initiated out of hide during January 1968 at the request of the National Council on Marine Resources and Engineering, a new entity chaired by voluble Vice President Hubert Humphrey. The NDBDP was no small potatoes for the publicly announced goal was to deploy on the high seas during 1975 a pilot buoy network following the expenditure of $84 million over a seven year period. (2.2)

As Smeder's infighting continued during late 1967 and the first half of 1968, the elbowing stayed at a civil level for the rear admirals he was jousting with might well be

sitting on his retention board four years hence. On the other hand, sooner or later a major reinforcement should show for back on 25 August 1967 Commandant Smith's memorandum to RADM Whalen called for recruiting a Chief Scientific Advisor to the Commandant who could provide Smith with expert technical advice without a built-in Coast Guard bias.

Unfortunately the recruitment was extremely tedious. Not until 12 January 1968 did ADM Smith certify to the U. S. Civil Service that he desired a Grade GS-18 scientist to do the following:

> a. As one of the Commandant's immediate staff, participate fully in the planning, development and implementation of broad technical and scientific policies and programs of the Coast Guard.
> b. Be the principal determinant of the direction and scope of the total scientific program.
> c. Exercise a major influence in the initiation and discontinuance of investigations.
> d. Develop and maintain effective liaison with universities, foundations, professional societies, including representing the Coast Guard on national and international research and technological committees.
> e. Recommend or foster cooperative research, development and test programs.
> f. Strive to foster a challenging scientific climate in he Coast Guard as well as to develop programs broadening the base of scientific participation in operational programs of the Coast Guard.

Even though the Commandant had spoken clearly, the U. S. Civil Service Commission's response of 7 March 1968 authorized only a Level GS-17 for the USCG's RDT&E program remained a concept, not a fact. Then another two months went by before the opening was nationally advertised as of 16 May 1968. The consequent selection process required only a few days. Although several oceanographers submitted Form -57's for consideration that of Dr. Charles C. Bates (the author) led the pack.

At the age of 49, Bates had already been a super grade GS-17 federal scientist for seven years, first in the Office of Secretary of Defense and then with the Navy's Oceanographic Office where he was currently technical director of a quasi-Navy laboratory utilizing 2,500 employees, three aircraft and eight survey vessels. Furthermore, as a Lieutenant Colonel in the Air Force Reserve, he held an ideal specialty - that of R&D Director (AFSC 2711). Moreover during 1944 he had been seconded to the British Admiralty in London where he earned the Bronze Star medal for forecasting the sea, swell and surf conditions of the Normandy invasion (Operation Neptune). Perhaps best of all he was part of an informal Oceanographic Conniving Society led by Captain Paul Bauer USNR (Ret.), a staff member of the House Merchant Marine and Fisheries Committee. As an aid to the Bates candidacy, the "Society" arranged for Senator Warren Magnuson, the powerful Chairman of the U.S. Senate Commerce Committee, to write Commandant Smith during November 1967 noting that Bates' qualifications were "impressive."

So in due course Bates reported for duty on 22 June 1968 to Coast Guard Headquarters at 1300 E Street, NW, i.e., just three blocks east of the White House. Constructed long before centralized air conditioning, the decrepit, overcrowded seven-story building typified the Coast Guard way of doing things --- suck it up and get the job done despite inadequate and badly rundown facilities. Upon completing on-board pleasantries, RADM Smeder escorted the author to a small, uncarpeted corner room on the second deck, i.e. Number 2224, and announced it as being Bates' office.

"But where will you be sitting, Admiral?"

"No problem--- I'll be just outside in the bull pen with the others!" (2.3)

Bates quickly learned he was one of two fair-haired civilians within a 178-year-old military organization whose specialty was operating under the worst possible sea conditions using the informal motto:

YOU HAVE TO GO OUT BUT YOU DO NOT HAVE TO COME BACK!

Although the Coast Guard was the poor boy operation of the five armed services, its enlisted men and officers were proud of performing well no matter what the personal cost proved to be. Thus, its budgeting routinely called for a 58-hour work week at its 300 shore-based life saving stations. Because of this perpetually excessive and dangerous work-load, civilians made up only 14 percent of the work force.

With respect to the officer corps, most individuals were comparable to Eagle Scouts and graduates of the USCG Academy in one of two specialties - engineering or social sciences. Included in such training were three summers aboard the 295-foot, three masted barque, *Eagle*. (2.4) After graduation typically came four years of sea duty prior to specialization, e.g. flight school or post graduate education. But even after this specialization, sea duty at various command levels aboard cutters remained a prerequisite for selection to flag rank. (2.5)

To make clear that Dr. Bates was truly a member of the top side staff, VADM Trimble had him join the flag level koffee-klatsch held each weekday morning in the Chief of Staff's office. Because of space limitations, however, there was no flag mess. In lieu thereof, for requisite get-acquainted sessions the courtly Commandant invited Bates to lunch at the Army and Navy Club while the latter reciprocated with dining invitations to the prestigious Cosmos Club.

At the working level, RADM Smeder laid out policy issues requiring resolution prior to starting up the Office of Research and Development. One such key issue was where Bates stood within the Coast Guard hierarchy. Should he be merely the Principal Scientist or should he be the Deputy Office Chief and thereby involved in officers' fitness reports and take command whenever RADM Smeder was absent for periods of several days at a time? To explore this issue further, Bates called in a couple of chits from outstanding naval R&D specialists, namely, RADM John Leydon USN (Ret.), the past

Chief of Naval Research, and Dr. Ralph Bennett, the initial Technical Director of the esteemed Naval Ordnance Laboratory.

In his invitation to them dated 18 July 1968, VADM Trimble commented:

> "...the Commandant and I are anxious to finalize our RDT&E management structure within the Coast Guard. To this end, we earnestly solicit your advice on how we might best meld the talents, motivations and skills of uniformed and civilian scientists, engineers and managers of this fledging [sic] program."

During the ensuing two-hour meeting of 24 July 1968 involving one three-star admiral (Trimble), four two-star admirals (Sargent, Henderson, Smeder and Leydon) and two past technical directors (Bennett and Bates), Leydon and Bennett stressed the following items:

> a. To bow to outside convention, the USCG must have an R&D organization specifically labeled as such. Moreover, such an organization must stress 5-year or even longer term planning for a true vision of the future is not achievable through direct arithmetic extrapolation. This longer term view is particularly important because new and sometimes radically different responsibilities are being generated via assignment from the new Department of Transportation.
>
> b. Once the Coast Guard enters the formal RDT&E business, it must use officers and civilians who will be accepted by the outside R&D community. In the past the Coast Guard has done remarkable internal self-improvements by using fall - out from other agencies. It is now timely to get a head-start on technological change by having its own research program.
>
> c. Managers are paid to make nasty decisions - - you can't have your cake and eat it too! Remember, one cannot make changes without change.
>
> d. With respect to the proposed Office of R&D's organization chart, there has to be a duality of management by uniformed and civilian managers within the military RDT&E business each does business best with his own peer group. There is great merit in double-hatting the top civilian so he acts as Chief Scientist to the Commandant as well as the deputy to the rear admiral in charge of the proposed office of R&D. This set up is comparable to the highly successful Office of Naval research organization. Be sure, however, to have no other deputy in the Office, particularly one in uniform. Three policy makers in the top box are simply one too many and create major problems in coordination.
>
> e. In summary, it was most timely for the Coast Guard to get into formal RDT&E programs even though immediate creation of such a group means splitting away present personnel rather than waiting for a slow build up via the legislative process.

By using another chit, Bates reviewed the gist of the 24 July 1968 meeting with Dr. Frank W. Lehan, DOT's Assistant Secretary for Research and Technology. (2.6) Lehan agreed with the proposed USCG use of a modified ONR command structure so Bates relayed that input to VADM Trimble. Trimble's immediate response was for RADM Smeder to draft an official directive activating the new Office of R&D once finite knowledge was at hand regarding the finalized FY 69 Congressional allocation.

Even so, as late as 30 August 1968 RADM Henderson sent a "bird dog", LCDR Robert Shenkle, down to Room 2224. Once there, Shenkle quizzed CWO Jones concerning the number of RDT&E personnel expected for FY 69 and where they would be drawn from. As a consequence, Jones's boss, the now CAPT Parkhurst, fired a memorandum to RADM Smeder which read in part:

> "3. Apparently, another onslaught against the formation of an Office of R&D is in the making. We object to helping prepare it."

Overall, the pitter-patter of Coast Guard negativism towards centralizing in-house continued. For example, during 6 September 1968 CAPT James Moreau, the esteemed project manager of the Polar Transportation Requirements Study, recommended to the Chief of Staff that the Coast Guard establish a Sea Ice Research Program under the Chief of Operations and justify it as an operational requirement.

Perhaps that did it. To stop the squabbling, Admiral Smith and VADM Trimble had RADM Thomas Sargent, the Chief of Staff, promulgate Commandant Notice 5400:

> Subject: Office of Research and Development, establishment of, during 29 October 1968. The rationale for doing so:
>
> "3. Discussion: The missions of the Coast Guard have become increasingly more demanding and complex...To serve the public more effectively and at minimum cost, the Service must increase its efforts to discover new concepts and develop technological improvements necessary to meet present and future mission requirements. ...This review led to the decision to establish an Office of Research and Development, which will combine presently fragmented research and development functions as well as provide for orderly expansion of such activities as necessary."

Two days later came the official press release:

> WASHINGTON , DC . Nov. 1 -- The Commandant of the U. S. Coast Guard, Admiral Willard J. Smith, has established an Office of Research and Development effective 1 November 1968....
>
> Rear Admiral Orvan R. Smeder, USCG, former Assistant Chief of Staff for Research and Development, has been appointed Chief of the new office. Dr.

> Charles C. Bates, Science Advisor to the Commandant, has been named Deputy Chief of the Office and Chief Scientist, U. S. Coast Guard.
>
> The new organization will include the National Data Buoy Project. Planning and Evaluation Staff, and the Science Advisory committee as well as three divisions: Applied Sciences, Applied Technology, and Human Resources...Beginning with a staff of 39 military and civilian personnel, the new Office of Research and Development plans to employ a staff of approximately 120 in the next three years. The initial appropriation for the Office of Research and Development, Fiscal Year 1969, is 4 million dollars.

End Notes for Chapter Two

2.1. Under new guidelines provided by the Government Performance and Results Act of 1993, justification of the $21,722,000 USCG RDT&E effort for FY 2002 required nine sheets of paper, i.e., one page per every $2.5 million. Should this ratio have held when the Navy submitted its $11.4 billion RDT&E effort, its submission would have utilized some 4,600 pages, i.e., the equivalent of four complete Bibles.

2.2. The NDBDP traced back to an early 1960's effort wherein the Office of Naval Research funded a General Dynamics proposal to design, construct and install a long lived "monster" sea buoy. Ten meters across and equipped with a diesel powered electrical generator, the buoy would then transmit to shore by radio routine oceanographic and meteorological observations. As of early 1967 the Coast Guard had a field evaluation underway wherein such a light equipped buoy replaced the manned Scotland Shoal Lightship off Sandy Hook , NJ .

2.3. Despite many pleas that the cramped corner office with its banging air conditioner be jointly shared, RADM Smeder never moved in much to the author's chagrin.

2.4. As it so happened, the author never mastered the art of knot-tying, nor did he like high places. In contrast, after Swab Summer Academy cadets knew a dozen knots. Moreover, they had also learned the best location for minimal work aloft was the *Eagle's* top-most yard despite the accentuated roll at that height.

2.5. Although RADM Smeder held Aviator Precedence #185 for fixed wing and #13 for rotary wing aircraft, he had also served aboard the cutters *Itasca*, *Bibb* (WPG-31), *Escanaba* (WPG-77), *Buttonwood* (WAGL-306), *Chautaqua* (WPG-41) and *Androscoggin* (WPG-68). Of these he commanded the last three for a total of nearly five years.

2.6. By happenstance, Assistant Secretary of Transportation Lehan was a friend of the Bates family. A pioneer in secure FM/FM communications systems, during 1970 Lehan became a member of the National Academy of Engineering. Three decades later it was also announced by the hush-hush National Reconnaissance Office that he had earned one of its coveted Founders Awards.

Chapter Three
Plank Owners of the Office of Research and Development
(1968)

Fleshing out the cadre for the embryonic Office of Research and Development came quickly. In less than two weeks, Headquarters Notice 5400 of 12 November 1968 reported:

> "1. The Testing and Development Division (ETD) previously under the Office of Engineering has been transferred to the Office of Research and Development and renamed as the Applied Technology Division (DAT)."

Fortunately for RADM Smeder and Dr. Bates, a considerable number of bright young officers had received post-graduate training over the past years in some twenty-plus sub-specialties. Thus, to a large degree it became a simple matter of pick and choose (see Table II).

If there had been no office politics, the transferred specialists would have been quite comfortable while being members of the evolving Office of R&D. Unfortunately, this was real life. Thus, it was a major worry whether transferees would be spooked by RADM Henderson's well-known opposition to a formalized RDT&E program. On 27 July 1968 Smeder jotted a note to himself on a 4 x 6 inch card which read:

> "Considering E's opposition, is an assignment to the R&D Office a kiss of death for future promotion?"

Fortunately, most engineering specialists believed joining the new Office could be an exciting adventure for it allowed them to pioneer during at least one of their regular duty assignments.

TABLE II

SUB-SPECIALTIES WITHIN THE USCG ENGINEER CORPS

CODE	SUB-SPECIALTY	CODE	SUB-SPECIALTY
04	Engineering Administration	26	Advanced Electronics
05	Naval Engineering	27	Aviation Electronics
06	Electronics Engineering	28	Aviation Engineering
07	Civil Engineering	29	Communications Engineering
08	Aeronautical Engineering	37	Nuclear Reactor Engineering
09	Aircraft Maintenance	41	Engineering Physics
10	Electronic Maintenance	46	Mechanical Engineering
11	Engineering Physics	47	Architectural Engineering

12	Management & Industrial Engineering	48	Chemical Engineering
20	Ordnance Engineering	53	Electrical Engineering
21	Nuclear Engineering	56	Ocean Engineering
24	Aerological Engineering	58	Industrial College (Armed Forces)

Once personnel assignments firmed up for FY 69, RADM Smeder learned that the new Chief of Staff, RADM Thomas Sargent (a civil engineer), had been sweet talked into RADM Henderson retaining the 23-man Field Test and Development Center at the Coast Guard Yard, Curtis Bay, MD. Be as it may, Smeder's initial R&D command was probably the most top heavy rank-wise of any ever fielded within the military R&D community. All told, it utilized a rear admiral (lower half), four captains, eight commanders, seven lieutenant commanders, one lieutenant (jg), four ensigns, four civilian scientists, one chief warrant officer, two enlisted men and eight secretaries. In naval parlance, this break out of top-side ranking might have been capable of directing a modest sized sea-going task force here they all rode desks. (see Table III)

Another irony of launching the Office of Research and Development in this manner meant for the next ten months 29 quality Coast Guard officers would jointly focus on expending the paltry sum of $4 million! Moreover, this complicated start up was sharply impacted by a rigid USCG budget system that, after receiving inputs from 22 Program Officers, generated a laundry list of 35 topics requiring immediate attention during the Office's first fiscal year. (3.1) In other words, McNamara's infamous Plan-Program-Budget System totally negated RADM John Leydon's advice of 24 July 1968 which recommended that the Coast Guard start its R&D program with a bang by working on only a very few high visibility projects keyed to priority issues facing top-side commanders.

But the die was cast. Now there would be 35 balls in the air with only modest funding, a situation prone to few successes and frequent non-completions. And when that happened RADM Henderson would be announcing: "I told you so!" To avoid this eventuality, RADM Smeder and Dr. Bates urged the FY 70 RDT&E appropriation be expanded by a factor of FOUR over that granted during FY 69. Even this recommended level of $16 million would be but 4 percent of the Coast Guard's total operating expenses, i.e., still at noise level. But this new scale of RDT&E efforts within the old line Coast Guard remained debatable. Quadrupling one's budget within a single year was definitely unheard of. Fortunately, outside politicking took over and soon cemented in place this much needed jump in R&D funding.

TABLE III

Plank Owners of the USCG Office of Research and Development

Element	Personnel
Office of Research and Development (D) Headquarters Building 1300 E Street, N.W.	RADM O. R. Smeder Dr. Charles C. Bates (GS-17) Miss Pauline M. Ipsaro Mrs. Linda S. Naber
Planning & Evaluation Staff (DP) 1201 E Street, N.W.	CAPT E. L. Perry LCDR J. E. McCarty LCDR J. A. Peebles CWO W. F. Jones QMCM J. B. Fuller Mrs. Vernice S. Coban
Applied Sciences Division (DAS) 1201 E Street, N.W.	CAPT R. D. Parkhurst CDR R. H. Baetsen YN1 K. A. Pence Mr. C. E. Catoe (GS-14) Mr. W. M. Lawall (GS-13)
Applied Technology Division (DAT) 1201 E Street, N.W.	CAPT A. N. Siemens CDR J. M. O'Connell CDR R. C. Powell CDR W. E. Lehr LCDR J. T. Montoya LCDR J. A. McIntosh Mrs. Evalda L. Adams Miss Cynthia Bradley Miss Rebecca M. Pohovich
National Data Buoy Project Office 733 15th Street, N.W.	CAPT J. A. Hodgman CDR V. W. Rinehart CDR J. E. Wesler CDR P. A. Morrill CDR E. L. Parker LCDR W. F. Merlin LCDR M. E. Gilbert LCDR J. W. Coste LT(JG) S. H. Barton ENS R. F. Wells ENS J. A. Berres ENS S. H. White ENS J. W. McCarthy SK2 D. C. Huggins Mr. R. F. Powell Mrs. Sandra Rushbrook Miss Deborah E. Juhans

End Notes for Chapter Three

3.1. Project breakout for the USCG FY 69 RDT&E effort by theme, funding level and topic went as follows:
a. Search and Rescue: $310,000 (4 topics)
b. Aids to Navigation: $512,000 (5 topics)
c. Merchant Marine Safety: $635,000 (9 topics)
d. Oil/Hazardous Cargo Pollution Detection & Control: $835,000 (7 topics)
e. Continental Shelf Safety Program: $146,000 (3 topics)
f. Oceanographic and Polar Operations: $200,000 (3 topics)
g. National Data Buoy Systems: $580,000
h. RDT&E Program Support: $782,000 (3 topics)
Note: In its start-up phase, although the NDBP had only 11 percent of the FY 69 RDT&E funding, it still utilized 41 percent of the R&D staff. Moreover, the buoy project was directed by the highly respected Captain James A. Hodgman, initiator as Commander, Squadron One, of the Coast Guard presence in South Vietnam (1965-1966).

Chapter Four
Political Shenanigans Expand the USCG's FY 70 RDT&E Appropriation (1968)

The gamesmanship that jumped the USCG's FY 70 RDT&E appropriation by 370 percent over the $4 million allocated for the prior year can be traced back eight years. After taking office during 1961, President Kennedy specialized in Cold War issues (Vietnam and Cuba) while his vice president, the manic Lyndon Johnson, ruled as the U.S. space czar. If Kennedy wanted a man on the moon by the end of the decade, NASA's route had to go through the American South rather through California as had been done with ballistic missiles. So in due course Texas had the Manned Space Center, Louisiana the Apollo rocket assembly, Mississippi the Apollo test facility and Florida the launch facility. Each was a partial counterbalance to a presently existing German-dominated Space Flight Center up in Huntsville, Alabama under famed Werner von Braun.
By mid-1963 construction was underway within 138,000 acres in southern Mississippi of a static test facility for the Apollo lunar rockets. As such, it was the largest building effort within the entire state and required eliminating five small logging communities that happened to lie in the test zone. But five years later COL Jackson M. Balch, the Mississippi Test Facility's (MTF) installment manager, knew the balmy days of his empire were numbered as no more Saturn Five boosters weighing 6 million pounds at launch were to be manufactured after the early 1970's. To overcome this loss of MTF employment, flamboyant Balch initiated a scheme wherein the massive NASA reservation would be steadily converted into a multi-agency research center composed of independent elements pried out of non-NASA federal agencies. Moreover, by this point in time, the aerospace/defense lobby also knew that a Wet NASA was not to be. So that potent lobby, too, was willing to foster smaller oceanographic initiatives wherever possible.

Consequently via some type of symbiosis, Balch decided that the earliest captive units to be dragged south to the pine forest despite desperate wailing by the transferees should be oceanographic in nature. Thus, as early as 17 June 1968 representatives of the Naval Oceanographic Office in far away Suitland, MD were inspecting MTF capabilities for reducing and analyzing large amounts of raw numerical data. (4.1) Within the next few months and with the backing of Mississippi's U.S. Senator John C. Stennis, Balch visited Coast Guard Headquarters to see what might be transferable. As a senior senator and upcoming Chairman of the powerful Senate Armed Services Committee that approved flag-rank promotions, Stennis could make things happen. Thus, shortly after the Balch visit, Smeder and Bates were on their way to determine what the mosquito-ridden MTF had to offer.

Bates' initial trip by Coast Guard Airlines was an eye opener. Somehow the poverty stricken Coast Guard had under lease the northern half of the northern most hangar at a crowded Washington National Airport. Thus, auto parking was free as was the coffee while waiting to board Coast Guard TWO, a plush 14-passenger Convair turboprop. Upon arrival at the U. S. Aviation Training Center, Mobile, AL, Smeder was highly

welcome for back in 1944 as the Training Officer for the Coast Guard Air Station, Brooklyn, NY he had organized the first ever ground school course for maritime helicopter maintenance. (4.2)

After appropriate pleasantries, Smeder and Bates boarded one of the USCG's new HH-3F helicopters and landed with a flourish alongside the flagpoles at the MTF where Colonel Balch had his assistants lined up as an impressive welcoming party. Despite the MTF costing $300 million (perhaps a billion dollars in today's terms), we visitors were not overly impressed regarding its potential for hosting an oceanographic activity. Office space in the main building would be limited while useful laboratory space was next to nil. Vessel access to the open sea was also difficult and required a 20 mile transit along the narrow, alligator infested Pearl River. As for decent private housing, the sheer size of the MTF required a daily round trip commute of 40 miles or more. Moreover most residential tracts were in floodable hurricane prone areas. Regarding schools, the less said the better.

But the southern hospitality was great. Among cocktail hour guests was Trent Lott, administrative assistant to Congressman William M. Colmer, who, i.e., Lott, would eventually rise to being the U. S. Senate's Majority by the turn of the century. As the liquor flowed it became evident that Smeder and Bates were experiencing pure Washington politicking--if you scratch my back, I'll scratch yours! In this instance Balch wanted the MTF to host the field base for the National Data Buoy Development project. In return, Senator Stennis' staff would ensure that the upcoming USCG FY70 RDT&E appropriation jumped to $14.9 million, thereby allowing NDBP funding to jump by a factor of 11 over the prior fiscal year. Obviously, this was a situation wherein both sides would profit. So the budgetary wheels ground and the USCG's RDT&E appropriation for FY 70 blipped upwards by the much desired factor of 370 percent! (4.3)

End Notes for Chapter Four

4.1 Balch's concept worked so well that by 2003 the now John C. Stennis Space Center hosted not only NASA but also 26 other federal and state agencies. Included therein was the U.S. Navy's world-class oceanographic research and forecasting complex led by a resident rear admiral. However transferring the Navy units required a decade of time and winning several lawsuits plus extensive new building construction and outfitting which cost of the order of $20 million dollars.

4.2 The first helicopter to fly with a pilot aboard was back in 1907. However, it was not until 20 April 1942 that two Coast Guard officers -- CDR Watson Burton and CDR William Kossler - watched a Sikorsky VS-300 hover 25 feet off the ground while a man ascended to it by a rope ladder. Although they immediately thought rotary wing aircraft had great potential for the Coast Guard and the U. S. Navy, others up the chain of command thought differently. After a 19-month tussle, ADM "Blow Torch" Ernest King, the Chief of Naval Operations, ordained that the USCG Air Station at Floyd Bennett Field, Brooklyn , would become the sole wartime training base for using helicopters at sea. To learn more about this classic case of bitterly fought development, testing and evaluation, scan the USCG's web page by Dr. Robert Browning, Jr. at

www.uscg.mil/history/hantisb.html and Arthur Pearce's book, *A History of U. S. Coast Guard Aviation*. Annapolis: Naval Institute. 1991.

4.3 With the Coast Guard's help, by early 2003 NOAA was maintaining 70 data buoys along the coasts of the continental United States, Hawaii, Alaska and the Great Lakes . Moreover, the National Data Buoy Center with an associated USCG detachment still resided at the unique Multi-Agency Center in southern Mississippi , i.e. the Stennis Space Center.

Chapter Five
Diversionary Tactics --- RADM Smeder Becomes Assistant Chief of Staff for Ocean Sciences
(1968)

Within the week following the initiation of the Coast Guard's Office of Research and Development, the 1968 election forced a drastic change in political leadership for Richard M. Nixon would now become president as of 20 January 1969. Outgoing was Secretary of Transportation Alan Boyd who had worked so closely with VADM Trimble to establish the DOT. Incoming would be a whirlwind construction executive, John A. Volpe, former governor of Massachusetts, who presumably had close personal ties with Dr. Julius Stratton, past president of the Massachusetts Institute of Technology and now the highly visible Chairman of the Presidential Commission on Marine Science, Engineering and Resources.

Moreover, as mentioned earlier in Chapter One, it was almost certain that the Stratton Report when released to the President and the Congress just prior to Nixon's inauguration would recommend that the U. S. Coast Guard be plucked from the DOT and shifted to a massive new civilian oriented ocean agency. To provide full time flag level attention regarding this horrible prospect, VADM Trimble asked RADM Smeder during December 1968 to leave his new R & D command and assume a watch dog function in the role of Assistant Chief of Staff for Ocean Sciences. Moreover, it would require being contentious. As early as 13 July 1968, DOT's Secretary, Alan S. Boyd, had written Chairman Julius Stratton:

> "I understand that the creation of a new independent agency, some sort of a Department of Oceans, is among the alternatives being considered by the Commission. I am most skeptical of the need for any such new independent agency and I am ever more dubious that such an agency would be able to make significant progress in advancing marine science programs."

Even so and lacking Coast Guard membership, during 9 January 1969 the Stratton Commission reported out its findings that read in part:

> "The proliferation of marine activities places an unnecessary burden on the President and the Congress. [Page 229] .....
>
> It is our conviction that the objective of the national ocean program recommended by this Commission can be achieved only by creating a strong civil agency within the Federal Government with adequate authority and adequate resources. No such agency now exits and no existing single Federal agency provides an adequate base on which to build such an organization. [Page 229]
>
> The Coast Guard's uniformed officers would benefit from the expanded opportunities that operations under [the new] NOAA [National Oceanic and Atmospheric Agency] would offer." [Page 239]

Despite the platitude expressed in the last paragraph above, RADM Smeder knew that when Dr. Robert White of the U. S. Weather Bureau acquired the U. S. Coast Guard & Geodetic Survey via the ESSA route, the Survey's chief, RADM Arnold Karo, was booted sideways with a meaningless promotion to VADM while his deputy's slot at the Survey was immediately civilianized. To keep this type of wipeout from happening to the militaristic Coast Guard required skillful political maneuvering. On the public side during 10 March 1969 Secretary of Transportation Volpe sent a six page letter to The Vice President, U. S. Senate, plus a 24-page attachment generated by RADM Smeder, which stated, in part:

> "The Commission's basic recommendation for a new Federal emphasis on ocean programs is one with which this Department is in complete accord. Without... [the Coast Guard, however], this Department [DOT] would be severely crippled in carrying out its responsibility to facilitate the development and improvement of coordinated transportation services for the Nation.
>
> The Commission's estimates of costs seem unrealistically low in most instances...For example, the Coast Guard would be included in the new agency but the proposed budget fails to take account of such major Coast Guard programs as aids to navigation and search and rescue.....
>
> I am pleased that the Coast Guard has been recognized as the principal base of competence and facilities upon which to build a new agency to enhance civil marine affairs. [Even so], the Coast Guard can serve the missions of military readiness and transportation as well as other marine interests, with adequate funds, within the Department of Transportation.
>
> {Signed - John A. Volpe}
>
> cc. Members and observers of the National Council on Marine Resources and Engineering Development

Although Secretary Volpe had been aboard for only six weeks, his readiness to fight for the status quo as had his predecessor, Alan Boyd, was most reassuring to the politically feeble Coast Guard. On the other hand, behemoths in the aerospace and defense industries still hoped that the prestigious Stratton Report to the President and to the Congress would trigger massive new spending on ocean technology. But Spiro Agnew, the new vice president and thereby the new Marine Council chairman, was not an ocean enthusiast like the outgoing Hubert Humphrey. To stymie Dr. Stratton, a newly created President's Advisory Council on Executive Organization led by Roy L. Ash was asked to review the NOAA concept. Despite congressional pressures including a floor speech in favor of NOAA by Senator George Herbert Bush, (U. S. President, 1989-1993), the Ash Committee required a half-year before advising President Nixon informally that they would go along with the crowd only if the NOAA concept were converted into a watered-down, non-independent National Marine Agency (NMA).

Even then, despite a continuing hue and cry from Capitol Hill, Nixon would not authorize a fettered NMA. Angry Senator Ernest F. Hollings then arranged for Chairman Stratton, Dr. Edward Wenk (Executive Secretary of the Marine Council) and himself to complain in person to Nixon's close confidant, Attorney General John M. Mitchell. This ploy worked. Soon Mitchell advised Nixon that a full fledged NOAA was a good idea. But which competing department head should get it? Should it be Wally Hickel (Interior) who was in bad congressional repute, Volpe (Transportation) with his sizable Coast Guard, or Maury Stans (Commerce) who supervised the civilian ESSA and its scheming Commissioner, Dr. Robert White?

On 9 July 1970 the outside world learned that the Stans/White team had won out. Nixon immediately transmitted Reorganization Plan No. 4 to the Congress calling for NOAA to be established within the Department of Commerce. However, this NOAA was sans the Coast Guard except for its National Data Buoy Project. In due course the Congress agreed during 28 September 1970 and NOAA became a federal entity five days later. Even so, the news was poorly disseminated. As late as 20 October 1970 RADM Chester Richmond, the new R & D Chief, advised the Coast Guard's assembled district commanders:

> "We are going to lose the National Data Buoy Project....$10.5 million and 53 people...All I can say is that the first time I knew about it was when I read it in the Washington Post...We are playing into a stacked deck. We never really had a chance. We didn't know what was going on...."

To some degree Richmond's comment was incorrect. Secretary Volpe was quite aware that if he lost the Coast Guard to Commerce, his deluxe Coast Guard ONE jet aircraft and his Coast Guard mess boys would disappear. (5.1) So sometime during the final back room negotiations Volpe gladly gave to Commerce the 53 people of the NDBP while retaining the remainder of the 42,000 member Coast Guard. As for Smeder, his reward for waging the uphill fight was a much-prized posting during the summer of 1970 to that of Commander, 7th Coast Guard District, Miami, FL.

End Notes for Chapter Five

5.1 Coast Guard ONE was a Gulf Stream III executive jet carrying ten passengers for up to inter-continental distances. Normally a dry aircraft, the liquor kit promptly appeared if congressional or departmental representatives were aboard. Although technically for Transportation Department use only, Volpe loaned it to Secretary Stans for a flight to Morocco. While there, Stans was spotted by the world press shooting antelope! Needless to say, Volpe dried up similar loans to other departmental secretaries. As for the mess boys, this tradition in the Navy extended down to the Assistant Secretary level but not so in Transportation.

Chapter Six
Early RDT&E Leadership Issues
(1968-1969)

The more it changes, the more it stays the same! This applies to the initial Office of Research and Development. After assuming command on 1 November 1968, RADM Smeder quickly left to become the afore mentioned Assistant Chief of Staff for Ocean Sciences. Then soft- spoken and low keyed CAPT Ellis L. Perry, recipient of a MIT master's degree in naval construction and engineering (1946), took over on an acting basis. Perry knew his stuff for back in 1954-1955 he had directed the USCG Field Testing and Development Unit at Curtis Bay, MD. Hopefully, he could stay on and earn his two stars while in R&D. This was not to be for six months later he was heading back to Curtis Bay to be commander of the Coast Guard's one and only ship yard.

Overlapping Perry was CAPT Chester A. Richmond, a hard-charging test pilot (Aviator Precedence #146 for fixed wing and #145 for rotary wing aircraft). During the mid-1930's, Richmond had been an Army enlisted man for two years prior to joining the Coast Guard and graduating from its academy during May 1941. Although a graduate of the U. S. Navy Test Pilot School in July 1953, Chet's continued postings remained in the area of conventional flight operations. Undoubtedly the hairiest of these tours was the three years spent as Commander, USCG Air Detachment, Naval Operating Base, Kodiak, AK. There, in the land of perpetual bad weather, he earned the Distinguished Flying Cross for carrying out a wild-eyed evacuation of critically burned persons from the Pribilof's St. George Island during 13 April 1961.

Although Richmond knew as early as January 1969 that he was being nominated for flag rank, a half -year went by before it became official. From Seattle during the interim, CAPT Richmond phoned RADM Scullion, the Coast Guard's top personnel officer and asked:

> "Joe, what do you know about this office of R & D?"

The answer:

> "Chet, I don't know very much about it but the pay is good!"

Fortunately by the time Richmond reported into Coast Guard Headquarters, the expanding office of R & D had tolerable office space within pigeon-infested 733 15th Street, NW, just off Farragut Square. Then, after officially becoming a rear admiral (lower half), Richmond reinitiated the fray with the Office of Engineering as to how far the Office of R & D should penetrate into the realm of full-scale hardware development.

In a memorandum to Assistant Commandant Trimble dated 22 September 1969, Richmond complained that Commandant Notice 5409 of 29 October 1968 still allowed

the Office of Engineering to continue "...carrying out certain R & D projects which should be administrated by D."

RADM Pearson's reply (Henderson's replacement) of 15 October 1969 again argued for maintaining the status quo. To obtain a new opinion on this bitter item of contention, LCDR R. C. Williams and Mr. Charles Holt of the Chief of Staff's Management Analysis Division were charged with performing "A Study Concerning Proposed Changes to Coast Guard RDT&E Organization."

Upon interviewing the key players, the two analysts described the scene as follows:

> "D has proposed that they be assigned full spectrum control of the R&D Program, including engineering development and operational systems development. Neither of these two functions is presently assigned specifically to any HQ office, although E lays claim to them."

Their summary report continued:

> "The polarization between the two primary offices involved [E & D] is evident. There is something to be said for both positions...
>
> Due consideration was given to the many conflicting and controversial points of view which provided the bulk of the input to this study".

"Due consideration", unfortunately, lasted for eight months. Thus, the study arrived topside in the same month (June 1970) that ADM Smith and VADM Trimble were retiring. Accordingly, its conventional conclusions such as those listed below were then filed away until further notice:

> a. The USCG should adopt the Department of Defense categories for several stages of the R&D process, namely: Research, Exploratory Development, Advanced Development, Engineering Development, Management and Support, and Operational System Development.
>
> b. The USCG's Office of R&D should manage and control the entire RDT&E spectrum, with all such projects being funded out of the congressionally allocated RDT&E appropriation.
>
> c. There should be no reallocation of existing USCG billets/positions. Instead, additional R&D personnel should be obtained...through the budgetary process.

So in this continuing hassle, RADM Richmond fared no better than had RADM Smeder. After reopening the turf fight with the Office of Engineering, Richmond also started a second battle - that of stripping his Chief Scientist of the collateral duty of Deputy Office Chief. In typical test pilot fashion of acting first and thinking second, Richmond's memorandum of 3 December 1969 to the Chief of Staff bluntly recommended:

a. That Dr. Bates be advised he is relieved of all duties and responsibilities as Deputy Chief of R&D.

b. That Captain C. E. Meree (2540) be designated as Deputy Chief of R&D.

From Richmond's point of view Bates was not staying at home and minding the store, i.e., preparing elaborate budgetary material. Instead, as will be noted later, Bates was away giving speeches about the American Arctic and even serving as deputy representative to the National Aeronautics and Space Administration (NASA) on behalf of Dr. Secor D. Browne, DOT's new Assistant Secretary for Research and Technology. (6.1) Unfortunately for RADM Richmond, he had not delved into the how and why of the author being hired for a carefully crafted position which stated to the world at large that the hoary Coast Guard was developing a top-notch R&D program with continuity attached thereto. In fact, just seven months prior to Richmond's nasty-gram while defending its appropriation authorization, Coast Guard testimony of 9 May 1969 explicitly stated to the U. S. Senate's Merchant Marine Subcommittee:

"Research and Development ...

Fiscal year 1969 witnessed the first appropriation for specific R&D projects. From a modest start in this field, the Coast Guard program has grown so that the establishment of a new Office of Research and Development was completed last November. Dr. Charles C. Bates was selected as the scientific advisor to the Commandant and is <u>also the Deputy Chief of the new office</u>." (6.2) (Underlining by author)

So VADM Trimble who had already spent many hours pondering how best to fit Bates into the Coast Guard organization rejected the junior admiral's request and suggested Richmond work within the status quo.

End Notes for Chapter Six

6.1 Bates' tie to the nation's space program traced back to his being the Navy member of the Technical Advisory Group for Project TIROS, the country's first meteorological satellite launched during 1 April 1960. Then in 1965 Bates became co-chairman of the NASA Spacecraft Oceanography Committee on which CAPT Leroy A. Cheney, USCG, represented the Coast Guard.
6.2 Citation is from Page 27, Serial 91-12, Hearing before the Merchant Marine Subcommittee, Committee on Commerce, U.S. Senate.

Chapter Seven
Science Advisor for Commandant Willard J. Smith
(1968-1970)

As the son of a Coast Guard warrant officer, ADM Smith knew the Coast Guard forwards and backwards. Although modest in nature, he was a skillful aviator. Thus, although less than three years out of Navy flight school, during 13 February 1943 he landed a two-engine PBY (Catalina) amphibian in a rough seaway 200 miles off California, picked up a critically ill naval officer, and returned him in time to a naval hospital to save his life. (7.1) Moreover, both he and his small bouncy wife knew the Washington social circuit well for during the latter part of World War II, he had served as the Aide to Commandant Russell Waesche. Then as the Academy Superintendent fifteen years later during August 1962 he sailed the spectacular training barque, *Eagle*, to Washington, DC and entertained aboard such notables as President John F. Kennedy and Vice President Lyndon B. Johnson.

Once ADM Smith had his Science Advisor on hand, he treated him as the equivalent of a junior rear admiral. By doing so Dr. Bates could more easily bring to bear external know-how acquired while spending eight years in the Pentagon -- three with the Office of the Chief of Naval Operations and five with the Advanced Research Projects Agency of the Department of Defense. Although Bates' salary remained unchanged while transferring to the Coast Guard, the new perks were notable. Included was a modest allowance for official entertaining, authorization to park officially in front of downtown federal buildings, and the right to request Coast Guard aircraft for priority trips. In addition, to signal rear admirals at Headquarters that Bates was truly one of them, VADM Trimble invited Dr. Bates and family to share his office for viewing the wintry presidential inauguration parade of 20 January 1969. Similarly, four months later during the posh Salute to Spring event at the Commandant's private quarters, Mrs. Smith and Mrs. Bates were Secretary of Transportation Volpe's dining partners.

Among the Science Advisor's duties that Commandant Smith had personally certified to during 12 January 1968 were performing liaison with universities and professional societies plus representing the Coast Guard on national and international technological committees. Typical of the earliest interfaces was Bates being invited to join the National Research Council's Maritime Transportation Research Board (1968-1971) and the American Management Association's Research and Development Council (1969-1978). (7.2) At the state level during 28 February 1969, Dr. Bates dropped by to discuss coastal matters with Louisiana Governor John J. McKeithen, a visit soon followed by Louisiana State University's president, John A. Hunter, asking Bates to join his Sea Grant Advisory Council.

One of Bates' most popular duties during this early period was making a presentation: The American Arctic- Is It Here to Stay? Basically a travelogue, it was keyed to Bates' long time Arctic efforts and the discovery in early 1968 of Alaska's Prudhoe Bay, soon to be North America's largest oil and gas field. All told, during 1969 this presentation was

made to 30 audiences ranging from the Massachusetts Institute of Technology to the Chamber of Commerce of Long Beach, CA, with the peak audience being six hundred petroleum explorers gathered at Houston's venerable Rice Hotel. (7.3) Simultaneously, Bates maintained his bona fides with DOT's top-side by arranging for Under Secretary James Beggs to give the keynote speech in Radio City's Rainbow Room at the American Management Association's oceanology briefing for business executives. (7.4)

Then after Bates asked Secretary Volpe to present a Monday Night lecture at the famous Cosmos Club, Volpe opined at the beginning that he was not making much progress in life. As he put it:

> "Up in Boston I was born above a grocery store. And now here I am in Washington, DC . But would you believe it, I'm still living above a grocery store!"

But then he added that his present living quarters were atop the plush Watergate apartment complex that just happened to have a Safeway grocery down in the basement! Besides public relations, within the year Bates was deeply involved in a first-love -- that of making the ice covered Polar Sea a useful ocean in terms of commerce and defense. (7.5) Fortunately, during August 1968 Secretary of Transportation Alan Boyd had announced that a major thrust of his department would be improving polar transportation, both as to cost and length of the marine shipping season. On the commercial side, the major impetus came from Houston's Humble Oil and Refining Company which needed to determine whether it was feasible to haul newly discovered Prudhoe Bay oil to its East Coast refineries by ice breaking tanker. To do so the firm chartered and converted America's largest merchant ship, the grain hauling 114,700 DWT SS *Manhattan*, into an experimental vessel by adding ten thousand tons of ice shielding steel and an untested double curve ice breaking bow designed by CDR Roderick White, USCG, as his doctoral dissertation at the Massachusetts Institute of Technology.

In as much as Humble, by virtue of operating one of the nation's larger tanker fleets, was already on good terms with the Coast Guard, the *Manhattan* experiment was given the green light for close cooperation with the maritime community. Thus when the modified giant tanker headed during September 1969 through the ice infested waters of Canada's fabled Northwest Passage, she was accompanied not only by the elderly USCG icebreaker *Northwind* (WAGB-282) but also by the new and more able Canadian Coast Guard ice breaker *John MacDonald*. Overhead was a USCG C-130 aircraft equipped with a AN/DPD-2 side looking radar modified and operated by three early Coast Guard RDT&E personnel - LTCDR James McIntosh, Dr. Lloyd Breslau and Mr. Dennis Farmer. Thus, when the *Manhattan* tried to exit directly into the Arctic Ocean, radar patterns showed only polar pack ahead. Accordingly, the ship's captain, Roger Steward reversed, sailed southwestwards, and easily came to Prudhoe Bay five days later. In short order the proverbial barrel of Prudhoe crude was swung aboard and the massive vessel returned through the Canadian archipelago. After that it was all down-hill until she was tumultuously welcomed into New York harbor as being the first commercial vessel to conduct a round trip through a seaway that had frustrated mankind for 390 years.

Contemporaneously to the highly publicized *Manhattan* ice breaking experiment, Dr. Bates, with the cooperation of the USCG's Office of Operations and the U. S. Geological Survey, had underway Polar Profile 1969 as another polar spectacular off Alaska 's northeastern coast. Back in July 1968 when a Coast Guard party led by RADM Goehring and including the Science Advisor stood on the drilling platform of Prudhoe Bay's confirmatory well less than two miles from the coastline, no one knew whether the massive petroleum trap extended seaward into federal properties or whether other comparable structures also lay offshore. Obviously, having such knowledge at hand was mandatory before such tracts could be put up for public leasing.

To fill this unbudgeted information gap, the Survey's Dr. William Pecora advised Bates that he could assign his West Coast marine geology team under Dr. Arthur Grantz plus a 160,000 joule electrical sparker unit and associated geophysical sensors to the project. (7.6) In return, the Coast Guard would airlift this gear by C-130 aircraft from San Francisco, CA to Kodiak, AK where it would be installed on the fantail of the Coast Guard's 227-foot ice breaking tender, *Storis* (WAGB-38). Then, after picking up the joint scientific party at Nome, AK, the *Storis* would spend July-August 1969 performing a combined geological /geophysical survey between Point Barrow and the Canadian border out to the 1,500 fathom curve.

Initially the cruise went well even though the skipper was rusty CDR John Byrd, the Coast Guard's top lawyer in Alaska. (7.7) The Polar Pack, however, was slow in retreating north during the early summer of 1969. As a result, the *Storis* began spotting polar bears on drifting ice and shut down the towed seismic array well to the southwest of Point Barrow, the northernmost point in the United States. Then when just fifteen miles from reaching that turning point, the *Storis'* skipper tried to relieve ice pressure on an eastward bound tow involving a tug plus two thin-hulled barges, one of which carried 125 tons of seismic explosives. Suddenly the *Storis'* bow fractured, creating a four foot gap just above the waterline. Fortunately, the ice breaker *Staten Island* (WAGB - 278) came to the rescue and by skillful seamanship extracted the Storis from 100 miles of dense pack ice. Nonetheless, that was the end of Polar Profile 1969. Instead, the ship had to dead-head for repair in a stateside shipyard 2,700 miles away.

End Notes for Chapter Seven

7.1 Apparently the knack of landing and taking off multi-engine seaplanes safely in the presence of ocean swell dates back to the Pan American Clippers of the late 1930s. Be as it may, LCDR Smith was taking off parallel to swell crests while operating out of San Francisco during 1942-43. Then between 1946 and 1949 the "Stormy Petrel" of Coast Guard aviation, CAPT Donald B. MacDiarmid, pushed the technique further by consulting with the Scripps Institution of Oceanography and then making jet-assisted take offs. (Note: For details of MacDiarmid's colorful career, go to the Coast Guard Historian's web page - www.uscg.mil/history.)

7.2 Meeting twice a year, the AMA's R&D Council consisted of 25 vice presidents for research and development from some of America's most prestigious firms including

General Electric, Radio Corporation of America, Du Pont, International Nickel and Eastman Kodak. By happenstance, Bates was the only governmental member and held this slot for nine years even though three years was the normal tour duration.

7.3 The extended travel associated with this speech presentation allowed Bates to visit most of the Coast Guard districts. To make certain he arrived on time during rush hour, Coast Guard helicopters were used if required. Thus, in order to make a tight flight connection out of New Orleans, the helicopter left from the football stadium parking lot at Louisiana State University and flew directly to the correct boarding gate at Moissant Airport.

7.4 In the late 1940's Under Secretary Beggs served as a naval officer aboard the USS Tanner, a hydrographic survey vessel in the Persian Gulf. Because these surveys were under the technical control of the USN Hydrographic Office- Bates' employer of the time- we had much to talk about. As for flight amenities to and from New York City, they were a disaster. Beggs chose to" FAA Airlines". Upon our arrival at the FAA hangar, a couple of raunchy guys showed up. After stubbing out cigarettes, they advised: "Follow us!" Once aboard the decrepit DC-3, we then learned that even our morning coffee had to be provided by Begg's aide who, knowing the FAA system, had brought along a filled thermos and paper cups.

7.5 As part of a Navy-wide cooperative project, Bates spent July 1949 at the Navy's Arctic Research Laboratory, Point Barrow, AK. Included therein was making a North Pole flight aboard a B-29 of the Air Force's 375th Reconnaissance Squadron out of Eilesen Field, AK. Then, after six years passed, it so happened that he was also directing the U.S. Navy Hydrographic Office's widespread ice observing and forecasting service which supported construction of the DEW LINE air defense radar chain across the American Arctic in just one short summer!

7.6 Even before Polar Profile 1969, Drs. Pecora and Bates had close working relationships dating back to 1960 when the USGS established a Crustal Studies Branch utilizing funds from Project Vela Uniform, a Bates directed effort within DOD's Advanced Research Projects Agency.

7.7 Coincidentally, among prior skippers of the *Storis* was no less than the current Assistant Commandant, Paul Trimble, who commanded her between 1951 and 1953.

Chapter Eight
The Commandant's Research Advisory Committee
(1970)

During the frank discussion of 24 July 1968 with Assistant Commandant Paul Trimble, the past Chief of Naval Research, RADM John Leydon, USN (Ret.), advised: (8.1)

> "A Science Advisory Board is very much called for. Avoid the pitfall of having only illustrious names...You need both lustrous names and some young Turks who are bright, anxious to change the world, and who will do some hard work on their own for you...The Board should not be allowed to perpetuate itself. Staggered three year tours avoiding the buddy system should be utilized."

Trimble remembered this commentary well. Thus, when COMDT NOTE 5400 of 29 October 1968 was promulgated three months later, duties of the Research Advisory Committee's (RAC) included:

> a. Provide the Commandant and the Chief, Office of R&D, with a broad external review of the Coast Guard's RDT&E effort.
>
> b. Make recommendations concerning new techniques applicable to Coast Guard missions as well as to suggest more effective utilization of R&D staff.
>
> c. Review Coast Guard long range planning as related to its R&D program and propose changes as necessary in RDT&E policy, staffing, use of facilities, etc."

By law advisory committee operations involve considerable red tape. For example, its Executive Secretary must be a full time federal employee. In addition, agenda, time and location of any upcoming meeting must be posted in the Federal Register at least thirty days prior to the event. Because Dr. Bates had been involved in over a dozen official committees dating as far back as the Defense Research Board in 1947, he not only assumed the role of Executive Secretary but also rounded up ten outstanding research specialists (see Table IV). Chairing the group charismatic and hard driving Ralph Decker Bennett, instigator of the fabulous Naval Ordnance Laboratory at White Oak, MD. (8.2)

The RAC traditionally met twice a year, once in Washington and once at a major Coast Guard field installation, for a two-day work session. When held at Coast Guard Headquarters, the first evening included a dinner party at Fort McNair attended by all local flag officers. On the second afternoon the RAC then met for an hour with the Commandant, the Assistant Commandant and the Chief of Staff to present its findings. At the first such meeting during late January 1970, Dr. Bennett reviewed the tender subject of how more of the Coast Guard's overall RDT&E effort should be performed by the Office of Research and Development and how Bennett hoped that the Commandant would persevere in shifting this in-house responsibility.

During 5-7 October 1970 the RAC's second meeting was held in a most unusual site - the Western White House! This facility, a temporary structure located at a Loran-A station adjacent to President Nixon's residence just south of San Clemente, CA, had been erected under the supervision of the then RADM Thomas Sargent, Commander, 11th Coast Guard District, but now as a vice-admiral the Coast Guard's Assistant Commandant. Consequently, RAC sessions were held in what was normally the Head of State's conference room. Meanwhile business calls were placed from an office whose name plate read: Dr. Henry Kissinger, National Security Advisor. Likewise, the Committee's four panels: Electronics, Environmental Monitoring, Ocean Engineering and RDT&E Management, met in similar offices with comparable name plates. An extra fillip was flying to and from San Clemente by helicopters based at the Coast Guard Air Station, San Diego, which just happened to be commanded by CAPT Abe Siemens, USCG, one of the initial staff members for the RDT&E effort.

TABLE IV
INITIAL MEMBERS OF THE COAST GUARD RESEARCH ADVISORY COMMITTEE
(January 1970)

Member	**Specialties**	**Remarks**
Dr. Ralph D. Bennett San Francisco (Chariman)	R&D Management Weapons	Teaching stints (MIT, CalTech)
Dr. Wilbert M. Chapman San Diego	Commercial Fisheries	Director, Univ. of Washington School of Fisheries (1947-1948) Director of Marine Resources Ralston Purina Corporation
Col. Joseph Fletcher, USAF (Ret.) Santa Monica, CA	Polar Operations	Director, USAF Geophysics Directorate, Cambridge, MA (1948-1949) Commander, 375th Recon. Squadron Eielson AFB, AK (1949-1952) Expedition Leader to Fletcher's Ice Island near the North Pole (1952) Chief, USAF Long Range Plans Division (1963)
VADM John T. Hayward, USN (Ret.) New York City	Test Pilot R&D Management ASW Warfare	Outstanding naval officer with Ph.D. degree (nuclear physics) see: *Bluejacket Admiral* by Hayward and Borklund, Naval Institute Press, 2000.
Prof. Samuel R. Heller	Naval Engineer and Docking	Head, Hull Design Branch, BuShips (1963-1965) Director, Industrial Engineering, Naval Ship

Washington, D.C.	Officer	Systems Cmd. (1967-1968) Professor of Mechanical Engineering Catholic University (1968-1970)
Prof. John A. Pierce Cambridge, MA	Electronic Navigation	MIT Radiation Laboratory Division Head for developing LORAN-A. (1941-1945) Senior Research Fellow, Harvard Univ. (1946-1970) (LORAN/OMEGA) Presidential Certificate of Merit (1948)
Dr. William E. Shoup Pittsburgh, PA	Nuclear Navigation	Director of Research, Bettis Power Laboratory (1948-1954) Vice President (Research) Westinghouse Electric Corp. (1962-1970)
Prof. Maurice Rattray Seattle, WA	Coastal Oceanography	U.S. Navy Fire Control Officer, USS *Helena* (CA-75) (1943-1946) Chairman, Dept. of Oceanography Univ. of Washington (1968-1970)
Dr. Richard C. Raymond New York City	System Design/Modeling	Manager, TEMPO Think Tank General Electric Corp. (1956-1962)
James P. Van Etten Nutley, NJ	Electronic Navigation	Commanding Officer, CGC *Conifer* (WLB-301) USCG Electronics Engineering Station Wildwood, NJ (1943-1958) Director, Airborne Systems Laboratory Int. Tel. & Telegraph Corp. Nutley, NJ (1960-1966)

End Notes for Chapter Eight

8.1 From a flag officer's point of view, Leydon's credentials were excellent. After graduating 11th from the top at Annapolis, he was the first of his class to achieve flag rank. Prior to his ONR post he had been the Deputy Chief of Naval Material.
8.2 To foster a continuing and knowledgeable interface between Coast Guard flag officers and Science Advisory members, Dr. Bates and his secretary prepared and distributed a yearly handbook providing everyone's biography and phone number, as well as a synopsis of the USCG's and DOT's current and pending budgets.

CHAPTER NINE
Full Speed Ahead for RADM Richmond
(1969-1973)

Two months after Chet Richmond pinned two stars onto his shirt collar, he hosted a RDT&E overview conference at the USCG Reserve Training Center, Yorktown, VA. Attended by 15 captains, 28 commanders, four lieutenant commanders and five civilians, the enthusiastic participants were drawn from Headquarters, the Coast Guard's twelve field districts and the Academy. Richmond immediately delineated how he and his team would be spending a steadily increasing allocation of RDT&E funds, an amount which hopefully would eventually reach six percent of the Coast Guard's OE allocation. For FY 70, however, this allocation was but two percent , a percentage one-fourth of what the Department of Defense spent annually on new or improved technology. Staffing percentages were even worse. Although the USCG's total personnel numbered 44,000, Richmond's command totaled 72, i.e., less than 0.2 percent of the overall complement. Richmond then explained some of the Office of R&D's ground rules he would be enforcing. First, he hoped to maintain a balanced program between simpler projects utilizing state of the art practices and providing immediate pay offs versus longer term and riskier projects promising larger payoffs if successful. Selection of these projects would be a judgment call after taking into account operational demand, potential benefit, technological feasibility and budgetary constraints. Because his command was manpower limited, up to the 90 percent of the assigned tasks would be performed out of house by industry, academic institutions or other governmental agencies. On the other hand, he was working diligently to increase staff to 115 personnel (35 officers, 7 warrant officers, 24 enlisted men and 49 civilians) by the end of FY 1971. Of particular note was another goal wherein the Office's staffing would become half civilian and half military in order to provide better continuity of contract management and provide more in house bench level technical effort (see Table V).

Unfortunately, as for FY 1970 the concept of a balanced R&D program remained infeasible. With the advent of television news, oil spills such as those associated with the tanker Torrey Canyon off southern England (1967) and the Union Oil's drilling platform off Santa Barbara, CA (1969) clearly demonstrated that industry was incapable of cleaning up spills quickly enough to avoid the pitiful and photogenic oily bird syndrome. (9.1) As a consequence, of the $8.4 million of RDT&E funds at RADM Richmond's disposal, 57 percent was allocated to Marine Law Enforcement leaving only token amounts of less than 10 percent each to the other key Coast Guard missions, namely, Search and Rescue, Aids to Navigation, Merchant Marine Safety, Oceanography, Meteorology and Polar Operations plus Recreational Boating Safety. Moreover, with only three percent of his FY70 funding allocated to Laboratory and Field Support, Richmond had no capability whatsoever to provide quick response to critical but unforeseen needs of either the Coast Guard Districts or the Executive Branch
.
In his role as the Office's Chief Scientist, Dr. Bates deplored the current lay-out of the Coast Guard's ongoing RDT&E program. Because external program managers

dominated formulation of the FY70 budget, assigned tasks numbered well over fifty but consisted primarily of engineering improvements with very low pay off to cost to ratios. In addition, operating as it did on a 24/7 basis, the Coast Guard was highly labor intensive but associated human factor issues were still not being addressed. (9.2) In closing, Bates griped about a budgeting system which justified $43 million per year in the OE account for Oceanography, Meteorology and Polar Operations, most of which was in support of external customers such as the National Science Foundation (ice breakers to Antarctica) and the National Weather Service (six ocean stations) and yet could find only one-fifth that amount for projects with direct pay off potential to the Coast Guard proper. (9.3)

RADM Richmond's next major accounting concerning the RDT&E effort came a year later during his hour long presentation to the assembled District Commanders on 20 October 1970. In reading the fifteen page transcript, one instinctively recalls the Richmond style-quick acting, knowledgeable and totally involved. But here again one finds that a command of just 51 (29 officers, one warrant officer, three enlisted men, 10 scientist and nine secretaries) was addressing a multitude of technical problems without the benefit of an in-house laboratory capable of avoiding the voluminous red tape associated with external federal contracting.

Among the Richmond highlights was one of great importance to him personally as earlier he had directed the Headquarters desk for Search and Rescue (SAR) (1965-1968). In this instance it was an airborne radar developed specifically with SAR in mind in order to reduce by approximately 50% the time spent in a given search effort. Backing this up would be a computerized search planning procedure keyed to cranking in new data on visibility and surface current as the operation progressed. Further improving this SAR scenario would be a more accurate means of delivering air droppable gear to the rescuees such as a specially developed de-watering pump kit.

Related to the general problem of enhancing the capabilities of motor rescue boats, perhaps by introducing a 290 horsepower diesel drive motor or water pump jet, was the overall problem of developing better high speed surface craft for the Federal government as a whole (exclusive of the DOD). As an experiment, the Coast Guard Academy had assembled a 1970 Summer Study Group from its own officers and professors to delineate what needed to be done in theoretical studies and prototype construction and testing for such craft with excellent results.

Moving rapidly on, Richmond then reviewed what was being studied with regard to enhancing existing radars for what might become, because of political pressure, formalized Marine Traffic Systems. Related to this was an ongoing contract to develop a mathematical model for delineating the criteria for a harbor traffic system that took into account the vagaries of each particular harbor. (9.4)

Although ship collision avoidance was the ideal condition, tank rupture from grounding or collision still occurred. What happens then? For U.S. waters during 1969 the Coast Guard had been directed to establish a 24/7 National Pollution Response Center. To

provide this Center with working tools, the Office of R&D had development underway of an information system which, when given the type and amount of substance spilled plus its locale, would quickly feed to the Coast Guard on-scene commander what to expect in terms of hazard to personnel and local ecology, protective devices to be worn, neutralization or clean up procedures to be used, dispersal rates, and potential incompatibility should more than one chemical have been spilled.

As further tangible evidence that the Coast Guard was truly becoming the national leader in maritime safety, Richmond noted that during August 1969 his Office had dedicated the Ship Board Fire and Safety Testing Facility aboard the stranded tanker, Rhode Island, not far from the USCG Base, Brookley Field, Mobile, AL. In practice, this concept dated back to 1966 when an industry group led by Captain Kenneth Savage of the National Fire Protection Association tried to create a full scale burn laboratory without success. Fortunately, Dale E. McDaniel of the USCG's Office of Merchant Marine Safety kept the concept alive until dynamic LTCDR James A. Peebles came on scene with R&D money and was able to convert concept to fact after receiving extensive cooperation from industry, sundry Coast Guard components and the local officialdom which was willing to tolerate a smoke generating laboratory within their domain.

Moving down in scale, Richmond mentioned he and RADM "Red" Wagner were having their staffs jointly investigate deadly fires and explosions on recreational boats. As he expressed it:

> "What needs to be done about the carburetor system? The ventilation system? The ignition system? What about the human factor? " (9.5)

While on the topic of work effort magnitude, Richmond touched on a subject close to the heart of District representatives -- are there ways wherein RDT&E can assist in making the maintenance and effectiveness of 45,000 fixed and floating aids to navigation less costly? To be sure, lighthouses could be automated, buoys be made of light- weight plastics and higher speed surface craft substituted for plodding buoy tenders. In addition development was also underway of an electronic positioning system for small craft that might eventually cost only $1,00Ó per unit. (9.6)

The R&D admiral then addressed domestic ice breaking, an area in which the Coast Guard retained literally all the expertise in this country for this type of technology. Even now, Great Lakes area politicians were pressing for extension of their shipping season well beyond the normal closing date of mid-November. In fact, why not sail for twelve months of the year like the Lake Michigan auto ferries did?. (9.7) Accordingly RDT&E funds were being used to instrument the Mackinaw (WAGB-83) for measuring propulsion efficiency and resistance under varying ice conditions. Of a longer term nature was finding an economical method of moving ice out of the cut channel once the ice cover had been broken during wintertime locking operations at such locations as Sault Ste. Marie, MI.

Finally, Richmond reported the biggest challenge currently facing his minimally funded group:

> "By agreement with the FWQA (Federal Water Quality Administration) and through an interagency coordination group we have undertaken the development of offshore oil spill control and cleanup for the Federal government."

Already 90 percent complete was the Air Deliverable Anti-Pollution Transfer System (ADAPTS) consisting of an air deliverable 8,500 pound self powered pumping system that could be deployed by a single parachute next to a stranded tanker. Following soon would be a plastic receiving bag weighing 13, 500 pounds and delivered by two parachutes. Also under contract with four vendors were analyses pertinent to six different barrier concepts, some air deployable and some ship deployable. Finally, his staff was working diligently towards developing a suite of airborne sensors that would allow Coast Guard aviators to detect pollution, identify who did the spill and map its extent.

All in all, the R&D program Chet vividly described during October 1970 remained much the same throughout the rest of his Headquarters tour. In his blunt way, Richmond definitely had the show off and running. (see Table VI). For this, in April 1973 he was awarded the Meritorious Service Medal and given command of the 13th Coast Guard District in his beloved Seattle, WA.

End Notes for Chapter Nine

9.1 Because of poor industrial practice relative to surface casing, the Santa Barbara well three miles offshore blew-out into well protected waters. Nearby scenic beaches were soon contaminated and had to be cleaned by having prisoners spreading bales of straw and raking up the resultant oily debris for trucking to a nearby land fill.

9.2 During Polar Profile 1969, Bates observed with some dismay that Coast Guard manning tables placed a crew of 110 aboard a 227-foot vessel. As a consequence, up to ten crew members would be on the bridge simultaneously. By that point in time, Canadian ice breakers used crews one-third that size.

9.3 Although ocean station duty was monotonous and often highly uncomfortable, it was a prized function used to justify keeping the Coast Guard's high endurance cutter (HEC) force in being during peacetime.

9.4 One upshot of such concern was the Coast Guard installing and operating its own traffic monitoring radar for the inner approaches of Valdez, AK harbor after it opened for Alaska Pipeline traffic during 1975. Shortly after, a U.S. Geological Survey glaciologist proclaimed the pending catastrophic breakup of Columbia Glacier, Alaska's largest, would clog these approaches with bergy bits. CAPT Roderick White of the USCG Academy then conducted a study indicating such a catastrophic outflow could be deflected by a huge nylon cable. However it was never installed. Instead, while outside of harbor radar range at 12:04 AM on 24 March 1989, the helmsman of the tanker, Exxon Valdez, steered her onto Bligh Reef while avoiding floating ice. The result -- 257,000 barrels of Alaskan crude dumped into Prince William Sound, the worse to date in U. S.

waters and costing Exxon some $5 billion in associated clean up costs and punitive penalties.
9.5 During 1967 there were 5,274 known accidents affecting recreational boats causing 1,452 fatalities.
9.6 Richmond had in mind upgrading the local microwave voice transmission system into a microwave digital measuring system using local responders.
9.7 To ascertain the state of the art, Dr. Bates sailed aboard the U. S. Steel ore carrier, the Roger Blough , between Two Harbors, MN and Lime Island, MI during January 1973. Less than three years later another ore carrier, the Edmund Fitzgerald, sank with all hands along the same route even as early as 10 November 1975. Nonetheless, Bates arranged for David Roderick, President of U. S. Steel, to receive the Marine Technology Association's 1976 Award for Corporate Pioneering.

TABLE V
LIST OF PERSONNEL IN THE OFFICE OF RESEARCH & DEVELOPMENT
June 1970

Science Advisor (DS)
Dr. Charles C. Bates
Kay Bouchie

Special Assistant, R&D (DA)
CAPT C. E. Meree
Nell A. Sweeney

Planning & Evaluation Staff (DP)
CAPT O. E. Unsinn
LCDR J. E. McCarty
Mr. J. Feldman
CWO J. H. Williams
Vernice Coban
B. A. Tuggle

Applied Technology Division (DAT)
CAPT J. Iversen
CDR C. J. Glass
CDR W. E. Lehr
CDR R. N. Abrahams
CDR R. H. Baetsen
CDR J. L. Coburn
Mr. C. Catoe
CDR G. J. Budridge
CDR R. J. Ketchel
CDR G. Seaman
LCDR E. L. Jones

LCDR R. E. Womack
LCDR J. A. Peebles
LCDR R. M. Polant
LCDR J. T. Leigh
LT J. E. Lindak.
Mr C. L. Schaller
LT(JG) V. L. Banowetz
LT(JG) J. L. Glaeser
LT(JG) F. L. Orthlieb
ENS T. Scarano
ENS D. M. Bovet
Mrs. Catherine Cox
M. M. Hankins
YN1 L. Hudspeth
LTjg W. J. Gehrke
Gloria McCain

Applied Sciences Division (DAS)
CAPT R. D. Parkhurst
Dr. L. Breslau
Dr.N. R. Anderson
Mr. W.M. Lawall
Mr. J. D. Johnson
LCDR J. A. McIntosh
Mr. Dennis Clark
MSTC C. T. Barger
Mr. J. R. Jadamec
LTjg T. C. Johnson
YNC1 K. A. Pence
Diana White

National Data Buoy Development Project (DB)
CAPT V. Rinehart
CDR P. A. Morrill
CDR W. L. King
CDR W. F. Merlin
CDR W. M. Flanders (MTF)
CDR R. I. Rybacki
Mr. R. A. Zettel
LCDR R. H. Cassis (MTF)
LCDR M. E. Gilbert (MTF)
LT R. H. Canada (MTF)
LT L. A. Onstad
L(JG) S. H. White
LT(JG) P. J. Hartman
ENS D. M. McGuire (MTF)

ENS G. L. Petrie
CWO-4 R. H Newman (MTF)
SK2 C. B. Voltartorni
M. P. Robison
Ruby Carter

USCG Ship Fire and Safety Test Facility, Mobile, AL
LCDR James A. Peebles
CWO Victor Popplewell

TABLE VI
UNITED STATES COAST GUARD RDT&E PROJECTS
FY 1973 Short Titles

(RDT&E Appropriation: $14,500,000)
ACCOUNT NO. & DESCRIPTION
Increase Capacity of National Marine Transportation System
- A. Polar & Domestic Ice Operations
  - 1. Ice Research
    - 736410 Airborne Equip. & Tech.
    - 736420 Ice Classification, Dynamics, Effects
  - 2. Ice breaking Technology
    - 731310 Advanced Ice breaking Concepts
    - 731340 Modified Conventional Concepts
    - 731399 General

Protect & Enhance The Marine Environment
- A. Marine Environmental Protection
  - 1. Pollution Response
    - 734102 Oil Spill Cont. (High Seas)
    - 734103 Oil Spill Recovery
    - 734108 Arctic Oil Spill Response
    - 734110 Novel Systems
    - 734111 Fast Current Cleanup
    - 734112 High Speed Delivery
    - 734151 CHRIS
    - 734153 Response Capability
    - 734999 General
    - 734101 ADAPTS
  - 2. Pollution Prevention
    - 734204 Airborne Oil Slick Survey
    - 734240 TIPS
  - 3. Pollution Abatement
    - 734305 Vessel Abatement - Oil
    - 734321 50-Man Wastewater System
    - 734322 10-20 Man Sewage System
    - 734323 1-10 Man Sewage System

734324 Solid Waste
734328 Waste Project Support
734330 Ship Air Pollution

B. Aid to Navigation

1. Advanced NAVAID Technology

732110 Great Lakes Season Extension
732120 RIHANS
732140 Audio Visual Signals

2. Vessel Traffic Systems

732211 VTS Radar Development
732212 System Development & Spec.
732213 Site Development & Support
732214 Communication
732999 General

3. Buoy Systems Development

732510 Buoy Hulls
732520 Mooring & Placement
732540 Payload
732550 Support

Protect Public Safety at Sea

A. Search and Rescue

1. SAR Detection Systems

731110 SAR Radar Development
731120 Helicopter Sensor Development
731130 Target Enhancement
731140 Distress Alerting & Locating (DALS)
731150 Global Rescue Alarm Net (GRAN)
731999 General SAR

2. Equipment & Technology Development

731210 Search Planning
731240 Rescue Equipment
731260 SAR Techniques

3. Command and Control

731410 Satellite Telecommunications

4. Vehicle Development

731530 High Performance Watercraft

B. Recreational Boating Safety

1. Safe Boat & Equipment

735100 Boat/Equip. Test Proced.
735200 Boat/Equip Stand. Dev.
735999 General RBS

C. Commercial Vessel Safety

1. Vessel Safety Technology

33000 Equipment Research
733400 Commercial Vessel Motion Stability
733500 Structural Strength & Load 733010 SF & STF

2. Cargo Safety Technology
    733900 Pollution Prevention Thru Design

Chapter Ten
RADM Richmond's Half Loaf -- The Interim R&D Center
(1970-1972)

In the same month that he reported in at USCG Headquarters to be Chief, "Office of Research and Development, RADM Richmond on 12 March 1970 heard a fervent plea to Commandant Willard Smith by RAC Chairman Bennett:

> "To accept its identity and expedite its work, the Office of R&D should have its own laboratory building...Three hundred to five hundred square feet will be required for each worker and it may cost as much as $100 per square foot. While R&D can be carried on temporarily in less convenient quarters, a definite plan and schedule for the construction of a laboratory should be created, and the Commandant should be prepared to contest vigorously for the appropriation to construct it."

This advice was agreed to. RADM Richmond then began a four-step plan for establishing a permanent Marine Science and Technology Center adjacent to the Coast Guard Academy, New London, CT during the mid 1970's.

> Step One: Locate and lease potential laboratory space utilizing FY 72 funding for an interim R&D center.
>
> Step Two: Once the location of the interim R&D Center is known, have Secretary of Transportation Volpe obtain approval for it and the permanent R&D Center from George Shultz, Director, Office of Management and Budget, and also advise Congressional overseers of new construction, i.e., Senator Robert Byrd and Representative John McFall of the respective Appropriation Committees of what is being contemplated.
>
> Step Three: During mid-1972 relocate the USCG Field Testing and Development Center currently existent in six buildings at the Curtis Bay, MD shipyard to the interim R&D Center and meld those engineering talents with the professional skills of the Applied Sciences Division, USCG Headquarters, which would be simultaneously being transferred to the new Center.
>
> Step Four: After receiving inputs from USCG program managers and long range planners, develop a tentative architectural layout with associated cost estimate for a permanent R&D Center on Coast Guard property immediately north of its Academy within the 1976-1977 time frame.

To implement Step One, RADM Richmond directed his hand picked assistant, CAPT C. E. "Bud" Meree, to find and inspect possible interim locations. By early 1971 Meree generated eleven possibilities. The most logical one was the abandoned Coast Guard Training Center at scenic Avery Point, Groton, CT, a site owned but barely operated by the University of Connecticut . (10.1)

Bates totally agreed for back in 1966 Harold Nash, the technical director of the U. S. Navy Underwater Sound Laboratory just across from Avery Point, had telephoned:

> "Hey, Bates, the Coast Guard's pulling out from a nice waterfront facility just outside my window! Why don't you ask the admiral to let you move your landlocked Naval Oceanographic Office up here?"

But RADM "Muddy" O'Dale Waters had demurred: (10.2)

> "If we move up there, the Maryland congressional delegation will be mad at me. So let's stay where we are!"

So the Coast Guard gave back its abandoned campus to the State of Connecticut that then reassigned the 73-acre tract to its university for a potential Southeastern Branch when such funding became available. Four years went by. Meanwhile, at Avery Point the grass had to be mowed and 52 nearly empty buildings maintained to avoid pilfering and leaking roofs. Thus, when RADM Richmond, CAPT Meree and Bates visited the Storrs campus thirty miles north of Groton during the spring of 1971, the university's prexy quickly concurred with the concept of having the USCG's interim Research and Development Laboratory become a major tenant at Groton's 1082 Shennecossett Road. With this tentative commitment at hand, on 15 June 1971 ADM Bender, the new Commandant, began departmental clearance. Nine weeks later on September 1, Secretary Volpe not only authorized the facility but began acquiring White House and Congressional level approval for this unique federal laboratory. (10. 3) During early 1972 penny-pinching contract specialists of the Coast Guard came up with a very favorable lease (DOT-23341-A) i.e. 48,000 square feet of space between 1 June 1972 and 31 May 1975 at the rate of $146,000 per annum. Included therein were custodial services, utilities, parking spaces, library and recreational faculties, plus full time use of a machine shop and boat dock. Best of all, however, was primary occupation of the main four story barracks complex ideal for quick conversion into office and laboratory space. In due course the *Norwich Bulletin* for 8 February 1972 headlined:

> Rep. Steele Announces Seconn Will Receive New CG Oceanographic Center
> Washington -- U. S. Rep. Robert H. Steele (R-Second District) announced Monday that the U. S. Coast Guard will establish an oceanographic research and development center in Southeastern Connecticut. The center will be established on a temporary basis at the Southeastern Branch of the University of Connecticut at Avery Point. The long range plans of the Coast Guard provide the construction of a permanent research and development center in the mid-1970's on government land adjacent to the Coast Guard Academy in New London.

Congressman Steele said that plans call for relocating the current Coast Guard Field Test and Development Center from Curtis Bay, MD to Avery Point in June 1972. In addition, the scientific research personnel in the Applied Science Division of Coast Guard Headquarters, Washington, DC will also be transferred to Avery Point to augment the

staff. These planned relocations will involve approximately 36 personnel (31 military and six civilians) of the Field Test and Development Center and 19 (seven military and 12 civilians) of the Applied Science Division.

Steele said that President Nixon's budget for Fiscal 1973 provides for an additional 29 civilians and two military personnel for the new facility. According to the Coast Guard, during the next five years, the Avery Point Center is expected to grow to at least 175 personnel, two-thirds of whom will be civilian employees....

Steele said his office had been working closely with the Coast Guard, the office of Gov. Thomas J. Meskill and the University of Connecticut on the project since January 1971. Six months later, the USCG force in being at Avery Point consisted of 43 military (17 officers, 6 warrant officers and 20 enlisted men) and ten civilians, five of whom held doctoral degrees. By working long and hard the Center's commander, CAPT John M. O'Connell, and his coworkers hosted a very credible dedication ceremony during 11 September 1972 on the wide lawn bordering sparkling Long Island Sound. Following before-and-after music by the Coast Guard band and prayers by two chaplains, appropriate remarks were offered by RADM Richmond on behalf of Coast Guard Headquarters, by Acting President Edward Gant for the University of Connecticut, and by Congressman Steele.

Meanwhile, back at the beautiful Nassif Building with new bosses topside, RADM Richmond won his long running skirmish wherein Bates lost his office deputy function to Captain Meree. But this lapse in corporate memory dating back to the Smith-Trimble days also worked against Richmond. Thus, ADM Bender on 31 January 1972 signed Headquarters Instruction 5401.3 which limited the test pilot's span of control by specifying:

> "4. Action: Program directors/managers shall be responsible for initial determination of which projects shall be managed under the R&D support program and which shall be managed under the Engineering support program.....
>
> (c) The Office of Engineering shall manage modification projects which change existing systems or hardware...
>
> (d) Projects or efforts now in the Office of Engineering shall remain there until they are completed...

In other words, no longer is the Chief, Office of Research and Development, the dominant player in determining the technological future of the Coast Guard."
Then a year later came another severe blow to the Coast Guard's technical future. As far back as 1970 there had been a total agreement as high up as the President's Science Advisor that the USCG should build a permanent R&D Center just to the north of the Coast Guard Academy. However, in Step Four, Chet Richmond did not assign a dollar cap to his gung-ho action officer, CDR William Lehr. Following Coast Guard protocol ordained by the infernal Plan-Program-Budget system, Lehr interrogated the score of

program managers concerning potential R&D requirements during the upcoming decade. Despite low level grumbling by Bates and the RAC, CDR Lehr had his support contractor, United Engineers and Constructors, convert this unscreened wish list into a preliminary laboratory design with associated cost figures. The result was a beautiful facility complete with multi level covered parking and a ship model ice covered towing tank.

On a parallel track, Vice Commandant Thomas Sargent, a New London, Connecticut boy, was aggressively pursuing acquisition by purchase or eminent domain the waterfront tract just below the proposed R&D Center for use by a relocated USCG Operating Base, New London. Unfortunately, these 13 areas were occupied by the century old Thames Shipyard. Although this decrepit facility employed only twenty people or so, the owners refused to sell. Instead they initiated proceedings to have the yard declared a National Historic Site. Frustrated, VADM Sargent took a harder look at RADM Richmond's proposed R&D Center. Being gold-plated, the Center's cost estimate, instead of being a tolerable $8 million, came in at $27 million! Obviously, this was an impossible amount considering that the Coast Guard's entire request for replacing aging aircraft back in Fiscal Year 1970 had been only $11.9 million. So despite all prior statements to the contrary, Sargent deleted construction of a permanent R&D Center from the Coast Guard's five-year construction plan. In other words, Richmond had his Center but it must stay in leased space for the indefinite future. (10.4)

End Notes for Chapter Ten

10.1 The Coast Guard departure from beautiful Groton was actually a shift to the equally scenic but far more elaborate Governor's Island just off lower Manhattan caused by Third Army Headquarters' abandonment of that 185-year old military installation during 1965.
10.2 RADM Water's reticence of 1966 against moving NAVOCEANO away from isolated Suitland, MD was overruled by a later Oceanographer of the Navy, RADM J. Edward Snyder. As noted earlier, that field command was actually totally moved to NASA's semi-abandoned Mississippi Test Facility on the Gulf Coast between 1975 and 1978.
10.3 The Congress was extremely sensitive in the matter of new public works for it meant a tangible demonstration of how individual congressmen or senators were returning taxpayer's money to their respective states. During 1962, for example, the author had to clear with the Hill any seismic vault construction costing in excess of $25,000 even though the site happened to be in far-away Athens, Greece.
10.4 On matters of construction, one did not argue with VADM Sargent. After receiving a BS degree in civil engineering from Rensselaer Polytechnic Institute during 1952, he spent nine years in that field, including earning the Legion of Merit during 1966 for supervising creation of a chain of Coast Guard LORAN-C transmitting stations across remote Vietnam and Thailand.

Chapter Eleven
The USCG Research and Development Center's Evolving Years (1972-79)

Although RADM Richmond was the sole arbiter of spending the USCG's RDT&E appropriation, he permitted Captain John O'Connell, the R&D Cente's commander, to follow managerial concepts recommended by VADM John Hayward USN (Ret.) and sage Dr. Ralph Bennett. (11.1) For example, in a memorandum of 19 August 1972 regarding "Operating Principles for the Coast Guard R&D Center", Dr. Bennett proposed:

> "1. The Center reports to the Commandant (D) through a Commanding Officer, who shares with the Technical Director the responsibility for effective operation of the Center.
>
> 2. The Commanding Officer's responsibility is to see that the center conforms to the formal requirements of the Coast Guard...[and he serves] as the administrative link between the technical organization and the [external] Coast Guard.
>
> 3. The Technical Director is responsible for the acquisition, allocation, assignment and evaluation of performance of the technical manpower (and) for establishing and maintaining adequate contact by himself and through his subordinates with the world of science and engineering in order to make timely application of new developments to Coast Guard problems.
>
> 4. The most expensive commodity with which the Center deals is the time of its technical staff, and services should be organized to conserve this commodity. The nature of the Center and its work may require deviation from some of the norms applicable to operating and other units of the Coast Guard."

Unfortunately for Bennett's concept, he was writing about a Navy-type laboratory in which 95 percent of the technical investigations were performed by permanent civilian cadre. But at Groton, over half of the initial investigators were USCG officers and enlisted men. In their case, it was particularly important that their fitness reports be officer prepared and approved in order for them to retain promotability within a military corps wherein specialization and geographic permanence was a "no-no". Nonetheless, O'Connell's organizational chart did place the Center's commanding officer and its technical director within the same command box.

Even though this managerial concept of dual responsibility for the R&D Center's overall performance was locked in place by late 1972, nearly three years went by before its first Technical Director came on board as a super grade GS-16. To meet Civil Service criteria for filling scientific posts at the super grade level, the technical director's vacancy was advertised nationally in *Science* and the *Wall Street Journal*. In response, 140 persons sent in resumes. The team of CAPT Unsinn and Bates quickly reduced this to 30

promising candidates. Now the screen became much tougher. Heavy emphasis was placed on these rating factors:

a. Familiarity with military management techniques/objectives

b. Demonstrated ability for conducting a research and development program

c. Experience in establishing programs in new organizations or in a responsible position during a major reorganization.

d. Evidence of writing for national publications or for major technical conferences.

e. Membership, preferably as an elected official, at the professional level in major technical or managerial societies.

f. Demonstrated ability to establish and maintain multiple relationships and cooperative efforts with divergent groups such as other federal agencies, representatives of foreign governments and recognized authorities in the field of science or engineering.

From this second screening effort during late 1974 came a final field of six candidates. Two passed over candidates were difficult to exclude-CAPT Roderick White, Dean of Academics at the USCG Academy, and Dr. Lloyd Breslau, a Center plank-owner and its current Assistant Director for Physical Science and Technology. (11.2) Consequently, all finalists were outsiders, thereby making their track records something of a question mark. To assist in this all or nothing choice each finalist received invitational travel orders and was asked to present a fifteen minute briefing on one of his key accomplishments before the USCG Science Advisory Committee. Despite it being a face-to-face competition, the overall gathering involving the RAC members, the six candidates, RADM Abe Siemens (the new R&D Chief), CAPT Graeme Mann (the Center's new commander), Dr. Bates, and the Center's managerial staff, went very well. When the votes were counted, the selectee by anonymous agreement was Dr. Donald L. Birkimer, P.E., a structural engineer from the U. S. Naval Proving Grounds, Dahlgren, VA. After Birkimer arrived at Groton, he smoothly melded into the Center. Accordingly a year later when CAPT Mann's replacement as Center Commander, namely, CAPT Milton Suzich, remained tied up at the Naval War College, a formal Change of Command ceremony was still held on 21 May 1976 wherein Mann's official relief was Dr. Birkimer who then served as Officer in Charge until CAPT Suzich could report in. (11.3)

In practice, CAPT O'Connell's tour as "Mr. Everything" at the embryonic R&D Center was highly laudable. In just two years at what once had been an austere barracks, O'Connell and his staff built, equipped and started up acoustic, optical, electronic, chemical, mechanical and computer simulation laboratories. Organizationally, the Center had two technical divisions: Ocean Science and Technology (including marine safety) under CDR Richard I. Rybacki while Physical Science and Technology (including oil

spill chemistry and experimental vessel traffic systems) was led by the earlier mentioned Dr. Lloyd Breslau. Cutting across these organizational components, however, was the O'Connell concept that the Center should become nationally expert in these specific technologies:

1. Domestic and Polar Ice Technology
2. Marine Traffic Management
3. Marine Navigation Technology
4. Marine Fire and Safety Research
5. Marine Pollution Technology
6. Search and Rescue Technology

To make certain that the Coast Guard knew how to achieve this level of endeavor, Bates asked Dr. Arthur Bueche, a good friend from the American Management Association's R&D Council, to lay on a Coast Guard Day at General Electric's famed Corporate Laboratory. Airborne via Coast Guard ONE at exactly 0800 from Washington National, RADM Richmond's party of ten touched down 50 minutes later at Albany, NY. Following a get acquainted coffee break, Bueche and his staff presented a two hour run down on how the Central Laboratory was funded, how it interfaced with Divisional Laboratories responsible for upgrading current product lines, and how it selected 20 long term research areas which offered special promise for future technological growth and enhanced corporate sales. As an example, the GE endeavor into creating commercialized artificial diamonds and other gem stones was described in detail. Following a private lunch, the Coast Guard group then toured the laboratory spaces initiated by Steinmetz seven decades before that eventually became the source of such innovations as fluorescent lights, power turbines and X-ray imaging.

By the close of December 1974 the R&D Center had 43 technical reports to its credit starting with foam-dry chemical testing for fire suppression on the hulk, M/V Rhode Island. (R&DC Report 1/73) and ending with a field evaluation of an expendable probe for surface current determination (R&DC Report 4/74). Other reports of special interest included Weathering of Oil at Sea, Design, Construction and Evaluation of a Laser Range Light, Development of a Safer Jon Boat, A Census of New York Harbor Marine Traffic Derived from Side Looking Airborne Radar Data ,and Full Scale Ice Breaking Tests of an Air Coating System for [Lubricating] Hulls. Numbering wise, these specific center reports would be 6/74, 9/74, 12/74.19/74 and 23/74. Although the effort to create a much safer Jon boat for hunters and fishermen saved the most lives of all of the Center's projects undertaken during its first four years of existence, the best dollar payoff came from the Chemistry Branch's successful effort to develop an oil spill finger printing system easy to use in the field but also rigidly defensible in the court room. (11.4)

After being spilled, petroleum products immediately begin losing volatile compounds. Therefore reliably matching samples of the same product before and after weathering is not easy. Nonetheless, after investigating five techniques, by October 1974 Dr. Gert Kleineberg's group released the monumental R&DC Report 34/74, An Oil Spill Identification System, which not only provided identification technology but also offered

procedures for slick sampling, sample tagging and exchange of custody that met legal standards for court room use. Two of these techniques -- fluorescence spectroscopy and thin layer chromatography --proved adaptable for field usage. Consequently by late 1975 USCG Captains of the Port for New York City, Philadelphia and Portland, ME had their own mini labs while another 26 mini labs were planned for additional harbors throughout the nation.

By then the R&D Center staff had grown to 49 civilians, 27 commissioned officers and 40 enlisted men and women. Of these seven held doctoral degrees and another 21 had engineering or master's degrees. In addition, temporary employees, special active duty reservists and ready reservists on annual two-week duty tours were used extensively. Interfacing with the near by Coast Guard Academy was also going smoothly. Thus, during the 1975 summer period, 28 cadets and four faculty members were assigned to the Center. In addition, an R&DC/Coast Guard Academy Scholars Program had been established for highly motivated cadets.

But the "Hit of the Show" as far as the R&D Center was concerned was the six-member team initiated by Dr. Kleineberg back in mid 1973 to create the science of oil spill forensics. Consequently, the very first annual report of the USCG Research and Development Center issued on 5 January 1976 could state:

> "Using these [forensic] techniques alone in over 300 oil pollution incidents [in just three harbors] resulted in potential savings or recovery of contingency funds in excess of $1 million...One advantage arising from national recognition of our forensic oil identification capability is the deterrent effect it appears to have. During the past year, for example, the number of pollutant incidents in New Haven Harbor dropped to less than half the number of the preceding year."

One reason for this new meticulousness on the part of tanker operators derived from an incident cited in Commandant Siler's official biography:

> "Earlier, in 1975, through chemical analysis of oil finger printings of samples from 34 ships that were tested at the USCG Research and Development Center at Groton, CT, the Coast Guard was able to identify the polluter responsible for dumping 40,000 gallons of oil in the Florida Keys. This resulted in the arrest of the master of the Liberian flag tanker, Garbis."

Further proof that the Coast Guard's annual RDT&E appropriation was paying off came in the Center's second annual report released 7 January 1977:

> "For the fourth consecutive year, the R&D Center's Chemistry Branch has organized an Oil Identification Symposium for the internationally recognized annual Pittsburgh Conference on Analytical Chemistry and Applied Spectroscopy. The branch continues to hold chairmanships in several ASTM (American Society for Testing of Materials) subcommittees involved in developing standard identification methods of oil."

As a consequence of this effort and several others that were not so glamorous, less than five years after his corporate laboratory opened, Commandant Siler awarded the Coast Guard Unit Commendation during January 1977 to the R&D Center for outstanding achievement during the period 1 July 1975 to 30 September 1976. By 1978 the Center had stabilized with an on-board count of 150 personnel, half military and half civilian, plus another seven military located in Mobile, AL. Project wise, each ongoing effort tied directly back to a specific Headquarters' program manager with a problem requiring immediate solution. Thus, of the total project funding assigned to the Laboratory, 54 per cent supported the USCG's Office of Marine Environment and Systems, 21 percent the Office of Engineering, 14 percent the Office of Operations, eight percent the Office of Merchant Marine Safety and only three percent, i.e. $74,500, went for Independent Research.

Despite this minimal amount available for fire drills, the Center could instantaneously call on these in house professional disciples:

Biochemistry
Marine Science
Naval Engineering
Oceanography
Optics
Organic Chemistry
Physical Science
Physics
Statistics
Telemetry
Biology
Business Administration
Civil Engineering
Computer Science
Electrical Engineering
Electronic Engineering
General Chemistry
General Science
Geochemistry
Geophysics

Fund wise, stability ruled with the variation by any given year being about of ten percent. During the typical calendar year of 1979, Center funding was $5,672,850, 90 percent of which came from the RDT&E appropriation. Of that total amount, $1,489,400 went for civilian salaries, $801,050 for military pay and $324,000 for leasing 76,909 square feet of space from the University of Connecticut.

Meanwhile the question of continued leasing versus actual construction of an R&D Center remained a sensitive issue even in 1979. For example, back in 1977 a major

economic downturn caused Connecticut's Chancellor for Higher Education to propose shutting down the University's Southeastern Branch, an action that would leave the USCG R&D Center occupying a vacated 72 acres of valuable coastal waterfront. Upon learning of this potentiality, Chief of Staff RADM Robert Scarborough directed the Office of Research and Development to reanalyze its modified Shore Facilities Development Plan prepared three years earlier. In response, the Office's program analyst, Julius Feldman, evaluated in detail the possible options but took two years to do so. His report offered eight alternatives, ranging from abolishing the center outright to building the long proposed Center on the still vacant eight acres adjacent to the Coast Guard Academy while using a no-frills design costing $13,000,000 in 1982 dollars. With respect to the existing Avery Point facility, three alternatives were offered, including buying the entire site and upgrading the buildings thereon at an estimated cost of $16,700,000. By 1979, however, the overall Coast Guard faced budget downsizing so flagrant that serious consideration was being given to phasing out the Coast Guard's one and only military band. Thus, despite the high benefit-cost ratios being achieved at the Coast Guard's in-house laboratory, top- side flinched at the initial cost of going first-class within the RDT&E program. So the end product of the Feldman study was continued leasing at five year intervals, a practice fraught with difficulties whenever laboratories, particularly those dealing with chemicals, need upgrading. But nonetheless, this practice of making do with less is standard Coast Guard procedure. And so even in 2003 the Service's sole R&D Center remains in interim status utilizing rented property at the University of Connecticut. (11.5)

End Notes for Chapter Eleven

11.1 VADM Hayward's and Dr. Bennett's managerial ideas jelled while Hayward was the Commander and Bennett the technical director of the Navy's finest laboratory - the Naval Ordnance Laboratory- with a staff of 3,000 sited on 875 areas just north of Silver Spring, MD. For more details on the concept, see Hayward's autobiography, Bluejacket Admiral . Naval Institute Press, 2000.

11.2 In the case of inventive and charismatic CAPT White, even though he would have been in retired status, he would still be Coast Guard in upbringing with unforeseen baggage while interacting with classmates. As for Dr. Breslau who held four degrees from MIT and among the very first to utilize computers at sea for processing sonar signals, his people skills were somewhat lacking. Even so, during the early 1980's he left to become the Technical Director, U. S. Army Cold Regions Laboratory, Hanover, NH

11.3 For leadership, competent Center commanders rotated through on schedule, including Captain Milton Suzich (1976-1979) and Captain Kenneth Urfer (1979-1983). On the technical side, Dr. Birkimer stayed in place until the mid-1980s when he left to become the Technical Director, U. S. Navy Civil Engineering Laboratory, Port Hueneme, CA. Today the current director (as of 2003) is Dr. Marc B. Mandler, a specialist in visual detection.

11.4 In addition to commercial vessels, oil refineries were often "midnight dumpers" of oily waste into federal navigable waters. Moreover, a not typical situation arose in Norfolk, VA where, come the dawn, a puddle of waste oil existed under a wharf while ships were tied up on either side. The two captains, of course, vigorously denied the

spillage being theirs for there was no ready way of forensically proving who was the liar. Accordingly, both ships were cleared for departure while the federal taxpayer paid for cleaning up the mess.

11.5 The author's description of this evolutionary process primarily pertains to the human side. For quantitative details, one should refer to the USCG R&D Center Annual Reports for calendar years 1975 and beyond, to Julius Feldman's Analysis Development Plan, U. S. Coast Guard Research and Development Center (28 March 1979), List of Publications of USCG R&D Center (10 January 1979), and A Brief History of Research and Development in the Coast Guard: A Management Perspective, U. S. Coast Guard Headquarters (1993).

Chapter Twelve
Science Advisor for ADM Chester R. Bender, Commandant
(1970-1974)

Between June through September 1945 Commander Bender, USCG, and Captain Bates, USAAF, worked in neighboring buildings at Headquarters, Far East Forces, within Manila's burned-out Fort McKinley, Philippines Islands. However, we never intersected even though Bender was FEAF's air-sea rescue advisor and the author one of FEAF's decorated sea/swell forecasters. Consequently, our first face-to-face contact was on 1 June 1970 when Chester Bender became the 14th Commandant of the Coast Guard. Although Willard Smith, his predecessor, and ADM Bender were rated pilots of fixed-wing aircraft, the latter acted far more conservatively for he had neither attended a command-and-staff college nor acquired post graduate training at an academic institution. (12.1) For Vice Commandant Bender chose a fellow Academy boxing team member, Thomas Sargent, who, although more outgoing, was also steeped in the concept that the nation's senior maritime service should remain a low-key organization.

Consequently, this new Commandant saw no need for exchanging ideas on the Coast Guard's future with his Science Advisor at the Army and Navy Club. Nevertheless, to provide a broadening experience, Bates did arrange for ADM Bender to host one-on-one lunches with outside guests within the Commandant's private mess. Several ran well over the proposed duration of an hour, particularly the one with charismatic Dr. Dixy Lee Ray, Chairwoman of the Atomic Energy Commission and soon to be the Governor of the State of Washington.

During ADM Bender's breaking-in period, his Science Advisor kept involved in two external efforts of some importance. Even before the change in command, the Director of Defense Research and Engineering (DDR&E) had asked that Dr. Bates, in light of prior service with the Advanced Research Projects Agency (ARPA, 1960-1964), be the Coast Guard member on the Panel for Ocean Surveillance at the Defense Science Board's summer study of August 1970. Among the Panel's travels were visits to the National Security Agency, to the Sixth Fleet anchored off Gaeta, Italy, and to the Commander, Naval Forces, Atlantic, located in London, England. In return, when the Coast Guard's district commanders held their annual assembly during October 1970, Bates presented a forty minute classified briefing concerning the latest on ocean surveillance should the on going Cold War suddenly turn hot.

Another time consuming project dated back to a request of 6 June 1969 from Acting Secretary of the Interior Russell Train to Secretary of Transportation Volpe which read in part:

> "...that the department nominate someone from the US Coast Guard to serve as Co- Chairman of the Marine Facilities Panel, U.S. - Japan Cooperative Program in Natural Resources."

Acting Secretary James Beggs replied on 2 July 1969:

> "We are most happy to do so and nominate Dr. Charles C. Bates, Science Advisor to the Commandant, U. S. Coast Guard. He is a professional petroleum geologist...and thoroughly familiar with the many and varied problems pertaining to development of the natural resources of the sea."

Exactly what should take place under this cooperative effort was a big question mark. Its origin dated back to an earlier meeting between the Premier of Japan and U. S. President Johnson wherein the latter, not willing to turn over the captured island of Okinawa, substituted a new State Department program wherein the United States would assist the Japanese overcome deficiencies in a multitude of natural resources. The missing word from the program's title was, however, "unfunded". Thus, when Bates asked other federal departments to assign members to the Panel on Marine Facilities, the response was mediocre, while only one corporation, General Electric Company, chose to add a skilled observer to the group.

On the other hand, Japan was taking this show and tell exercise very seriously. Bates's counterpart was no less than Dr. Hiroo Kido, Director of the Ship Research Institute, Ministry of Transport, backed up by the English speaking Tamio Ashino, Manager of New Products for the industrially funded Ships Machinery Development Association. And always sitting in the second row behind the official panel members were bright middle level executives from mammoth zaibatsus such as Mitsubishi, Mitsui, and Ishikawajima-Harima Heavy Industries, ship builders all.

Dr. Kido and the author soon agreed that their joint sphere of interest would include ports and harbors, tunnels, underwater pipelines, dredging, submersible work platforms, ship collision avoidance, marine pollution control and clean up, and man-in-the-sea projects. The first face to face exchanges on these topics took place between 16-31 March 1970 in Tokyo's Hotel Okura, one of the world's top ten hotels. Guidance for the upcoming meeting came from no less than U. S. Ambassador Armin Meyer who kindly had our group of eight to dinner at his residence across from the Okura during the evening prior to the opening session.

The Panel's next major session came between 19 April and 3 May 1971 for it was keyed to attending the massive Third Offshore Technology Conference in Houston's Astrodome. To provide a better overview of Japanese maritime know-how, Bates arranged for Texas A & M University's Office of Sea Grant Programs to host a one-day seminar at the nearby Astroworld Hotel wherein each Japanese panel member made a twenty-five minute presentation to the hundred offshore engineers that Letha Milloy had rounded up from the American oil industry. Moreover, to make these presentations in Japanese intelligible to American listeners, Bates imported the State Department's translation team. Meanwhile Ms. Milloy scurried about finding a hundred head-sets by which everyone could follow the dialogue in real time.

Although the Japanese came out ahead on this presidential gambit, Bates gave a heavily illustrated 30-minute talk in many locations describing how one could not tell where the

Japanese government ended and industry began. Among the most interested was Senator Ernest "Fritz" Hollings, a World War II veteran and now a key member of the U. S. Senate's Commerce Committee. Officials at the departmental level also liked what they heard so the Science Advisor was once again en route to Tokyo as the departmental representative at further meetings concerning technical cooperation between the two countries. (12.2)

By now the Science Advisor was heavily involved in marine pollution issues, particularly in making certain that the low key Coast Guard was not overridden on technological policy by the brash, lawyer dominated U. S. Environmental Protection Agency and its ally, the U. S. National Oceanic and Atmospheric Administration. Among such issues were "How Clean is Clean?" i.e., when does one stop cleaning up a spill? Moreover, does the mere creation of an oily sheen cause a Federal law violation? Consequently, the March 1971 issue of The River Pilot announced that next month's meeting at New Orleans' Rivergate Center by the International Association for Pollution Control would have as its keynote speaker Louisiana's Senator Alan Ellender, Acting Chairman of the U. S. Senate's Appropriation Committee. As for the following session on Pollution and the Marine Industry, its leader would be the Coast Guard's Chief Scientist, Dr. Charles C. Bates, who:

> ."..has played a prominent part in directing the research and development of pollution instrumentation and control equipment by the U. S. Coast Guard."

By actions such as these Bates believed he was successfully representing the Coast Guard on national and international research and technological groups. However, RADM Richmond saw it differently. In due course Richmond advised that the Commandant wanted Bates to stay off Capitol Hill. Shortly after that, he further advised that Bender wished his Science Advisor to cease being involved with the Japanese. To reinforce this type of guidance, Richmond presented his Chief Scientist with an adverse performance rating, the first in thirty-one years of government service "...for lack of cooperation". But ADM Bender was not entirely unhappy. Just four months after Richmond left for his Seattle assignment, Dr. Claude Brinegar, the Secretary of Transportation, awarded DOT's Silver Medal to Dr. Bates for "notable achievements while serving as science advisor to the Commandant, USCG"! (12.3)

By then, ADM. Bender had allowed his Coast Guard Yard to become the skunk-works for a development close to the heart of Bates' former Pentagon boss, Dr. Robert Frosch. As of early 1972 Frosch had been Assistant Secretary of the Navy (R&D) under the Johnson and Nixon administrations for nearly six years. Even so, he felt it necessary to sidestep the Navy's opinionated Bureau of Ships while constructing the prototype of a revolutionary ship -- the SSP-1 (Stable Semi-Submerged Platform) -- conceived out of channels by Dr. Thomas Lange of San Diego's Naval Undersea Center. But who could build it with minimal cost and overhead? How about the Coast Guard?

A call from Frosch to Bates was passed to RADM Helmer Pearson, Chief of Engineering, who averred that his Yard would be interested in the assignment. After several informal

conferences and the signing of appropriate documents, work began using the sketchiest of blueprints on an 88-foot long, twin hulled catamaran featuring six-foot diameter pontoons for flotation. Power for the deeply submerged dual propellers was delivered by two vertical "bicycle chains" some 30 feet in length extending between the deck mounted power units and the actual drive shafts, a "Rube Goldberg" contraption to say the least. Once built, the Kaimalino (Hawaiian for smooth water) successfully completed evaluation trials in choppy waters near Hawaii. Now, at the turn of the century, she still serves as an easy-riding range ordnance retrieval vessel off San Diego. (12.4)

End Notes for Chapter Twelve

12.1 Within six months of becoming a four star admiral, ADM Bender failed to override orders issued by First Coast Guard District Commander, RADM William Ellis, that the skipper of the cutter *Vigilant* (WMEC-617) must allow a Soviet boarding party to search his vessel stem to stern during 23 November 1970. While doing so the Soviets forcibly extracted defecting Simas Kudirka who later proved to be a U. S. citizen. Upon being apprised after the fact of this ten-hour action, President Nixon termed it, "Outrageous", as did most of the nation.

12.2 By traveling on behalf of the Department of Transportation, Bates rated first class rather than tourist class travel. Consequently, while his B-747 chased the sun and arrived in Tokyo just at sunset, it had been free champagne during 16 hours of flying. Nonetheless, the cabin air was so dry that inebriation did not set in to the slightest degree.

12.3 Duty alongside RADM Richmond was never dull. Even the ebullient ADM John Jack Hayes (Commandant, 1978-1982) noted in his USCG web page memoir that when he was a three-striper handling SAR shore facilities during 1967: "I had a very challenging boss, a fellow by the name of Chet Richmond."

12.4 Three decades later the world's leading builder of fast wave-piercing catamarans is Incat Tasmania of Hobart, Australia. For example, its 319-foot *Spearhead* under U. S. Navy charter at Diego Garcia is capable of transporting 750 tons of cargo for 1,100 nautical miles at a cruising speed of 36 knots. In addition, the Office of Naval Research has signed a $59 million contract with Titan Corporation to build even a faster catamaran featuring two helicopter landing pads.

Chapter Thirteen
Science Advisor for ADM Owen W. Siler, Commandant
(1974-1978)

During the hot sunny morning of 1 June 1974, cautious ADM Bender was replaced as commandant by 52-year old Owen W. Siler, an outgoing, perspicacious pilot of fixed-wing aircraft known as "Si" to his close associates. (13.1) Moreover, his current Chief of Research and Development was another multi-talented pilot, RADM Abe H. Siemens, one of the RDT&E plank-owners back in 1968. Both men enjoyed challenge and change. Thus, Siler's official biography describes his tour in part:

> "The traditional view of the Coast Guard as simply the humanitarian service, the water borne rescue agency of the Federal Government, did not disappear during the Siler years, but it was altered. Although search and research was still the bread and butter mission of the Coast Guard, legislators and the general public attained a broader perspective of the service. It came to be recognized as a leader in marine environment; a law enforcement agency with which to be reckoned, a conservation conscious protector of our marine resources and as a major force in a dozen other roles the public was theretofore unaware."

To enhance the Commandant's local image, the author annually hosted a private luncheon at the famous Cosmos Club between "Si" and Washington's most popular morning talk show hosts - Frank Harden and Jackson Weaver. Thus, while stuck in heavy traffic, morning commuters found themselves listening to the Coast Guard Band playing (via tape) the *Coast Guard Hymn* at 7:08 AM (hymn time) and to *Semper Paratus* at 7:22 AM (march time). Similarly, Bates' good friend, Howard Simons, Managing Editor of the prestigious *Washington Post*, each year invited the top three USCG officials and the author to dine with him and his top reporters within the *Post's* executive dining room, a soiree typically capable of generating one or two follow-up articles involving the Coast Guard. (13.2)

In return ADM Siler invited the author to accompany him on trips of note. Because of his oil company background, Bates believed neither industry nor the federal government had adequate plans for protecting the hundreds of offshore petroleum installations from foreign sabotage. Therefore, as part of the education process, the author gladly tagged along when two commandants, namely, General Thomas Barrow of the Marine Corps and ADM Siler of the USCG used Coast Guard One to spend a day at the U. S. Navy Inshore Warfare Center, Panama City, FL.

Equally intriguing was a week's swing via Coast Guard One during 1977 to major Coast Guard facilities throughout Alaska. While at Kodiak, the author had no luck in persuading anyone to delve deeper into improving safety practices of the deep sea fishing fleet although some 30 lives were lost out of that port each year. However, Bates did note with interest when the Commanding General, Alaskan Air Command, reported during lunch at his quarters that fifty percent of his time was currently devoted to sorting

out issues associated with uniformed females being posted to isolated outposts, e.g., how do you find baby sitters on Shemya, the outermost island of the Aleutian Chain? Another political hot potato for ADM Siler dated back to Secretary of Transportation Volpe's letter of 19 December 1969 to Commandant Smith directing him to establish pollution baselines to measure changes, with such pollution to include hazardous pollutants other than oil. In practice, this edict was superseded when the U. S. Environmental Protection Agency came into being ten months later. By then, however, Coast Guard Headquarters was operating the National Pollution Response Center wherein the inputs, being primarily based on Mark One Eyeball reports by USCG field units and other impacted governmental entities, were highly subjective and difficult to use as legal evidence against a wrongdoer.

To remedy this deficiency, during the spring of 1970 the USCG's Office of Research and Development began spilling various amounts and grades of oil into the Gulf of Mexico and then photographing the slicks in color and in black and white. The purpose--to give air and ship crews some guidance as to what illegal spills looked like when exceeding the legal limits of 100 parts per million or 50 liters of effluent per mile. Simultaneously, other R&D staff were testing potential all weather sensors, such as radar, infra red and passive microwave, against the sunken tanker, Arrow, off Nova Scotia and a Chevron platform blowing wild off the coast of Louisiana. Then after another decade of persistent effort, the R&D staff came up with a workable AIREYE pollution mapping system which, unfortunately, had to be forcibly squeezed into the USCG's newly developed HU-25 Guardian medium range surveillance aircraft.

ADM Bender's main claim to fame had been mandating the "Bender Blues", a uniform that resembled Air Force clothing far more than it did the Navy's. However, his $180 million decision to purchase 41 jet powered French Falcon executive aircraft for surveillance purposes was equally controversial. According to Bender's Aircraft Characteristics Board, the HU-25 would:

> "...operate from sea level to an altitude of 42,000 feet at dash speed, an important capability for the Coast Guard missions of search and rescue, enforcement of laws and treaties, including illegal drug interdiction, marine environmental protection and military readiness"

Although the Board's chairman, a USCG Captain, claimed that the aircraft's untested Garrett turbo fan engines would be fuel efficient while conducting eye-ball searches at elevations of a thousand feet or so, such was not to be. In addition, in a memorandum dated 29 August 1974, Bates complained to new Commandant Siler that the board chairman had consulted with neither the Chief of R&D nor the Science Advisor regarding how the AIREYE and its associated APS-127 MRS radar (another R&D development), plus viewing consoles, could be optimally installed within the HU-25 aircraft . As a consequence, what could have been a major break-through in providing on-scene coordinators with a 24 hour, all weather capability for mapping the extent and thickness of major oil spills was severely handicapped by airframe design and by the small cabin volume typical of high performance executive aircraft. (13.3)

Another item of concern to the Science Advisor which carried over from the Bender to the Siler regime was shifting the Coast Guard's marine science program away from routine observation and chauffeuring of other agencies to one directly keyed to the Coast Guard's burgeoning maritime environmental protection effort. Finally, in a memorandum dated 1 August 1972 Acting Commandant Sargent directed his Science Advisor to do the following:

> "I want you to make a detailed review of the various activities and projects which the Coast Guard is carrying out in the marine science area. Provide me with your specific recommendations concerning the continuation, redirection or discontinuance of these elements of our program together with any recommendations you may have for alternate activities."

In response during 3 October 1972 the Science Advisor submitted a staff study, *Coast Guard Marine Science Activities: What Are Today's Options?*, consisting of twenty-two pages of text and twenty attachments. The author first noted that the Coast Guard had built up a respectable oceanographic capability involving 275 officers, men and civilians utilizing 29 high endurance cutters, six ice breakers, the CGC Evergreen (WAGO-295), and, for ice patrol purposes, HC-130 (Hercules) aircraft. At that moment in time, the Coast Guard still occupied seven ocean stations (three cutters to a station) on behalf of the National Oceanic and Atmospheric Administration. Even so, meteorological satellites had been in orbit since 1959 and the National Data Buoy Program underway since 1968. Thus the demise of the Coast Guard's intensive ship/ manpower high seas observational program was only a matter of time. (13.4)

To generate a congressionally defensible shift in emphasis, the Bates study addressed a wide range of options, some being controversial straw-men designed to trigger true thinking on the part of the reader. In summary, Bates recommended deeper involvement in military oceanography/hydrography, increased real time participation in internal search and rescue and environmental protection programs, and centralization of all oceanographic research, both pure and applied, at the USCG R&D Center. Needless to say, because of inbred fiefdoms, the last of these recommendations was never implemented.

By then, however, USCG Headquarters had activated an Office of Marine Environment and Systems under RADM Sidney Wallace. (13.5) Because any new office tended to come out of the Coast Guard's overall hide, the USCG's Oceanographic Unit eventually operated the Service's Forensic Analysis Laboratory and assessed potential drifting ice problem affecting the USCGÕ Vessel Traffic System in the Valdez Arm region of Alaska. Even so, nearly five years went by before the Commandant sent his Science Advisor a note that read in part:

> 18 March 1977
> Subject: Optimization of Oceanographic Services

1. It appears that we have accomplished, to a large degree, what you have suggested. This probably was only because of your pushing and agitating. Keep it up!

/signed/
O.W.Siler

During the same period Coast Guard commentary before the Congress, the media and the shipping industry relative to spillage issues and tanker design/operations was largely handled by two articulate rear admirals: namely, RADM "Mike" Benkert, a hard-driving ice breaker skipper and now Chief, Office of Merchant Marine Safety, and by the above mentioned RADM Wallace, a slick "legal eagle". Nonetheless, despite all the hue and cry and the frequent showing of oily birds during evening television programs, very little quantitative knowledge existed as to how spilled petroleum products behaved in water, their long term impact on aquatic fauna and flora, and the best methods for clean up, i.e., physical retrieval, burning, or dispersion.

Back in 1947 the Science Advisor had been a co-founder of Bates & Glenn (later A. H. Glenn and Associates), the first oceanographic forecasting firm serving offshore oil operators within the Gulf of Mexico. Thus, Bates quickly became involved in efforts by industry, academia and government to expand public knowledge, both scientific and technical, regarding the nature, control and amelioration of accidental spills of petroleum and other hazardous materials. The first of these came when he was asked to chair the Inputs Panel at the pace setting 1973 Airlie House workshop: Inputs, Fates and Effects of Petroleum in the Marine Environment, sponsored by the Ocean Affairs Board of the National Academy of Sciences. This effort then gave rise to the Academy publishing during 1975 the authoritative document used on a global basis entitled Petroleum in the Marine Environment. (13.6)

To generate further information on this highly controversial subject, during June 1978 Bates initiated and served as General Chairman of the conference, Assessment of Ecological Impacts of Oil Spills, hosted by the prestigious American Institute of Biological Sciences. Held in Colorado's deluxe Keystone Lodge, the meeting drew speakers from nine countries and discussed in depth such infamous spills as those of the Metula (Chile), Urquiola (Spain), Potomac (Greenland), Ekofisk Bravo (North Sea) and Barge STC-101 (Chesapeake Bay). Then, in the off years of 1977 and 1979, Bates served as Chairman of the Technical Program Committee for the biennial conference, Prevention, Behavior, Control and Clean up of Oil Spills, sponsored by the American Petroleum Institute, the U.S. Environmental Protection Agency and the U. S. Coast Guard. Each time some one hundred papers were screened and edited, followed by publication so immediate that each of over a thousand attendees from twenty countries received his/her 700-page Proceedings during conference registry, i.e. New Orleans during 1977 and Los Angles during 1979.

Another R&D topic achieving tangible progress during the Siler regime was that of search and rescue (SAR). In 1946 the author watched his research vessel, the USS Blish

(AGS-10), fruitlessly steam for a day looking for an overboard sailor off Bikini Atoll during Operation Crossroads. By 1972 SAR had become the overworked Coast Guard's key operation for it was responding to over 48,000 calls for assistance each year. Yet the state-of-the-art remained keyed to eyeball searches frequently hindered by having only the vaguest knowledge of the rescuee's supposed location. Fortunately, Jim Van Etten, a member of the USCG Science Advisory Committee and Chief Scientist for ITT's Avionics Division, came by during 1973 with a simple transceiver and associated umbrella-like antenna system that could transmit a SOS signal plus associated OMEGA positioning data to a shore side readout station via a communication satellite. RADM Siemens and the author thought this concept worth investigating. However, the Commandant thought differently. Bender made it clear: (13.7)

> "Forget it! We have all the searches we can handle in the open Pacific and we don't need any more."

But the inefficiencies of high seas SAR would not disappear. Consequently, during 14 February 1974 exasperated Vice Commandant Sargent fired a memorandum directly to RADM Siemens, his R&D Chief, with an information copy to Chief of Staff Ellis Perry:

> "Subject: Emphasis to be Placed on Certain Projects
>
> 1. In view of the fuel shortage, it behooves the Coast Guard to give the greatest emphasis to the solution of the problem surrounding an inexpensive, reliable small boat radio beacon. I desire you to place all emphasis possible on obtaining such a beacon and by copy of this memorandum, the Chief, Office of Boating Safety, will issue regulations requiring that such a beacon be carried on board all small boats venturing off the coast....
>
> 2. There must be a concentrated effort to eliminate as many duplicating electronic aids to navigation facilities as possible. In view of this, the term RIHANS (River and Harbor Navigation System) will no longer be used nor will any effort to research a different system other than VTS or LORAN-C be undertaken..."
>
> /signed/
> Thomas R. Sargent III
> Vice Admiral, USCG

Sargent's sensitivity regarding RIHANS derived in part from the fact that space cadets of the U. S. Air Force were claiming geographic accuracies of twenty feet once their Global Positioning System (GPS) had 24 NAVSTAR satellites in earth orbit. To clarify this possibility, on 15 March 1974 a new Assistant Secretary of the Navy (R&D) wrote Commandant Bender:

> "Dear Admiral Bender,

> Dr. Bates indicated in a note to my office that you have expressed considerable interest in the Global Positioning System (GSP). He.... requested that I advise you of the Navy's views on this system.
>
> The Navy has agreed to participate in the joint GPS experiment to determine the technical merit and limitation of GPS, evaluate its potential for providing precision position location, and more realistically pin down the cost of the system, particularly the receivers.
> We have made it clear that the Navy does not have a requirement for GPS at this time with sufficient priority to warrant its implementation....
>
> It is also pertinent to note that for a precise river and harbor navigation system the important accuracy number is the maximum error the system is likely to have to prevent straying from the channel...Whether the GPS would meet Coast Guard requirements, if implemented, can best be assessed by Coast Guard participation in the experimental program...
>
> In summary, it is my view that the GPS experiment should have only a minor impact on navigation system plans as a decision on GPS is not expected until FY77-78 at the earliest....With appropriate time allowed to amortize existing [navigational] inventory, LORAN-C and OMEGA phase out cannot realistically be anticipated until the 1990-95 time period."
>
> /signed/
> D. S. Potter

Dave Potter's technological forecasting proved to be on target. Only on 27 April 1995 did the U. S. Air Force declare the GPS System fully operational. In response, on 30 September 1997 the Coast Guard ceased OMEGA transmissions but planned to keep LORAN-C on the air as a back up navigation system until at least 2008.
Yes, ADM Bender had prohibited his R&D Office from becoming a leader in satellite aided SAR. However, the idea would not die. Leading the charge was the U. S. Congress for back in 1970 an aircraft carrying two popular members had crashed in coastal Alaska never to be heard from again. Initially the U. S. Air Force and the Federal Aviation Administration came up with "emergency locator transmitters" (ELT's) for aircraft. Then under ADM Siler the USCG approved "emergency position indicator radio beacons" (EPIRBS) for maritime use. Both used 121.5 MHz, the international aircraft distress frequency for signal transmission, a choice creating many false alarms on a cluttered transmission band. But in 1979 the United States, Canada, France and the Soviet Union agreed to fly the joint COSPAS-SARSAT system aboard Russian and USA satellites as of 1982 using 406 MHz radio beacons. As a result distress signals became available on a dependable basis from anywhere on Earth 24 hours a day, 365 days a year! But the irony for ADM Bender was that it was the National Oceanic and Atmospheric Agency which operated the American SAR-satellites. Moreover, during this formative period, no less than Dr. Frosch, who still owed the Coast Guard something for

constructing his pet Kaimolino , had become Administrator of NASA (1977-1981), the SARSAT's main source of funding. (13.8)

From the Science Advisor's point of view, Abe Siemen's four years (July 1973 - June 1977) as Chief, Office of Research and Development, passed far too quickly. Many battles were fought and often lost, particularly with salty RADM Benkert, Chief of Merchant Marine Safety. (13.9) The big issue here was speed of response to major oil spills associated with tanker strandings and collisions. Should the initial response be oil spill control equipment delivered by "Coast Guard Air" (heavy lift or parachute) or should it remain traditional with the ship or barge owner calling in a salvage contractor days later? As for purchasing power, Siemen's budget went backwards during his stay. For example, his FY 73 RDT&E Appropriation was $17.9 million while that for FY was $18.8 million, a increase of six percent while the Consumer Price Index was increasing by 35 percent.

Despite such tribulations, the Office of R&D celebrated its first nine years of existence by issuing a glossy, well illustrated 72-page document, U. S. Coast Guard: Efforts in Research and Development. Divided into ten sections, this report addressed both ongoing activities and future projections for the themes of marine environmental protection, search and rescue, marine safety, maritime law enforcement, polar operations, marine science and aids to navigation. Besides releasing this photo journal to the the public at large, RADM Siemens transmitted a five-page "swan song" to his fellow office chiefs.

In looking back, hard charging Abe Siemens may have pushed too vigorously introducing airborne solutions for fixing run-of-the-mill Coast Guard operating problems. Be as it may, his replacement was the "smoothie", RADM James P. Stewart, an "electroniker" who not only had served as Commander, Far East Section, Fuchu, Japan (1972-1974), but also in the flag level post of Commander, First Coast Guard District, Boston, MA (1974-1977). At first glance, bringing a seasoned rear admiral on board to be the new Chief of Research and Development, an action never undertaken before, might hint at a high level decision for drastic change within that part of USCG Headquarters. S uch an assumption would be wrong. During his year in " R&D", RADM Stewart rocked no boats, the proof of which was his becoming the Coast Guard's Chief of Staff as of 30 June 1978. (13.10) But just in case that RADM Stewart did wish to change things, during 28 November 1977 his Chief Scientist provided him with many appropriate suggestions in a six-page memorandum entitled, RDT&E Management Mechanisms, Updating Of. For the record, some are listed here:

> "2a. Both past and present Commandants have indicated that the Office of R&D has too many projects underway simultaneously for the resources available. As a consequence, this broad approach provides too slow an advance in any given area and creates a RDT&E program of such complexity that it is difficult to market to the Office of Management and Budget and to the Congress. For example, how would one highlight the best of the 44 projects now planned or underway relative to marine safety?

2d. Perhaps the key issue...is who should truly have final line authority as to the scope, internal balance, and execution rate of the Coast Guard's RDT&E effort at the two-star flag level? Should it be the Chief of Staff (who delegates most of this decision making to his staff), the Program Directors (who know their own programs and needs but not those of their peer Program Directors), or the Chief, Office of R&D, who looks at the USCG as a total entity and normally has equivalent training approaching that of the Chief of Staff and the Program Directors.

The question should resolve itself into whom the Commandant wishes to hold personally responsible for the technical improvement of the Coast Guard via the RDT&E appropriation -- the Chief of Staff, the Chief of the Programs Division [a four-striper], the several Program Directors or the Chief, Office of R&D?

End Notes for Chapter Thirteen

13.1 Siler graduated from naval flight training during 1948 while Siemens earned his wings three years later. "Si" also graduated from the famed National War College (1965-1967) and received a M.S. degree (International Affairs) from George Washington University (1968). Siemens' post -graduate training included a year at the USAF Aircraft Maintenance Officer School (1955-1956) and receipt of an M.S. degree (Industrial Management) from Purdue University (1960-1961).

13.2 The Simon-Bates interface dated back to 1960 when the former, as a prize winning science reporter (Westinghouse Award of 1962), covered Bates' VELA UNIFORM (underground nuclear test detection research) program at the Pentagon's Advanced Research Projects Agency (ARPA).

13.3 As ultimately developed, the AIREYE system featured displays from a side looking airborne radar(SLAR), an infrared/ultra-violet line scanner, a KS-97B reconnaissance camera and linkage to the computer controlled air navigation system.

13.4 The Coast Guard's Oceanographic Unit ceased during 1982, a full decade after the author's staff study concerning marine science. CAPT Kennard Palfrey, one of the Units last commanding officers, saw it this way:

"The [USCG oceanography] program did a good job servicing the cause of the larger scientific world, but could not sell oceanography to management. You can't eat oceanography, and when another rainbow appeared, whether it was law enforcement or marine environmental protection or migrant interdiction, the Coast Guard always chased it."

13.5 The most famous of this Office's field units were three air transportable Pollution Incident Strike Teams equipped with gear capable of pumping out dead-in-the-water holed tankers. As their skills became better known, their services were requested by such foreign governments as Norway, Chile, Japan, Colombia and Ecuador. In passing, it should be noted that one of the original plank owners -- LT(jg) Vivien S. Crea -- of this Office became a rear admiral. As of 2002, she was the Director, Office of Information and Technology, and thus the Program Director for the USCG's formal RDT&E appropriation.

13.6 Funding for this monumental effort was provided by the Rockefeller Foundation, American Chemical Society, Office of Naval Research, U. S. Environmental Protection Agency and the U.S. Coast Guard.
13.7 To provide guidance to SAR planners relative to duration of search prior to fatal hypothermia setting in, during 1947 Bates acquired the classified Alexander Report containing mortality data for Jews intentionally immersed in cold- water tubs by German doctors during World War II. By blending these gruesome numbers with monthly ocean temperature contours, Bates generated charts with isopleths of probable survival times for inclusion within the oceanography section of the National Intelligence Surveys issued by the Central Intelligence Agency.
13.8 As of 24 March 2003 the COSPAS-SARSAT system was credited with 14,487 persons rescued worldwide of whom 4,456 persons were inside the USA.
13.9 "Mike" Benkert never hesitated to make Antarctic ice breaking duty palatable. After contending with howling gales, he sometimes authorized medicinal alcohol for the entire crew. As for being a hemisphere away at Christmas time, his solution while in Antofagasta, Chile, was to rent a "house of pleasure" for the day with the putas preparing a feast as well as providing other services. Closer to home, during 1973 he enthusiastically blasted a 35-page paper, "Where Trends the Flow of Merchant Ships," presented at the Eighth Annual Conference of the Law of the Sea Institute by Bates and co-author CAPT Paul A. Yost who eventually became the Coast Guard's 18th Commandant (1986-1990).
13.10 The author opined upon occasion that the worst job in the Coast Guard was that of Chief of Staff. Not only did the two-star admiral have to make order out of chaos when it came to paper flow, but he also had to keep mollified area and district commanders who outranked him in terms of military seniority.

Chapter Fourteen
Science Advisor for ADM John B. Hayes, Commandant
(1978-1979)

Courtesy of the military's up or out promotion system, the early summer of 1978 featured a complete change of top-level Coast Guard management. On 1 June bouncy and competent John B. (Jack) Hayes moved from Juneau, AK to become the new commandant. For a change of pace, he chose a Merchant Marine Academy graduate, namely "Clean Desk" Robert H. Scarborough, to be his vice commandant. And as noted earlier, ever-smiling Jim Stewart moved from the slum at Buzzards Point to the glossy Nassif Building where he became Chief of Staff. For his R&D officer, Hayes brought from Seattle, WA, RADM Alfred P. Manning whose first command, like that of Hayes, had been an overseas LORAN station, i.e. Japan's Matsumae for Hayes and Italy's Simeri Crichi for Manning. (14.1)

Unfortunately for Hayes' new management team, the nation was in an economic tizzy. Inflation was twelve percent per year and climbing. Energy shortages persisted even though the price of crude oil had quadrupled during the prior four years. Furthermore, upon taking office 17 months before, President Jimmy Carter had appointed a record number of women, Blacks, Hispanics and activist lawyers to federal positions of management. For example, at the nearby U. S. Environmental Protection Agency, Douglas M. Costle, a civil rights and urban planning lawyer, was the Administrator, while his opposite number at the equally aggressive National Oceanic and Atmospheric Administration was Richard A. Frank, the immediate past Director of the Center for Law and Social Policy, the nation's first and largest public interest law firm.

Meanwhile old timers within the Department of Transportation shook their heads when on the ninth floor Ellen Greenberg, Director of Civil Rights, was decked with a broken jaw while resolving a policy issue with her deputy, a black male. Fortunately, Alex Haley, a retired Coast Guardsman who had risen under the tutelage of RADM "Iceberg Eddy" Smith from mess boy to Chief Journalist (1939-1959), had just received the National Book Award for *Roots*, a best seller with over a million copies sold. Because Haley was publicly proud of being a "Coastie', most of the diversity flak directed towards the Coast Guard centered on its lack of Hispanics, a deficiency hard to overcome for that segment of American society pays little attention to nautical matters.

As for Brockman Adams, this Secretary of Transportation's (1977-1979) chief claim to fame became deregulation of the commercial airline industry. With respect to RDT&E efforts within DOT, Adams was strictly "from Missouri" concerning its profitability to date. In view of this political picture, Hayes' USCG biography tersely notes:

> "During his tenure as Commandant Admiral Hayes led the service through difficult budget battles each year. He also thwarted attempts to transfer the USCG to the Navy."

Surprisingly, although President Carter trained as a nuclear engineer, he allowed the "Greens" to dominate his agenda. Gone was industry's hope of installing nuclear power plants every fifty miles off the East Coast from Chesapeake Bay to Cape Cod. Instead, the Vietnam peace dividend would be spent in areas such as urban mass transit and urban housing. Moreover, to demonstrate further how the White House was saving taxpayers' funds, mandatory orders came down from the Department to abolish the Coast Guard's Research Advisory Committee which now had fast moving Professor Ira Dyer, Chairman of MIT's Ocean Engineering Department, as its third chairman.

Nonetheless, the author hoped that 49-year old RADM Manning would fight the good fight and make his first flag level command a memorable one. To this end, his Chief Scientist presented Manning during 10 July 1978 with a densely written eight page memorandum as to where RDT&E currently stood within the Coast Guard structure and where it might be taken during the second decade of its existence. On the positive side, this RDT&E effort was finally broad based, turning out useful products, and manned by 210 competent people including 150 at a very viable R&D Center in Groton, CT.

On the negative side, Manning's FY 78 RDT&E appropriation remained less than that authorized in FY 71 even though the Office of R&D had upwards of 90 projects underway. Unfortunately, such a sprawling work menu meant that the technological advances being made appeared infinitesimal when scrutinized by budgeteers at departmental and higher review levels. Although a program generating infanticide for the less promising RDT&E efforts had been attempted three times, each time the concept had been outranked by RADM Scheiderer's management scheme of 1974 wherein 13 Program Managers/Directors for specified USCG missions could trump the two-star Chief of Research and Development. (14.2)

Equally troublesome was a complex and time consuming USCG/DOT RDT&E contracting method forcing the Office of R&D to carry over annually about $5 million (25 percent of its appropriations) into the next fiscal year, there being delays of up to nine months between the Request for Proposals and the contract award. Finally, although the federal appropriation was labeled RDT&E with T&E meaning "Test and Evaluation", the Coast Guard had no formal method of field testing, e.g., no fly before you buy system as in the case of the controversial HU-25 medium range surveillance aircraft procurement. Within two months, it became evident that low key RADM Manning's new broom could not alter the Coast Guard's suffocating RDT&E budgeting process. Accordingly, Bates advised the Commandant he would retire once 37 years of federal service were completed. In the meantime his program of exposing key associates to new perspectives continued. Per departmental mandate, he proceeded to arrange the third biennial technical exchange between the Canadian and U. S. Coast Guards during September 1978. By some conniving he also ensured that Commandant Hayes keynoted the upcoming American Petroleum Institute - Environmental Protection Agency- US Coast Guard Oil Spill Conference during January 1979 in Los Angeles, CA. (14.3)

For a final swing aboard plush Coast Guard One, Bates arranged for Administrator James B. Palmer of DOT's Research and Special Programs Administration, RADM Manning

and assorted spear carriers to ascertain the latest in energy technology along the Gulf Coast. After arrival at USCG Air Station, New Orleans, the group flew by Coast Guard helicopter to a Chevron drilling platform far off coastal Louisiana. Then came a visit to wave making facilities at Texas A & M University, a briefing on new structural designs at San Antonio's Southwest Research Institute, and a run-down on the University of Oklahoma's new up-scale Energy Center. For Administrator Palmer, it was "Mission Accomplished" for during 2 May 1979 he wrote:

> "My most memorable occasion [with you] must be the Grand Tour of 1979. As an experience in learning new things and as an assault on the senses, it was a true Charlie Bates expedition-- organized, timed and great."

Despite these kind words, the author looked forward trepidation as to what might be said during his retirement luncheon on 21 May 1979. For eleven years he had been a boat-rocker from outside the Coast Guard who had never made a living venturing during winter into or over the stormy North Atlantic and Pacific Oceans. On the other hand as the Washington scene's senior oceanographer dating back to mid 1946, he had attempted to ensure that the Coast Guard could approach the 21st century as a service performing multiple missions with modern equipment at minimal personal cost to a devoted work force. (14.4)

Fortunately Commandant Hayes, past Commandant Siler, and brusque Vice Commandant Scarborough chose to be congratulatory. At a brief Headquarters awards ceremony chaired by the latter, ADM Hayes recognized by letter Pauline Bates' facilitation of her husband's career. As for the farewell luncheon at Bolling Field's Officers' Club, so many flag officers came that the author noted nineteen stars were present. For one who once dug latrine pits in the field artillery back in 1941, it was gratifying to be accepted as a peer by those who had gone through the stormiest of seas to reach the top positions they now held within the nation's busiest armed force.

End Notes for Chapter Fourteen

14.1 Although Jack Hayes graduated from the USCG Academy after the end of World War II, he still was able to command a naval unit during combat, namely, Naval Task Group 115.4 off Vietnam during 1966-67. As for RADM Manning, he had served as a electronics technician aboard the CGC *Chautauqua* (WPG-41) prior to starting at the Academy during 1947. Later, he also earned two master's degrees, one in electrical engineering (University of Connecticut, 1958) and one in marine affairs (University of Rhode Island, 1971).

14.2 After pondering over R&D project ranking schemes used by such firms as Chevron, General Electric and Texas Instruments, Bates designed a technique comparable to the one the Coast Guard used for selecting individuals for the rank of captain. Then in 1977 the Research Advisory Committee ranked the hundred ongoing USCG RDT&E projects into three categories: Highly Desirable, Desirable, and Questionable. Captain Robert Platt also tried a separate scheme during the FY 79 budget markup. None were accepted at the flag level.

14.3 During the first Canadian-U.S. Coast Guard technical exchange during October 1974, the Canadian plane carrying Commissioner William O'Neil and his group arrived on time at 2030 at the New London, CT airport. Although prior arrangements had been made, Bates could not locate the immigration officer who supposedly had driven over from New Haven. Time sped by. Meanwhile O'Neil kept advising Bates he could not debark until officially cleared to do so. Finally, after a desperate two hours, the missing official was found drinking coffee in the control tower. Incidentally, O'Neil's next assignment was that of Director General for the Intergovernmental Maritime Consultative Organization based in London, England.

14.4 Times never seem to change. In April 2003 hearings before the Coast Guard and Maritime Transportation Subcommittee of the U. S. House of Representatives, Commandant Thomas Collins maintained that his service, now part of the Department of Homeland Security as of the first of that month, was adequately funded despite the increased threat from terrorism. On the other hand, subcommittee members worried that traditional services such as search and rescue were being cut back. After all, Operation Iraqi Freedom had pulled 1,250 Coasties off regular duties and posted them to the Arabian Gulf earlier in the year.

Chapter Fifteen
Retrospect and Sequel
(1979-1987)

In the authoritative *Politics of the Ocean* (University of Washington Press, 1972), Professor Edward Wenk Jr. notes on page 4:

> "Paradoxically, for a nation that was settled by sea and that enrolled a rich heritage of maritime accomplishments, the political as well as scientific communities proved almost indifferent to the influence of the sea on national affairs except in time of war. The turning point for the United States occurred in 1966".

One of the major responses to this shift in emphasis came on 1 April 1967 when the 177-year-old Coast Guard became the maritime component of the new Department of Transportation. Now that the Quiet Service had broader horizons, ADM W. J. Smith requested authorization from the Civil Service Commission to recruit a Science Advisor to the Commandant who would:

> "...participate fully as one of the Commandant's immediate staff in the planning, development and implementation of broad technical and scientific policies and programs of the Coast Guard".

Fortunately for the author who came on board during 22 June 1968 the above position description remained valid for another eleven years. In fact, on the opening page for the Department of Transportation within the U. S. Government Organizational Manual, 1972-1973, the "Science Advisor" is listed in the slot immediately below that of Assistant Commandant. Although such a prime location did not confer command authority, it did verify that the Science Advisor was a participant in a management team directing a far flung organization about the size of a major domestic corporation. Once the Coast Guard moved during early 1970 from the ex-Southern Railway headquarters building to L'Enfant Plaza, the USCG's "Board of Directors" assembled each workday at 0915 to brief the Commandant. As might be expected, the four-star admiral sat at the far end of the long conference table while his 12 flag level staff officers occupied its flanks. At the table's opposite end sat the "peanut gallery"- -- the Chief Administrative Law Judge, the State Department liaison, and the Science Advisor. Year in and year out, it was a most enjoyable group of men to interact with. Even so, throughout the decade the author never did guess correctly on three different occasions which of these regular conferees might be chosen as a new Commandant by the Secretary of Transportation. (15.1)

The only discernible constant in this choosing process was that the new four-star admiral must not be a boat rocker. Cabinet level politics were obviously bad enough without having to contend with a revolt from within. Moreover, to enhance their own chances for promotion, the 25 admirals junior to the Commandant generally toed the party line except "Eager Beaver" Siemens who appears to have paid the penalty of non-selection for higher rank during 1977. Thus, after VADM Trimble retired during 1970, the only permanent

enthusiast within USCG Headquarters for a powerful, well-funded RDT&E program was that of the Science Advisor.

Fortunately for Bates, the well-respected members of the USCG Research Advisory Committee agreed with his line of thought. (15.2) Accordingly, each year the Committee's articulate chairman would apprise the Commandant that his RDT&E program was on track but could do far better. For example, after the group completed a "Man from Mars" review during November 1977, Chairman Ira Dyer, a MIT department head, advised ADM Siler:

> a. Your R&D organization has a good basis in programs and capability for continued growth in the future as an important R&D asset and problem solving resource...In terms of its competence, capability and responsibility, it deserves the full confidence of the Commandant
>
> b. The personnel in the R&D area are dedicated and competent in their fields. The establishment of the R&D Center was a fine step for the future of the Coast Guard...All of the people associated with the establishment of the R&D effort deserve the Commandants "Well Done" accolade.
>
> c. The Committee recommends...increased application of human factors in the systems design of the man-machine interface.
>
> d. The present organization of the USCG does not seem to understand the principles of R&D. The USCG budget allocation for R&D is critically low -- only about 1.5 percent of total budget. U. S. industry runs 4-6 percent and the DOD (Department of Defense) at about 11-12 percent. [The present] $20 million R&D budget is basically sub-optimal for an agency of this size. It almost guarantees a failed program-- a self -fulfilling prophesy.

But unfortunately for those who believed that the Coast Guard motto, *Semper Paratus* - "Always Ready," required a viable RDT&E program, others in positions of power disagreed. First to disappear was the Research Advisory Committee. In response, Dr. Dixy Lee Ray, by then the governor of the State of Washington (1977-1981), wrote Bates during 9 February 1979:

> "I'm sorry to hear of the demise of the Research Advisory Committee -- it was a good outfit!"

Then four months later upon the author's retirement, ADM Hayes canceled the position of Science Advisor.

But now came the hard part. During 1981 the powerful Edward Meese and several other top Reagan appointees arrived in Washington believing that the Coast Guard should not only give up its presence on the high seas but also civilianize internal functions such as ice breaking, vessel inspection and aids to navigation. For a sop, ADM Hayes agreed to

cancel the R&D Center. But then the U. S. Congress entered the debate by having its Joint Appropriations Report for FY 82 require congressional approval -- which was never forthcoming --- before closing the Coast Guard research and development facility at Avery Point in Groton, CT.

Nonetheless, the Congress did go along with a 29 percent cut in the USCG RDT&E appropriation ($24 million dropping to $17 million) between FY 81 and FY 82. But in a counterbalancing action, the annual AC&I appropriation for Coast Guard buys continued to average $240 million per year between FY 81 and FY 85. Moreover, in the Coast Guard way of doing things, none of this new hardware required formalized test and evaluation. Consequently, the two-star admiral responsible for the technical future of the Coast Guard during the early 1980s now had direct input to less than one percent of his service's total funding.

As it so happened, the new rear admiral forced to struggle with this administrative RDT&E mess between 1981 and 1984 was Kenneth G. Wiman, a very personable civil engineer. Moreover, the new Commandant, ADM James Gracey (1982-1986), advised the author during 15 August 1985:

> "My R&D thrust is: Take a chance...go for the big pay off, but don't wait for the proverbial Ultimate...get something that looks reasonably good and give it a try. The D-Boss has the lead in selecting the program. He is NOT bound by satisfying all of the Program Directors' input."

By then, however, too much budgetary damage had been suffered to allow reintroducing a full-fledged research and development program. Nonetheless, bureaucratic momentum permitted two additional rear admirals -- Howard B. Thorsen (1984-1986) and Marshall E. Gilbert (1986-1987) -- to be R&D chiefs prior to moving upwards within the USCG command structure. (15.3)

Then in mid-1987 what had been so proudly initiated back in 1968 as a formal Office of Research and Development disappeared into a new entity, the Office of Engineering, Logistics and Development. As for the associated RDT&E responsibilities and funding, these became the responsibility of a Program Director with the rank of captain, one of 300 such individuals within the service and one sure to be rotated out before he/she acquired personal clout within Washington's technological community. Even in FY 93 when its congressional appropriation was reaching $3 billion per year, the Coast Guard's Commandant saw no need for a publicly visible RDT&E effort.

Thus, during 1996 in central Turkey when the author stood beneath the high arches of a Silk Road hostel dating back to the 14th century, his thoughts reverted back to when his beloved Coast Guard had a full-scale Office of Research and Development:

Think, in this battered caravanserai
Whose portals are but alternate night and day
How Sultan after Sultan with his pomp

Abode his destined hour and then went on his way

From *The Rubaiyat of Omar Khayyam*

While pondering, Bates mulled over Commandant Jim Gracey's commentary of 1983:

"One thing I know for sure about my friend, the sea. The tide comes in and the tide goes out...There are times of flat calm, and there are times of raging storm. Whatever the case, man must accommodate the sea, and he must plan his actions according to its vicissitudes...for my friend the sea is very unforgiving when not treated with great respect."

And so even now in a new century I wonder whether by down playing research and development, the 213-year-old Coast Guard is truly *Semper Paratus*. How certain is it that the Service can be technologically up-to-date while avoiding the purchase of wooden nickels as it proceeds with the Integrated Deepwater System costing some $17 billion over the next 20 years? Because of the aging process, unfortunately, I will never get to know the final answer to this conundrum.

End Notes for Chapter Fifteen

15.1 In his web-posted memoirs, ADM John Hayes, USCG (Ret.), notes submitting six fitness report jackets for Coast Guard admirals to Secretary of Transportation Andrew Lewis for consideration during 1982. Not surprisingly, the choice was a personable fast burner, James S. Gracey. Even as a Coast Guard cadet, "Jim" had been the Battalion Commander (1949) and later the recipient of one of Harvard's much prized master's degrees in business administration (1956).

15.2 As of 1976, RAC membership included Dr. Dixy Lee Ray, past Director of the Pacific Science Center, Dr. George Michelin, Vice President (Research) of the Westinghouse Corporation, VADM John Hayward, USN (Ret.), formerly Deputy Chief of Naval Operations (Development) and Captain Donald Walsh, USN (Ret.). formerly Deputy Director, Naval Laboratories.

15.3 In 1984 RADM Kenneth Wiman became the Coast Guard's Chief of Engineering, followed a year later by being elected President of the prestigious Society of American Military Engineers. During 1989, Howard Thorsen became Commander, Coast Guard Atlantic Area, with the rank of vice admiral, while Marshall Gilbert in 1990 became Commander, 11th Coast Guard District, based in San Francisco, CA.

Acknowledgments

The author's appreciation is extended to everyone within the Coast Guard family who facilitated the formation and operation of its Office of Research and Development between 1967 and 1987. Although this memoir primarily cites by name and rank flag officers and four-stripers, this was only for brevity's sake. In practice, hundreds of personnel contributed including those in the field such as coxswains, aviators and drivers who efficiently provided round the clock transportation whenever needed.

The support interface ascends from there and includes Dr. Dennis L. Noble, now a successful nautical historian but in my day a very helpful Chief Marine Science Technician. Far closer to home was excellent secretarial support provided by two estimable young ladies -- Kay Bouchie who chose to marry Captain Robert Lucas, a future commander of the 17th Coast Guard District (Alaska) and Patricia Wright who chose to wed CDR Robert Shenkle, a future Chief of Engineering for the 11th Coast Guard District (California). In the same vein, mention should also be made of Agnes McGehan and Pauline Ipsaro, career secretaries for the Commandant and for the Chief, Office of Research and Development, respectively, during my decade-plus stay at Coast Guard Headquarters. And now, twenty-four years later, note is also made of Dorothy Wilkinson who skillfully converted to computer format text generated by a World War II Royal typewriter.

At the professional level, I was persistently amazed by the skill and dedication of the Coast Guard's officer corps, a can do group of great competence. Once again, interfacings numbered in the hundreds, so listed here are only co-authors of jointly prepared technical papers, namely, Captains George Flanigan, Richard Rybacki, Merrill Wood and Paul Yost; Commanders George Seaman and William Lehr; Lieutenant Commanders John Harrald, Don Jensen and James Leigh, and Lieutenant (JG) Horace O'Neal.

But all of what has been described above could not have happened without the insight of four men, of whom the first and last still survive. It was VADM Trimble who saw the Coast Guard needed a viable RDT&E program in order to survive on the Washington scene. Backing him up was ADM Willard Smith even though several of his office chiefs remained in near revolt against the concept. Nonetheless, the sage outsider, Dr. Ralph Bennett, successfully argued that the end product was worth it even though resignations might be necessary. Finally, it was RADM Orvan Smeder, the pioneering helicopter pilot, who skillfully generated the voluminous paper work needed to establish the Coast Guard's Office of Research and Development as of 28 October 1968.

Comment on Sources

The prime sources for this memoir are the personally maintained R&D files of RADM Orvan R. Smeder, USCG (Retired) and of the author. In due course, these will be donated to the Coast Guard Historian for archiving and for use, hopefully, by those who design facets of the upcoming Coast Guard Museum . The Historian's office has also

been helpful by supplying biographic material as needed. Finally, annual reports from the USCG R&D Center's earlier years were also very useful when reconstructing that special period of Coast Guard history.

Green Valley , Arizona
15 May 2003