

REMARKS IN CELEBRATION OF WALTER MUNK'S 65TH BIRTHDAY

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Because the remarks that I will make here are not to be recorded or preserved in imperishable print — "off the record" so to speak — I can take some liberties in mentioning events and personalities which would otherwise be unthinkable, secure in the knowledge that they — the remarks, I mean — will soon join the snows of yesteryear.*

It was thirty-three years, four months ago, almost exactly a third of a century, when I visited Walter here at Scripps. Walter was then living in one of the now vanished white frame cottages along the shore. I was living in a garage apartment somewhere in the village, and Albert Defant was living with Ludovic Lek, his pre-war Dutch graduate student who, like Walter, had done a Ph.D. thesis on internal waves, but who had turned into a La Jolla real estate operator and was living in luxury on Mount Soledad. I well remember an expedition that summer with Walter, Teddy Bullard, their wives, and Tim Shepard to ascend San Geronio — a picturesque mountain somewhere east of Los Angeles. We walked up to a lovely valley — Walter, Teddy and Tim went on to scale the summit — others including myself, elected to wait for them at Edelweiss hut. That is always the way it has been. Some are destined to scale the heights; others remain at near-surface pressure. My old Ford was not much better. Twice I tried to drive up to Mt. Palomar, but boiled over and broke fan belts both times. I could see I could never compete with Walter in California and went home.

A unit of thirty-three and a third years is both a long time and a short time. Some of you, who have lived here during most of these years, are sometimes a little discomfited by the growth, the new buildings, the urbanization. To an occasional visitor like myself the cove, the shore line, parts of the village, the Pacific Ocean, the climate, all seem very much the same, and in some sense one might assert that there has been relatively little change. Relative to what? Why, to the change in the past before 1949, where only three third-centuries would bring us back to the Goldrush; or ten third-centuries reach back to 1616, the year when Galileo received his first warning.

*Editors' Note. This remark should not be taken as typical of Stommel's prognostic skills. He succumbed to some arm-twisting by the editors.

Over the years Woods Hole and Scripps have grown to be more alike, I think, than they were in 1949. In those days Woods Hole was a loose association of amateurs, whereas Scripps was noticeably more professional. Being associated with the University, its purchasing and financial offices were more rigid. Toward the end of my 1949 visit I went to the shipping office to send off a foot-locker by railway-express collect. I saw a stencil cutting machine there and some scraps of the cardboard used for cutting stencils lying on a shelf next to it. I asked the attendant whether I could use one of them and he said yes, but that I would need a purchase order. I asked him for a blank purchase order form and his reply was that he could not issue them singly but only in pads. But when I asked for a pad he said he would need a purchase order to give me a pad.

During 1949 Walter fell into the toils of this inexorable system himself. It concerned the financing of the Sverdrup Anniversary Volume in the *Journal of Marine Research* of 1948. A special Sverdrup Fund had been set up at the business office at Scripps, and early in 1949 it had become clear that there was a cost overrun due to a substantial increase in the cost of paper and printer's charges, and the Sverdrup Fund was in the red. And red was a very bad color in the University of California in 1949. During all of that year Walter wrote to possible donors, and by its end had reduced the deficit, but not to zero. Mr. John C. Kirby, of the business office, was adamant: the books must be balanced. Only one way remained for Walter to extricate himself from the toils: to pay the balance out of his own pocket.

Now it is not an altogether simple matter to give money to the University of California. The terms of the gift must conform to certain rules, and before it can be accepted there is a very definite procedure which must be adhered to. A form entitled "Report of the Tender of a Gift" must be filed by the responsible officer of the university to whom the gift is originally offered. This form is submitted for approval by the Provost, the Business Manager, the President and the Regents. Decisions must be recorded as to whether the gift requires acknowledgment by the President of the University, in addition to that by the Secretary of the Regents, the latter of which is automatic. After two months of approvals and acknowledgments, Walter's gift was accepted, and at last the books balanced. The amount was \$1.33.

All this was long ago, and one realizes that nothing like this could occur today.

Walter himself has written that the three great influences on his scientific career were Harald Sverdrup, Roger Revelle and Carl Eckart, all at one time directors at Scripps. Through Sverdrup and Eckart, Walter was linked indirectly with the great European geophysical tradition of Bjerknes, Hergesell, von Ficker and the great physical tradition of Sommerfeld.

Sverdrup imbued Walter with the belief that knowledge grows from a deep study of data, and I think Walter's beautiful series of studies of tides and waves using novel spectral data-processing methods is an eloquent testament to this influence. Revelle inspired Walter with a wideness and generosity of vision, spanning the full breadth of the human predicament, particularly as it relates to natural resources, climate, and population pressure. And I think Revelle's informal style of academic management, his receptiveness to criticism, his optimism about human destiny, all had a powerful effect on Walter's own open style of administration at IGPP.

Eckart's influence on Walter was powerfully astringent. Basically a shy, kind and gentle man, Eckart brought to Scripps a kind of mathematical formality to which Scripps oceanographers had not been fully exposed. Once, when praising Dave Bonner, Eckart spoke of him as "a strong character with a creatively skeptical approach to research". You will note that creative is the modifying adverb, skeptical the adjective, and for a man of such precision of mind, this is not a randomly chosen phraseology. Walter has written of Eckart's years at Scripps that although Eckart began with the belief that he would solve the problems of oceanography, he concluded that they were unsolvable. Eckart's formidable lectures both inspired and intimidated his students, and I think frightened some away from thinking about ocean currents.

A certain tension between rigor and vigor is characteristic of science: it is a tug-of-war to which we each must find our own accommodation. It looms largest to one who teaches. Edwin Bidwell Wilson, George Carrier's mentor, wrote in the preface of one of his texts an elaborate apologia for not overemphasizing modern questions of rigor, and concluded with the words: "That the compositor should have set 'vigor' where 'rigor' was written, might appear more amusing were it not for the suggested antithesis that there may be many who set rigor where vigor should be." Walter's encounters with Eckart were like those of a great comet with the planet Jupiter. His orbit was perturbed into that of an ellipse with greater major axis and some of us feared it might be hyperbolic. For a while he veered away from conventional oceanography into general geophysics and the theory of the earth's rotation and returned to our midst to concentrate upon tide and wave phenomena, where representative data records can be obtained, thorough data-processing pursued, and firmly based physical interpretations created — as Walter has indeed done so beautifully over the years.

How chilling Eckart's skepticism could be, was dramatically revealed to me when in the mid-fifties Carl-Gustaf Rossby arrived at Woods Hole, visibly shaken after an interview with Eckart, and literally wondering if his own scientific career had been worthwhile.

Men with very great formal powers do not always seem to realize what a profound effect they have on their younger colleagues.

One of the perils of a scientist's life is the danger of being overpowered by a colleague of superior formal abilities. Once, on the train from Princeton to New York, Bernhard Haurwitz and I and a young professor of applied mathematics from Brown University were recovering from a rather spectacular interview with von Neumann and the young professor was very depressed by the comparison of his own abilities with von Neumann's dazzling display. Haurwitz soothed him with the story of how he, while at lunch at the Faculty Club of NYU, had once expressed his own sense of depression after a von Neumann interview, and Richard Courant had replied: "That's funny! It's just the way he makes me feel, too!". With such words from such a man, we can all take heart and believe that there is something of value that we can all contribute.

The scope and originality of Walter's contributions is well attested to by the program in this symposium, where so many of the subjects represent developments of ideas and studies pioneered by him. Walter's own sense of precision and skepticism has been so tempered by his zest and enthusiasm that it has inspired many to follow the leads and thoughts which he first discovered. There is little need for me to attempt to review his contributions and accomplishments once again, when it has already been so admirably done these past two days. But I would like to stress one last outstanding characteristic feature of Walter's works: Walter's impeccable craftsmanship. His papers are beautifully composed and written. They have balance and counterpoint; they have a compelling logical structure and clarity; they are a joy to read.

Do you know that T.V. advertisement about soft drinks that asserts "Coke is it" and another in which a well-known celebrity, as they say in California, says in a Dixie dialect: "They all compare themselves to Coke... number 29, number 41,... but you know that Coke is number one. That's why they compare themselves to Coke... I see you nodding... yes-sir, Coke is number one." Well Walter has been number one for all these years, and whether we want to or not all of us compare ourselves to him, at one time or another. When I was called to the chair of oceanography at Harvard, it was only after Walter had declined it.

Of course, I am not the only victim of Walter's preeminence. It has happened to others before, and will happen to more of us in the future.

Let us imagine the following scene: You have been invited to an ambassadorial reception in Venice. Arriving in a gondola by torchlight you step into a grand palazzo between the striped posts at its watergate. Perhaps you are the guest of honor, and an oceanographer of great distinction. Perhaps you are Klaus Hasselmann. You make your way amongst the elegant guests, shaking hands, introducing yourself, with assurance and grace. The main salon is crowded with the elite of the Italian academic world; the crystal chandeliers are ablaze, the champagne flows. Your eye catches the sight of a beautiful girl standing alone under a Tintoretto — a vision of

loveliness. Unconsciously you slowly make your way in her direction, smiling, and exchanging greetings with old acquaintances all the while. The orchestra strikes up a waltz by

Strauss. You approach her, bow, politely ask her for this dance. As she extends her hand, her eyes melt and she says: "You're Walter Munk aren't you?".