

ME AND IGPP

Some time in 1960, the San Diego division of IGPP (Institute of Geophysics and Planetary Physics) became part of the Scripps Institute of Oceanography (SIO). No one seems to be absolutely sure of the exact date but the summer of 1960 is close.

In the beginning, there was Walter, being, of course, Dr. Walter Munk, already a part of SIO. Walter's office and lab were on the top floor of Ritter Hall. His core group consisted of Dr. George Backus, Frank Snodgrass, who was Walter's engineer, a technician and shared office staff. plus Gaylord Miller, who was probably Walter's best graduate student. This group formed the oceanography section of IGPP.

Later, a geophysical group was forming in the newly constructed Sverup Hall. The initial geophysical academic was Dr. Richard Haubrich, a recent graduate of the University of Wisconsin. The group also included Dr. H.M. Lyer of India and Florence (Flicky) Ogilvy, the programmer, plus office staff. This small group was the entire SIO/IGPP staff in November of 1960 when Dr. Haubrich hired me (Don Miller) as his electronics technician.

I had been working since 1956 for Convair Astronautics in San Diego on the then developing Atlas missile and Azusa missile tracking system at Cape Canaveral, Florida. I had had enough of secrecy and daily lunch box inspections so the "help wanted" ad for SIO was definitely the right thing at the right time for me.

Dick Haubrich's project was to obtain seismometers and associated equipment and to develop a digital seismic data recorder. The digital recorder was developed with a Los Angeles firm, then tested, modified and put into service.

We purchased three vertical and six horizontal Press-Ewing long-period seismometers and began a series of seismic tests and recordings, using sites varying from the basement of the old SIO library directly east and across the street from the then existing Irwin Gill building, to a vault constructed on Mrs. Meanly's (nee Scripps) property near what is now Miramar Lake, to an abandoned (already underground, you see!) U.S. Marine latrine on Camp Elliott.

After 2 1/2 years of testing and acquiring knowledge of our equipment, modifying the data recorder from "punched paper tape" to the new medium of seven-track 200bpi magnetic tape, we felt ready for anything.

Well, anything came in the form of Dr. Haubrich saying, "We are going to Hawaii for the summer. Pack up the equipment, get ready to go to Maui!" So everything was securely loaded into our Chevy Travelall, driven to the port of Long Beach, loaded on to a container ship and sent on its way.

At the same time, Dr. Hugh Bradner and his crew of James Dodds and Forest Whitcomb were exploring ocean bottom seismic recording methods and developing more new equipment. (Dr. Bradner had come to IGPP in 1966 after spending some time at Los Alamos...working on whatever they were doing out there.) They subtitled their group, "GLUB" for the sound that equipment makes as it is dropped overboard, intentionally or not, never to be seen again. They were going to the South Pacific to charter a yacht and sail around Tahiti in search of a good place to drop the sensors and record deep ocean waves... poor devils! Meanwhile, Gaylord Miller and Frank Snodgrass had developed underwater, near shore, ocean wave recorders and were on their way to Yakutat, Alaska and New Zealand, respectively.

With the help of people from the Kahului railroad on Maui, we constructed a recording lab and three seismic vaults. We set up a three station array of long period seismic recorders, including our digital data recorder, with all elements cabled into a central site on the Ulapalakua cattle ranch. The interconnecting cables ran across pasture land and one soon learns that cattle can eat multi-conductor cable as easily as they can eat bermuda grass. Problem detected, repaired, cables re-routed and recording resumed.

There were now three fixed and one floating wave recording stations extending from New Zealand to Alaska and all recording at the same time, to see if ocean waves generated off Antarctica made their way to Alaska. This became known as "Waves Across the Pacific", the first of IGPP's long list of significant research projects led by Dr. Walter Munk and other researchers over the years.

All this collected data had to be analyzed, which was no easy task. So Walter dropped the BOMM or was it BOOM, I'm not sure. IGPP was now in its new building with many new people. This included Sir Edward Bullard, who participated in developing a computer program to analyze the collected divers data. Thus BOMM: Bullard, Ogilvy, Munk and Miller (not me) which was later modified to BOOM.

Gaylord Miller had graduated and gone to Hawaii by then but other projects and graduate students appeared at IGPP. By 1970, twelve

students had received their PhDs at IGPP, including two, Jon Berger and Bill Farrell, who had become most interested in seismology. Berger developed a laser strain meter and placed one east of US Hiway 395 and one on old Camp Elliott, the eventual site of UCSD's animal farm. Farrell employed a Block-Moore modified LaCoste gravity meter to record long period seismic waves generated by large magnitude earthquakes. Recording stations ranged from Camp Elliott to Payson, Arizona. The LaCoste gravity meter had previously been used in oil exploration.

Early in 1974, Drs. Freeman Gilbert, Jon Berger and Bill Farrell determined that a world-wide seismic network of the modified LaCostes would be a valuable research tool. I was asked to participate and gladly accepted.

With financial aid from Dr. Cecil Green, co-founder of Texas Instruments, a number of these gravity meters were obtained, station sites selected and equipment deployed around the world. Since it was an International Deployment of Accelerometers, the acronym IDA seemed an appropriate name for the project, especially since Ida was also the name of Mrs. Cecil Green.

Project IDA began in a Camp Elliott seismic vault and later moved to IGPP's seismic station at Pinyon Flat, CA (PFO). The first international station was at Canberra, Australia (CAN) before being moved to Tennyson Woods Observatory (TWO) at Flinders University in Adelaide, Australia. Eventually 23 stations were installed with the LaCoste and mostly IGPP lab produced or modified equipment. Some never did come on line but at times we had 17 to 20 stations producing useable seismic data. The IDA network has evolved from a data sample every ten seconds, recorded on cassette tape to a much expanded world-wide network, most often available via satellite and the internet.

By July of 1996, all of the early IDA station equipment (LaCostes, data recorders and associated electronics) was collected and returned to IGPP for storage...and I was out the door to new and far different diversions.

How things did change from the days when you looked into someone's office and they weren't there because they were out in the field. Today as you walk down the hall, everyone is at their computer terminals...what can they all be doing?

I was privileged and happy to be at IGPP and thoroughly enjoyed my career there. I feel it is only fitting that Walter is still involved at age 93.