MHAS-Observer

Newsletter of the McMath-Hulbert Astronomical Society, Lake Angelus, Michigan

Contents

President's Message

Greetings all,

As we look toward the beginning of 2021 the cold winter months allow us to plan future activities. I doubt that the pandemic will subside enough for star parties and other astronomical group activities to continue this new year. Although the Sun does seem to be increasing in activity, hopefully we will be able to increase our solar observations.

Most of our efforts have been concentrated on equipment upgrades and displays for future events. We're also looking to increasing our membership and fundraising.

Since we are now past the December Solstice you may start noticing longer days and shorter nights, which is better for solar astronomers if not for nighttime astronomers. Something that I also notice at this time of year is that on very hazy days where you can more safely see the position of the Sun, try to notice just how much closer it appears to the Southern horizon at noon.

Conversely, notice how high the full moon is at midnight. I've always enjoyed seeing that bright moonlight reflecting off of snow crystals late at night. The planet Mars will still be shining brightly in the evening sky for months to come.

We'll be working to winterize the observatory too with a temporary tarp on Tower 1 and furnace work in the main building.

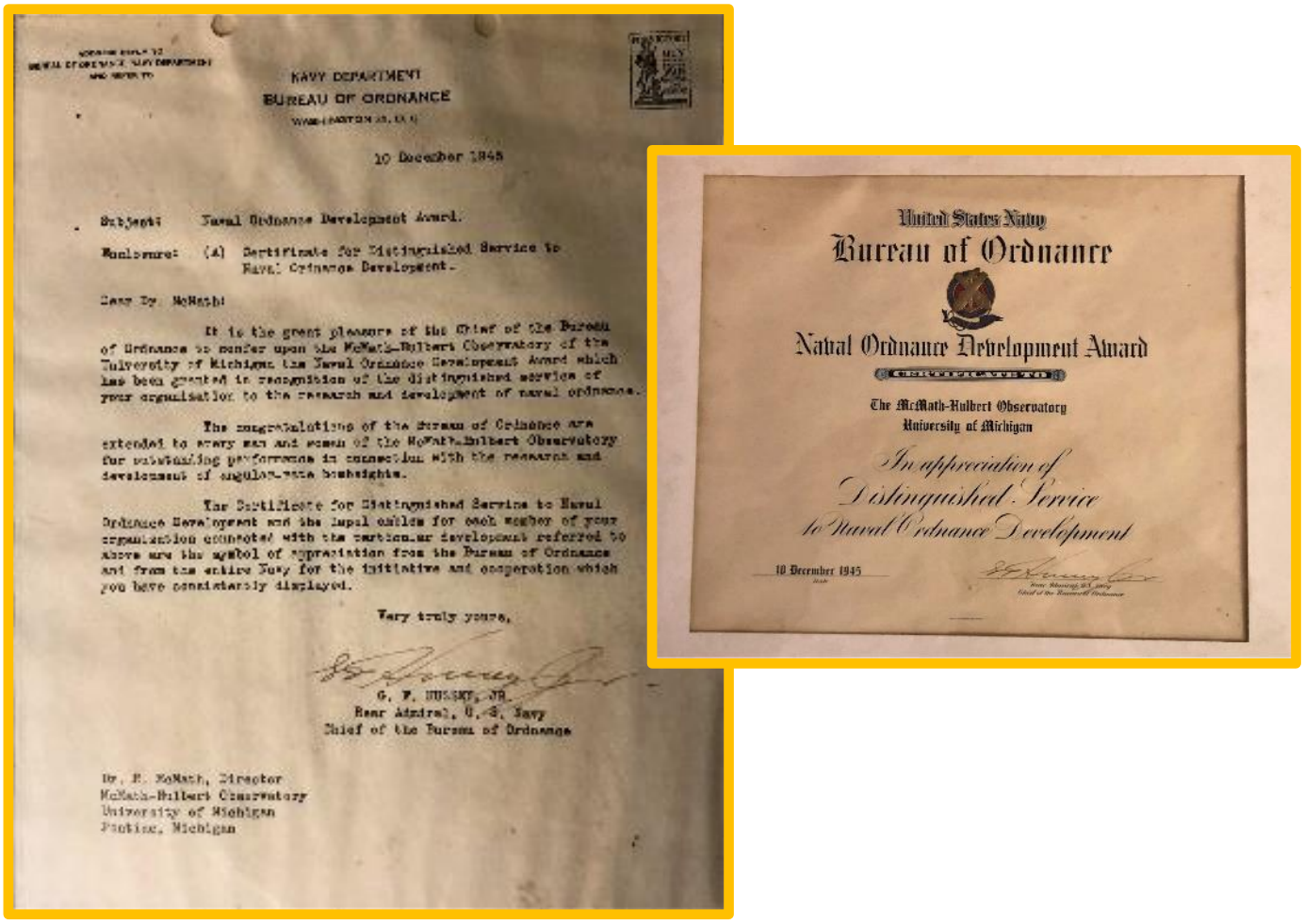
As always please consider joining our society and hopefully we will see you at the obs this year.

Marty Kunz

Corona Virus Update

With the most recent restrictions due to the increase of the Covid infection rate, we unfortunately have to restrict access to MHO again.

We at MHAS are all hoping we can resume normal operations and visits this year with the coming of vaccination. And at the time of this writing there appears to be a decrease in infection rates.



NAVY DEPARTMENT
BUREAU OF ORDNANCE
WASHINGTON 25, D. C.

10 December 1945

Subject: Naval Ordnance Development Award.

Enclosure: (A) Certificate for Distinguished Service to Naval Ordnance Development.

Dear Dr. McMath:

It is the great pleasure of the Chief of the Bureau of Ordnance to confer upon the McMath-Hulbert Observatory of the University of Michigan the Naval Ordnance Development Award which has been granted in recognition of the distinguished service of your organization to the research and development of naval ordnance.

The congratulations of the Bureau of Ordnance are extended to every man and woman of the McMath-Hulbert Observatory for outstanding performance in connection with the research and development of angular-rate bombsights.

The Certificate for Distinguished Service to Naval Ordnance Development and the lapel emblem for each member of your organization connected with the particular development referred to above are the symbol of appreciation from the Bureau of Ordnance and from the entire Navy for the initiative and cooperation which you have consistently displayed.

Very truly yours,

G. F. HUSSEY, JR.
Rear Admiral, U. S. Navy
Chief of the Bureau of Ordnance

Dr. K. McMath, Director
McMath-Hulbert Observatory
University of Michigan
Pontiac, Michigan

United States Navy
Bureau of Ordnance

Naval Ordnance Development Award

The McMath-Hulbert Observatory
University of Michigan

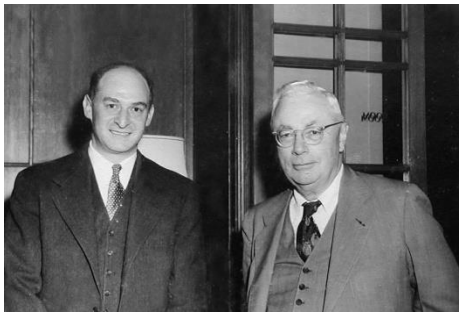
In appreciation of
Distinguished Service
to Naval Ordnance Development

10 December 1945

Commendation Letter and Naval Ordnance Development Award from The US Navy Bureau of Ordnance

History Corner—Jim Shedlowsky: MHO Goes to War—Astronomers vs. Submarines

It was July of 1941 when the 28-year-old Leo Goldberg, was hired by Robert McMath to the staff of the McMath – Hulbert Observatory. He was a rising star in the scientific community, having earned his PhD in Astronomy from Harvard in 1938 and in the process been associated with many of the notables of the astronomy world of that era. He went on to become the head of the Astronomy Department at the University of Michigan, the director of the Kitt Peak Observatory, a leader of early space astronomy and indeed one of the giants of 20th century astronomy.



Leo Goldberg and Robert McMath (ca. 1941)

But it was just 5 months later, on December 7,1941, with Goldberg just beginning to get acquainted with his new boss, that the attack on Pearl Harbor plunged America into World War 2. Goldberg, noted for his intense theoretical interests in astrophysics, was eager to make a contribution to the War effort. “I told McMath quite frankly that I was not going to spend the war doing astronomy”*. In the winter of 1942, he and McMath got on a train and visited MIT and through Goldberg’s former acquaintances secured a contract with the Naval Development Research Council.

Their initial assignment was to work on pneumatic control systems for possible antiaircraft applications. Goldberg became familiar with and made extensive use of the unique resources of the observatory which had been assembled by McMath only a few years earlier. These consisted of a very well equipped small, high grade machine

shop, with 2 or 3 instrument makers, a couple of technicians and a very good design engineer (George Malesky). Goldberg himself became a proficient specification writer and learned to operate many of the shop tools. He was a "scientist become mechanical engineer".

Their assignment very quickly changed to address a submarine problem on the East Coast in 1942. Washington had decided to create an improved low-level bombsight based on an earlier British design. It was thought that the British mechanical principle could be improved in accuracy by implementing it electrically, magnetically or pneumatically. So, the Naval Ordnance Bureau set up three different competing groups, to design and build one according to each of these principles.

"We had the Pneumatic, because we'd already spent a few weeks becoming experts in pneumatics"*quotes Goldberg in a 1978 interview. They produced a model in a relatively short time and participated in a live competition at the Quonset Point Naval Air Station in Rhode Island. Their pneumatic design won the competition and after some refinements a production model was designed and manufactured by a company named the American Cystoscope Makers Inc. "They eventually built about a thousand of those things" per Goldberg. We would love to obtain one of these devices to add to MHO's collection of vintage instruments.

One of Leo's significant contributions to this project involved his theoretical insight which allowed a much simpler, faster and more accurate means for calibrating the bombsight by deriving the theory behind its operation. His colleagues at the observatory were quite impressed when his "single point calibration" exceeded the accuracy of their laborious "point by point" empirical method.

After the war, on 10 December 1945, the Observatory was given the Naval Ordnance Development Award for "outstanding performance in connection with the research and development of angular rate bombsights". A copy of this award hangs proudly in the upstairs gallery of the McGregor building.

Rumor has it that there are a few dummy torpedoes in Lake Angelus as a result of these activities.

* Quotes from a 16 May, 1978 interview with Leo Goldberg by Spencer Weart of the American Institute of Physics

Introduction to Radio Astronomy—Amateur Pulsar Detection; Part 2

Last month we discussed neutron stars and how they can be detected as pulsars in the radio frequency range. These stars rotate and spew out plasma jets from their magnetic poles and if the plasma beams sweep past Earth, they can be detected as radio "blips" that are extremely regular in period and pulse width. This effect is like that of a lighthouse beam sweeping by an observer. When they were first discovered in 1967, it was thought at first that they might be signals from an alien civilization!

The project that first discovered pulsars was not intended to find them; instead they were looking for scintillations in radio signals from quasars caused by the interstellar medium hydrogen gas, solid particles and other matter. Quasars are very energetic sources of radio energy and are among the most distant objects from earth. They had only been discovered a few years before the start of this observation program.

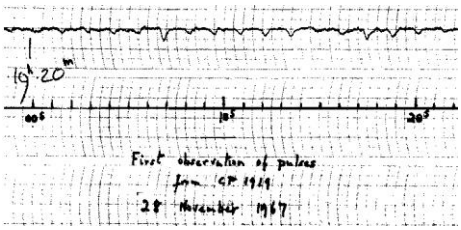
The setup for detecting scintillation was designed by Cambridge University radio astronomer Antony Hewish. Jocelyn Bell was an astronomy graduate student from the University of Glasgow studying under Hewish. She helped build the system and later worked as an observer using the system. The site of the telescope was at Cambridge University's Mullard Radio Astronomy Observatory near Cambridge in the UK.

Jocelyn Bell at the 4.5 Acre Antenna

This radio telescope took two years to build and consisted of 120 miles of wire suspended to form 128 pairs of dipoles and reflecting surfaces. By phasing the individual dipoles, the beams could be steered to point at different areas of the sky so individual objects could be pinpointed accurately in the telescope's beam as they passed over the telescope due to the earth's rotation. The entire telescope covered roughly 4.5 acres of ground and the frequency of operation was 81.5 MHz, or a wavelength of 3.7 m.

The bandwidth and filtering parameters of the telescope's receiver were selected to detect fast changes in signal strength that are caused by scintillation or flickering of the intended radio energy received from a quasar. As it happens so many times in science, by accident, this setup was ideal for detecting pulsars, which definitely was not the intention of the project!

When the telescope was finished in July, 1967, observations began and in August, 1967, Bell noticed some "scruff" or fuzziness in the signal of an unknown object. Upon further examination, the object displayed a period of about 1.34 seconds. This was the first pulsar discovered, now designated as PSR B1919+21.



Paper Strip Chart Recording of the First Known Pulsar (Courtesy NRAO)

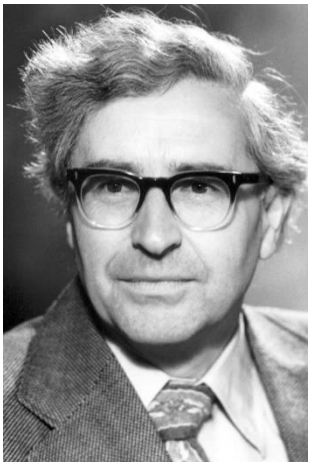
Each day, Bell stared at roughly 900 feet of paper, and over those six months she analyzed more than three miles of fuzzy lines. When the paper speed was speeded up, the regular blips were first detected.

Because the timing of the "blip" is so precise, it was jokingly thought that the signals were of artificial orgigin and were humorously labeled LGM signals which stood for "Little Green Men"! After further sober consideration, it became clear that this signal was from a rotating neutron star.

In the following weeks and months after this first discovery, Bell and Hewish discovered a number of other pulsars and this was later understood to be the first confirmation of the existence of neutron stars.

Even though Hewish received the Nobel prize in 1974, partly in recognition for the pulsar discovery and other work in the area of radio interferometry, Bell was not recognized by the prize committee, although she received many accolades over her distinguished career. She is philosophical about it, saying: "One of the hazards of making a major discovery early in your career is the burden of expectation, not helped in my case by becoming a wife and mother soon afterwards. I'm sure some people think it was a flash in the pan."

Jocelyn Bell, circa 1967, (cc-by-sa-2.0)



Antony Hewish, circa 1967

Mullard Radio Astronomy Observatory near Cambridge, UK

MHAS Contact Information:

MHAS Website

http://www.mcmathhulbert.org/solar/

MHAS Facebook Page

Click on the button below to get to the MHAS Facebook Page.

Address:

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895 N. Lake Angelus Rd.
Lake Angelus MI 48326

Email: info@mcmathhulbert.org

Phone: 248-494-8256 (Google Voice, leave message if nobody picks up)

MHAS Officers

President
Marty Kunz

Vice-President
Jim Shedlowsky

Secretary
Ken Redcap

Treasurer
Tom Hagen

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Ken Redcap

Dir-Communications & Website
Tom Hagen

Dir-Educational Activities
Tom Hagen

Dir-Finance
TBD

Dir-MHO Preservation
TBD

Dir-Buildings Security
TBD

Dir-Social Activities
Marty Kunz

Dir-History
Jim Shedlowsky

ALCOR
Austin Sabatino

Scheduled Meetings

All MHAS members are welcome to join us on Saturday Work Days and Board of Directors Meetings. We are temporarily unable to hold Open Houses for the public.

MHAS Board Monthly Meetings / Teleconferences:

Board meetings are scheduled on the 1st Sunday of Each Month @ 2 PM and will be via teleconference. MHAS paid members are invited to participate in this meeting. For an invitation, email us at info@mcmathhubert.org.

Space Pirates Radio!

MHAS President Marty Kunz hosts an astronomy internet show called “Space Pirates Radio" on the website www.astronomy.fm. The show airs every Wednesday night at 9 PM Eastern and features current information about space mission developments, astronomy news, and a “what’s in the sky today” report. Set your alarm today!

Join MHAS

Membership in MHAS is $25/year. Join with us on our mission to preserve and promote the McMath-Hulbert Solar Observatory. Just drop us a line at info@mcmathhulbert.org and we’ll get you signed up! Or use the application form on the next page, print it out, and return it to us via email or USPS.

McMath-Hulbert Astronomical Society

Membership/Donation Form

Name_____

Address_____

Email_____

Phone_____

Date_____

Dues_____Donation_____

Annual membership is $25. Checks should made out to “MHAS” or “McMath-Hulbert Astronomical Society”. You can also pay using PayPal on our website.

Bring to meeting or mail to:
MHAS
McMath-Hulbert Solar Observatory
895 N. Lake Angelus Rd.
Lake Angelus, Mi. 48326