

Agenda

- Open meeting and introduce new members (get names, email)
- Club Business
- Interesting observations, experiences
- Show and tell
- Current news and what's in our sky this month: *Member input + Newsletter*
 - Bob Keyser – JWST
- Events, outreach
 - Dan McNeill – putmanmountainobservatory.com, Hill Country Astronomy Club
 - Larry Wells – video trailer, maybe about “The Stars at Night”?
- Main feature(s)
 - Steve Ellery – how to build a concrete pier
 - Charlie Kahn – guiding for Astro imaging

Coming up: **OUR 275th ASTRONOMY CLUB MEETING**

August 18th, 2022, from 6 - 8 pm

Bosses Pizza on Loop 337

astronomynbtx.org Email: info@astronomynbtx.org



Astronomy Friends New Braunfels.....

facebook.com/groups/354953995432792/



Comal County Friends of the Night Sky.....

facebook.com/groups/166098014710276/

comaldarksky.org/ Email: info@comaldarksky.org

New

Braunfels

Astronomy

Club

BECAUSE IT'S OUT THERE

Larry's Celestial Calendar & Newsletter

by Eric Erickson

300th Edition

Volume 25, Number 7

July 21st to August 18th, 2022

NBAC's 25th Year!

NBAC Observing Calendar

Solar System Happenings

Watch the ISS

My Celestial Pick

Astrophotography

Lagniappe

Cover Story > Optical Coatings

Hardin Optical

JULY/AUGUST 2022

SUN

MON

TUE

WED

THU

FRI

SAT

On the Cover: An assortment of lenses showing the colorful phenomenon – Thin Film Interference – the physics of optical coatings. Hardin Optical

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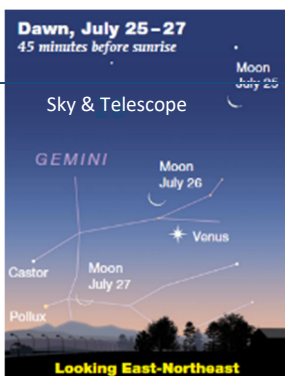
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NBAC Meeting 6:00
Bosses Pizza-Loop
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Aug 01

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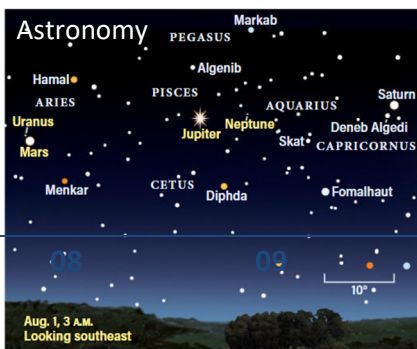
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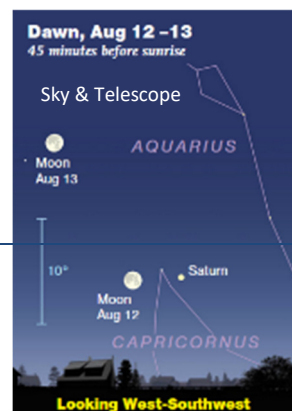
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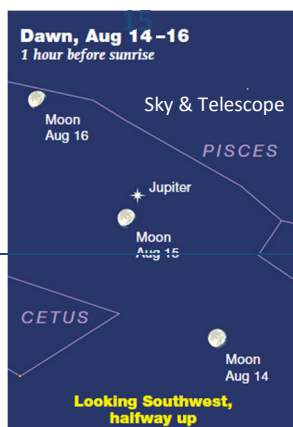


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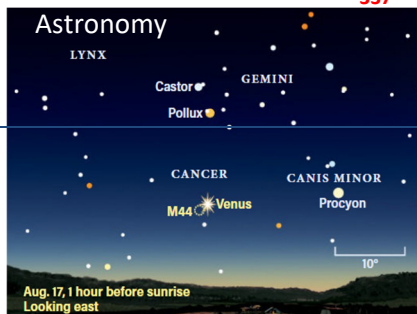


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NBAC Meeting 6:00
Bosses Pizza – Loop
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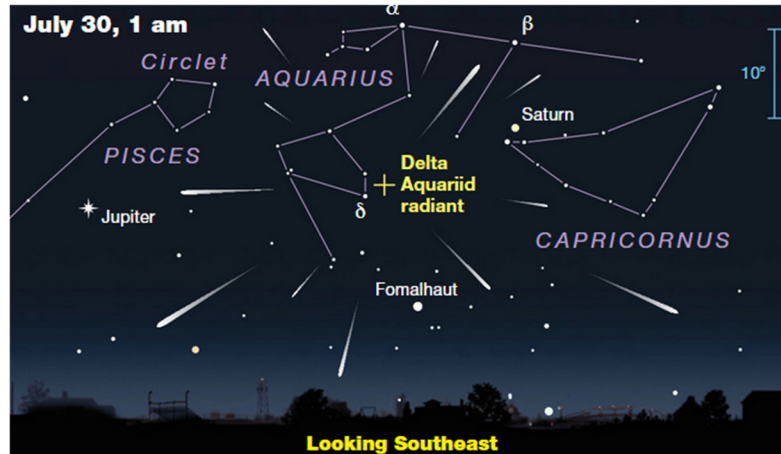


Solar System Happenings

This is a transition time for the seven planets after their pre-dawn line-up show. They are becoming evening, late night-early morning wanderers.

- ✚ **Mercury** emerges from superior conjunction with the Sun and shows up in the low western sky at sunset on July 25th. Good luck seeing it. It improves throughout August.
- ✚ **Venus** is bright in the eastern morning sky.
- ✚ **Earth** still spins, and we are still here to marvel at it all.

Sky & Telescope - 2

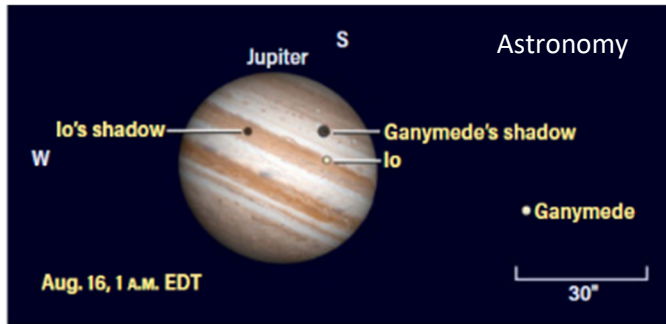


The Perseid meteor shower peak occurs on the night of August 12-13. A bright waning gibbous Moon interferes with the fireworks.

Best ISS viewing for New Braunfels (works for Canyon Lake too) -From [Heavens Above](#)

Date	Start Time	Start Loc	Max Alt °	End Loc	Note
08/01	21:43	NW	36	ENE	Enters Earth's shadow at End Loc
08/02	20:55	NNW	20	E	Enters Earth's shadow at End Loc
08/03	21:44	NW	55	S	Passes close to Arcturus. Enters Earth's shadow at End Loc
08/04	20:55	NW	68	SE	Enters Earth's shadow at End Loc
08/06	20:55	NW	28	SSE	Enters Earth's shadow at End Loc
08/18	06:19	S	15	ENE	Passes close to Sirius, Procyon, and Venus

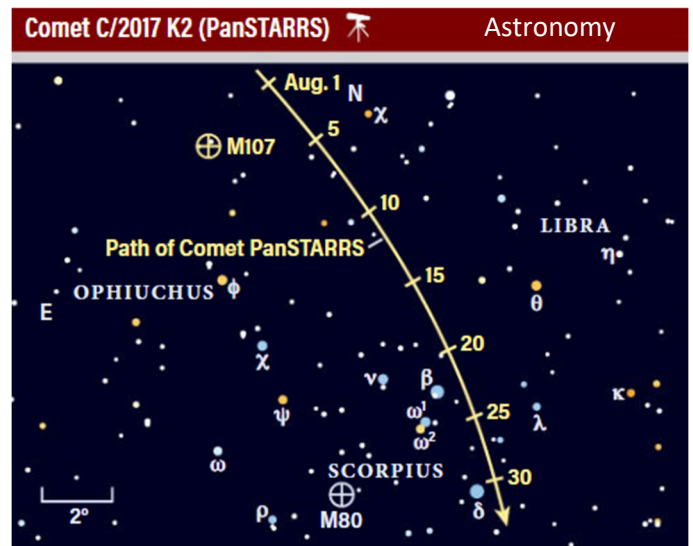
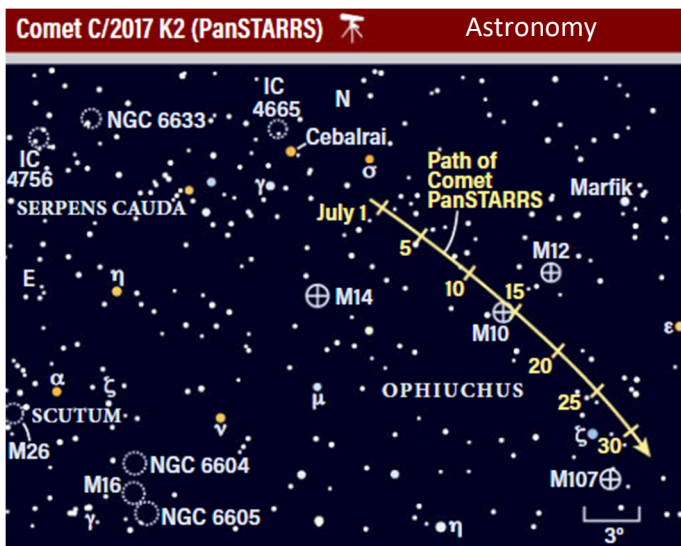
- ✚ **The Moon** dances with planets and stars.
- ✚ **Mars** rises late night with Uranus and is only 1.4° south of the ice giant. Check them out with binoculars or low power telescope.
- ✚ **Jupiter** rises late in the night and is in the south as dawn approaches.



The dual transit of Io and Ganymede (and their shadows) Aug. 15/16 highlights these moons' orbital motion. Europa and Callisto lie farther east at this time.

- ✚ **Saturn** rises at night is in the southwest pre-dawn sky. It is at opposition on August 14th
- ✚ **Uranus** is in Aries, rising late night (east) and a morning planet in the southeast – use binoculars or telescope.
- ✚ **Neptune** is a late night (east) and morning (south) planet in Pisces – use binoculars or telescope.
- ✚ **Comet(s)**

○ PanSTARRS (C/2017 K2) is from the Oort Cloud. Mag 8+

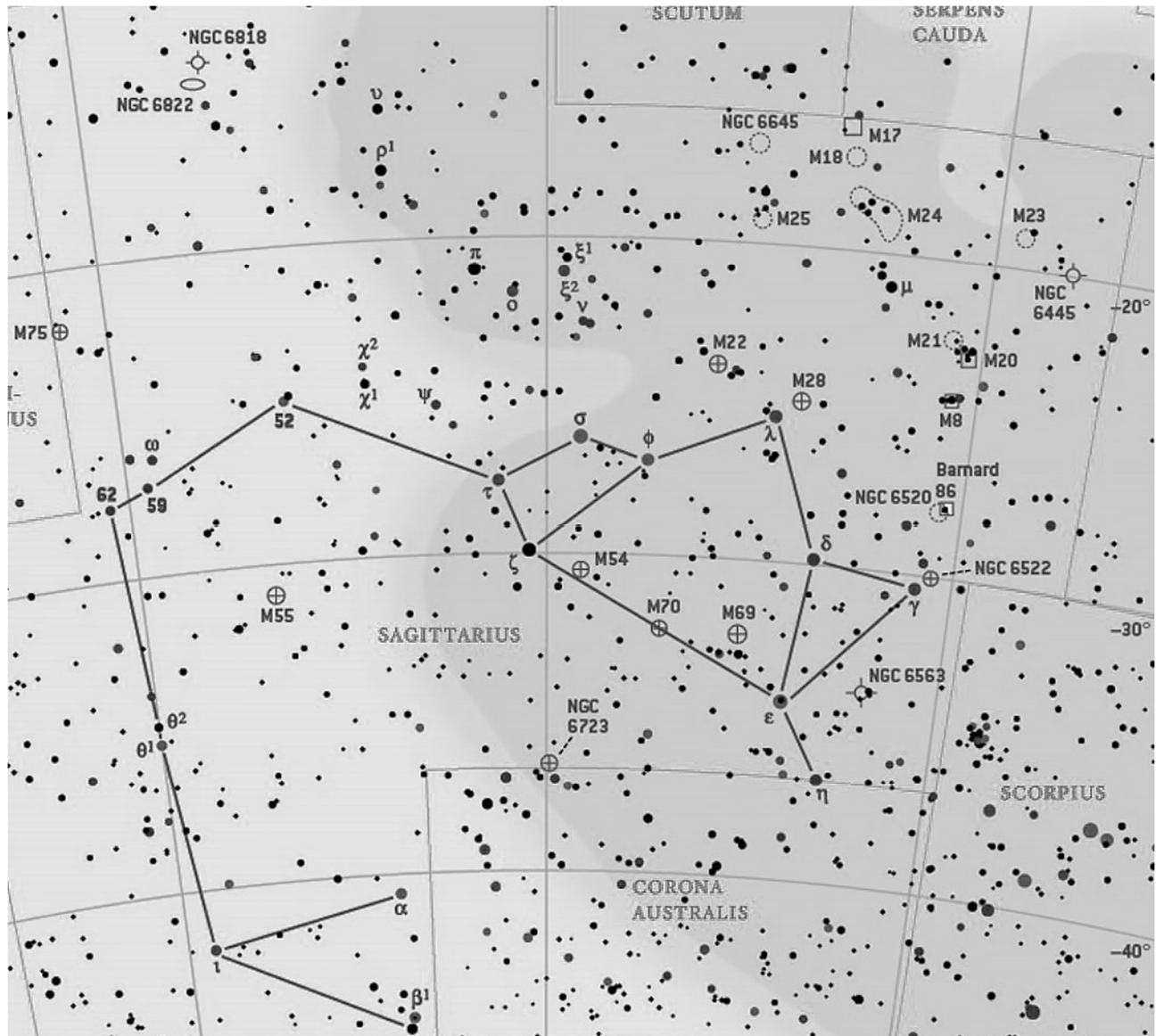


My Celestial Pick: Sagittarius

Oh, to be a centaur. The Greeks' can really create creatures fantastic. Then the Romans' run with it and create their own take. But wait, the Sumerians and Babylonians depicted this grouping of stars as a half human, half horse, with the Babylonian version having two heads – panther and human.

Getting back to the Greeks, there is confusion about the human part. Was he the centaur Chiron who changed into a horse to escape his wife – that's desperate! Or was he satyr Crotus, son of Pan, with ears and tail of a horse? Either way, he also was an archer. Then there's the constellation Centaurus, the southern hemisphere's man-horse. Tradition clarifies the conundrum by having Chiron place both Sagittarius and Centaurus in the sky to guide Jason and his Argonauts in their quest for the Golden Fleece.

Whatever, Sagittarius is the gateway to our Milky Way's center and as such, is littered with dim, fuzzy things to look at, photograph, and generally ponder upon.



Cover Story – Optical Coatings, the Magic of Physics

This article is not intended to be a lesson, nor a technical paper. It is simply basic, broad stroke information.

Look at any modern camera lens, telescope objective, eyepiece, binocular lens, eyeglass lens etc., and what do you see? Looking from some angles, you just see through the lens, at other angles maybe colorful reflections. The same occurs with oil slicks and soap bubbles. Why is that? Why don't you see those colors when looking through the optic? Ever think about that? OK, maybe not and maybe you don't particularly care, but I'm going to go on and blather about it anyway.

What's going on with these colorful reflections? In physics the phenomenon is called *thin film interference*. Reflections from the upper and lower surface of a very thin film can interfere with each other, reducing or increasing the reflected light's intensity. The film's thickness and/or composition will have a refractive index that produces a specific reflected wavelength, often giving the reflection a color. Hence the multiple colors in a soap bubble or oil slick, camera lens, etc.

The first optical coating was oxidation, tarnish. As he checked out his inventory of lenses, John William Strutt, 3rd Baron Rayleigh, aka Lord Raleigh, noticed an interesting thing. The old lenses, the ones with tarnish on their surface, had slightly better light transmission than his new lenses. This was 1886 and this physicist was also figuring out why the sky is blue! Not bad. Anyway, he calculated the tarnish's refractive index and found it somewhere between that of glass and that of air. The same, or similar phenomenon occurred on early camera lenses, and they were sought out for their improved contrast vs newer lenses of the same design. The phenomenon was called "blooming".

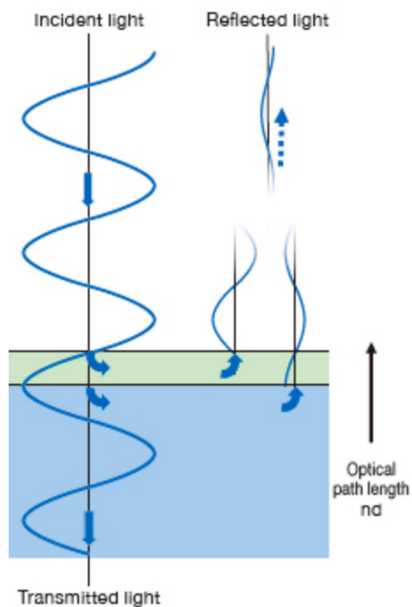
In 1904 optical designer Harold Dennis Taylor, of the Cooke Optical Company and Cooke Triplet fame, found that telescope objective lenses exposed in a shop fire had a curious purple reflection and improved light transmission. He determined the purple reflection was from a thin layer of oxide. He then developed a chemical technique to replicate this process and the first man-made anti-reflective coating came into being. A little optical shop named Zeiss improved optical coating technology, making it more efficient and durable for the German war effort in 1935. American and Japanese optical companies followed suit and the race was on!

Yada-yada-yada and today we have an immense array of optical coatings available for a multitude of needs. The most widely used coatings are made to reduce reflection and increase light transmission in lenses and increase reflectivity for mirrors. Coatings, also called dielectric coatings, are added to lens or mirror surfaces via vacuum chamber vapor deposition of materials such as magnesium fluoride and other compounds depending on the optics design.

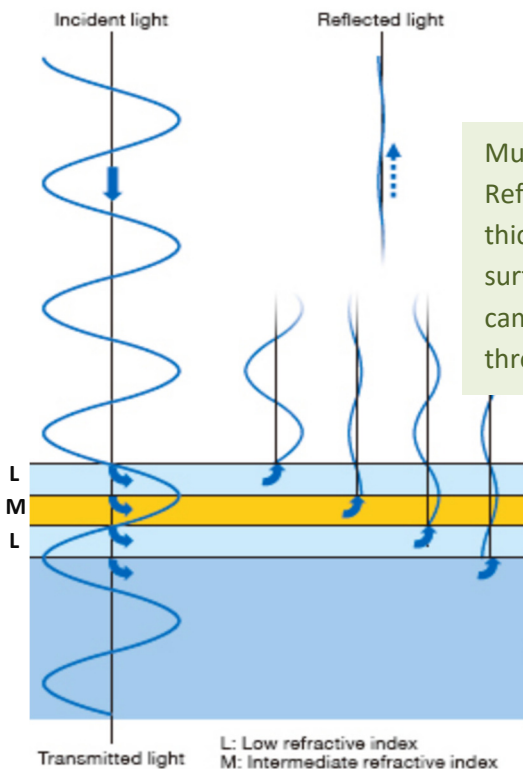
Optical coatings allow up to 99.8% of light to pass through a single lens element where an uncoated lens element would transmit around 90% (losing 5% at each air-to-glass interface). Extrapolate for a lens with

multiple elements and you see the value. Coatings also reduce surface to surface reflections in multiple element optics that can produce veiling glare and reduce contrast. So, better throughput and better contrast, a good combination. Optical shops now apply multiple layers of coatings, called multi coatings to a variety of optics. Each layer produces specific characteristic, and are tailored to the glass formulas and configurations, and ultimate purpose. Your objective, corrector plate, eyepieces, eyeglasses, etc. have these coatings. How do they work?

Anti-Reflective Coatings



Single layer coating example showing a $\frac{1}{4}$ wavelength (λ) coating interfering with incident light reflection. Reflectance is reduced as reflections at the substrate and coating interface, and coating and air interface cancel each other (destructive interference). A single layer coating generally reduces reflectance from 5% to about 2%.



Multi-layer coating example showing interference with incident light reflection. Reflectance is further reduced by combining different coating materials and thicknesses (refractive indexes). This can reduce reflectance to about 0.1% per air to surface interface. For multi – element optics such as binoculars, eyepieces, and camera lenses tailored multicoating can significantly improve contrast, light throughput, even color rendition.

Enhanced Reflectivity Coatings

As with anti-reflection coatings, similar coatings can be used to improve the performance of mirrors, such as those used for astronomy. A typical polished uncoated aluminum telescope mirror reflects about 90-94% of the light striking it. Using coating technology as shown above, the reflectivity can be boosted to 99%+. The principle is, instead of using destructive interference to suppress reflections, the coatings employ constructive interference to boost the reflection. It takes many layers, with each layer improving the output from the layer below. Many modern telescope mirrors are “enhanced” with these multi-layer coatings. These coatings are also seen on secondary mirrors and diagonals.

Specialty Coatings

Using the same principles, thin and thick films of specialty materials can be deposited to perform specific functions. The coatings are tailored to selectively block certain wavelengths while allowing others to pass. For astronomy, these functions are to eliminate or enhance the transmission of specific wavelengths to reduce the effects of light pollution, and/or better view or image certain object types.

-Eric Erickson

Lagniappe

CARPE DIEM



MACANUDO



MACANUDO

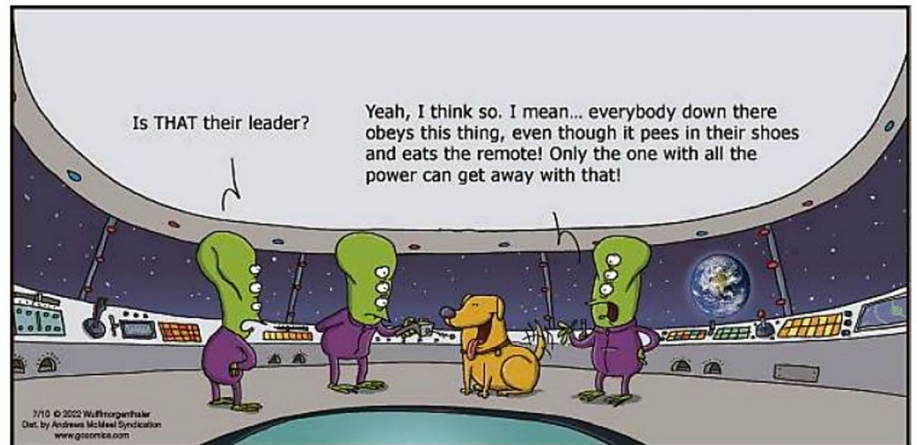


PARDON MY PLANET



WUMO

BY WULFF & MORGENTHALER



BABY BLUES

BY RICK KIRKMAN & JERRY SCOTT

