

HEY GANG! BORED ALREADY?  
WE'LL READ THIS!



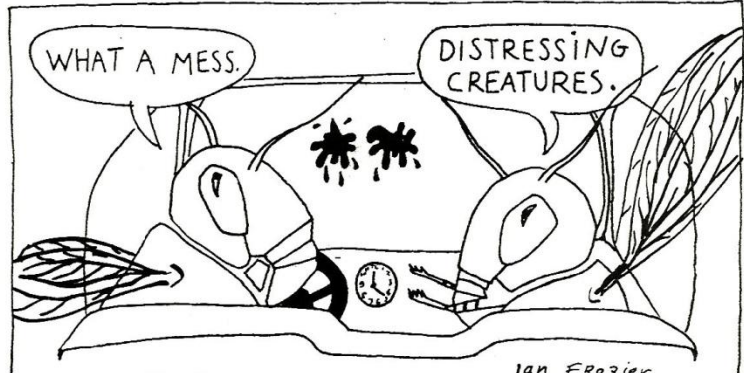
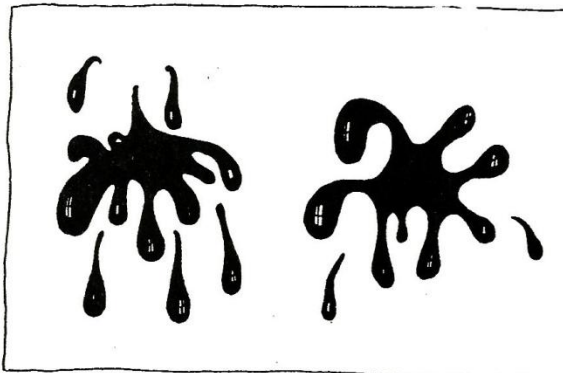
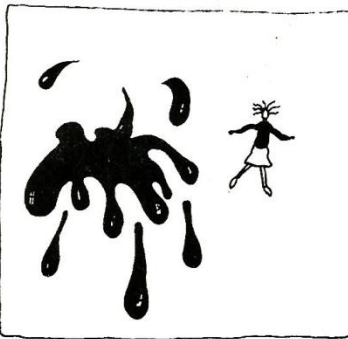
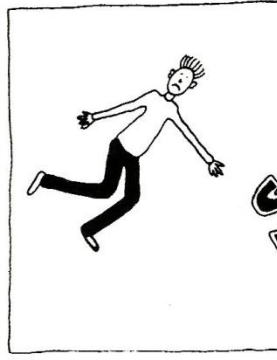
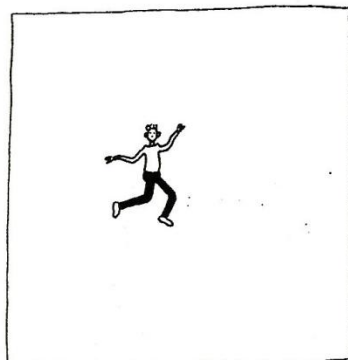
variously  
described  
(as:)

THE  
WASP

December,  
1972 ← (A GOOD YEAR)

"Awarded 1972 WASP WORST COVER of the YEAR"

THE JOURNAL OF THE WARREN ASTRONOMICAL SOCIETY ☆



ian Frazier

6/12

DEEP SKY WONDERS  
by  
Walter Scott Harrington

A fine constellation that is usually neglected by amateur astronomers is Mononucleosis, just south of one of the heads of Hydra. This constellation contains numerous interesting deep-sky objects, including stars as bright as the 14th magnitude. Using only my wide angle contact lenses, I have often observed the famous double-single star, epsilon Mononucleosis. To the naked eye, this star appears to be a blue-gold double separated by 24" of arc, but in any of my fine optical instruments it is seen in its true form; a single fuzzy white star with diffraction spikes.

When I was part of the Moonwatch team back in Kansas in the 1880s, I would often sneak off from the rest of the group and look at NGC 007, the famous cluster-cluster in Mononucleosis. This 16th magnitude object is easily spotted in my excellent Tasco 7x50 binoculars, and with averted vision I can even glimpse structure. This fine object is actually two globular clusters which are revolving around each other with a period of 4h 10m. Thus, at the great distance of one cluster from the other, each is traveling faster than light in relation to the other. This means that one of the clusters is invisible when viewed from the other. The only thing one would observe is a white hole. However, from my backyard, this relativistic phenomenon appears as a pinwheel some 11" of arc in diameter. By viewing first from Kansas, and then from Connecticut, I have established the parallax, and have determined the distance to the cluster-cluster as 2300 megaparsecs. By using my wire-frame bifocals I can easily resolve the individual stars in these clusters. It seemed futile at the time to search for planets circling these stars, but to my surprise they were at once evident, an unmistakable group of black dots. (Either that or my cataracts are acting up again).

As a test of the excellent optics in my 3" reflector, I tried the 17th magnitude Shawl Nebula, P-300, in Mononucleosis (At 1950 coordinates, 36<sup>h</sup> 24<sup>m</sup> 36<sup>s</sup>, -9000'). The 1/100<sup>th</sup> wave speculum metal mirror promptly revealed this wisp of nebulosity, even though it was only 2° from the full moon and it was overcast.

As an indication of other exciting objects to be found in Mononucleosis, I quite easily discovered one of the missing Messier objects in just a few hours of observation from my backyard. I feel quite certain that I could discover the other missing objects if my next door neighbor would just turn off his 1500 watt floodlights. In fact it was this constellation that I recently scanned with my superb radio telescope (a 0.9 foot dish made of chicken wire, with an illuminated reticule), and became the first astronomer to detect positive proof of an advanced extragalactic civilization; a 60 cycle hum coming from radio source GL-70 in Mononucleosis! The extreme sparseness of bright objects in Mononucleosis makes it an even more exciting constellation, since it obviously was the exact center of the big bang, and hence everything has since moved away from the area. This means that this constellation will be even more exciting in the future, since all objects in the universe will move back into it during the great contraction. This contraction will produce an exceedingly rare event; the occultation of Orion by the Big Dipper! Since our solar system will be going there with everything else, we should have an excellent vantage point.

Walter Scott Harrington

## Constellation of the Month

by

Frank McCullough

Taurus

(The Bull)

Every year we cannot help but notice one of the most prominent constellations leading the winter sky show. Taurus "The Bull" has within its boundary some of the most interesting objects to be found.

In brief, Taurus is said to have been placed in the sky for its bravery as it is charging at Orion the hunter who outmatched everything put against him. In this case even Taurus.

Contained in the shoulder of the bull is the mysterious group of stars known as the Pleiades, seven sisters, the baby dipper, or Messier 45. To the naked eye six or seven stars are seen and on very few occasions some observers say they have seen more. On ideal nights it may be possible to observe the faint nebulosity around Merope. On tri-X film a twenty five to thirty minute exposure with a medium focal length telephoto lens will bring out the nebulosity. Some have done shorter exposures with the hyper-sensitizing process of tri-X.

Another object of considerable interest is the remains of the famous Super Nova in 1054 a.d. This object is said to have been so bright it could be observed during the daylight hours. Upon his finding this object in 1758 Charles Messier came upon the idea of recording all his nebulas in his Messier Catalog which now contains 103 objects. Needless to say this is the famous Crab Nebula found off  $\zeta$  Tauri, a star marking one of the tips of Taurus' horns which lies above the head of Orion. An interesting variable star is  $\lambda$  Tauri, a 8.3 star with variability of 3.3 to 4.2 magnitude. The period for this to happen is 3.9 days. It is listed in Norton's Atlas as an Algol type eclipsing binary.

- Here is a list of double stars.

$\Sigma$  422

x

$\Sigma$  559

a

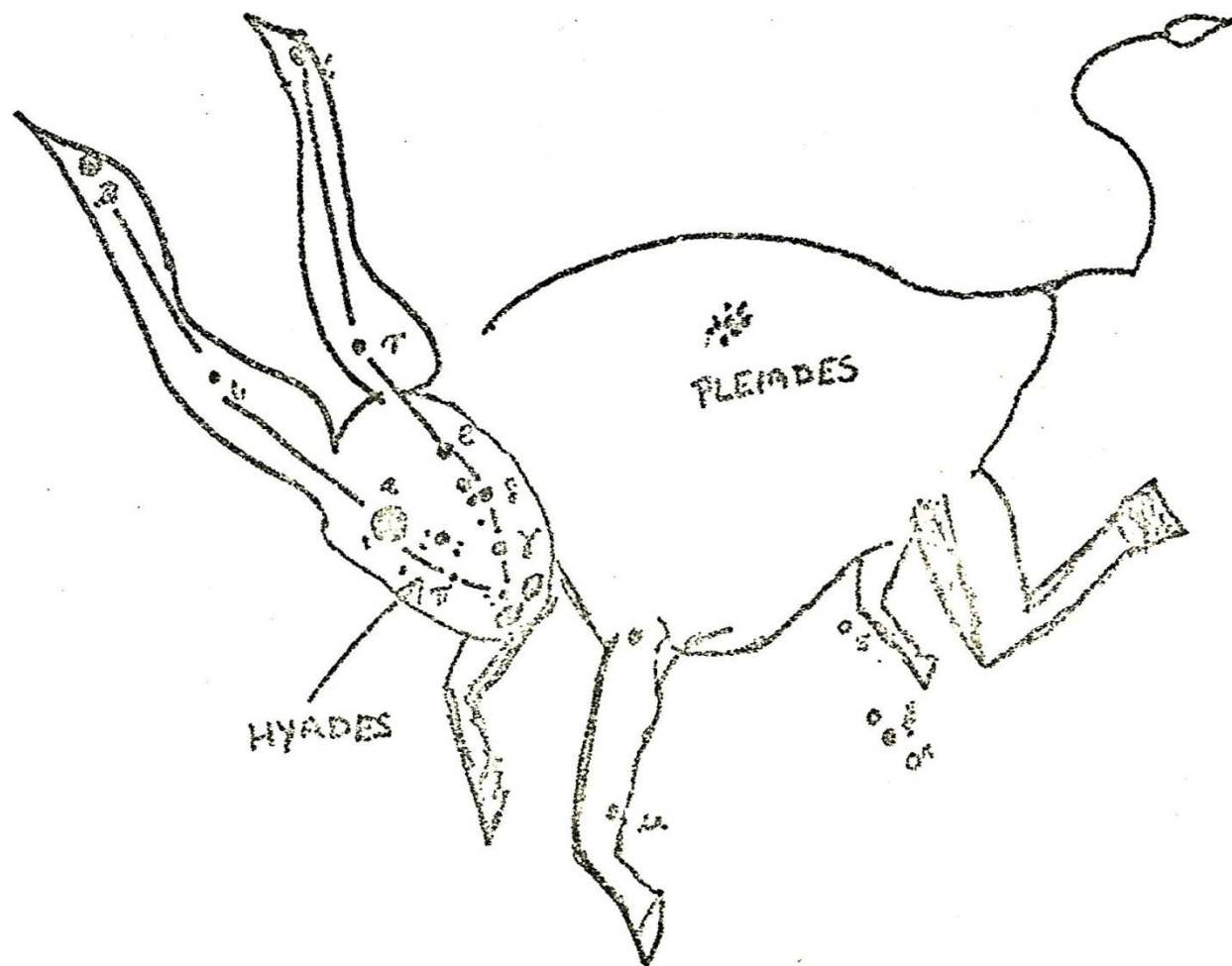
$\Sigma$  572

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A thing of interest is that now the planet Saturn is retrograding in this constellation. Saturn is  $10^{\circ}$  north east of Aldebaran, a red giant marking one of the eyes of Taurus.

One more star group of interest are the actual V shape groupings of the head known as the Hyades which are moving generally in the same direction with same velocities toward the star sphere.

\* Refer to Norton's Atlas.



# Observational Astronomy☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆



by C. J. Edsall

*Impressions of the spot on the horse's nose and the fly in Perseus' eye as seen through a large reflector.*

"Which way to M76?" asked the astronomer on duty, as he turned to open a copy of Norton's Star Atlas. Ken pointed at the atlas and uttered, somewhat vaguely, "uh - Perseus I believe - below the double cluster - north of sigma-chi - I think it's in his left ear." What followed bears some attempt at description.

You are standing five or six feet above the floor on a large platform supported by hydraulic lifters which has placed you precisely beneath the enormous bulk of a 52-inch reflecting telescope. In front of you are several tons of metal and glass and beyond, through the open slit of the dome - the stars.

Suddenly the astronomer at the control panel cries out, "Next stop, M76!" The star machine begins to move, at first slowly, but after the next few moments delivering the full fury of its seemingly limitless powers upon the helpless observers, who, after all are only along for the ride. Immediately you become aware that it is impossible to explain what you are seeing - the observing platform seems to be suspended in the air while the entire observatory floats past you, upwards into the black night sky, perhaps eventually to reside among the stars, perhaps to get a better view. But in the moment you realize that it is the observers who are in motion, the platform reverses direction, soaring upwards toward the top of the dome, while the floor drops out of sight and you swiftly duck, for the moment escaping annihilation by the enormous instrument spinning wildly on its axes. As a photometer comes flying at you out of the dark, you silently curse the machine before ducking once again.

The motions of the telescope and observing platform are synchronized in an attempt to maintain the observer's relative position at the Cassegrain focus, regardless of the position of the telescope itself, whether driving at sidereal rate or slewing from object to object in the sky. This synchronization, however, is imperfect. The result can only be described as chaotic. The combined effect of violent jauncings up and down, accelerated telescopes, and grinding motors driving the giant dome across the sky was to send the universe reeling on its magical axes backward into chaos in which everything was in perfect order. The spacious observatory echoed with the cries of observers perhaps tormented, perhaps in pain, perhaps in spiritual ecstasy. Or perhaps it was only the wind.

Similar impressions perhaps were shared by the other members of the W.A.S. that were present that evening last month when we visited the University of Michigan's observatory on Peach Mountain: Ken Wilson, Frank McCullough, and Tim S. From the ground the sky seemed dark and favorable for observing, yet while walking on the platform circling the outside rim of the dome, high above the trees of the surrounding forest, many vapor lights could be seen in the surrounding hills. They spoil the horizon, yet the views obtained through the giant reflector can only be spoken of in terms of the wonder and emotion expressed by men who travel through space and those who often search among the stars for the beauty and strangeness of regions of the universe remote from our own.



### *The Spot on the Horse's Nose*

#### *M 15 - Globular cluster in Pegasus (Mag. 6.3)*

These observations were made through a large guiding eyepiece on the photometer mounted at the Cassegrain focus of the U. of M.'s 52-inch reflector (see *Sky & Telescope*, Feb. 1971). I do not know the magnification achieved by this optical system, but I am sure it was adequate to obtain a very good look at most of the things such an instrument is used to observe.

The only photograph I have encountered that adequately approximates what can be seen of M 15 through this instrument is of M 13 and appears on the cover of the July, 1970 issue of *Scientific American*. I am looking at it now.

Over two hundred of these clusters orbit our galaxy at various distances and each contains nearly a million stars. Recent evolutionary analyses of these enormous concentrations indicate that the stars that inhabit them are as old as the universe itself, although the significance of this apparent fact has yet to be established. Despite their great age, or perhaps because of it, the beauty of the individual stars of this cluster is surpassed only by their beauty as a whole.

Their colors are a blue of subtle brilliance and white, evenly mixed. While the stars of M 15 are not distributed as symmetrically as those of the Hercules cluster, the cluster as a whole being smaller and more dense, their concentrations in the nucleus are resolved completely by the large reflector. This in itself is exciting and wonderful to view, yet a telescope of this size reveals another feature not visible in amateur instruments. A kind of steamy blue haze clouds the central regions of the cluster, not obscuring, but somehow revealing the shimmering qualities of an object so strange and unfamiliar to earthly eyes that its distance seems to approach orders of infinity. Yet the telescope brings us close - close enough to count the very stars, though perhaps not accurately.

The capacity for the human eye to sustain an effect of great apparent depth in three dimensions of this cluster through the telescope is amazing. Stars seem to be literally falling out of the eyepiece. Their gradual accumulation in piles on the floor however, failed to become a nuisance. The only problem that seemed awkward at the time involved our degree of responsibility for their disappearance from the sky. On who would fall the blame? Who would bear the inevitable penalty for such an impious act?

It was during the consideration of these two questions that we agreed, after an exchange of views, that we came nearest to God. But this is irrelevant.

### *The Fly in Perseus' Eye*

#### *M 76 - Planetary nebula in Perseus (Mag. 11.4)*

This object is situated near Andromeda's left foot, the big toe of which might appear to be uncomfortably close to Perseus' left eye and is apparently referred to as the "little dumbbell" because of its resemblance to M27 (the dumbbell nebula) in Vulpecula, if for no other reason. Many shapes can be made out in these clouds of hydrogen gas that flood the known universe with their numbers. To me, however, the nebula resembled a butterfly or at least the wings of one. I believe Ken Wilson shares this view.





SPIRIT  
of  
AUTUMN

by  
FRANK McCullough



## a Period of Inverse Proportions

by C.J.Edsall

*Or, I Had All Those words in My Head, and They  
Just Had to come Out, But It's Too Bad  
They Couldn't Have Made it in the  
Right Sequence.*



Over a period of time that can vary from thousands to billions of years, the stars which now inhabit space exhaust themselves of their fuel, and either become burned-out cinders or, in last great bursts of energy, destroy themselves in gigantic explosions. To replace these, new stars are continually being formed within the galactic nebulae: tremendously huge collections of hot, glowing hydrogen gas. Stars are born in nebulae.

In the following passage from an 1870 edition of *other Worlds Than Ours*, the famous 19th century astronomer Sir Norman Lockyer refutes the orthodox view by way of a clever and amusing deduction involving observations from an earlier age.

“In the northern heavens one peculiarity has been remarked, which is well worthy of careful consideration. Sir William Herschel, while prosecuting his series of researches among stars and nebulae, was struck by the circumstance that, after sweeping over a part of the heavens which was unusually barren, he commonly met with nebulae; insomuch as it was his practice at such times to call to his assistant (his sister Caroline) to “prepare for nebulae.” This peculiarity was noticed also by (his son) Sir John Herschel.

“Now what are we to understand by such a relation as this? Can we suppose that, owing to some strange accident, external nebulae have been placed always opposite the barest regions of the galactic system? Or, setting aside such a notion as obviously incredible, are lie to imagine that when searching over those barren regions the astronomer has a better chance of detecting nebulae than where stars are more richly strewn, because the sky is less filled with glare? We are forced to dismiss this notion that the barren regions of the heavens are thus in a manner the spy-holes of the galaxy, by the fact that in the Magellanic Clouds, where stars of all magnitudes are richly strewn, nebulae, even down to the very faintest orders, are more abundant than in any other region of the heavens. We have then no other conclusion to form, but that the association thus observed between starless regions and richness of nebular distribution indicates a very close relation indeed between stars and nebulae; that, in fact, *the nebulae in a sense represent the missing stars; that the region where those nebulae appear has been drained of star materials, so to speak, in order to form them.*”

In a later section of this amazing treatise, after the embryo of his cosmography has been more thoroughly fertilized, incubated, perfected, and developed, Sir Norman’s progeny emerges as what may be the unique British contribution to the growing body of relativistic concepts that would culminate in the space-time physics of the 20th century.



“Suppose that a being armed with such powers of vision as we have imagined should watch from the neighborhood of our earth the progress of some interesting event. If he then began to travel from the earth at a rate equal to the speed of light, he would see one phase of the event continually present before him, because he would always be where the light-message recording that event was actually travelling. By passing somewhat less swiftly away, he would see the event taking place with singular slowness; while passing away more swiftly, he would see the event occurring in inverted order. Suppose, for example, he was watching the battle of Waterloo--he could gaze on the fine picture presented by the Imperial Guard as they advanced upon the English army, for hours, years, nay, for centuries or cycles; or he might watch the whole progress of the charge occurring so slowly that years might elapse between each step of the advancing column, and the bullets which mowed down their ranks might either seem unmoving, or else appear to wend their way with scarcely perceptible motion through the air; or finally, he might so wing his flight through space that the Guard would seem to retreat, their dead men coming to life as the bullets passed from their wounds, until at length the Old Guard would seem as it was when it began its advance, in the assured hope of deciding Waterloo, as it had already decided so many hard-fought battles for its imperial chief.”

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Below appears a certain verse that seems to share a measure of what is sometimes felt in that special period of time during which the amateur astronomer pursues his quest to confront the stars. Our trackless ventures into the realm of night can allow us to achieve a unique view of the world which is precious to those that know *it*. Here is a part of its story.

Inge Meidinger-Geise

Nächtliche Autobahn

*Motorrausch beim tiefgekrochnen Mond-  
Spuren tilgen sich mit glasigen Augen.  
Wer ist nah? Wer kreuzt vor fern en Zeichen?  
  
Fliehn ist alles und verstört Erreichen.  
Dunkles Mass der Schweben nur belont  
Mit Gefährten: Busch und Haus und Turm,  
Wie sie einsam in dem muldenweichen  
Nachthauch stehn  
Und sich vermehren:  
Eine sanfte Kette, drin die Rasenden  
Doch irgendwann sich fangen  
Und ertastend in die Stille gehn.*

Nocturnal Highway

Sound of the engine when the moon  
has crept down-  
traces are removed with glassy eyes.  
Who is near? Who is crossing at  
distant signs?  
Flight is all and arrival is troubled.  
The dark extent of suspense amended only  
with companions: bush and house and tower,  
as they stand there lonely in the hollow-soft  
breath of night  
and multiply:  
a gentle chain in which the racing men  
sooner or later are caught and walk,  
feeling their way, into the silence.

The 52-inch telescope supports two 6-inch refractors mounted on its sides which serve as guide-scopes. Through one of them I first saw the planetary nebula. It was very small, yet it glowed sharply against the black night sky and the stars that surround it here in the outer fringes of the Milky Way. Its general appearance remained essentially unchanged through the 52-inch, yet the order of magnification and resolution achieved by the giant instrument revealed the sense of mystery involving all such planetary nebulae. All are enormous spheres of hydrogen gas and are the result of mild explosions within unstable stars, stars that have become known to us as novas, supernovas, and pulsars.

The apparent size of M76 in the 52-inch was on the same scale as photographs of these objects obtained through the world's largest telescopes. But these immense powers of resolution magnify only its mystery. So ambiguous was its appearance that it could have easily been mistaken for a smudge on the lenses of the eyepiece. For some observers the mistake was not apparent, for they reported seeing nothing.

The three-dimensional visual effect achieved by M76 under very high magnification is very much like what can be seen of M27 in large amateur telescopes - a spot of gas situated like a solitary cloud beneath a clear night sky. The nebula seemed to be literally falling out of the eyepiece. Upon its swift descent, however, it lodged in the retaining rings and was impossible to remove. Such are the perils of observations involving large optical systems with which the amateur never hopes to become familiar.

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P. Huchel

### Eine Herbstnacht

*Wo bist du, damals sinkender Tag?  
Septemberhügel, auf dem ich lag  
Im jähen blätterstürzenden Wind,  
Doch ganz van der Ruhe der Bäum umschlungen...*

*In Bäumen und Büschen wehte dein Haar,  
Urfrühe Mutter, die alles gebar,  
Moore und Flüsso, Schluchten und Sterne.  
Ich sah dich schwingen  
Durchs Sieb der Ferne  
Den glühenden Staub der Meteor.  
Die Erde fühlend mit jeder Pore,  
Hört ich Disteln und Steine singen.  
Der Hügel schwebte. Und manchmal schoss  
Den Himmel hinunter ein brennender Pfeil.  
Er traf die nacht; Sie aber schloss  
Mit schnellem Dunkel die Wunde  
Und blieb über wehenden Pappeln heil.  
Quellen und Feuer rauschten im Grunde.*

### An Autumn Night

*Where are you, once sinking day?  
September-hill on which I lay  
in the sudden, leaf-scattering wind,  
Yet quite enclosed by the peace of  
the trees...  
In trees and shrubs your hair blew,  
primeval mother, who gave birth to all,  
fens and rivers, gullies and stars.  
I saw you fanning  
through the sieve of distance  
the glowing dust of meteors.  
Feeling the earth with every pore  
I heard thistles and stones singing.  
The hill swayed. And from time to time  
a burning arrow hurtled down the heavens.  
It struck the night. But night  
with swift darkness closed the wound and  
above swaying poplars remained unscathed.  
Fountains and fire roared in the valley.*