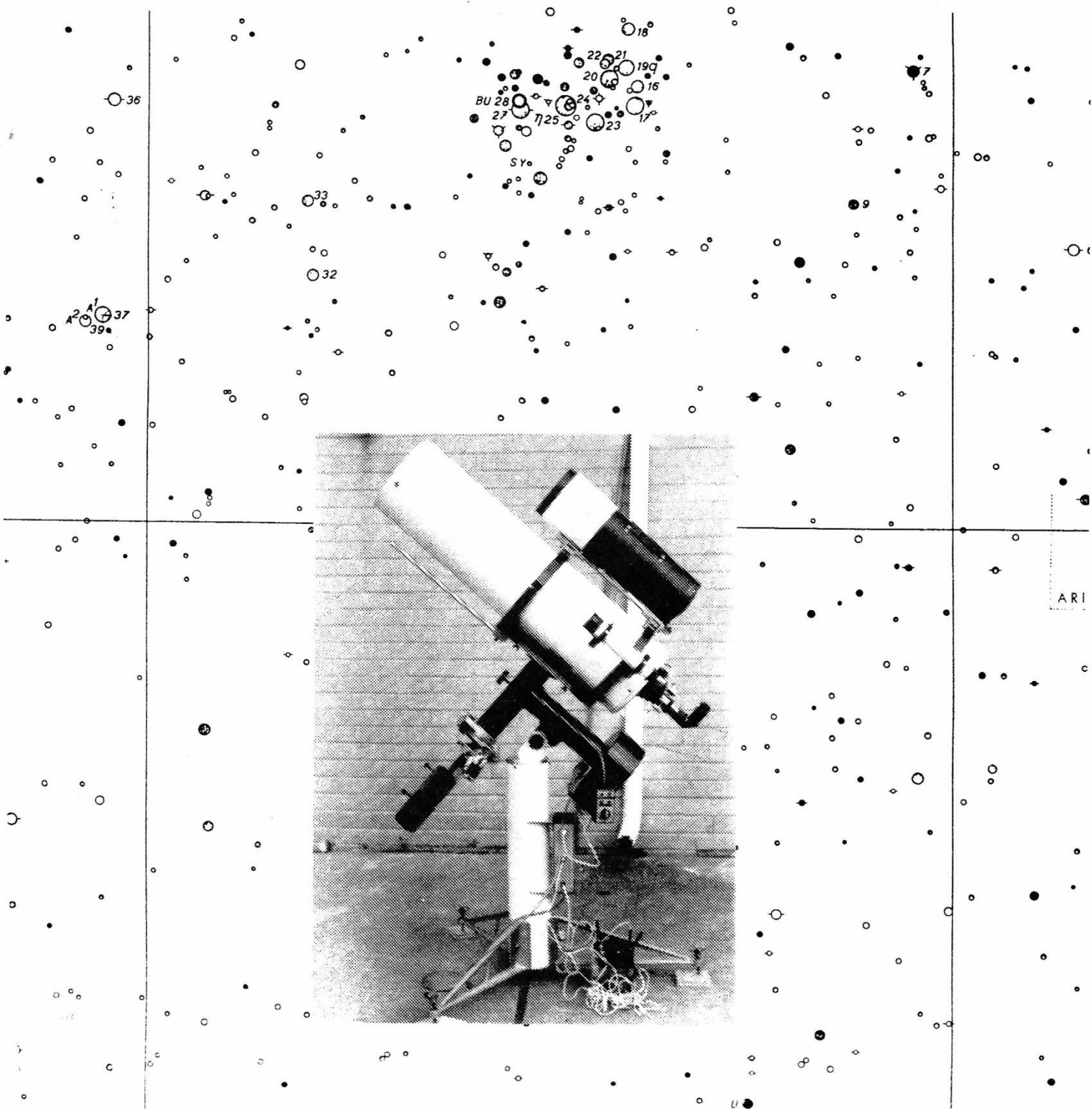




The WASP

October 1974



Les Corps Obscurs de Laplace-Existent-ils?

PARIS, 1976 - At a recent meeting of L'Academie des Sciences, M. Le Marquis De Laplace, the eminent mathematician and natural philosopher, provided for all those present a most amusing and entertaining evening. With readings from his recent best seller "Exposition Du Systeme Du Monde," while circulating amongst the audience

Book Review:

"The Other Side"

by Alfred Kubin

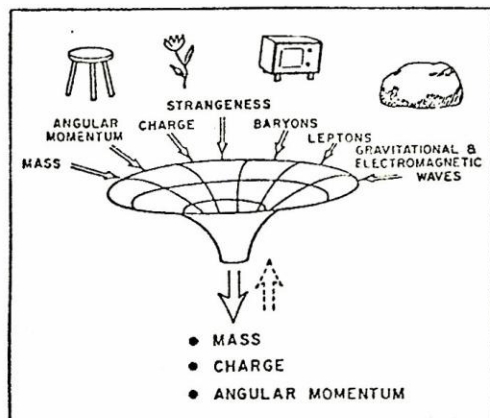
VIENNA, 1909 - In a fit of brilliant insight and intense productivity, the great Austrian surrealist painter Alfred Kubin has succeeded, where no man has before him, in grasping the full physical significance of collapse into a black hole. A brief illustration from his novel "Die Andere Seite" should suffice to support this claim. Turning from the brush to the pen, he wrote: "And now, for the first time, I discovered in the veil of mist an immense, high wall. Suddenly, unexpectedly, it loomed up before me. Someone carrying a light was walking in front of us toward an enormous black hole: that was the gate to the Dream Kingdom. As we approached I noticed its huge dimensions. We entered a tunnel, keeping as close as we could to our guide. Then something strange happened. I had already penetrated some distance into the vaulted passage when I was overcome, as though at a blow, by a wholly unfamiliar and dreadful sensation. It began at the back of my head and ran down my spine; my breath stopped, and my heart beat wildly. Helplessly I looked toward my wife, but she herself was white as a corpse, deathly fear mirrored in her face. In a quivering voice, she whispered: 'I shall never come out of here again.'" His recognition of the role of tidal forces and of the irreversibility of such a predicament are all the more remarkable for they predate Herr Einstein's General Theory of Relativity by seven years.

reprints of his latest paper in the Allgemeine Geographische Ephemeriden, he presented a talk entitled "Future Progress of Astronomy." Amongst other speculations, he suggested that the Universe is filled with "des corps obscurs," dark bodies, in numbers equal to the visible stars! He bases these ideas on his calculations which show that "a luminous star, of the same density as the earth, and whose diameter should be 250 times larger than the sun would not, in consequence of its attraction, allow any of its rays to arrive at us." He concluded by saying that "it is therefore possible that the largest luminous bodies in the universe may, through this cause, be invisible." Despite the irrefutability of his mathematics, he failed to suggest how any object would come to exist in such an ignominious state. One can only hope that his good name will not be darkened by such flights of fantasy. (Ed. note - By the publication of the fifth edition of "The System of the World" Laplace had expunged all references to "des corps obscurs.")

SCIENTISTS FORESEE:

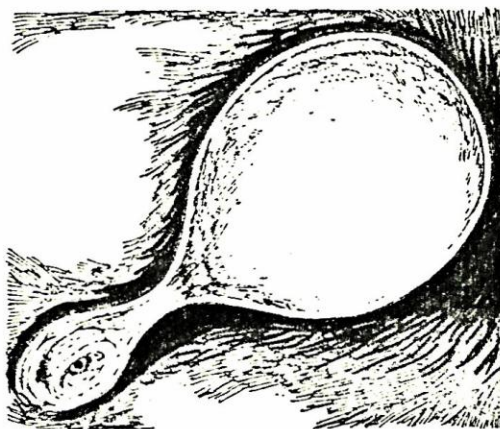
COLLAPSE INEVITABLE

BERKELEY, 1939 - Out of the depths of the Great Depression, and confronted with the possibility of another worldwide conflagration, the brilliant young American physicist J. Robert Oppenheimer and his graduate student, former truck driver Hartland Snyder, have reported in the latest issue of the Physical Review that "when all thermonuclear sources of energy are exhausted, a sufficiently heavy star will collapse." Such news should be kept in mind by those who would hope that a detente could be achieved by bringing pressure to bear on arbitrarily large bodies to counter the ever present gravity of the situation. Furthermore, as the authors are the first to point out, while a sufficiently distant observer will never see its final demise, a person collapsing with a massive body will experience all the accompanying stresses in less than a day.



A rose is not a rose, nor would it smell as sweet, were it to be inside a black hole whose only attributes are mass, charge, and angular momentum

CYGNUS X-1: BLACK HOLE OR RED HERRING?



Popular model of Cyg X-1, consisting of a binary star system containing a black hole (at the center of the disk, lower left) accreting matter ejected from its more massive companion.

NEW YORK, April 1, 1971 - The New York Times today reported for the first time the discovery of a "black hole in space." Various referred to as a "collapsar" (A.G.W. Cameron of the (Veritas) Center for Astrophysics) or "frozen star" (Ya.B. Zeldovitch of the Soviet Academy of Sciences), such objects have long filled the void of theoretical astrophysicists waking hours. Now at last, it seems, there is an object upon which they can lavish their speculations. Scientists from American Science and Engineering, Inc., headed by Dr. Riccardo Giacconi, making observations with instruments aboard the first small astronomical satellite, nicknamed UHURU, claim to have finally shed some light on the matter of black holes or, more precisely, say that they have seen the light, from matter spiralling headlong into the oblivion of a black hole. They interpret the x-ray emissions from Cyg X-1 as arising from gas flows in a close binary star system containing a massive young star ejecting unwanted matter, which then accretes onto its fully collapsed companion (see picture). Waving aside the objections of a dissident minority of scientists who question whether Cyg X-1 is fully collapsed, or massive, or accreting, or, even, whether it is a binary star system, Dr. Giacconi told this reporter in no uncertain terms that "...

(Continued on page 13)

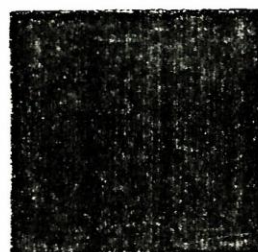
Texas Teachers Tout Tunguska Tragedy

AUSTIN, 1973 - Waving aside as extravagant and speculative the claims by Russian scientists that the immense explosive event which occurred in the Tunguska region of Siberia on June 30, 1908 was a great meteorite or comet, two scientists at the Center for Relativity Theory at the University of Texas, A.A. Jackson IV and M.P. Ryan Jr., have explained the event as having resulted from the passage of a mini black hole through the earth. Their suggested test of the theory, by hunting through old ships' logs for any record of the expected air and sea shock disturbances accompanying the re-emergence of the black hole in the North Atlantic has so far been stymied by Russian refusals to provide the vital records. (Tass, the Soviet News Agency, comments: Bourgeois capitalist Americans, in an attempt to discredit the greatness of the People's Meteorite, which fell within Mother Russia in 1908, have put forward the ludicrous suggestion that it was a black hole, that most degenerate of all western inventions...)

Exciting Young Star Finds Happiness With Old Degenerate Dwarf

BOSTON, 1973 - On a day with very little news reaching us, a hopeful and touching story has emerged. It is commonly believed that overweight old stars have no alternative but to eventually collapse and disappear from sight altogether. Not so, say two MIT Professors, K. Brecher and P. Morrison. In a surprising twist of the usual scenario, they suggest that such stars can avoid this fate by turning instead into degenerate dwarfs. If they get around enough, such stars can again become radiant and even, as they suggest in the case of Cygnus (The Swan) X-1, co-

habitate with a star as young and bright as HD226868. (Ed. note - This story should satisfy those readers who have accused us of a discriminatory publishing policy. It is only the first in our new affirmative action series featuring such recently neglected stars as white dwarfs, red giants and, if space permits, blue stragglers. This series will complement our ongoing reports on the activities of some prominent white holes. Owing to cosmic censorship, however, we have been unable to uncover any information surrounding naked singularities.)



First detailed color photograph of a black hole. Note features at upper left and center, in good agreement with current theoretical predictions.

Princeton Professor Proclaims Black Holes Have No Hair

PRINCETON, 1972 Professor John Wheeler of the Princeton University Physics Department, reporting on his own researches, as well as those of Drs. Penrose, Hawking and others of Great Britain, has revealed that should black holes be discovered soon, there is little to distinguish one from the other. This follows, he says, from very general and powerful mathematical theorems which imply that such a body is completely characterized by three independent quantities: mass, charge and angular momentum (see figure). Such a conclusion, however, may be premature as has been emphasized by Professor F.

Curtis Michel in his recent article in the journal Comments on Astrophysics and Space Physics, entitled "Hair Tonic For Black Holes." He cautions the unwary, "If black holes indeed have no hair, it could be because they have no scalp for it to grow out of. However, there is a lot of stuff floating around looking suspiciously like Landruft."

SKY CALENDAR OCTOBER 1974

Information for helping teachers and students observe the sky

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
<p><u>Planets This Month:</u></p> <p>Jupiter is brilliant in SE at dusk, and passes S 4 hrs after sunset in early Oct, decreasing to 3 hrs in late Oct. Saturn rises in ENE within 2 hrs after Jupiter passes S. See Oct 9, 23-24.</p>	<p>Venus is brilliant, but rises in bright twilight. Look very low E 30 to 15 min before sunrise and you should see it first half of Oct. Binoculars help, and an unobstructed view of horizon is needed.</p>	<p>Full Moon. Look for moon setting in western sky around sunrise. Look again around sunset to see moon rising in east. Full moon is in opposite part of sky from sun.</p>	<p>After full moon, the moon rises later each evening. But at this time of year, the moon rises not much later each night. You can see it for several nights more without staying up too late.</p>	<p>A full moon followed by a succession of early evening moonrises occurs each year within 15 days of beginning of autumn. Convenient for the farmer gathering the crops, it is called the Harvest Moon.</p>	<p>Notice the deep orange color of the moon when it first rises. All objects, whether stars, planets, moon, or sun, appear reddened when close to the horizon.</p>	<p>Notice that the moon has been rising farther to the north along the horizon each night. Look for twinkling Aldebaran, the eye of Taurus, 6° to lower right of moon.</p>
<p>If the moon now rises too late in the evening for you, you can still see it in the morning, for several hours after sunrise.</p>	<p>Each morning after sunrise, note the shape of the moon, and how far away from the sun it appears in degrees or "fists." DO NOT LOOK at sun.</p>	<p>This morning the moon is about 90° from the sun. 90° is $\frac{1}{4}$ of a circle, so this phase of the moon is called Last Quarter. Note moon's shape, with only one week to go before New.</p>	<p>1 hr before sunrise: The bright "star" close to the moon is actually the planet Saturn. Telescopes show moon's craters and Saturn's rings.</p>	<p>After sky darkens, 10 look carefully at Jupiter with binoculars. You might see its 4 brightest satellites.</p>	<p>1 hr before sunrise: Bright star to lower left of moon is Regulus in Leo. This morning and next two mornings are best for earthshine, bluish light on dark part of moon.</p>	<p>Jupiter and its moons 2 hrs after sunset as viewed in binoculars.</p>
<p>Look for Summer Triangle (Vega, Altair, and Deneb) overhead in early evening and high in W later. Use Map #9 2 hrs after sunset, and Map #10 4 hrs after sunset.</p>	<p>Very thin crescent moon, 1 day before New, rises before sun. Best 45 to 30 min before sunup. Look for Venus 9° lower left of moon. Binoculars help.</p>	<p>New Moon, passing nearly between Earth and sun, cannot be seen. Its dark side is toward us.</p>	<p>Before moonlight interferes next week, look for Milky Way passing overhead, the "spiral" galaxy in Andromeda high in E, and the Pleiades low in E.</p>	<p>Moon, now 30° to upper left of the setting sun, sets more than an hour after sunset. Face SW in early evening and look for Antares 13° upper left of moon.</p>	<p>Reddish twinkling Antares, the heart of Scorpius, is 4° south of moon. Satellite #3 (Ganymede) disappears into Jupiter's shadow 9:40 pm EDT. Use telescope.</p>	<p>Jupiter and its moons 2 hrs after sunset. Satellite #3 = Europa, #4 = Callisto.</p>
<p>This afternoon and next 10 days, look for sun and moon in daytime sky before sunset. Note moon's shape and its angular distance from the sun.</p>	<p>Extend the west side of the Great Square of Pegasus southward, past brilliant Jupiter, to Fomalhaut, the mouth of the Southern Fish.</p>	<p>As you face the setting sun the moon is $\frac{1}{4}$ turn to your left. Note the shape of the First Quarter moon is half. Notice that lighted side of moon is right half (the side toward the sun).</p>	<p>Saturn low in ENE 5½ hrs after sunset (look left of Orion):</p> <p>• Castor • Pollux • Saturn</p>	<p>Saturn high in S 1 hr before sunrise (look upper left of Orion):</p> <p>• Castor • Pollux • Saturn</p>	<p>1 hr after sunset: Brilliant Jupiter about 8° to lower left of gibbous moon, three-quarters full.</p>	<p>1 hr after sunset: Jupiter about 10° to lower right of gibbous moon. Moon has shifted eastward since last night, and now appears 5/6 full.</p>
<p>Tonight the moon appears about 9/10 full. Look for the Great Square of Pegasus to the upper left of the moon.</p>	<p>If you look at the moon carefully early this evening, you may be able to tell the lower left edge appears to be missing. The Square of Pegasus is above the 95% full moon tonight.</p>	<p>The moon appears essentially full, though it isn't exactly so until tomorrow night. Watch for moonrise about 1 hr before sunset today.</p>	<p>Today the moon rises only a short time before sunset. From a place with a good view toward ENE and WSW it should be possible to see sun and moon simultaneously.</p>	<p>The moon has passed exact full phase, so tonight it rises shortly after sunset. You can see sun and moon simultaneously in morning today thru Nov 12.</p>	<p>In late October, the bright orange star Arcurus is easy to see 1 hr after sunset (low WNW) and 1 hr before sunrise (low ENE). Follow the curve of the Big Dipper's handle to locate this star.</p>	<p>At end of Oct Spica rises in ESE 1 hr before sunrise. Continue arc of Big Dipper's handle past Arcurus to Spica. Beginning around Oct 31 look for Mercury 4° lower left of Spica. See diagrams in Nov issue.</p>

Motions of the Planets in October: Jupiter 1.8° westward in Aquarius; Saturn 0.8° eastward in Gemini, passing 0.3° S of $\frac{3}{4}$ -magnitude Delta on Oct 3.
 Magnitudes of the Planets, October 1: Venus -3.4; Jupiter -2.4; Saturn +0.3

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