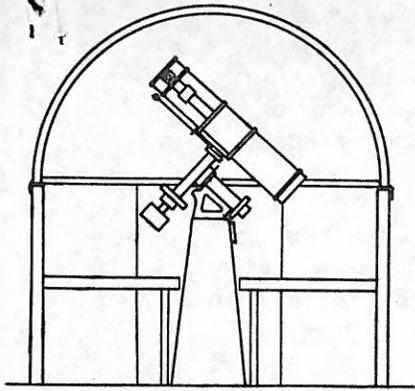


BUFFALO ASTRONOMICAL ASSOCIATION INC.  
BUFFALO MUSEUM OF SCIENCE  
HUMBOLDT PARKWAY  
BUFFALO NEW YORK 14211

# The Spectrum

M A Y 1 9 6 8



MAY MEETING: For our meeting on May 10, 1968, at 8:00 pm (EDT) we take great pleasure in welcoming Mr. RALPH DAKIN, whose topic will be "ECLIPSE TRIP TO PERU." Mr. Dakin is another member of our sister group in Rochester and is associated with the Eastman Kodak Company of that city. He will bring with him excellent illustrations of his trip to Peru to photograph a total eclipse of the Sun. Many of our members will vividly remember his excellent lecture on this topic at last year's convention. Welcome back to Buffalo, RALPH DAKIN!

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INTRODUCTION: Among all the creatures inhabiting this planet Earth, man alone seems to be capable of rationalizing the physical nature of his universe. The question of the universe's nature has occupied mankind since the dawn of its history. Indeed, one might argue that it is the noblest of all of man's activities. Various scientific solutions have been proposed, but in the final analysis it will be an intensely personal problem since frequently it ties in with questions of a metaphysical nature. Ultimately, then, each one of us must come to grips with these questions: "What is the Universe?" and "What is my place in the Universe?" We present here, without further comment, one man's solution to the first question. eeb.

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\* THOUGHTS ON THE PHYSICAL NATURE OF THE UNIVERSE. \* By Walter W. Whyman.

It is a physical law that mass and energy can be neither created nor destroyed; and the annihilation of mass results in the liberation of energy in accordance with Einstein's equation  $E = mc^2$ . By a simple re-arrangement of this equation to  $m = E/c^2$ , it is evident that energy can be reconverted to mass; this can occur when energy travelling at the speed of light is brought to a stop by impact with mass.

If this is correct, then all the energy liberated by a star will eventually be reconverted to mass, wherever in space energy is "used up" by impact. In the case of the Earth, that portion of the Sun's radiation which strikes the Earth is either re-radiated, by reflection or otherwise, or absorbed. The absorbed energy may cause the Earth's temperature to rise, in which case re-radiation into space takes place, or it may be stored in some form such as coal, oil, gas, water power, or radioactivity; all of which will eventually be reconverted to energy and again radiated into space. The total quantity of energy arriving at the Earth plus the quantity being reconverted from stored energy equals the total quantity leaving the Earth plus the quantity being put into storage.

It can thus be seen that the mass lost by a star by conversion to radiant energy will all be eventually re-converted to mass at whatever point in the universe each portion of it comes to rest. And if a star is not repelling energy arriving from all points in the universe by virtue of its high temperature or otherwise, it should add to its total mass by conversion of the arriving energy to mass.

Electrons in motion give rise to magnetic fields which, travelling through space, transfer the energy of the moving electrons to distant points; this is the nature of electromagnetic radiation and the means for transfer of all radiant energy through space. Under certain conditions, all the available energy of a moving electron will be so transmitted; when this occurs, the mass of the electron will have been converted to energy and the electron will cease to exist. Wherever this resulting "energy in motion" strikes a particle in space, the energy will be either re-radiated as described above, or absorbed and converted to mass, adding to the mass of the particle. Where there is no particle to strike, the energy continues on, undiminished in total quantity, although its intensity may appear reduced by virtue of the inverse square law. For this reason truly "empty" space will remain empty, and space containing mass will tend to add mass in proportion to the amount of mass already present. This may account for the formation and growth of stars; those objects in space having greater initial mass being able to intercept larger amounts of moving energy, which through conversion to mass increases the size of the object.

As stated before, the total quantity of mass plus energy in the universe will remain constant, although the total volume occupied by the universe may be continuously increasing. Studies of the RED SHIFT seem to indicate that the outer parts of the universe are receding, which is the basis for the theory that all matter in the universe started expanding from some point billions of years ago. If no mass was in existence other than that which is now so expanding, the energy radiating outward from the outermost fringes of the material universe will find no matter in which to impinge and be converted to mass, with the result that the outermost fringe of the universe is surrounded by an outward moving shell of pure energy.

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\* WEATHER AGAINST ASTRONOMY.\* By Darwin P. Christy, Jr.

Lately I have wondered if it is worth the trouble to be an amateur astronomer. During the past year I have kept a record of the weather versus the astronomically usable nights. In January 1967 we started out with a night where one could observe lunar and planetary objects provided they were in the evening sky. Anything fainter than second magnitude was blotted out by the hazy skies mixed with pollution and city lights. The 5th and 11th were only as good as the first of January. After 12 days had past came Friday the 13th, the night of the first meeting in the new year for the B.A.A. and - it cleared! Although this night did not prove too good telescopically, it did reward one with a beautiful Aurora.

For the rest of the month of January there were not too many other good nights for the observer. A total of five nights proved fruitfull with eight partly usefull and 18 designed for the sleeper. This is only one month out of the year; what about the other eleven months? February being a short month anyway did not give the astronomer much encouragement. It only had four nights for srious observing; eight nights were for the die-hards and again a majority for the devotee of Morpheus - the god of sleep (=16).

The windy month of March was even poorer than February. Only three evenings

were good, although there were twelve other nights one could observe through a haze. Some of these nights were ideal for planetary work due to a steady atmosphere. The rest of the month, sixteen evenings, was terrible so we caught up with our sleep again. After these first three months had past I started to believe that my son Orrin was right in getting involved in Radio Astronomy because it did not seem to affect his observing.

April was next to be recorded and it only gave us seven good evenings. These were exceptional ones, since I obtained a few good photographs of constellations. Again, only five were medium and eighteen were soup and smoke. May started to improve with thirteen good evenings and six mediocre ones and again twelve were bad. Good old June then let us down. We were at the telescope only seven nights with seven fair. This left 16 more nights to catch up on lost (????) sleep. With the first six months gone and six more to go I was sort of discouraged to keep up my records. So, to summarize the first six months, we had a total of 39 good evenings, 46 fair or hazy, and the grand sum of 96 for the Radio Astronomer.

July proved worthless with only two good nights, six fair, and twenty obnoxious ones. August did not improve very much having only four good, eleven halfway decent, and sixteen bad ... BUT - good old September came around to supply us with nine wonderful evenings and thirteen fair ones. Only eight were out. October: seven good, eight fair, sixteen optically lousy. Now, as the Radio Astronomer put it: "Hurray for November" - we optical nuts had one of thirteen to really observe the heavens. Four were partly decent and nineteen - ugh! The final month cheated us again with only four beautiful evenings, eight fair ones and nineteen of the most common variety.

With all of this, don't let it frighten you. With an annual count of 66 good nights - just think what little sleep you lost. If you were one to observe through a little haze, you only lost an additional 96 nights. And who knows, with 213 nights to catch up on our sleep, maybe we will have a good year this time. We all could become Radio Astronomers, but then we would never get any sleep as they can work through thick or thin!

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\* TWO CONTRIBUTIONS. \* By Ray D. Manners.

The first item concerns a meteorite which is of local origin and it may be of interest to unearth some further details. In the catalog of the collection of meteorites in the British Museum there is one specimen weighing about 5.3 kg, which is listed as having been found at Cambria (Lockport), N.Y. in 1818. The meteorite is described as an octahedrite iron. Since the displayed specimen may be only a fragment, there is the possibility of further specimen on display in this country and it should be possible to obtain further details of this object.

My second item concerns the possibility of communication with extraterrestrial life forms. If it were possible to set up some kind of communication channel, just what would we transmit? The message would have to be decipherable by those who had no knowledge of the English language etc. etc. yet it should contain sufficient information to relay the message that it was transmitted by intelligent beings. Such a message has been devised and I am repeating it herewith. The problem is to decipher it, using only whatever inborn native intelligence one possesses. The answer is absurdly simple, yet it is surprising how many intelligent people are completely stumped by it. Others have deciphered it as fast as they could write it down. The item first appeared in a Tokyo newspaper and was later reprinted by Martin Gardner

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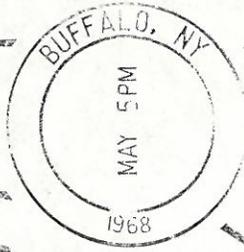
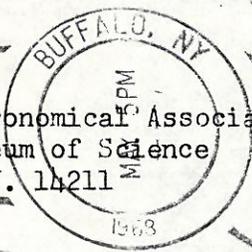
in the Scientific American some years ago. Numbers on the message are for the benefit of Earth people. Punctuation marks merely serve to break up the "words".

1. A.B.C.D.E.F.G.H.I.J.K.L.M.N.P.Q.R.S.T.U.V.W.Y.Z.
2. AA,B; AAA,C; AAAA,D; AAAAA,E; AAAAAA,F; AAAAAAA,G; AAAAAAAA,H; AAAAAAAAA,I; AAAAAAAAAA,J.
3. AKALB; AKAKALC; AKAKAKALD; AKALB; BKALC; CKALD; DKALE; BKELG; GLEKB; FKDLJ; JLFKD.
4. CMALB; DMALC; IMGLB.
5. CKNLC; HKNLH. DMDLN; EMELN.
6. JLAN; JKALAA; JKBLAB; AAKALAB. JKJLBN; JKJKJLCN. FNKGLFG.
7. BPCLF; EPBLJ; FPJLFN.
8. FQBLC; JQBLE; FNQFLJ.
9. CRBLI; BRELCB.
10. JPJLJRBLSLANN; JPJPJLJRCLTLANN. JPSLT; JPTLJRD.
11. AQJLU; UQJLAQSLV.
12. ULWA; UPBLWB; AWDMALWDLDPU. VLWNA; VPCLWNC. VQJLWNA; VQSLWNNNA. JPEWFGHLEFGWH; SPEWFGHLEFGWH.
13. GIWHYHN; TKCYT. ZYCWADAF.

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NOTE: The first correct solution to arrive at my office at the Museum wins a copy of Fred Hoyle's "Frontiers of Astronomy." eeb.

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