SOLAR DIVISION Bulletin

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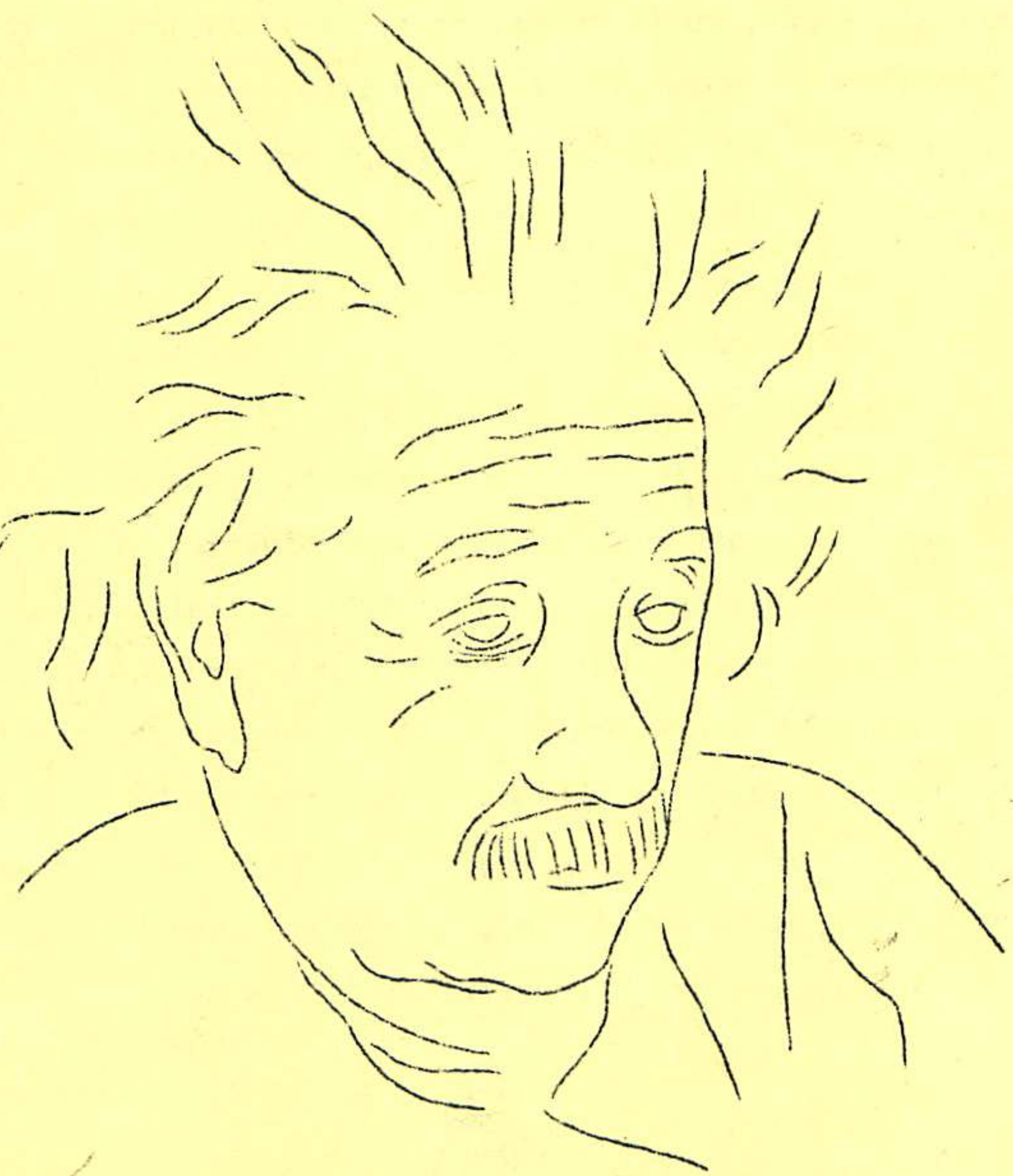
May 1955 Number 105



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A L B E R T   E I N S T E I N (1879-1955)

Scientists, even the most eminent, are seldom known outside the circle of their own specialty. Their work may alter profoundly not only the development of their particular field, but also the very course of civilization, and yet their names and their works remain unknown except to a relatively tiny group of fellow specialists.

The most notable exception to this anonymity rule has been Albert Einstein, whose name is familiar even to people who have no idea of what physics is about. Furthermore, even the least scientifically inclined immediately associate his name with the word "relativity", and most people can also add other biographical bits: born in Germany, Nazi exile, amateur violinist, typical "college professor" of whom dozens of amusing anecdotes are told. It is said of him, for example, that shortly after leaving Nazi Germany he was asked by a reporter what nationality he thought future generations would assign to him: "If my theory of relativity is proved correct, Germans will say that I was a German and others will claim that genius knows no country. If relativity is proved wrong, Germans will say that I was a Jew and the rest of the world will insist that I was a German."

There is no need to mention here his tremendous contributions to science, which rank among the greatest achievements of the human intellect, but let us in closing recall that here was a truly great man whose absorbing interest in science never dimmed his passion for justice and his profound love for his fellow man.

Gonzalo Segura, Jr.

(Ed. note: Mr. Gonzalo Segura, Jr. is a friend of ours and a member of the New York City's Amateur Astronomers Association /AAA/. During the war he worked at the "Manhattan District" and is now Chief-Radiochemist at Foster D, Snell, Inc.)

(Ed. note: Last year we published in our SD BULLETIN (No.91) the brief abstract of an important paper dealing with the effect of solar activity on the brightness of Jupiter. Mr. Leith Holloway kindly reviews for our readers this interesting paper.)

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REVIEW of:

"A Planetary-Atmospheric Response to Solar Activity"
by Ralph Shapiro, Journal of Meteorology, 10: 350 (October 1953)

by Leith Holloway

In this article Shapiro studies a relationship between the gradient of brightness on Jupiter's disc and Zürich monthly and annual sunspot numbers. Blue and Yellow sensitive plates taken at Lowell Observatory between 1926 and 1940, and between 1947 and 1950 are used in this study. A correlation coefficient as high as 0.8 is obtained. This high correlation is proved to be unrelated to the fact that the period of Jupiter's revolution is by coincidence approximately the same as the primary period of the relative sunspot numbers. Apparently the changes in ultraviolet light associated with the sunspot cycle affect the height of the top of ammonia clouds in Jupiter's atmosphere by changing the maximum height of the condensation of ammonia by changing its temperature and thus its vapor pressure. These height changes in the ammonia clouds presumably influence the albedo of the planet.

A change in the brightness between Jupiter's equator and its high latitudes then should correspond to a change in the temperature gradient at a given height between these latitides. In turn a change in temperature gradient would cause a change in the intensity of the general circulation of the planet. The effect of solar activity on the Earth's general circulation has been studied by many meteorologists such as Willett, but no mechanism for this effect has been discovered.

Most of the ultraviolet of the sun's rays cannot penetrate to low levels where clouds on the Earth exist. It is thought that the ultraviolet acts as a triggering mechanism at high levels in the Erath's atmosphere, and these effects are propagated downward to levels of ordinary meteorological phenomena. Shapiro thinks that a similar phenomenon occurs on Jupiter whereby the effects of ultraviolet reaching high levels ultimately reach the level of the ammonia clouds (at a pressure of about 1000 millibars) where they are reflected in a change in brightness of the clouds.

The discovery of a possible solar-weather effect on other planets is encouraging for meteorologists attempting to find such effects on the Earth. However, it is unfortunate that these data are so difficult to obtain from other planets thus limiting the number of observations available for analysis. Shapiro has less than two sunspot cycles represented in his data. Even though the curve for the relative sunspot numbers closely parallels that of the relative brightness of Jupiter, it would be advisable to study this relationship through one or two more sunspot cycles before concluding that this relationship is real.

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S O L A R D I V I S I O N - AAVSO - R E O R G A N I Z E D .

The President of the AAVSO, Mr. Cyrus F. Fernald, has nominated Harry L. Bondy Chairman of the Solar Division. I have accepted this honor.

As Chairman of the Solar Division I have asked the following members to form a Solar Division Committee: Mr. Ralph N. Buckstaff; Mr. Thomas A. Cragg; Mr. William A. Reid; Mr. David W. Rosebrugh and Mr. Alan H. Shapley (NBS). I am very glad to say that all accepted membership on our Solar Division Committee.

The Solar Division Committee together with the President of the AAVSO and your Chairman will formulate our activity programs and be the policy making body. The actual organizational work will continue to be carried out by: Mr. David W. Rosebrugh, Computer of the American Relative Sunspot-Numbers-R_A'; Mr. William A. Reid, Recorder of our sunspot-number observations. This Chairman will continue as Editor of the Solar Division BULLETIN.

Our former Chairman, Mr. Neal J. Heines, conveyed to me on my recent visit to him his best wishes for the future success of the Solar Division. An ailment, unfortunately, prevents him to do any work for us. We are greatly indebted to Neal J. Heines and sincerely hope that he will again be able to participate in our work.

I wish to assure our members and friends that I shall do my utmost to make the Solar Division a successful organization- one that will fully reflect the fine work of our active members. My goal is a mutually satisfactory cooperation of all interested in solar astronomy in the hope that this work may contribute to advance our knowledge of the sun and his influence on our Earth.

Your cooperation is gratefully appreciated; your advise, comments and criticism are always welcome.

Very sincerely yours,

Harry L. Bondy
Chairman, Solar Division-AAVSO

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SOME HIGHLIGHTS from the
92nd meeting of the AMERICAN ASTRONOMICAL SOCIETY (AAS)
at Princeton University April 3 - 6 1955.

A number of very interesting papers concerning solar astronomy was presented to the AAS meeting at Princeton. Perhaps the most outstanding paper was the one dealing with the most recent results in obtaining the far ultraviolet solar spectrum by means of rockets. Only a few years ago the first trace of the normally inaccessable ultraviolet spectrum was recorded by the Naval Research Laboratory in the upper atmosphere. This powerful radiation is responsible for the ionized layers in the earth's atmosphere which are indispensable for long range radio communications.

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(continued from page 4)

A few month ago the Naval Research Laboratory obtained an exceptionally fine spectrum which by far surpasses any previous solar spectrum. The abstact of paper 101 presented to the AAS follows:

Abstract: EMISSION LINES IN THE SOLAR ULTRAVIOLET SPECTRUM
by F.S. Johnson, H.H. Malitson, J.D. Purcell and R. Tousey
Naval Research Laboratory, Washington 25, D.C.

On February 21, 1955, a series of solar ultraviolet spectra was obtained at altitudes up to 117 km in an Aerobee rocket fired at White Sands Proving Ground, New Mexico. The spectrograph was kept accurately pointed at the sun during the entire flight by means of the University of Colorado biaxial pointing control. About 30 conspicuous emission lines are present in the region 977 to 1817 Å in a 30 sec exposure taken over the peak of the trajectory. The continuous spectrum extended down to about 1550 Å, with Fraunhofer structure visible to about 1680 Å; from 1680 Å to 1550 Å the spectrum is very weak and it is not clear whether the features are due to emission or absorption lines.

Definite emission lines have been identified as follows:
H 1215.7, 1025.7 (Lyman Alpha and Beta); He II; C I; C II; C III; C IV; N V; O I; O VI; Al II; Si II; Si III; Si IV; S II; Fe II

(Ed. note: the various wavelenghts listed in the abstract are omitted)

The astigmatism was removed from the spetrograph for the region below about 1600 Å and the sun's image was focused on the slit. Therefore, limb darkening or brightening can be looked for in the uniformity of density along the spectrum lines. In general, the emission lines are remarkably uniform indicating no limb darkening. This is in marked contrast to the Fraunhofer absoption, where the effect of limb darkening is conspicuous in the spectra. No definite indication of limb brightening has been found in the emission lines although a small amount may be concealed by small movements of the sun's image along the slit during the exposure due to tracking errors."

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(Additional abstracts and notes on the AAS meeting will be published)

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More **NOTES ON THE PROMINENCE TELESCOPE:**

Dr. Huberta von Bronsart kindly send us a copy of the last paper on the Prominence Telescope written by OTTO NÖGEL in <u>Die Sterne</u> No.1-2 1955;vol.31. In his article Nögel further describes his simple construction and illustrates some of the prominence photographs he made. One picture in particular points to the successful use of this instrument when he was able to photograph prominences with good seeing conditions but with the sun only 7° above horizon (no high altitude observatory)!

Baird Associates, Inc. 33 University Road, Cambridge 38, Mass. offer a narrow band interference filter with a passband half-width of 7 mμ for Hydrogen Alpha; 1" square $ 30.- (transmission approx. 70%)

American Relative Sunspot Numbers for March and April 1955 - R_A' -

Day	March RA'	April RA'	Day	March RA'	April RA'	Day	March RA'	April RA'
1	29	12	11	0	3	21	2	2
2	22	2	12	0	0	22	0	1
3	19	6	13	0	1	23	0	1
4	14	7	14	0	0	24	0	1
5	10	21	15	0	13	25	0	0
6	10	32	16	0	13	26	0	2
7	3	29	17	0	5	27	2	14
8	3	26	18	0	0	28	0	21
9	2	15	19	0	0	29	6	25
10	0	9	20	0	3	30	13	26
						31	12	-

Mean for March: RA' = 4.7
Mean for April: RA' = 9.7

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Zürich Provisional Sunspot Numbers for March and April 1955 - RZ -

Dependent on observations at Zürich Observatory and its stations in Locarno and Arosa.

Day	RZ March	April	Day	RZ March	April	Day	RZ March	April
1	23	9	11	0	0	21	0	8
2	20	14	12	0	0	22	0	0
3	16	8	13	0	0	23	0	0
4	15	21	14	0	0	24	0	8
5	8	36	15	0	7	25	0	0
6	8	30	16	0	9	26	0	0
7	8	32	17	0	13	27	7	10
8	8	31	18	0	0	28	0	22
9	7	19	19	0	0	29	0	23
10	0	10	20	0	0	30	17	29
						31	10	-

Mean for March: RZ = 4.7
Mean for April: RZ = 11.3

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Monthly summary of SUNSPOT MEASURES made at the U.S. NAVAL OBSERVATORY:

1954: Month	Mean AREA	Mean No. GROUPS	1954: Month	Mean AREA	No. GROUPS
JANUARY	0	0.0	JULY	19	0.5
FEBRUARY	2	0.1	AUGUST	75	0.7
MARCH	182	0.5	SEPTEMBER	3	0.1
APRIL	7	0.3	OCTOBER	37	0.8
MAY	1	0.1	NOVEMBER	70	0.7
JUNE	0	0.0	DECEMBER	137	0.6

Only two groups returned a second time to the visible disc.