Report on the observation of iron dust

by Rumeysa SÜSLÜ

(Submitted by the Director of the Department of Astronomy)

Özet: Her gün, arz yüzeyine düşen demir parçacıkların sayımına devam edilmiştir. Bir sene zarfındaki değişimi gösteren ilk eğri verilmiştir.

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Abstract: We have counted every day the iron dust falling on the earth. The first curve showing the variation in a year has been given.

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1. Since February 1954 at this Institute regularly counts have been made of the number of iron particlec which daily fall on the surface of the earth. The observations were inaugurated by A. Kızılırmak, who has reported on his results in one of the previous communications of this Institute (1). For his observations A. Kızılırmak used a glass plate with a surface of 2 square meter, which was placed horizontally an a table. Every day the iron particles were collected with the help of a magnet.

To one of the poles of this magnet a smaller glass plate was rigidly attached. This end of the magnet was moved back and forth over the surface of the horizontal plate until the whole surface had been covered. Next the number ot particles, collected on the small glass plate, were counted, first as seen through an eye piece of small enlargement, next as seen through a microscope. During the counts a magnet was brought near the small glass plate and moved back and forth so that the iron particles could easily be recognised.

In September 1954 Abdullah Kızılırmak temporarily left this Institute in order to continue his studies in Germany and meanwhile the present author has continued his observations. Care was taken to use the same method of collecting and counting the particles. By now more than a year has elapsed and a first

attempt can be made to study the variations of the numbers in the course of a year.

2. As was emphasized by A. Kızılırmak, it is very probable that the iron particles are related to the meteorites which are visually observed, this notwithstanding the fact that the particles, which are collected at this Institute, clearly do not contain any nickel.

Ultimate proof for a direct connection between the iron dust and the meteorites can be obtained by:

a) Comparing yearly variations of the observed number of iron particles with the corresponding variations in the numbers of meteorites.

b) Ascertaining that an increase in the numbers of observed iron particles occurs at the time or shortly after the time a meteor shower occurs.

It is for this reason that now a first attempt is made to establish the shape of the yearly distribution curve. When trying to establish the shape of this curve we are confronted by a serious drawback. Not only is it impossible to observe the number of particles on days of heavy rainfall, but A. Kızılırmak also found, that after each day of rainfall for a few days afterwards the numbers of particles remain abnormally low. Evidently these small iron particles are almost suspended in the air and it takes several days to fall even though the lower layers of the atmosphere.

It is a matter of future investigation exactly to determine for how many days the numbers remain affected. For the present I have assumed that on the days when rain fell and the first and second day after rainfall, the observed numbers are unreliable and have to be excluded. The result is that especially in the rainy months between December and May there still occur some gaps in the observed curve.

Next the total numbers, observed in ten days intervals, were determined and divided by the number of days in this interval during which the counts could be made.

The results appear in table 1 and table 2. The values in table 1 are based on the counts of A. Kızılırmak, those in table 2 on my own counts.

Therefore from these tables it is possible not only to read

the mean daily numbers but also the numbers of days from which these mean numbers were derived. This is a certain measure for the degree of accuracy of the various numbers.

Finally a survey of the different curves is given in fig. 1, where the observed numbers are plotted against the time of the year.

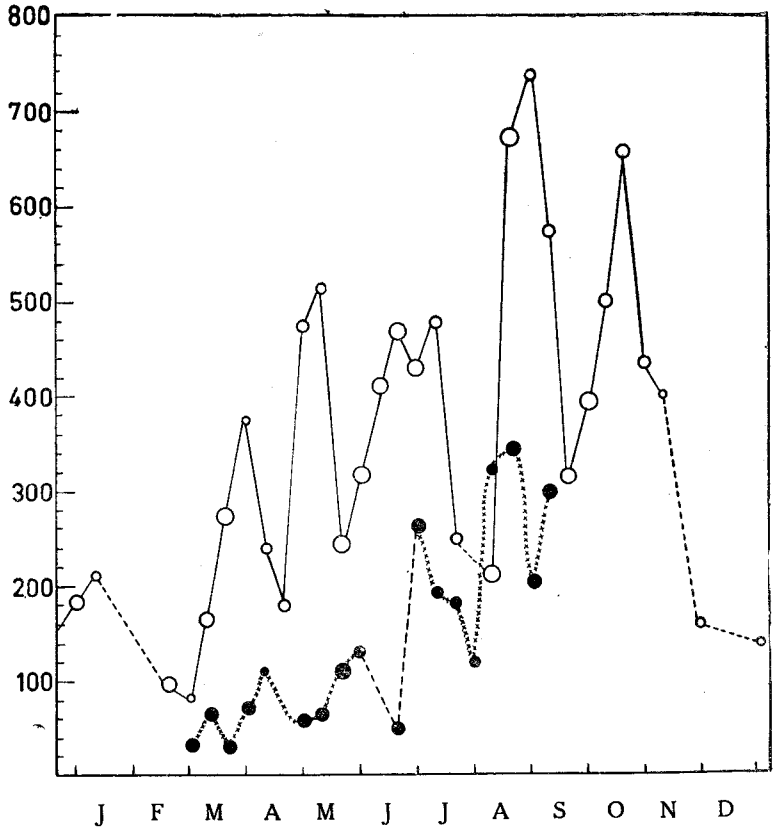

Fig. 1. Mean daily numbers of iron particles (mean of 10 days period) open circles, observations of present author, black circles, observations by A. Kızılırmak. Disc of open circles and dots is proportional to the number of observational days in each ten days period.

The scale of the figure is indicated on the left side. The broken line connecting the black dots is the distribution curve as derived from my own observations. Wherever the curve is uncertain, it has been dotted. The broken line connecting the

open circles is the distribution curve as derived from the observations of A. Kızılırmak.

There certainly is a certain resemblance between the shape of the two curves. At the same time there are conspicuous differences. In the first place the counts seem to be affected by a strong personal error. All numbers determined by me are systematically larger than those counted by Kızılırmak.

Also there are fairly large accidental differences between the numbers counted in the various ten days intervals.

Our conclusions are :

Table 1: Numbers observed by Kızılırmak

		Total	Number of days	Daily mean
Mar.	2—11	381	10	38
	12—21	603	10	60
	22—31	300	10	30
Apr.	1—10	693	10	69
	11—20	220	2	110
	21—30	128	2	64
May.	1—10	605	10	60
	11—20	662	10	66
	21—30	1103	10	110
Jun.	31— 9	1362	10	136
	10—19	541	1	541
	20—29	484	10	48
July.	30— 9	2623	10	262
	10—19	1961	10	196
	20—29	1860	10	186
Aug.	30— 8	595	5	119
	9 —18	1932	6	322
	19—28	3464	10	346
Sep.	29— 7	2006	10	200
	8 —17	3038	10	303

Table 2: Numbers observed by author.

		Total	Number of days	Daily mean
Jan.	1—10	1531	9	170
	11—20	1043	5	208
	21—30	0	0	0
Feb.	31— 9	0	0	0
	10—19	0	0	0
	20— 1	939	10	93
Mar.	2—11	161	2	80
	12—21	1610	10	161
	22—31	2674	10	267
Apr.	1—10	1111	3	370
	11—20	950	4	237
	21—30	890	5	178
May.	1—10	3304	7	472
	11—20	2033	4	508
	21—30	2408	10	240
Jun.	31— 9	3182	10	318
	10—19	4087	10	408
	20—29	4715	10	471
Jul.	30— 9	4375	10	437
	10—19	2869	6	478
	20—29	738	3	446
Aug.	30— 8	0	0	0
	9—18	2092	10	209
	19—28	6706	10	670
Sep.	29— 7	2955	4	738
	8—17	4529	8	566
	18—27	3168	10	316
Oct.	28— 7	3946	10	394
	8—17	4959	10	495
	18—27	6567	10	656
Nov.	28— 6	3863	9	429
	7—16	805	2	402
	17—26	0	0	0
Dec.	27— 6	975	6	162
	7— 16	0	0	0
	17—26	0	0	0
Jan.	27— 5	386	2	143

1. A first impression of the shape of the yearly distribution curve of the iron particles has been obtained.
2. The observed numbers of particles are strongly influenced by a personal error and before the final shape of the curve can be established, this personal error will have to be eliminated.
3. The purely accidental spread of the numbers seems to be fairly large and it will be necessary to continue the observations over an interval of several years.

Literature

(1) A. Kızılırmak: Communication Astron. Dep. Ankara, 4; 1955

Ankara, November 1955.