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DEPARTMENT OF INDUSTRY AND COMMERCE
METEOROLOGICAL SERVICE

INTERNAL MEMORANDUM

I.M.1/43 — Fog at Irish Lighthouses and Lightships, 1916-1938
by F.E. Dixon. Received, 30th April 1943;
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At lighthouses and lightships equipped with foghorns, or other devices used only in conditions of deficient visibility, a record is kept of the number of hours during which such conditions persist. The figures collected for the years 1916 to 1938 have been summarised and investigated, the results being the basis of the present note.

At meteorological stations the visual range is measured by observations of selected objects at known distances, and reports of fog or mist are made only when the objects at one kilometre and two kilometres respectively are not clearly seen. No such definite standards are employed by the lightkeepers and there seem to be considerable divergences between the criteria used at different lighthouses, and at different periods. One lighthouse reported an average of 72 hours per year for the period 1916 to 1925, the range being 35 to 116 hours; from 1934 to 1938 the average for the same lighthouse was 252 hours per year and the individual years experienced from 203 to 295 hours. Such a change would be very remarkable if it could be associated with any change in the climate, and it is more likely that the lightkeepers have extended their interpretation of the word 'fog' to include much clearer atmospheric conditions than formerly.

Lightships sound their fog signals much more frequently than do land-based stations: whereas the Tuskar Rock average is 509 hours per year the averages for the nearest lightships are 1483 and 1873 hours. A difference of this magnitude cannot be explained by the difference in distance from the mainland or in height above sea level.

The existence of such variations makes it impossible to use the data to investigate the distribution of fog round the Irish coasts, as had been planned. The annual variation can, however, be investigated and a number of stations were selected whose figures showed the fewest discontinuities and the closest similarity to those for neighbouring stations. The actual averages for the 14 stations selected are given in Table 1, and the positions of the stations are plotted in Figure 1.

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Table 1. Monthly and Annual Averages of Fog Duration, 1916-1938

Place	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
	hrs	hrs	hrs	hrs	hrs	hrs	hrs	hrs	hrs	hrs	hrs	hrs	hrs
Tory I.	30	29	30	26	20	32	34	22	23	26	12	17	301
Rathlin I.	5	15	15	19	33	36	37	33	18	6	3	5	225
Blackhead	33	45	47	20	29	29	37	36	24	17	26	26	369
Bailey	20	26	30	19	29	15	14	14	14	11	20	23	235
Kish	50	74	95	67	95	64	57	56	45	44	50	44	741
Arklow	121	149	199	139	192	135	126	122	124	113	96	120	1636
Lucifer	144	170	199	152	219	138	158	149	144	137	127	136	1873
Hook Point	17	25	27	23	44	27	31	36	26	23	22	21	322
Barrels	110	145	158	118	159	114	126	137	113	102	86	105	1483
Daunts	56	62	78	49	75	60	66	86	66	63	52	53	766
Fastnet	39	38	43	43	73	47	86	76	63	53	50	40	651
Mizen Head	48	53	45	38	77	57	92	81	70	63	53	48	725
Loop Head	36	33	28	23	32	46	45	41	42	29	32	38	425
Eagle I.	23	19	25	21	28	50	42	40	40	30	21	28	367

It is clear from Table 1 that, although the differences in total fog duration reported are considerable, there are some points of uniformity in the relative frequencies at different seasons of the year.

In order to render comparable the figures for the different stations the monthly averages were next computed as percentages of the annual averages, and the stations were divided into two categories, coastal stations and those on islands and lightships. The percentage distributions, and means for the two categories, are presented in Table 2, and also form the basis of Figure 2, in which, however, some groups of stations have been taken together.

Table 2. Monthly Averages of Fog Duration expressed as percentages of the Annual Averages, 1916-1938

Place	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
	%	%	%	%	%	%	%	%	%	%	%	%
Coastal												
Blackhead	9	12	13	5	8	8	10	9	7	5	7	7
Bailey	9	11	13	8	12	6	6	6	6	5	8	10
Hook Point	5	8	8	7	14	8	10	11	8	7	7	7
Mizen Head	7	7	6	5	10	8	13	11	10	9	7	7
Loop Head	8	8	6	5	8	11	10	10	10	7	8	9
Islands and Lightships												
Tory I.	10	9	10	9	7	10	11	7	8	9	4	6
Rathlin I.	2	6	6	8	15	16	17	15	8	3	2	2
Kish	7	10	13	9	13	8	8	7	6	6	7	6
Arklow	7	9	12	9	12	8	8	7	8	7	6	7
Lucifer	8	9	11	8	12	7	8	8	8	7	7	7
Barrels	7	10	11	8	11	8	8	9	8	7	6	7
Daunts	7	8	10	6	10	8	9	11	9	8	7	7
Fastnet	6	6	7	7	11	7	13	12	9	8	8	6
Eagle I.	6	5	7	6	8	14	11	11	11	8	6	7
Mean												
Coastal	8	9	9	6	11	8	10	9	8	7	7	8
Islands & Lightships	7	8	9	8	11	10	10	10	8	7	6	6

The differences between conditions on the coast and at lightships or on islands is not great, but the former category experiences a slightly greater percentage of its fog in winter and less in summer, as might be expected from the general annual variations of radiation and of sea fogs.

In most areas fog is most prevalent in summer and this is most striking at Rathlin Island, where 63% of the fog occurs in the months May to August, compared with only 9% for the period October to January. In general May is the foggiest month, but at northern stations, as also those in the extreme Southwest, the July maximum is the more prominent. The two western lighthouses at Loop Head and on Eagle Island both have most fog in June, in marked contrast to Fastnet and Mizen Head where June is a relatively clear month. At the four stations nearest the sources of industrial pollution on the East coast March is the worst month. Only one place, the Daunts lightship, has its maximum as late as August.

At the other extreme, most of the islands and lightships are freest from fog in November or December and the stations on the coast have their clearest months in October and April. It is an interesting point that at nearly all the stations April is less foggy than either March or May.

Tory Island has rather an exceptional record with a maximum in winter nearly as prominent as that in summer. In the absence of any confirmatory evidence the figures must be accepted only with caution.

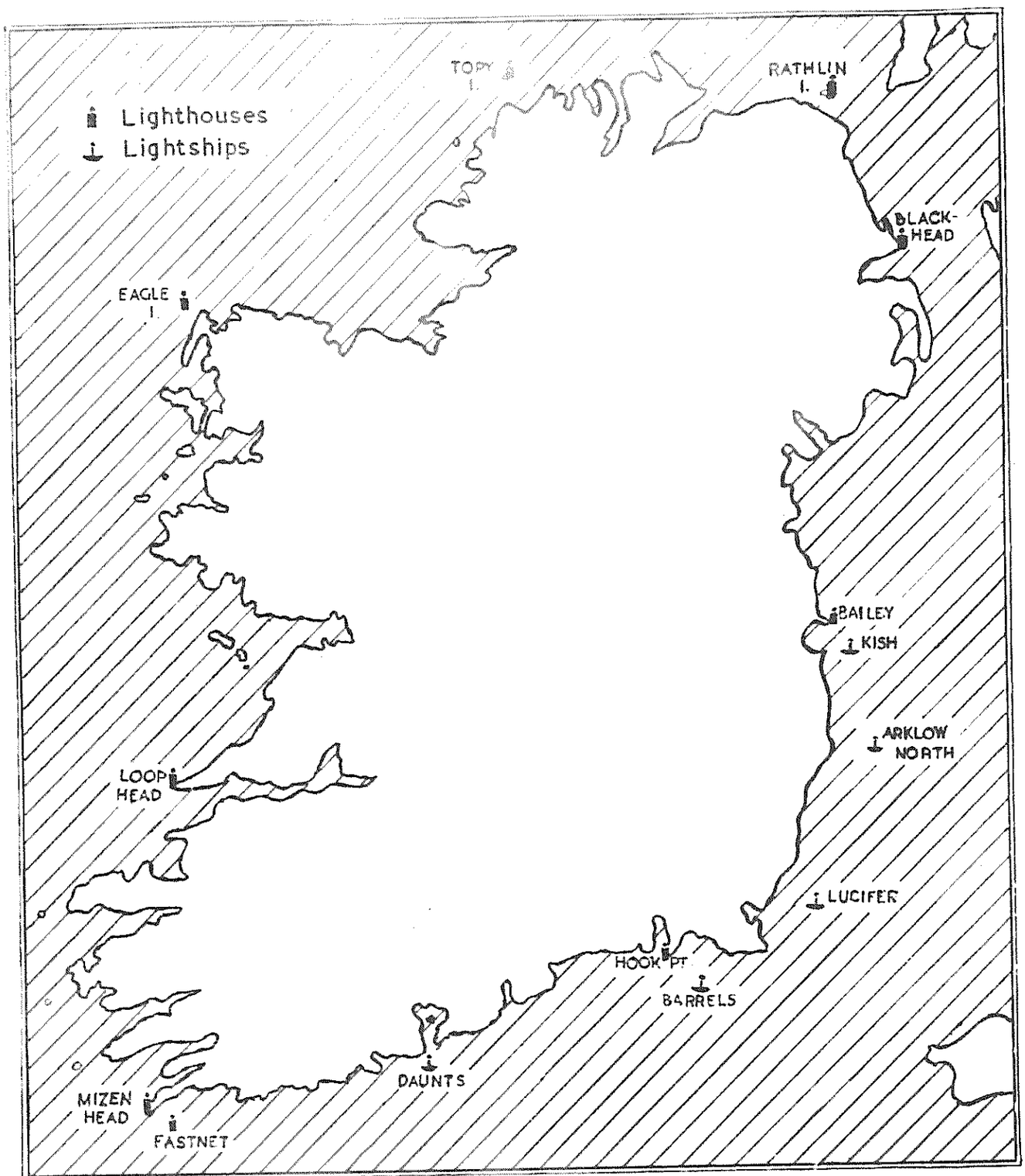

FIG. 1. LOCATIONS OF LIGHTHOUSES & SHIPS FROM WHICH DATA WERE USED

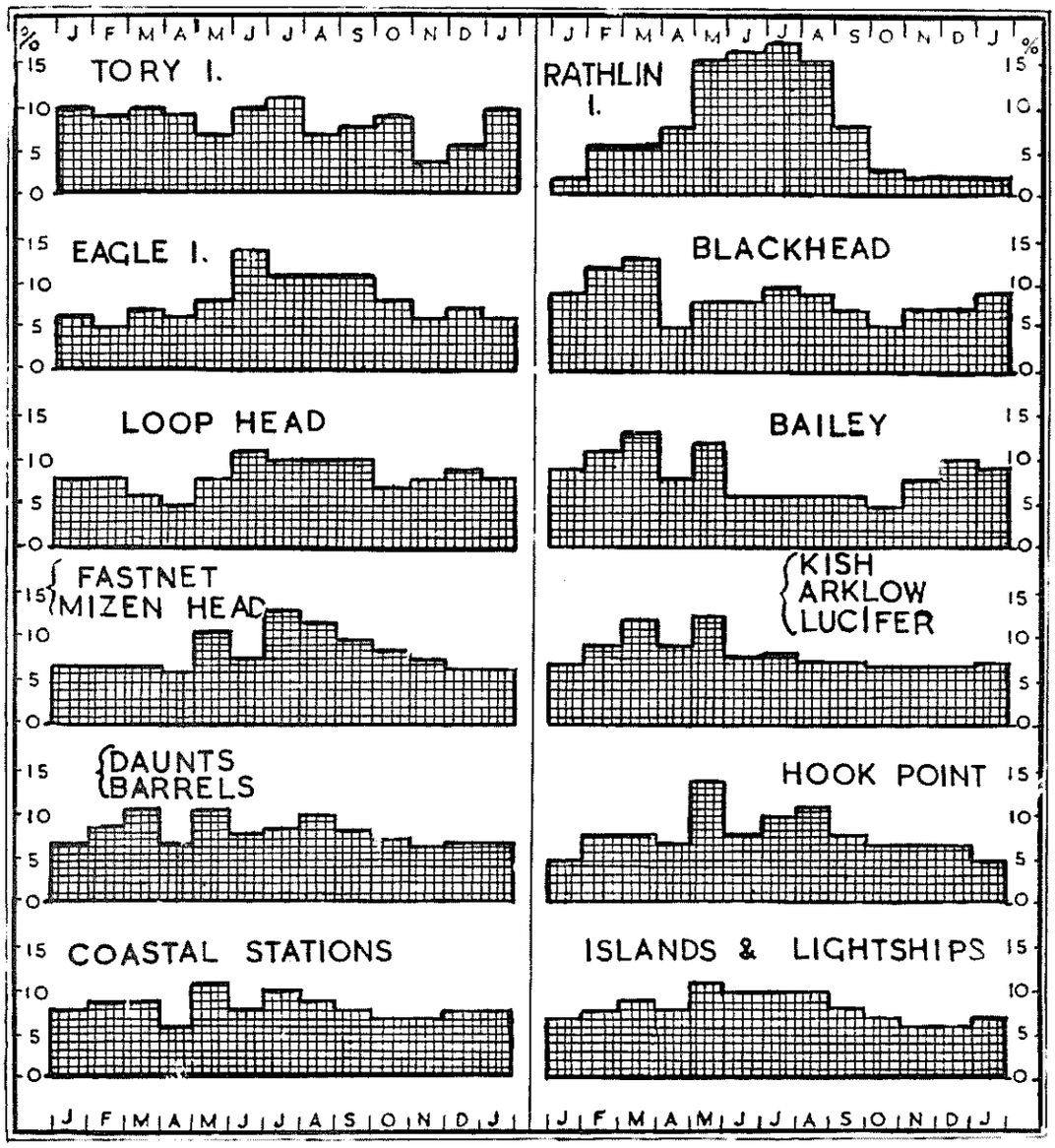

FIG.2. MONTHLY AVERAGES OF FOG DURATION AS PERCENTAGES OF THE ANNUAL AVERAGES