

During the period of winter stabilisation the Atlantic transgression does not reach the European continental shelf, which from December to June is fully affected by seasonal influences.

Although the movement may have started from the month of February off Morocco, the tendency of the Atlantic waters to approach the coasts of Europe and Africa does not make itself felt until the month of June. During the course of the summer the transgression gains in turn the coasts of Brittany, Ireland and Scotland; in autumn, the North Sea and the coasts of Norway, reaching its extreme limits, the distance of which varies according to the year.

The regression commences in November and is complete in May. In point of fact, the period of true stabilisation is only a few weeks.

From the thermal point of view, the transgression adds its effect to the fact that the coasts of Europe are not cooled by the Arctic waters, which have been driven to the westward.

The period of the transgressions is a result of the periods of the influence exercised by the sun and moon.

This development of the question of the *Gulf Stream* shows that there is a tendency to reduce the action of impulsion currents, and of the free currents resulting from them, to more modest proportions in favour of periodical cosmic influences.

These influences seem, further, to extend also to the atmosphere. The parallelism between the phenomena of the sea and of the atmosphere is not only due to the influence of the sea on the climate, but also to the effect of a single cosmic influence acting simultaneously on two more or less stratified media, the sea and the atmosphere.

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## OBERFLÄCHENSTRÖMUNGEN DES NORDATLANTISCHEN OZEANS ZWISCHEN 15° UND 50° N. B.

(SURFACE CURRENTS OF THE NORTH ATLANTIC OCEAN BETWEEN LATITUDES  
15° AND 50° NORTH.)

by

OTTO HEINR. FELBER,  
Hamburg, 1934, Deutsche Seewarte,  
29 × 22 cm. - 18 pp. - 24 fig. - 6 tables.

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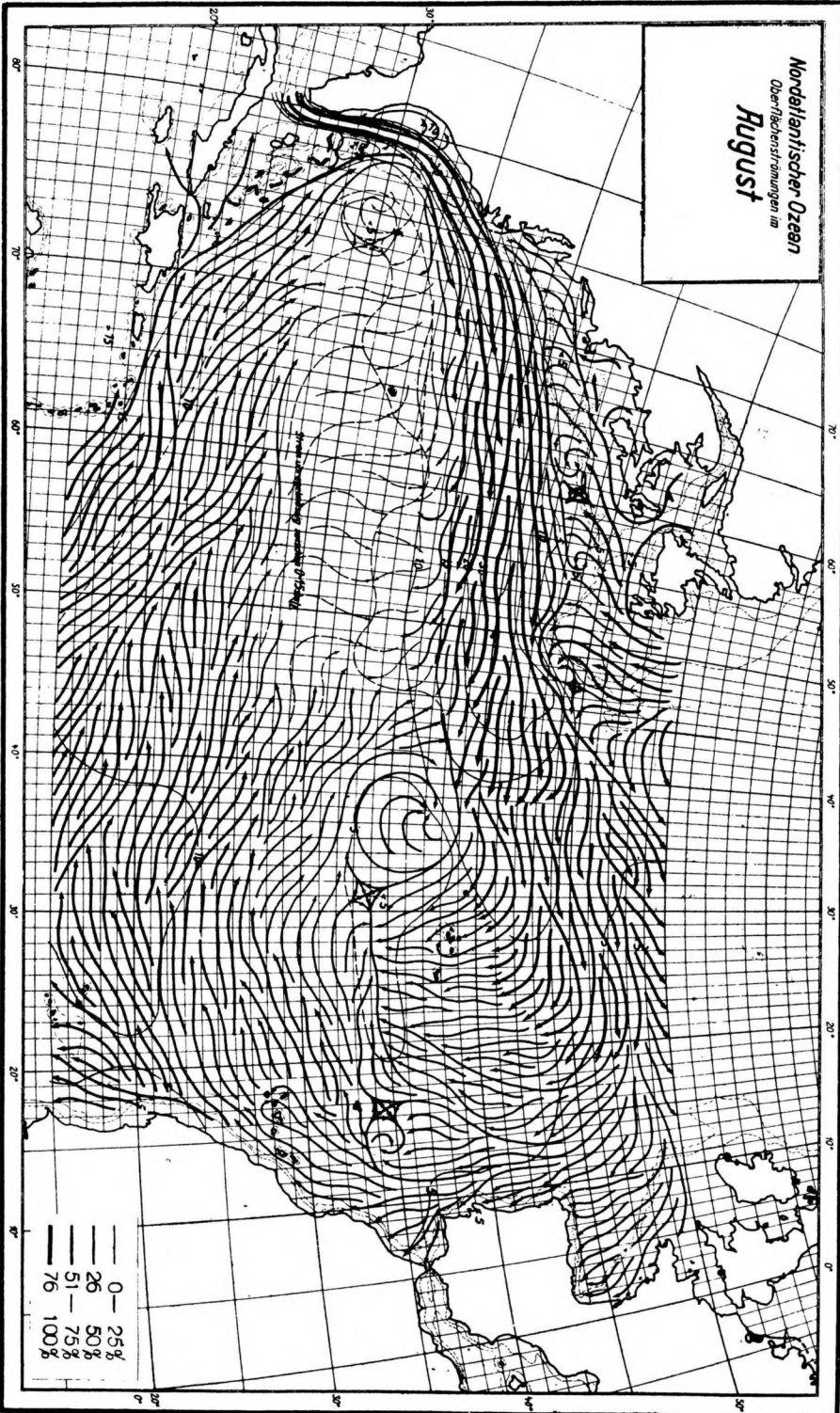
Studies of the surface currents of the Atlantic Ocean are now numerous enough to make it possible to show these currents by a chart, a form of representation necessary to make the characteristic details of the phenomenon stand out clearly. The Deutsche Seewarte has done this in a publication by Dr. O. H. FELBER.

The author has set out to show us the changes undergone in the course of a year by the surface currents of the North Atlantic, and with this object he gives us a series of charts on a conformal azimuthal (stereographic) projection, on which the currents are shown month by month by continuous lines the intensity of which indicates the stability of the current. The speed of the current is given by red lines of equal velocity varying every five miles. We reproduce here the chart for the month of August.

The book compresses a considerable work, accompanied by a bibliography, into a small number of pages. It is based on more than fifty years of observations which the author has examined and discussed with the aid of isothermal and wind charts, drawing charts of pure impulsion currents and making certain that the current shown was not contrary to the laws of hydrodynamics. In regions of convergencies he has taken into account observations of salinity and temperature at various depths.

The last part of the study describes the general run of the currents of this region of the Ocean and shows the various changes undergone by the current in the course of the year, such as a displacement of the origin of the Northern Equatorial Current, to

Nordatlantischer Ozean  
Oberflächenströmungen im  
August





the westward of the Cape Verde Islands; a slight seasonal variation of the anticyclonic eddy which constricts the Antilles Current before its junction with the Florida Current; the line of convergence of the polar front situated a little further north in summer than in winter and remaining clear to roughly between  $40^{\circ}$  and  $35^{\circ}$  west longitude; and cyclonic eddies on the south-east and south sides of the Great Banks subject to greater variations in winter, smaller in summer, the existence of the latter being only a certainty from March to October.

Like the wind, the current is more regular in summer than in winter and has fewer eddies.

With regard to the Gulf Stream, an examination of the component of the current due to the wind (pure impulsion current) shows clearly that this component, which apparently acts towards the south, then to the south-east and east, is dominated by the component of the slope current acting towards the north. Only in the narrow band between longitudes  $70^{\circ}$  and  $50^{\circ}$  do the directions of the two components coincide. It follows that the Gulf Stream is certainly rather a gradient current than a current due to the wind.

The ramifications of the Gulf Stream running towards the French and Spanish coasts are weak and irregular; starting from about the 20th meridian, they flow east- and south-eastwards.

A great line of sub-tropical convergence crosses the Atlantic; it undergoes a few seasonal variations, shown on a special plate.

The Canaries Current north of the parallel of  $28^{\circ}$ , which is particularly stable, appears in spring and winter to be at the same time a drift current (due to the trade winds) and a compensation current; while in summer and autumn it is entirely a drift current.

P. V.

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## STROMMESSUNGEN UND OZEANOGRAPHISCHE SERIEN-BEOBACHTUNGEN DER 4-LÄNDER-UNTERNEHMUNG IM KATTEGAT : 10-17 AUGUST 1931.

(CURRENT MEASUREMENTS AND OCEANOGRAPHICAL OBSERVATIONS  
OF THE COMBINED OPERATION OF FOUR COUNTRIES IN THE KATTEGAT :  
10th-17th AUGUST 1931).

by

A. DEFANT and O. v. SHUBERT.

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Berlin, E. S. MITTLER und Sohn, 27 × 18 cm. - 144 pp. - 1 pl. - 74 fig.

This book contains the results of the current measurements and oceanographical observations carried out in the Kattegat in August 1931 by five ships belonging to four countries: Germany (2), Denmark, Finland and Sweden. The observations have been published in full in the Hydrographic Bulletin of the International Council for the Exploration of the Sea, Copenhagen, and the methods of measurement and apparatus used will be found described in that Bulletin. (1)

The region concerned in the observations is the southern part of the Kattegat off the entrance to the Sound.

This very interesting collaboration was noteworthy for the high level of its scientific conception and for the learned utilisation of the observations by highly qualified technicians. The phenomena studied, although somewhat complicated in that district, nevertheless lend themselves to the most interesting verifications of various dynamical theories; and in spite of the limited extent of the region investigated it is possible to affirm once again how little data is available, compared with the complexity of the phenomena.

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(1) See also *Die Hochseepegelbeobachtungen im südlichen Kattegat im August 1931* by Dr. H. Rauschelbach; *Hamburg, Annalen der Hydrographie* 1934, pp. 177 and 233.