

a wise publicity the worth of its goods, sometimes excellent, but sometimes also copies of our models and inferior to ours; their catalogues, well edited and illustrated, are published in many languages, and give full details of the instruments they describe, their travellers, men of parts, knowing intimately their instruments . . . and trying to satisfy the wishes of their customers."

M. Boutaric points out that the collaboration between the man of science and the manufacturer is far more close in Germany than in France. In the former the man of science is in intimate touch with the works, and is well paid for his services. The foreman and apprentices are trained in the theoretical side of their subject in classes they are obliged to attend. In the firm of Zeiss half the time spent by the workers in the technical classes is counted as time spent in the works. No steps are neglected to perfect the organisation as a whole; everything is done to make the machine independent of a single individual. In France the success and reputation of a firm have too frequently depended on one individual. That some steps are being taken to strengthen the optical industry in France is shown by the fact that a large factory has been built by La Société française d'Optique, formed in conjunction with the firm of Lacour-Berthiot, for meeting the competition of the best German firms. M. Boutaric urges that if the future of the industry is to be assured, new blood must be introduced, young mechanics trained, and a school of optics founded. This school, for which M. Violle has pleaded, should be divided into at least two sections: optics proper and photography. In its practical classes on glass grinding, etc., should be given in conjunction with theoretical work.

After an appeal for mutual co-operation between the various firms and individuals interested, M. Boutaric urges that the Government should take steps to protect French patents and trade marks against unfair competition. Anyone with experience of the laxity of the French patent specification and patent laws will appreciate the force of this appeal.

ARCTIC OCEANOGRAPHY.

IMPORTANT contributions to Arctic oceanography are contained in the report of Dr. F. Nansen's work in Spitsbergen seas in 1912 ("Spitsbergen Waters." By F. Nansen. Christiania, 1915). Dr. Nansen spent July and August of that year in his yacht, the *Veslemøy*, on the west and north of Spitsbergen. His main object was to push far to the north to get deep-water samples from the polar basin in order to make more accurate determinations of specific gravity than were possible during the voyage of the *Fram*. But this aspect of the expedition was only partially successful on account of the pack ice being unusually far south. However, a great deal of valuable work was done, both in the open seas and in the fjords. Only one or two of many interesting results can be noticed here.

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It has been maintained that the melting of glacier ice has a considerable cooling effect on the water strata of Spitsbergen fjords. Dr. Nansen confutes this idea. He took a vertical series of temperatures at the entrance to Ice Fjord in July, when it was clear of ice, and again in August, when ice almost blocked the way. The water at 50 metres and the intermediate cold layer were much warmer in August than in July. Again, in Cross Bay, at both 100 and 200 metres from the face of Lillehook Glacier, the cold intermediate layer was both thinner and warmer than further out in the fjord. The bottom temperatures near the glacier were also higher than further out in the fjord. But as the surface salinity was greater near the glacier than further away it would appear that the glacier ice does not melt rapidly at the upper end of the fjord. The high salinities of the inner end of the fjord may be in part due to the more extensive formation of ice in winter there than further out, which would increase the salinity.

Another important matter raised in this paper is the extension and shape of the north polar basin. In this matter Dr. Nansen has modified his views since the days of his *Fram* expedition. The result of that expedition led to the belief that the water of the north polar basin differed from that of the Norwegian Sea. The work of the *Veslemøy* contradicts this, and shows that the salinities of the two are identical. The deep water of the north polar basin is probably derived from the Norwegian Sea. This discovery does away with the necessity for postulating a high submarine ridge between Greenland and Spitsbergen, yet one at a depth of about 1200-1500 metres is still necessary to account for the difference in temperature of the deep water in the two basins. In any case, if the deep water of the polar basin is derived from the Norwegian Sea and not formed in the basin itself, there is no need to believe in such an extensive polar basin as formerly was considered necessary. The discovery, a few years ago, by Vilkitski, of islands north of Cape Chelyuskin does something to confirm this belief in a less extensive deep basin. It is true that the Stefansson expedition found no new land, and that Peary's Crocker Land has apparently no existence, but these facts do not disprove the possibility of a wide continental shelf, and Nansen goes at considerable length into questions of the drift of the *Fram* and of the ice to substantiate the probability of this being the case. We have followed Nansen in using the form Norwegian Sea, but there seems to be no reason why this should replace the older and generally accepted name, Greenland Sea.

NOTES.

DR. J. O. BACKLUND, M. B. Baillaud, Sir F. W. Dyson, Dr. P. Lowell, Prof. F. Schlesinger, and Prof. H. H. Turner have been elected honorary fellows of the Royal Astronomical Society of Canada.

THE provisions of the "Summer Time" Act will cease to operate at the end of September. In a