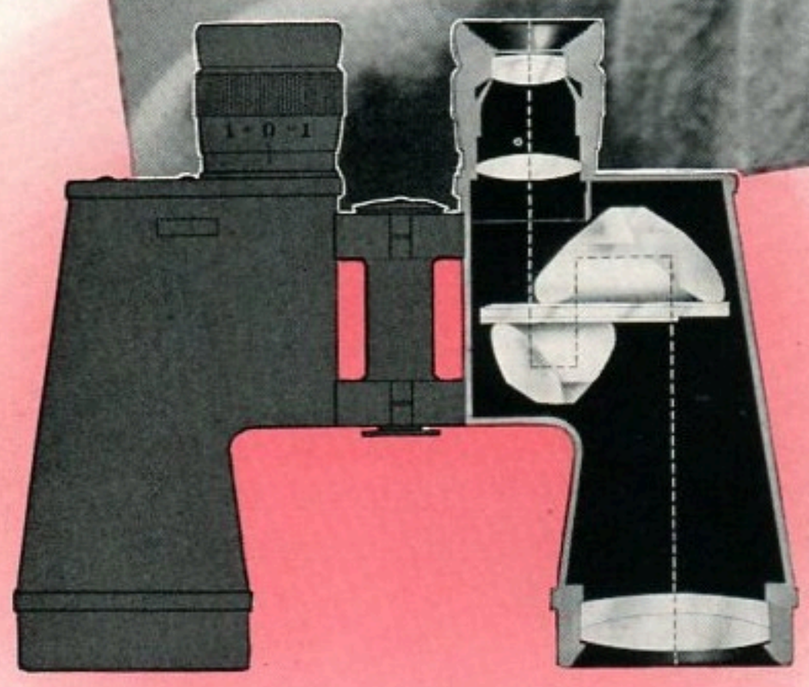
AO MAKES IT Reflection

As a demonstration of its post-war possibilities, the outer half of each of these spectacle lenses has been made non-reflecting by AO's new development, resulting in less conspicuous lenses and a clearer view of the wearer's eyes.



The normal amount of light transmitted by this binocular system is approximately 55%. Applying one type of AO non-reflection surface to lenses and prisms results in a gain of over 35% in light transmission.

★ The search for a means of making surfaces non-reflecting has been going on for a long time. Recently AO scientists made discoveries which represent a notable advance in this field—so important, in fact, that wartime publicity must be restricted.

There has been so much work done on reflection reduction by so many research groups that it is impossible to report on or mention all of their findings. H. Dennis Taylor, the father of modern photographic

Proof

lenses, observed back in 1892 that old telescope lenses and optical systems transmitted more light than new ones. By applying yellow laundry soap he succeeded in "aging" certain kinds of glass, permitting more light to pass through.

In 1915 Kollmorgen presented a paper on chemically etching certain glasses, which greatly increased their light transmission. Dr. Strong published a paper in 1936 setting forth another method of substantially reducing reflections by means of evaporating fluorite on glass. Dr. Blodgett's work on reduction of light reflection, an outgrowth of Dr. Langmuir's research on mono-molecular films, represented a big step forward. Later, Cartwright and Turner developed commercially practical processes of depositing fluoride films on glass surfaces.

Recent objectives have been primarily to improve techniques and equipment.

For the last ten years AO has carried on research on reflection reduction, realizing that all existing methods were too elaborate for use on large areas with simple equipment. We have not only discovered a practical means of making large areas non-reflecting, but are getting greatly increased efficiency and have succeeded in making the process independent of the material to which it is applied. Further, it tends to increase the durability of the treated material.

The final perfecting of our new development has been rushed ahead to serve urgent wartime needs and it is being produced in a variety of forms, from those making a temporary surface layer which can be easily removed, to one making an extremely durable surface. Each has its advantages for certain military uses.

From an ophthalmic viewpoint, the most promising application appears to be in certain instruments. The reason for this is that there is a reflection loss of about 4% per surface in crown glass. In an optical instrument having a series of seven lenses there would be present interfering reflections and a normal light loss of nearly 43%. By applying a non-reflecting surface to its lenses this loss can be reduced to as little as 10%. The effect would be similar to the difference experienced in reading under the light of a 100 watt light bulb in place of a 40 watt bulb, with the additional advantage that annoying reflections would be greatly reduced.

Because we must continue to devote our attention entirely to military demands it is impossible to make any promises as to what the postwar applications of our new reflection-reduction developments will be.

This unretouched photograph shows clearly the additional amount of light let through the right half of this series of lenses, which have been treated with a reflection reduction material.

H. R. Moulton, Assistant AO Research Director, and developer of the new reflection reducing methods, demonstrates the improved visibility made possible by the new surface material, which has been applied to the rectangular section of glass in front of his right shoulder and the right hand side of his head.