PHYSICS

New Optical Glass Has Highest Light Bending Power

Made From Rare Elements Instead of Silica, New Glass Will Make Possible Faster Lenses for Cameras

A DISCOVERY which may be a major stride in the advance of photography and which permits lens makers to produce "faster" and better lenses has been made by Dr. George W. Morey of the Geophysical Laboratory of the Carnegie Institution of Washington.

The discovery of a way to make optical glass out of rare chemical elements instead of common silica permits the production of a glass which has a very high index of refraction and a low dispersion, it is disclosed in a patent, No. 2,150,694, just granted to Dr. Morey. This means a lens which serves the photographer more efficiently.

Some of the optical glasses of Dr. Morey have the highest index of refraction (light-bending power) ever reported; more than 2.00. Only comparable refraction is that of the diamond, which is about 2.41.

The optical properties of glass used in lenses have long limited optical lensmakers in the exactness of the work they could produce. Dr. Morey's discovery of a new kind of glass should remove this present limitation.

Out of the work should come lenses of greater light-gathering power which would be a boon to all miniature camera fans who ever seek greater apertures.

Moreover, high index of refraction and low dispersion permit better corrections for chromatic aberration, the annoying property of some lenses of bringing different colors to different focuses.

Chemical elements most people have never heard of are used in producing the glass. Yttrium, lanthanum, columbium, hafnium, tantalum, zirconium, strontium, boron, and barium are typical.

The aim of Dr. Morey is to produce a glass with an index of refraction (ability to bend light rays) of over 1.65. One glass, made of 60 per cent. lanthanum and 40 per cent. boron, has a refractive index of 1.72 and a dispersive index of 54.

Another composed of 33 per cent. lanthanum, 41 per cent. thorium and 26 per cent. boron has a refractive index of 1.76 and a dispersive index of 52.

As a comparison, ordinary flint glass of a lower refractive index (1.65) would have a dispersion of about 33. Small dispersion numbers mean high dispersion and vice versa.

The new work is a continuation of efforts made in America since the World War to produce better optical glass. At the time of the conflict, the United States found it had been buying most of its superior optical glass from Germany. Furious wartime research partially overcame the difficulty, but research has been going on ever since to make American optical glass equal or superior to any glass in the world. Dr. Morey's work is a contribution to this end. Patent rights to his discovery have been assigned to the Eastman Kodak Company.

Science News Letter, March 25, 1939

PSYCHOLOGY

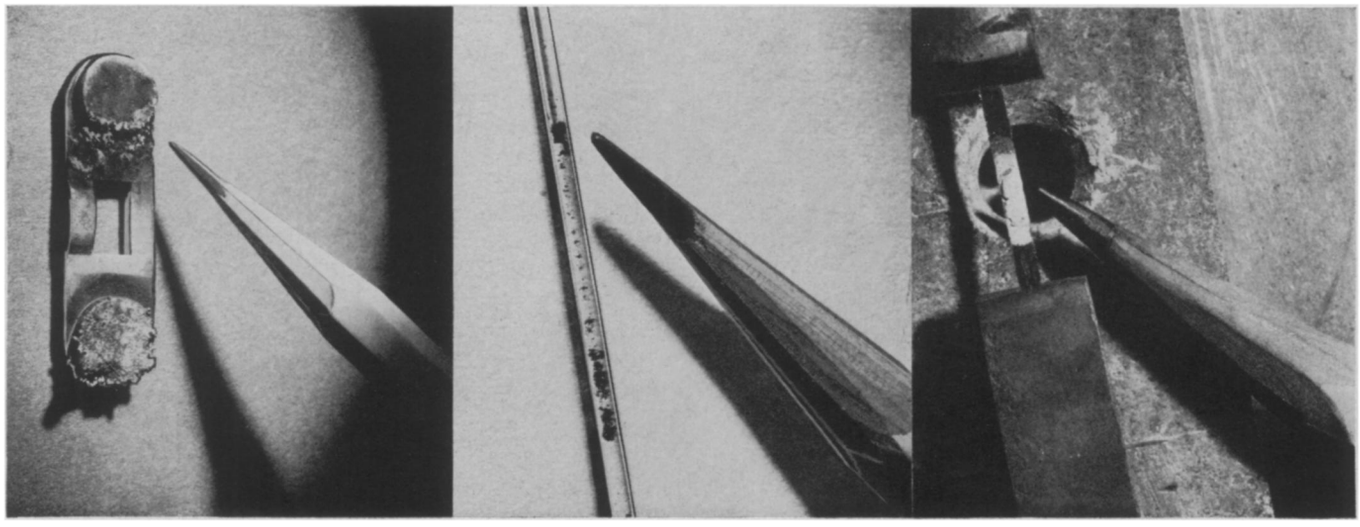
Neglected Life Periods Are Below 6 and Over 60

TWO of the most critical periods of life, before six and after sixty, are not getting the attention they deserve. There have been old age movements that have kicked up considerable political sand because the advancing years do not remove the right to vote. The pre-school boys and girls are too young to form a political bloc.

The three or four years between infancy and the first grade constitute the most important interval in life for formation of character, temperament and intelligence. It might almost be logical

TYPICAL JOB

The microchemist must analyze the chemical composition of the corroded material on an electric light switch which made the lights go out in someone's home. The pencil points (left) to the tiny speck of material available. Tiny particles are loosened with acid and drawn up into a fine pipette (center) to be transferred to electrical sintering equipment (right) which burns off all combustible materials and purifies the remainder. All the photographs on this and the facing page are from the General Electric laboratory. The photograph on the cover of this week's SCIENCE NEWS LETTER is from a similar laboratory at Westinghouse.



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MICROANALYSIS

Minute specks of matter are made to yield their history and chemical composition in this newest trick of chemistry. C. G. Van Brunt, chief of General Electric's microchemical laboratory, transfers a tiny specimen to a small centrifuge flask. This unposed picture of a scientist at work shows a laboratory table crowded with apparatus. Note the tiny Bunsen burner in the foreground, no larger than the match box.

to trade part of the years spent in high school, college, or graduate study for the most modern nursery school training, if a child could not have both. Of course, the nursery school experience would undoubtedly make him better material for an advanced education.

State University of Iowa studies show that I.Q. is increased by an affectionate and intelligent environment in home and nursery school. This gives added impetus to the idea that the age for conventional beginning of schooling should be extended downward. Two or three instead of six would be the age at which the children would start to school.

School for the two, three, four and five year olds is different from what it is for the older children in the grades. There is more individual attention and there is no air of the conventional school room. Teachers and children work together to create a little world that is fitted to the abilities and interests of these little beginners in life. There is no hurry-hurry or urgent drive to learn. Nursery school children want to go to school. It is fun to go. Just as older children in the more successful schools now want to go.

Our public schools extended their sphere first upward into the high school and then the junior college. Now they give promise of eventually starting the child's education earlier.

Science News Letter, March 25, 1939

CHEMISTRY

Whey, Once Mostly Wasted, Now Finds Profitable Uses

WHEY used to be something we heard of in connection with Little Miss Muffet's misadventures with a spider. Only if we were in the dairy business was our knowledge more extensive —and more painful. Whey was the leftover part of the milk after everything valuable had been taken out, smelly to have around and troublesome to dispose of. Whey was the milkman's headache.

Objectively, whey is the watery liquid left after cream has been extracted for butter and the solidifiable protein (casein) taken out for cheese. It contains some protein and a good deal of milk sugar. It isn't really palatable: Miss Muffet probably just used the spider as an excuse to spill the stuff, which she was eating under parental duress anyway.

Now, however, thanks to the imagina-

WHIRLED

At left the sintered specimen is placed in a tiny centrifuge tube. In solution form the sample under analysis is whirled around to effect a mechanical separation of the precipitate created by reagents. After centrifuging the precipitate comes to rest in the apex of the tube ready to be removed for analysis. Tiny hooks are made of platinum wire for use in handling the small samples. The inertness of platinum to acids and to hot flames makes it a valuable metal for chemical work.