and is about the same for all wave-lengths throughout the visible range of the spectrum. When the haze is caused by larger particles suspended in the air, $F_{max.}$ may be considerably less than 0.5 and seems to be of a selective nature, having larger values for the longer wave-lengths. For haze resulting from particles large in comparison to the wave-length of light, such as those of fog, polarization due to scattering ceases.

The writer has conducted a series of experiments with colored polarizing screens which indicates that the polarization of the air-light may be of considerable importance in the detection of forest fire smokes from high mountain lookout points. When viewed through a combination polarizing screen and red filter, the visual range of distant objects may be considerably increased, because under favorable conditions this filter combination removes a large part (the polarized fraction) of the atmospheric haze. The light given off by smoke from fires spreading in fresh fuel is only slightly polarized; hence such smoke shows up plainly when the surrounding polarized air-light is removed. The light from thin blue smokes, such as are given off by some smoldering fires, is rather strongly polarized and not easily seen through a polarizing screen rotated so as to extinguish the polarized fraction of the light. The use of a polarizing filter is restricted to certain directions with respect to the sun and it can not be used on cloudy days. It is also ineffective for penetrating fog or removing haze caused by particles of condensed water vapor suspended in the air.

The combined phenomena of (1) selective transmission of red light through the atmosphere, (2) polarization of light of all wave-lengths scattered in directions approximately perpendicular to the sun's rays, and (3) for some types of haze the selective polarization of the longer wave-lengths, make the polarizing screen and red filter an effective haze cutting device. The best results have been obtained with this device in long-distance photography, although it is almost as effective for direct visual work. On rather clear days, distant mountain peaks photographed through the filter on panchromatic film show as much detail as is shown on infra-red film with a red filter. Photographed from Mt. Mitchell in North Carolina, high cirrus clouds almost 350 miles away in western Kentucky showed up plainly on panchromatic film, and only the curvature of the earth prevented a visual (or photographic) range greater than this. A neutral polarizing screen is equally effective for removing haze in color photography.

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SCIENTIFIC APPARATUS AND LABORATORY METHODS

THE TYPING OF HEMOLYTIC STREPTOCOCCI[1]

THE control of outbreaks of hemolytic streptococcal infection may depend on the prompt identification of the epidemic type of hemolytic streptococcus. Strains from human sources can be typed either by Lancefield's[2] precipitin test or by Griffith's[3] slide agglutination technic. The main difficulty in the typing by either method is the production of satisfactory rabbit antisera. Frequently effective rabbit antisera may be obscured by the existence of a pro-zone when the slide agglutination method is used. The purpose of this report is to call attention to this finding because failure to recognize it may cause good agglutinating serum to be discarded.

In the past we have made a 1:5 dilution of the serum to be tested as recommended by Griffith. Early this year, before discarding a sample of serum, out of curiosity we made serial dilutions of it and were surprised to find that it agglutinated the homologous organism strongly in a dilution of 1:80 in spite of the fact that it failed to do so either undiluted or when diluted 1:10. This experience has occurred frequently. Examples are shown in Table 1.

TABLE 1

EFFECT OF DILUTION OF 5 RABBIT ANTISERA ON AGGLUTINATION OF THEIR HOMOLOGOUS HEMOLYTIC STREPTOCOCCI

Dilutions of antiserum	Hemolytic streptococcus				
	Type 1	Type 6	Type 8	Type 11	Type 12
Undil.	−	−	−	−	−
1:10	±	±	−	±	−
1:20	1+	2+	2+	2+	±
1:40	1+	3+	3+	2+	±
1:60	2+	3+	3+	2+	1+
1:80	2+	2+	2+	2+	2+
1:160	1+	2+	2+	2+	2+
1:320				2+	1+
1:640				1+	

The dilution of typing serum has additional advantages which should be mentioned at this time. With an optimum antigen-antibody ratio specific agglutination is maximal and almost instantaneous. This helps to distinguish it from non-specific agglutination which may occur after several minutes when some strains of hemolytic streptococci are mixed with rabbit serum.

It has been pointed out by de Waal[4] that in the

[1] This work was aided by a grant from the Fluid Research Fund of the Yale University School of Medicine.

[2] R. C. Lancefield, *Jour. Exper. Med.*, 47: 91, 1928.

[3] F. Griffith, *Jour. Hyg.*, 34: 542, 1934; 25: 385, 1926.

[4] H. L. de Waal, *Jour. Hyg.*, 40: 172, 1940.

typing of hemolytic streptococci cross-reactions can frequently be eliminated by dilution of the serum, and absorption of such sera with organisms of a heterologous type may be unnecessary. This has been our experience.

Lastly, there is the obvious but important point that the amount of available typing serum is considerably increased by dilution.

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AN AUTOMATIC DEVICE FOR PERIODICALLY DETERMINING AND RECORDING BOTH SYSTOLIC AND DIASTOLIC BLOOD PRESSURE IN MAN[1]

THIS device, which has been developed at the University of Wisconsin as a joint project of the anesthesia and physiology departments of the Medical School, determines both systolic and diastolic blood pressures by the auscultatory method, the method in common use by most members of the medical profession. The machine has been designed so that it can make and record a complete determination of both pressures and allow sufficient rest for the arm of the subject all within 30 seconds. Pressures may therefore be determined at any periodic rate up to one every half minute. The record consists of a graph of the pressure changes in an inflatable cuff placed on the upper arm (the ordinary type of cuff and application used by physicians in determining blood pressures) and a simultaneous record of the sounds over the brachial artery in the ante-cubital fossa below the cuff. The systolic pressure is taken as that pressure corresponding to the first Korotkow phase in these sounds and the diastolic as that corresponding to the fourth Korotkow phase.

The device consists essentially of two parts. One part controls the induction and recording of the necessary cyclic pressure changes in the inflatable cuff; the other is concerned with the detection, amplification and recording of the sounds in the brachial artery below the cuff.

Operation of the device is as follows. The pressure in the inflatable cuff is automatically recorded as it passes through the following events: (a) raising the pressure in the cuff to some desired pressure above systolic in a predetermined length of time which may be varied at will; (b) allowing this pressure to fall to some pressure below diastolic at a rate which may be adjusted; (c) completely deflating the cuff for any desired period of time to allow rest for the arm and to restore circulation. This cycle of events may be made to take place periodically or non-periodically as desired. The sounds over the brachial artery in the ante-cubital fossa are picked up by a suitable device, amplified and recorded simultaneously with the pressures in the cuff. The amplification may be varied and a limiting device is supplied to limit the oscillations of the recording pen or stylus.

The machine as constructed at Wisconsin accomplishes the pressure cycle by means of electrically operated valves. A Shure Stethophone picks up the sounds which are amplified and recorded by means of a moving coil type of ink writer. Pressures are recorded with an Esterline Angus pressure recorder. The paper drive is controlled so that the tape moves only during the actual determination and not while the arm is at rest.

A typical time distribution for the pressure cycle for recording pressures every half minute is 3 seconds for inflation, 22 seconds pressure fall and 5 seconds for rest. Pressures may be taken every half minute for hours at a time using this distribution with little discomfort to the patient and little interference with the circulation. The advantages of this machine over others is that both systolic and diastolic pressures are determined and recorded consecutively; no continuously inflated cuff or other pressure device which impedes circulation is needed; and once adjusted to the individual patient, it may be left to run unattended for hours.

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