among university professors was the problem of employment for the newly trained chemists. The picture has changed once again in the last two years. Unemployment has diminished rapidly until the number who are not placed, and whose training qualifies them for a research position, is relatively small. In fact, it does not now appear to be presumptuous to predict the possibility of a shortage of research chemists within a few years. This situation has been created through the recognition by the executives of an ever increasing number of our industrial organizations of the value and necessity of research. More and more chemists are being diverted to executive positions, to sales or legal departments in various organizations. The desirability of a technical training in these fields is not yet fully recognized.

Compare the chemical profession with any other. Is not the outlook for the chemist very encouraging?

—*Roger Adams*

SCIENTIFIC APPARATUS AND LABORATORY METHODS

A SECOND EXPERIMENTAL METHOD FOR INCREASING AUDITORY ACUITY[1]

IN previous publications[2,3] fixation of the round window membrane with a pledget of cotton or with a living tissue graft was shown to increase the intensity of tones transmitted through the cat's ear from 10 to 30 decibels. In all these experiments the Wever and Bray phenomenon was used to measure the strength of action currents set up in the animal's auditory nerve as a result of the specific sound stimulus applied to the ear. It was shown later[4] that measured increases in intralabyrinthine pressure tended to improve the intensity of tones transmitted, though only to a slight degree; the higher frequencies were affected more than the low. Decreased intralabyrinthine pressure resulted in a marked lowering of the intensity of all tones transmitted.

In the present series of experiments an attempt was made to block the cochlear aqueduct. This was done by drilling a hole with a small dental burr over the position of the aqueduct well away from the cochlea itself. The base of this hole was then scorched with a high frequency cautery, hoping thus to occlude the aqueduct. In two experiments the burr actually perforated the wall of the bulla, and, following recovery from anesthesia, these two animals exhibited what was apparently a cerebellar ataxia. In neither case was nystagmus present. Fourteen such operations were performed under strict aseptic technique. Five animals have been tested subsequently at intervals of from two to three weeks following the original operation. In every instance the intensity of spoken voice was greatly increased on the operated side, using the normal ear as control. In addition pure tones of the octaves from 1,000 d.v. to 8,000 d.v. were increased from 10 to 25 decibels over the normal ear.

To demonstrate occlusion of the aqueduct 10 cc of a 30 per cent. NaCl solution was given intravenously. While the usual rapid falling off of intensity was noted on the normal side, much less effect could be observed on the experimental side. Certainly no greater lowering of pressure took place than might be accounted for by absorption of fluid through the capillary beds of the inner ear itself. Without waiting for the histologic evidence of serial sections it seems safe to assume that the aqueduct had been occluded successfully. The intensity measurements of such an experiment follow:

Frequency	180	250	500	1,000	2,000	4,000	8,000
Right ear (Operated)							
Control, before injection NaCl	27	29	19	29	19	24	70
Immediately after injection	33	24	23	40	26	30	66
½ hour after injection	30	25	26	42	30	35	.....
Left ear (Normal)							
Control, before injection NaCl	21	23	33	40	40	50	.....
Immediately after injection	19	22	34	37	55	58	.....
½ hour after injection	20	25	44	.....	.....	.....	.....

The figures beneath the different frequencies represent decibels of attenuation necessary to balance the comparison intensity with the intensity of tone transmitted through the cat's ear.

Two possible explanations of the results observed present themselves. In the first place occlusion of the duct may result in a gradual increase of intralabyrinthine pressure with the resultant improvement in the transmission of the higher frequencies. In the second place the cochlear aqueduct may serve in a minor capacity as an additional safety valve for the cochlea. This function of the round window membrane was originally put forward by Hughson and

[1] From the Otological Research Laboratory and the Surgical Hunterian Laboratory, the Johns Hopkins University School of Medicine. Aided by a grant from the Ella Sachs Plotz Foundation for the Advancement of Scientific Investigation.

[2] Walter Hughson and S. J. Crowe, *Jour. Amer. Med. Asso.*, 96: 2027–2028, June, 1931.

[3] Walter Hughson and S. J. Crowe, *Ann. Otol., Rhinol. and Laryngol.*, 41: 332, June, 1932.

[4] Walter Hughson, *Am. Jour. Physiol.*, 101: 396–407, July, 1932.

Crowe[5] and more recently additional evidence to support the theory has been reported by Hughson and Witting.[6] True, it would seem unlikely that the cochlear aqueduct was of sufficient size to function in this "safety valve" capacity.

In all but one of the animals tested the bulla and middle ear on the operated side were entirely clear when examined at autopsy. In one case granulations filled both the middle ear and bulla, making the improved transmission of all frequencies even more remarkable.

CONCLUSIONS

(1) Experiments designed to obstruct the cochlear aqueduct in cats have resulted in a marked increase in the intensity of spoken voice and pure tones transmitted by the operated ear.

(2) Without histologic proof of actual occlusion withdrawal of fluid from the labyrinth and the resulting decrease in efficiency of the ear by intravenous injection of a hypertonic NaCl solution has been definitely obviated by the experimental procedure.

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A SIMPLE METHOD FOR MAKING LOW-POWER PHOTOMICROGRAPHS

SEVERAL days ago it became necessary to make a series of low magnification photomicrographs of insect dissections. Believing that other organizations may be in the same financial position as we are and in need of such an apparatus prompts me to describe it. It was made from materials found in the laboratory and cost only a little time.

An ordinary student's microscope is mounted upside down on a vertical iron rod by means of two condenser clamps. Above it is similarly fixed a 300 watt gas-filled electric lamp. A housing that might be used for projection drawing is fashioned of a light wooden frame and beaver board. The measurements of this box are 12″ high by 24″ by 18″ with the bottom and the 24″ front open. A hole cut into the center of the top fits snugly around the microscope tube. As the device now stands it may be used as a small demonstration projector for class work or for making projection drawing.

To convert it into a camera all that is needed is a blanket or a large piece of black oilcloth. We used three regular rubberized laboratory aprons. The operator sits in the position to make a projection drawing and envelops himself and the open side of the housing with the dark cloth. The plates used are Eastman Slow Lantern Slide Positives. The plate holder is an empty lantern slide plate box. The procedure is simple. The slide is focused on a piece of paper as for drawing. The closed lantern slide box containing a plate emulsion side up is moved into place and the light turned off. The cover of the box is then removed and the light again turned on for the duration of the exposure. The cover is then replaced and the slide taken to the dark room for development.

We found that so long as the operator was unable to read the lettering on the box cover the interior of the "camera" was safe for these plates. Satisfactory negatives were made with the following combinations and exposures.

Objective	Ocular	Projection distance	Exposure
16 mm	7.5×	11 inches	20 sec.
Zeiss a_2 3×	7.5×	11 inches	2 sec.

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SPECIAL ARTICLES

SELENITE—A CRITERION OF EFFECTIVE WIND SCOUR

THE future student who explores the intricacies of geomorphic literature will, according to his nature, be amused or exasperated in comparing Lang's note "Selenite Not a Certain Indicator of Wind Effect"[1] with our note published four years earlier[2] entitled "Selenite Fragments or Crystals as Criteria of Wind Action."

We hold that laboratory experiment in sandblasting produces a frosted surface on selenite so quickly that "it is inconceivable that bright selenite fragments could exist in an area having effective action by wind-blown sand." We suggest that selenite surfaces are dulled by solution within a few years in the climates prevailing in most parts of the United States where such fragments are found on the surface. Yet even this is a long time compared to the few minutes necessary for frosting by the sand blast. Therefore the presence of such fragments on the surface may be used as indicative of the general absence of effective wind scour.

[5] See note 2.

[6] Walter Hughson and E. G. Witting, *Acta Oto-Laryngologica* (in press).

[1] Walter B. Lang, SCIENCE, 80: 117–118, August 3, 1934.

[2] Walter H. Schoewe and Kirk Bryan, SCIENCE, 72: 167–170, 1930.