on this series. For example, it may be mentioned that the weights of animals 1, 2 and 3 of Table 2 were, respectively, 350, 320 and 340 grams.

The greatest width of the basilar membrane is located on the average in these thirty-five guinea pigs nearly a full turn below the apical end, which is always distinctly narrower than the widest part, and in fact is decreasing in width almost as rapidly as the basal end increases. Other points of particular interest in connection with functional theories are the great range of the actual and the relative widths in individuals (very noticeable upon inspection of the whole group of measurements); the wide departure from anything like a uniform rate of increase in width; and especially interesting is the fact that the width at the third half-turn and at the fifth half-turn is frequently less than or only equal to that of the half-turn below, while in many, although not in all, of the other individuals the rate of increase in width in these two regions is much less than in other parts. Thus for the guinea pig the usual description of width changes of the basilar membrane in mammalia must be completely revised, and may be briefly summarized as follows. Proceeding apicalward from a narrow basal end there is a relatively rapid increase in width which becomes less rapid toward the upper part of the basal turn and between the second and third half-turns the average increase is very slight and there may even be a zone of constant or of slowly decreasing width; above this is another region of more rapid increase in width for about a half-turn, followed by a second zone of slowly increasing or even of constant or slowly decreasing width as the middle of the fifth half-turn is approached; above this the membrane again increases definitely in width until a rather elongated part of greatest width is reached in the upper part of the third and lower part of the apical coils; above this widest zone there is always a rapid decrease in width as the apex is approached.

TABLE 2

EXAMPLES OF THE INDIVIDUAL VARIATIONS IN BASILAR MEMBRANES OF GUINEA PIGS

Half-turn	Animal 1		Animal 2		Animal 3	
	Width	Rate of change	Width	Rate of change	Width	Rate of change
P.v.	56		57		69	
		+1/44		+1/52		+1/46
1st	127		124		143	
		+1/61		+1/86		+1/107
2nd	177		161		173	
		-1/504		+1/196		+1/216
3rd	172		174		185	
		+1/78		+1/128		+1/107
4th	197		190		204	
		+1/425		-1/200		+1/357
5th	201		181		209	
		+1/167		+1/127		+1/123
6th	210		194		222	
		-1/665		+1/359		+1/1408
7th	208		198		223	
		-1/107		-1/66		-1/27
8th	198		180		182	

The fundamental bearing of such data upon possible functional performance is apparent at once to all who are familiar with the theories of hearing which have been based upon hypothetical movements of the basilar membrane. Since neither for the human nor for any other form has a sufficient number of labyrinths been measured it is of course impossible as yet to say whether or not the guinea pig is an exception or whether more data upon the other forms will disprove for them also the present descriptions. The guinea pig has been the most used animal in the sound injury experimental work and for this reason alone, if for no other, it is of importance to know whether it does differ sufficiently from other forms in this respect as to essentially affect the value of the conclusions drawn from these objective experiments.

It is of course well recognized that the width of the membrane itself is only one factor of the several that must influence the hypothetical responses of the basilar membrane to sound waves, and it may be that variations in width in an individual are compensated for by combinations of variations in the other factors. But of these other factors we have as yet an even more incomplete record than of the width of the basilar membrane. In my opinion the need at present for a better foundation of morphologic facts is much greater than for more theorizing on the problem of hearing.

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EXCYSTATION IN IODAMOEBA WILLIAMSI IN VIVO AND IN VITRO

IODAMOEBA WILLIAMSI is a human intestinal amoeba that apparently occurs in about 10 per cent. of the general population. Two stages are known in its life cycle, an active stage, the trophozoite, and a passive stage, the cyst. Infection of new hosts is supposed to be brought about by the ingestion of cysts which excyst in the human intestine. So far as is known, excystation in this species has never been reported.

Excystation in vivo: Washed cysts were inoculated into the stomach of guinea pigs and the animals sacrificed at intervals of one, three, four and six hours. Excysted specimens were observed at the end of three hours in the jejunum and ileum, and at the end of four and six hours in the ileum and caecum. These observations prove that the factors necessary for the excystation of *Iodamoeba williamsi* are present in the digestive tract of the guinea pig and that excystation may occur at least by the time the cysts reach the jejunum and within a period of three hours. No excystation was observed within one hour after cysts were introduced into the stomach of the experimental animals. The fact that a number of guinea pigs, including young amoebae-free specimens, that were fed repeated doses of viable cysts, did not become infected, indicates that the excysted amoebae are ordinarily unable to set up an infection in this animal. This is due, probably, to factors that render the medium within the guinea pig intestine unfavorable for their growth and reproduction.

Excystation in vitro: The method of escape of *Iodamoeba williamsi* from the enveloping cyst wall can be brought about under a cover glass by supplying the proper stimuli, and has been observed by the writer many times. Material containing washed cysts was diluted with physiological saline solution and sealed under a cover glass. Slides prepared in this way, containing cysts that had been passed about fifteen hours previously, were placed in an incubator at 37° C. for two hours, and then removed to a warm stage. Usually about three hours later some of the cysts were observed to be undergoing excystation. Small, irregular spaces appeared between the protoplasm and the cyst wall. Movement within the cyst consisted of the formation of minute pseudopodia. One of these would eventually find its way through the cyst wall, whether *via* a pore or an opening due to the activity of the amoeba was not determined. Sometimes this pseudopodium would be followed by the gradual emergence of the entire animal; in some cases, however, a partly extruded animal would return within the cyst, and, after a brief period, would again attempt to make its escape from the cyst wall, finally succeeding. The excysted amoeba is much more active than descriptions of the trophozoite of this species would lead one to expect. Pseudopodia were thrown out constantly; in one case, for at least forty minutes.

From these studies it is evident that the stimuli necessary for excystation are moisture and a suitable temperature for a certain period. The required temperature seems to be about 37° C., and the time that the cysts must remain at this temperature about five hours.

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THE PHOTOGRAPHIC STUDY OF THE INFRA-RED SPECTRUM OF MERCURY[1]

IN a previous work in 1922 the author attempted to photograph the infra-red spectrum of mercury with dicyanine stained plates and a prism instrument. The success was limited to the detection beyond $\lambda = 8{,}200$ A.U. of only the wave-length $\lambda = 10{,}141$ A.U. The discovery of a new sensitizer neocyanine by the Eastman Research Laboratory revived hopes for a more successful investigation. Using, as before, a Hilger constant deviation spectrograph, the mercury spectrum was photographed a number of times. The results of the present investigation in general are in good agreement with those of previous authors in the region below wave-length $\lambda = 8{,}200$ A.U. Above this wave-length the present work is entirely in conflict with a photographic study recorded in the literature, although it verifies the radiometrically detected lines. The plates revealed the existence of nineteen lines between $\lambda = 8{,}196$ A.U. and $\lambda = 13{,}670$ A.U. Nine of the lines of wave lengths, 10,141, 10,363, 10,765, 10,920, 11,288, 11,887, 12,850, 13,572, 13,670 A.U. were registered previously by means of various radiometric devices, the other ten of wave lengths 8,291, 8,443, 8,520, 8,704, 8,788, 9,012, 9,053, 9,258, 9,499, 10,243 appear to be detected for the first time. Beyond the last line measured $\lambda = 13{,}670$ A.U. four more lines were photographed. The means in the author's possession were not sufficient to determine the wave-lengths of these lines. The application of Canchy's formula leads to a very startling result for the last line in the neighborhood of 27,000 A.U.

The line $\lambda = 10{,}141$ A.U. presents a special interest. This line was first detected radiometrically by Paschen and was described as a single sharp line. Later it was suggested that it might be a double line with a separation of about 35 to 40 A.U. between the components. The present work corroborates the original observation of Paschen that it is a single, very strong line and of the wave-length as given by Paschen. The ease with which the line $\lambda = 10{,}141$ A.U. could be photographed in the present work suggested the study of the absorption of line $\lambda = 10{,}141$ A.U. by non-luminous vapor of mercury. In this respect the investigation corroborates later data in the conclusion that strong absorption of this line is out of the question.

A more detailed account of this work is soon to appear elsewhere, and the complete paper will be published in the University of Colorado Studies.

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