The commission proceeds to give synopses of two types of training which they deem suitable for a doctor's degree. It is worthy of note that they recommend for all candidates certain specialized preparation for teaching mathematics:

a. The equivalent of one year of observation and assisting three times a week in various college courses in mathematics which are taught by experienced members of the department of mathematics.

b. Practice teaching in college mathematics under the observation of, and with later criticism by, members of the department of mathematics. This teaching might advisably be done in different courses and should amount to the equivalent of at least a two-semester-hour course. The practice teaching should involve participation in the construction and grading of examinations.

c. Guided reading in books and periodicals relating to the theory of teaching, testing methods, and educational research. This reading could be directed either by a member of the department of mathematics or perhaps by a person outside the department who appreciates the viewpoint of teachers of mathematics.

The training peculiar to the proposed new type of program includes:

(1) Additional course work in mathematics and in allied fields, with emphasis on breadth of training.

(2) One or more expository papers of the variety known as minor theses in the existing requirements for the doctorate in mathematics in some universities. A thesis of this variety would require the candidate to give evidence of his ability to learn independently and to present in good written form, in a brief period of time, some specified known mathematical results with which he was previously unfamiliar.

(3) A major thesis which would exhibit the candidate's mastery of some field of mathematics and expository ability of high order, although perhaps not research ability. The preparation of this thesis should be the independent responsibility of the candidate. This thesis might be of a historical nature, or it might involve material which, though original from the candidate's viewpoint, might not be acceptable for publication in a leading periodical.

The commission discusses the possibility of awarding the degree of doctor of mathematics instead of a doctor of philosophy degree on the completion of the new type of program. There are a number of objections to this proposal, however, and the commission did not recommend its adoption.

With regard to the master's degree the commission states: "Under existing conditions in the teaching profession such a degree by itself is most useful if it implies certification of exceptionally good preparation for teaching secondary mathematics. For it must be anticipated that in the future a mere master's degree will be of only slight use in a search for placement on a college faculty, regardless of whether the college is a two year or a four year institution."

The commission does not advocate the writing of a research thesis as a requirement for a master's degree but states: "It might be desirable, although not absolutely essential, for the candidate to conclude his training by writing a major mathematical paper, although this thesis would be, in general, of an expository nature and not worthy of the name research."

The report concludes with detailed recommendations concerning undergraduate training for teaching secondary mathematics. The report was prepared by a commission of ten mathematicians, five of whom have served as presidents of national mathematical organizations, four as chairmen of mathematics departments in large state universities and three as deans of graduate schools.

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NORMAL "VISUAL HEARING"

LIP reading, or more accurately, visual hearing, is not a mysterious ability found only in deaf or hard of hearing people who have learned to use their eyes to replace or supplement their deficient hearing. There is an important element of visual hearing in all normal individuals. A child, in learning to understand speech, associates certain objects or actions with certain facial expressions as readily and as normally as with the corresponding sounds. If the child has deficient hearing, the visual element becomes the dominating factor in his speech understanding. Normally, however, the auditory associations of speech so completely overshadow the visual that the existence of the latter is generally not suspected.

Any situation which makes it difficult for hearing to function normally will enlist visual assistance if that be possible. Thus, our eyes invariably seek the speaker's face in a noisy location. Reverberation and echos in large halls may render speech from the stage unintelligible when heard from the rear seats. It is well known that an opera glass trained on the speaker's face can do much to help this situation. Much of the "spelling out" of unfamiliar words in telephone conversation results in large part from the absence of visual assistance.

In order to obtain some quantitative measure of this rather elusive ability, a small sound-proof booth has been built in our laboratories. This booth has a double glass window in front. The speaker in the booth can not be heard directly. His voice is picked up by a microphone, amplified, and then delivered to a loudspeaker. An operator outside the booth can render the speaker visible or not at will by means of lights which he controls. This operator can also

distort the speech before it is heard, by introducing filters, overloading the amplifier, adding various kinds of noise, etc.

This set-up was first demonstrated before a meeting of the Ohio Association of College Teachers of Speech this spring. In this demonstration, all frequencies above 1,500 cycles per second were removed from the speech as heard through the loudspeaker. A disturbing amount of noise was added by a loud buzzer. Under these conditions, sentences were practically never intelligible to any one. Only a word or two could be occasionally recognized. When the inside booth lights were turned on, however, sentences were correctly understood by practically every one, although the speech sounds were just as greatly distorted as before. This experiment is very effective in demonstrating the important part played by vision in speech understanding, even when untrained.

One of the major functions of our laboratories is the detection of students with deficient hearing from among those entering the university and the provision of special training for such students. A motion picture method of developing visual hearing was introduced in our laboratories and has been in successful use for the last five years. In this way students learn to understand speech with the auditory element entirely removed. Under this training students soon acquire strengthened visual speech associations which serve materially to facilitate their university work.

We are planning a series of articulation and intelligibility tests for use with this booth. These tests have been standardized by workers in the Bell Telephone Laboratories and have been used extensively in investigating telephone systems. The addition of the visual factor should be of interest to telephone engineers, talking picture producers and others, as well as to workers with the deaf and hard of hearing.

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A PHENOMENON IN FUNGI IMPERFECTI

WHILE doing research on variation phenomena in *Fungi imperfecti* it was observed that many isolates, representing 28 strains, 12 species and 7 genera in 3 orders of this group, behaved similarly to bacteria, in that single-spore culture series (composed of from 20 to 100) showed them to be dual in nature. Such single-spore series gave rise to three growth types, one mainly mycelial in character with scant or no production of conidia (designated as M), another usually with limited mycelial growth but producing conidia abundantly (designated as C) and a third type (X) similar to the primary isolate but intermediate in cultural characters between M and C. In *mass transfers* from M and C, cultural characters remained constant. In mass transfers from X, cultural characters were not uniform and constant but varied between those of M and C. Subsequent single-spore analyses of the three types revealed the fact that M and C were apparently definite entities as they retained their respective characters, whereas X again gave rise to the three types M, C and X. The X type can be produced *in vitro* by growing M and C together in mixed culture where they apparently combined by the mechanism of anastomosis. Single-spore series from such a combined culture, even when the spores are taken from a given sporocarp or from a single spore head, give rise to the three culture types, M, C and X. This behavior indicates that the X type is really heterocaryotic[1] and that the M and C phenomenon as it occurs in the laboratory is due to dissociation of discrete nuclei and not to mutation or nuclear change. Some of the M and C types have been kept in culture for more than five years and are still true to type. In this respect they seem to differ from smooth and rough in bacteria, which, according to the majority of investigators[2] (working mainly with mass transfers), may change rather rapidly from one form to the other, either directly or through intermediate forms. A more detailed account of the M and C phenomenon will be published soon.

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THE DESTRUCTION OF "VERMIN"

THE writer, who is not interested in killing for sport, is in constant disagreement with his sportsmen friends in regard to the wholesale destruction of certain animals classed by organized sportsmen as "vermin."

As has often been pointed out, many of these animals, even if not of positive economic value to the community as a whole, are of great interest to nature lovers, and these non-killing nature lovers have as much right to enjoy animals alive as the sportsmen have to enjoy them dead. There are many sportsmen who are "sports" enough to concede this point.

Although most organizations of sportsmen do not realize it, there is considerable difference of opinion as to the actual part taken by predatory animals in the reduction of the total amount of game. There are other factors of perhaps greater importance than the predators.

As chairman of the West Virginia Biological Survey, the writer has been collecting the reports of the vermin-destruction contests held in 1935 in 40 of the 55 counties of the state. In these contests, local mer-

[1] H. N. Hansen and Ralph E. Smith, *Phytopathology*, 22: 953–964. 1932.

[2] Philip Hadley, *Jour. Inf. Dis.*, 40: 1–312. 1927.