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International Commission on Mathematical Education.

Inquiry into the training of teachers of mathematics in secondary schools in different countries.

LIST OF QUESTIONS

Preliminary Note. — At the meeting held in Paris from April 1st to 4th, 1914, the International Commission decided to undertake an inquiry into the preparation, both academic and practical, of teachers of mathematics in various countries. This investigation will conclude the labours of the Commission, whose authority, it will be remembered, comes to an end at the next International Congress of Mathematicians.

Immediately after the Paris meeting the Central Committee set about the preparations for the conference which it was proposed to hold at Munich in 1915. The programme of the different sessions and the following list of questions had just been drawn up at a meeting at Göttingen during the second fortnight of July by MM. KLEIN, LORIA and FEHR, when the terrible war broke out, which will inevitably inflict a blow on all international institutions. All such institutions must undergo a check, which we must hope will not be too prolonged.

But in any case science, and above all mathematics, should remain outside and above the terrible conflict of to-day. They form a neutral ground on which learned men of all nations may work together.

The Central Committee desires to continue its work, though renouncing the hope of summoning a conference. If the national Sub-Commissions furnish the necessary documents, the works projected for 1915 will be collected in a pamphlet similar to that which was devoted to the conference at Paris.

The report upon the preparation of teachers of Mathematics in secondary education in various lands has been entrusted to M. Gino LORIA, professor at the University of Genoa.

We recall on this occasion that as in foregoing reports, we understand by secondary education the education given in institutions for adolescents, leading up to higher education whether university or technical. We include therefore public schools, high schools for girls, etc., and also institutions organised by private effort in those States where education is not directly in the hands of a Government department.

The Central Committee begs correspondents who undertake to

reply to the questions to be so kind as to furnish an outline, indicating both the present position and the tendencies towards change. Several questions have already been dealt with in the reports published by the national Sub-Commissions. It is hoped that collaborators will refer to these, and will attach to their replies any official publications (inquiries, regulations, or programmes of work) relative to the matters dealt with.

H. FEHR,
Secretary-General of the Commission.

Supplementary Note.—The foregoing paragraphs were written immediately the war began. Since then the intensity of the struggle has fearfully increased and penetrated into all domains of human activity. The Committee is compelled to postpone all the operations, strictly so called, of the inquiry.

But at the request of several national Sub-Commissions who desire to proceed to the preliminary investigations, we publish the following list of questions.

January 1915.

H. F.

I. — GENERAL-PREPARATION OF CANDIDATES.

a) How are teachers of mathematics for secondary education trained in your country?

Are there special institutions devoted to this task, or departments organised for this purpose in university or technical institutions for higher education?

If there is no special organisation nor regulation laying down a definite qualification to be obtained, what is the ordinary course of training pursued by teachers in your secondary schools?

Are there special conditions for girls' schools?

b) What are the courses of study followed by future teachers? public schools, high schools, etc., giving secondary education, classical or scientific? Is a knowledge of Latin required of future teachers of scientific subjects?

Besides the theoretical preparation, are any practical attainments of a professional kind required?

c) Are there regulations or traditions demanding a knowledge of other subjects besides pure mathematics from such candidates?

If so, are these subjects applied mathematics, mechanics, physics or branches of natural science; or on the other hand, topics of general culture such as philosophy, foreign languages, history, etc.?

d) Is the scientific training separated from the purely professional?

e) In many countries special scholarships exist for persons intending to enter the teaching profession. We desire to know the state of matters as regards this.

II. — THEORETICAL SCIENTIFIC TEACHING.

1. — What is the theoretical preparation? What modes of teaching are used? (lectures, discussions, exercises, preparation, practical work, etc.). Time required? Which methods are obligatory and which optional?

The following classification is suggested:

- a) pure mathematics,
- b) applied mathematics, including rational mechanics and mathematical physics,
- c) elementary mathematics considered in reference to principles,
- the foundations of mathematics,
- history of mathematics.

(Information is particularly sought as to the extent and nature of courses on the history of mathematics, and on the text-books used, if any.)

d) Other branches of science. Optional or compulsory.

2. — Is the theoretical preparation tested by an examination for a degree or a Government examination? How are these examinations organised?

III. — PROFESSIONAL TRAINING.

1. — Professional training may include:

- a) Study of method (didactic mathematics),
- b) Study of pedagogic method in the wide sense,
- c) Practical initiation into the usual methods, of applied mathematics,
- d) Study of educational legislation,
- e) Practical preparation, actual work in schools.

To what extent do these different objects receive attention? What time is devoted to them?

Is this preparation partially obtained at the University or during a probationary stage at a school?

Detailed information upon the following points would be welcome:

a) *Method*. Do candidates receive at the University any instruction in the methods of mathematical teaching? Syllabus?

Are the lessons given by a University professor or by a teacher in a school?

b) *Pedagogy*. Do the candidates undergo courses in pedagogy or psychology?

What is the current opinion in your country as to the value of these courses?

If it is unfavourable, is the opposition based upon the spirit in which the instruction is given, or is it simply thought that the time occupied might be better employed?

c) Would the creation of a course in pedagogy based on experimental ideas and specially destined for future teachers of science be viewed with favour?

Is the development of practical skill encouraged (measurements, calculation, drawing, actual surveying or workshop practice) so as to familiarise such persons with the commonest applications of elementary mathematics?

d) *Educational legislation.* Do candidates follow a course on this subject? Syllabus?

Does it include all the educational institutions of your country?

Is it limited to the law of your own country, or does it include a study in comparative legislation?

Does it make use of the publications of the International Commission?

e) *Practical training* (probationary work in school, etc.).

What practical training do candidates receive in your country?

Does this training commence (while theoretical studies are still continuing) by means of lessons given in a school by the candidate in the presence and under the direction of a professor, or does it form a stage by itself immediately after the university course?

If the latter, please indicate the organisation of this stage, the conditions the Government establishes, and how they are received by the authorities in the secondary schools.

2. — Is the professional training tested by an examination, or by a series of lessons given by the candidate? How are the examinations organised?

IV. — SUBSEQUENT IMPROVEMENT.

a) Are teachers in secondary schools expected to attend vacation courses or lectures so as to keep in touch with the progress of science and scientific teaching?

Or can they for this purpose obtain one or two terms' leave, after a certain number of years spent in teaching?

b) Details should be given here of the part played by scientific or pedagogic societies.

c) The activity of a professor may be estimated in reference to his employment in actual teaching, or to his personal scientific researches.

What view is taken in your country as to this?

d) Do teachers in secondary schools advance to university or higher educational posts?

What conditions have to be fulfilled in this respect?

Mention any mathematicians of position who have passed from posts in secondary education to posts in higher education.

V. — LEGAL PROVISIONS AS TO TEACHERS.

a) What are the qualifications of teachers in secondary schools, and how are they recruited?

Is the degree of Doctor demanded?

Are women included in the above regulations?

b) With what branches of instruction may a teacher of mathematics be charged?

Is the teaching of mechanics entrusted to the department of physics or of mathematics?

Is the teaching of descriptive geometry entrusted to the department of mathematics or of drawing?

c) Information as to number of hours of teaching, average salary, prospects of promotion, and pension, will be gladly received.

d) Are the teachers of mathematics expected to join in conferences with members of the other scientific departments of the institutions to which they belong?

Are they required to assist in the formulation of programmes of study?

If not, by whom and how are the courses of study settled?

VI. — BIBLIOGRAPHY.

Are there in your country books specially devoted to the training of teachers of science, or of mathematics in particular?

Have you journals dealing specially with scientific education?

VII. — ADDITIONS.

If you consider that you can add usefully any observations on questions not dealt with above, you are requested to do so.

Replies should be addressed to Professor Gino LORIA, 41, Piazza Manin, Genoa, Italy.

Kindly write on one side of the page only.