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metrie und die höhere Analysis als getrennte Fächer behandelt oder beide zu einer grossen einheitlichen Vorlesung zusammengefasst, die den gesamten rechnenden Teil der höheren Mathematik umfasst? — Welche Stellung nehmen im Unterricht die graphischen Methoden ein? — In welchem Umfange wird darstellende Geometrie gelehrt? — Gibt es besondere Vorlesungen über analytische Mechanik, oder wird die Mechanik nur von Ingenieuren als angewandte Mechanik vorgetragen? — Welche Beziehungen hat die niedere und höhere Geodäsie zur Mathematik?

V. *Lehrbücher.* — Welche Lehrbücher werden von den Studierenden benutzt? (Charakterisierung der Lehrbücher nach den in der Frage II dargelegten Gesichtspunkten.)

VI. *Lehrkörper.* — Sind die Dozenten der Mathematik Mathematiker von Fach? — Sind sie Mathematiker der abstrakten Richtung oder Mathematiker mit Erfahrungen auf einem oder mehreren Gebieten der Anwendungen? — Sind es Ingenieure, die ein besonderes Studium der Mathematik durchgemacht haben, oder Ingenieure, die lediglich mit den mathematischen Kenntnissen aus der eigenen Studienzeit ausgerüstet auf autodidaktische Weiterbildung angewiesen sind?

VII. *Weitere Auskunft.* — Sollten Sie Bemerkungen für nützlich halten, die in diesem Fragebogen nicht erwähnte Gegenstände betreffen, so werden Sie ersucht, diese unter Nummer VII vorzubringen. — An welchen Stellen der IMUK-Abhandlungen Ihres Landes findet man Ausführungen, die mit dem mathematischen Unterricht der Ingenieure in Beziehung stehen?

VIII. *Verzeichnis der mathematischen Vorlesungen.* — Es wird gebeten, dem Bericht ein Verzeichnis der mathematischen Vorlesungen für Ingenieure (Titel der Vorlesung, Anzahl der Stunden, Anzahl der zugehörigen Uebungsstunden) hinzuzufügen, die während des letzten Jahres an den hauptsächlichen Hochschulen gehalten worden sind.

Man bittet dringend, die Antwort auf den Fragebogen bis spätestens zum 1. Dezember 1913 an den Haupt-Berichterstatter Herrn Prof. Dr. P. STÄCKEL, Heidelberg, Scheffelstr. 7, zu senden.

Es wird gebeten, bei den Antworten nur eine Seite der Bogen zu beschreiben.

Der Bericht der Subkommission B wird im April 1914 zu Paris erstattet werden.

**The Mathematical Training of Engineers.  
Inquiries on behalf of Subcommittee B, of the International  
Commission on the Teaching of Mathematics.**

I. *General Inquiry.* — How is the training for technical professions organized in the higher educational institutions of your

country? — Does entrance to these institutions require the completion of a special course, as the class of *mathématiques spéciales* in France? — Are there special higher technical schools (*technische Hochschulen, écoles techniques supérieures*) for the training of students for advanced technical work, or is this training given in special departments of the universities, or are both plans followed? — Is a part of the training, in particular the training in mathematics, given in the same classes attended by students in other lines, for example in mathematics and the natural sciences?

II. *Purpose.* — Is general training in mathematics the purpose of the instruction in this science, and is it the same for all students in the various technical branches, or is there tendency to differentiate the courses according to the peculiar needs of students in special technical departments?

III. *Nature of the Teaching.* — How much time is allotted to the work in mathematics in the training of the engineer? — Are definite lectures and exercises in mathematics prescribed as part of a fixed course of study, regular attendance being required, or does there prevail a spirit of academic freedom which, within certain limits, allows the instructor to select his material and treat it as he may think best, and the student to arrange his own course and determine the extent of his participation in the work?

IV. *Material, Method and Extent.* — In the training of the engineer, how far is the instruction in mathematics carried? (For example, the work in differential equations). — What attention is paid to the question of rigour in the treatment of the subject? — Are models and apparatus used? — Is attention paid to the use of the modern methods of approximation? — In the training of students in special technical lines, such as electrotechnics, does the work close with special courses in higher mathematics? — Are analytical geometry and higher analysis treated as separate subjects, or are the two combined in a single extended and unified course, and does this course include the computations of higher mathematics? — What is the status of graphical methods in the course? — What is the status of descriptive geometry? — Are there special courses in analytical mechanics, or is the work in mechanics given by engineers as a part of the course in applied mechanics? — What are the relations of elementary and advanced geodesy to mathematics?

V. *Textbooks.* — What textbooks are in the hands of the students? (Characterise these books from the standpoint of Question II.)

VI. *The Teaching Body.* — Are the instructors in mathematics primarily mathematicians? — Are they devoted chiefly to pure mathematics, or are they interested principally in mathematics as

applied to one or more particular fields? — Are they engineers who have made a special study of mathematics, or are they self-taught engineers who, possessing only the knowledge of mathematics which they acquired as students, have carried on their further education independently?

VII. *Further Information.* — If there occur to you any points not covered in the above inquiry, which seem to you important to the investigation, kindly mention them under this heading (VII), giving such information as will be of assistance to the Committee. — The Committee would also like to have you add exact references to such parts of the report of the International Commission on the Teaching of Mathematics as relate to the mathematical training of engineers in your country.

VIII. *List of Courses.* — Please send a list of the courses in mathematics for engineers (title, number of hours of lectures, number of hours devoted to exercises) given in typical institutions in your country during the past year.

You are earnestly requested to send the reply to this Inquiry not later than December 1, 1913, to the Reporter-in-Chief Prof. P. STÄCKEL Scheffelstr. 7, Heidelberg. — Please only write on one side of the paper.

The report of Subcommittee B will be made at the Paris meeting, in April, 1914.

### Quesiti proposti alla Sotto-Commissione B circa la preparazione matematica degli ingegneri.

I. *Generalità.* — Come è organizzato l'avviamento all'ingegneria nell'istruzione superiore? L'ammissione alle scuole superiori è preceduta da corsi speciali come quello di « *Mathématiques spéciales* » in Francia? — Esistono apposite istituzioni (politecnici) per l'istruzione degli allievi ingegneri, o vi sono soltanto sezioni delle Università, aventi questo fine? oppure coesistono i due sistemi? — Una parte della preparazione, quella matematica in particolare, è comune con altre categorie di studenti, per es., di matematica pura o di scienze?

II. *Natura dell'insegnamento.* — L'insegnamento matematico ha indirizzo di coltura generale ed è identico per gli studenti dei diversi rami della tecnica, o è tenuto distinto, onde potersi meglio adattare ai bisogni particolari di ciascun ramo?

III. *Ordine degli studi.* — Quanto tempo è dedicato alla preparazione matematica degli allievi-ingegneri? — Esistono corsi ed esercitazioni pratiche con programma ben definito, obbligatori per gli studenti, sotto controllo di prove finali o d'altre sanzioni, o vige invece il principio della libertà universitaria, lasciandosi