

STUDY

3

THE DESIGN OF CHEMISTRY  
LABORATORIES FOR ASIAN  
SECOND LEVEL SCHOOLS



المركز القومي لبحوث الإسكان والبناء  
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ASIAN REGIONAL INSTITUTE FOR  
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1968

# ASIAN REGIONAL INSTITUTE FOR SCHOOL BUILDING RESEARCH

STUDY no. 3.

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## THE DESIGN OF CHEMISTRY LABORATORIES FOR ASIAN SECOND LEVEL SCHOOLS

by

HBRC

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Frontispiece - Plate I.

Adequate Space for Experimental Work

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The plates in this paper are from photographs by Max Hempel, Colombo.

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## SUMMARY

The present project, relating to the critical assessment of the design of chemistry laboratories for Asian Second Level Schools, occurs at a time when the theory and practice of chemistry learning and teaching are undergoing changes of a somewhat deep-seated nature. In many countries of the region these changes are taking place fairly rapidly. The purpose of the paper is to suggest the evolution of a design for chemistry laboratories that will not only meet the changing emphasis in chemistry teaching but also facilitate the extension of this work and perhaps result in some improvement of quality in second level chemistry education.

The paper reviews the situation in relation to chemistry curriculum development and concludes that traditional laboratories are suited perhaps to the needs and attitudes of an earlier day. The objectives of educability in the context of developing abilities, skills and attitudes are clarified and the paper shows how, in the case of one country of the Region, the changes implicit in achieving these objectives in respect of chemistry learning and teaching are reflected in a second-level chemistry curriculum.

Clearly a basic change in curriculum and in teaching method and technique may require a change in the physical facilities provided for their implementation. The requirements of the pupil and the teacher are, it is postulated, the point of departure for all laboratory design thought.

The paper develops an approach to the design of laboratories for the changed situation and describes the thinking that has led to the construction of new prototype laboratory benches. These prototypes and the field trials to which they were subjected are described in detail. The preliminary conclusions drawn from the study are that the new benches can be provided at a quarter of the cost of traditional laboratory furniture; that it is possible to dispense with piped water and drainage in laboratory design and finally, that the polygonal shape has a decisive effect on the formation and working of small groups within the laboratory.

## RESUME

Le projet actuel, se rapportant à une planification soigneuse de laboratoires de chimie pour les établissements d'enseignement du deuxième degré en Asie arrive au moment que la théorie et la pratique de l'enseignement et la connaissance de la chimie subissent des changements considérables. Dans plusieurs pays de la région les changements ont lieu assez rapidement. L'intention de cette étude est de proposer l'évolution d'un plan pour les laboratoires de chimie qui répondra non seulement aux changements dans l'enseignement de la chimie, mais encore facilitera l'extension de ce travail et, peut-être, résultera en une amélioration du niveau de l'enseignement de la chimie du deuxième degré.

Cette étude expose la situation en rapport avec le développement du programme d'études de la chimie et conclut que des laboratoires traditionnels ne servent qu'aux besoins et aux attitudes du passé. Les objectifs de l'éducation à l'égard des capacités, des connaissances et des attitudes développantes sont clarifiés et cette étude présente comment, dans un pays de la région, les changements absolus, en accomplissant les objectifs à propos de l'enseignement et de l'apprentissage de la chimie, se reflètent dans le programme d'études de l'enseignement de la chimie du deuxième degré.

Evidemment, il existe la possibilité qu'un changement fondamental du programme d'études et de l'enseignement entraîne un changement des facilités à disposition pour l'exécution des travaux. Les besoins de l'étudiant et du professeur sont le point de départ pour toute planification d'un laboratoire.

Cette étude expose quelques propositions pour un plan de laboratoires servant à des conditions changeantes et explique les idées qui ont contribué à la construction d'un nouveau prototype de laboratoires et de tables d'expériences. Ces prototypes et les expérimentations auxquelles ils ont été soumis sont expliqués en détail. Les conclusions tirées de cette étude nous montrent qu'il est possible de construire des tables d'expériences dont le coût est réduit à un quart de celui de l'équipement traditionnel de laboratoire. En même temps elle nous indique la possibilité de se dispenser de l'eau en tuyaux et du drainage et, finalement, on trouve que la forme polygonale a une influence décisive sur la formation et le travail de petits groupes dans le laboratoire.