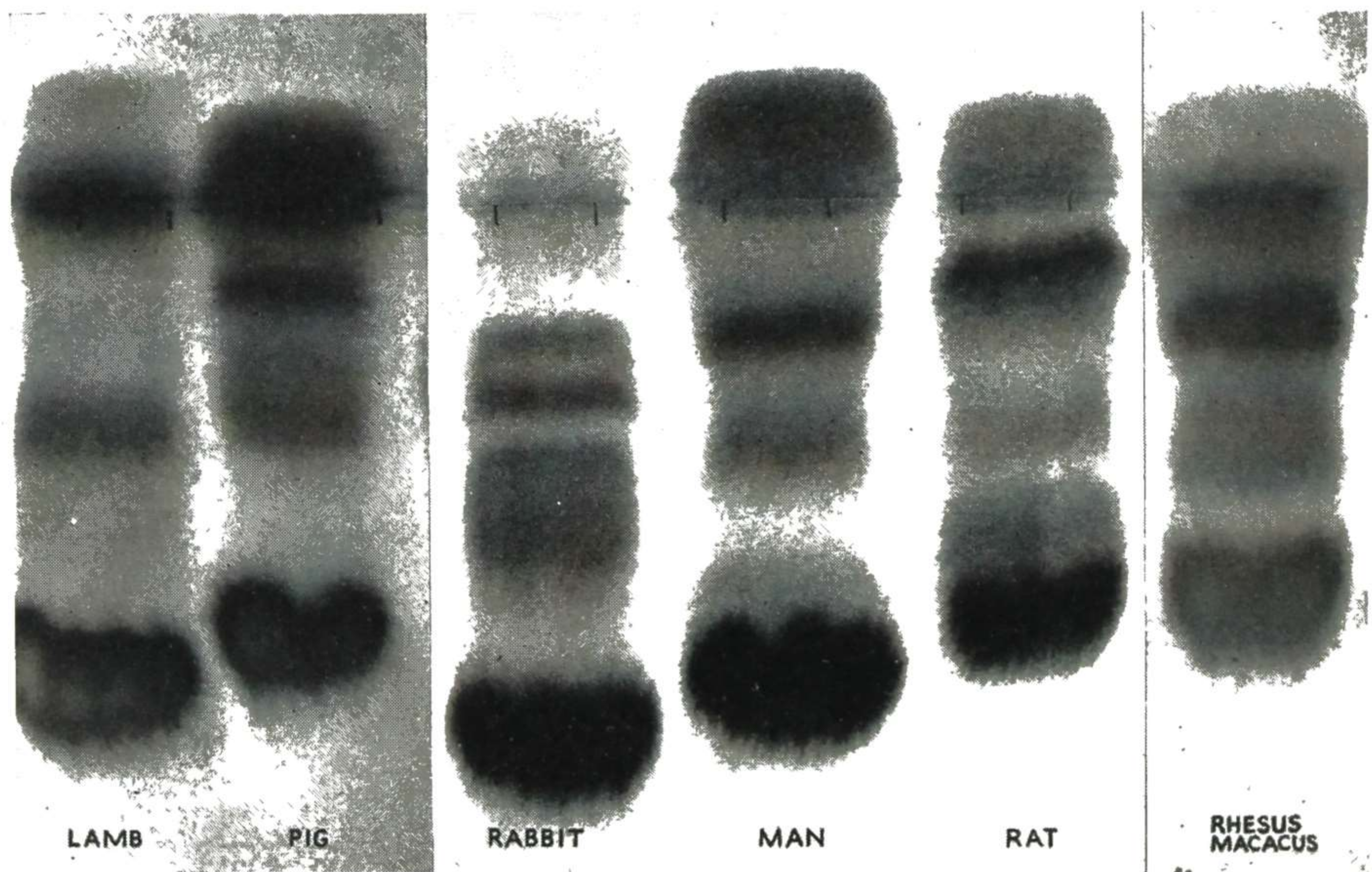


Albumin (A), globulins (G) and total proteins (T) in grammes per 100 ml. serum :—

A	4.8	3.6	3.8	4.6	3.40	4.0
G	1.7	2.4	1.3	2.4	2.35	3.0
T	6.5	6.0	5.1	7.0	5.75	7.0



Paper electrophoretograms of sera of six species (see also Figs. 32 and 33) : gamma globulin is at top, albumin at bottom of patterns. Intermediate fractions in animals differ from  $\beta$ ,  $\alpha_2$ , and  $\alpha_1$  globulins of Man and cannot be labelled correspondingly. Mobilities and therefore lengths of patterns also differ.

# CHEMICAL METHODS IN CLINICAL MEDICINE

THEIR APPLICATION AND INTERPRETATION  
WITH TECHNIQUES OF SIMPLE TESTS

By

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## PREFACE TO THE FOURTH EDITION

No chapters have been added, but this edition contains much new work. Editing has again been drastic but a slight lengthening of the book has been unavoidable. It is impossible in a single volume of reasonable size to deal adequately with Literature in addition to Methods and Interpretations, even though description is limited to simple tests of clinical value. For that reason and because this is primarily a record of personal experiment, opinion or method of presentation, references have been restricted to special points or particular techniques and are mainly in the text.

Chapter I on apparatus has been extended most because it includes the new subjects of flame photometry, paper chromatography and paper electrophoresis. Furthermore, microscopy and polarisation microscopy have been amplified, and an overdue account of photoelectric colorimetry has been included. Elsewhere, recent work on bilirubin and conjugated bilirubin has been summarised, respiratory tracings in determinations of basal metabolic rates have been added and much of the chapter on Metabolism has been rewritten. Additions and alterations, however, will be found in most chapters and there are 40 fresh illustrations.

There are omissions which may cause disappointment, but some are deliberate. Thus estimation of urinary 17-ketosteroids is not described: hundreds have been made under the writer's direction but apart from a few low ones which are difficult to interpret, all have been normal. The empirical test of Robinson, Power and Kepler has been positive only when diagnosis of Addison's disease has been obvious from clinical findings supported by low values for serum sodium. A few more tests have been excluded as being technically unsatisfactory, or because the writer has nothing to add to accounts published elsewhere.

In this revision the author did the paging and is responsible for defects. He wishes he had done it in earlier editions because it made him detect several flaws in his manuscript, and appreciate some of the difficulties which publishers and printers have to surmount. He knows where tables and illustrations should be placed, but soon finds that division into pages may make use of an ideal position impossible. He quickly learns where figures or tables are out of proportion to length of text, and discovers that most of his sentences contain words which can be deleted, often with benefit. He alone may alter the text, and therefore has that great advantage when paging. On the other hand he is largely ignorant of much of the printer's art. Acknowledgement follows in the next section of the great help he had from others. It is hoped that the reader will conclude that a real

improvement has been made in spacing, in layout and in siting of illustrations and tables.

As before the author is greatly indebted to many persons for facilities, help, suggestions or valuable criticisms. Acknowledgements follow and apologies are offered to anyone whose name has been omitted.

G. A. H.

CHICHESTER, SUSSEX, 1957.

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For use of figures thanks are given to Messrs. The Tintometer Ltd. (Figs. 8, 9, 52, and 102), Messrs. C. Baker of Holborn, Ltd. (Fig. 17), Messrs. Baird and Tatlock, Ltd. (Fig. 14), Messrs. W. Watson and Sons, Ltd. (Fig. 18C), Messrs. J. Swift & Son, Ltd. (Fig. 37), Messrs. R. & J. Beck, Ltd. (Figs. 41 and 115), *The Biochemical Journal* (Fig. 42), Drs. Peters and Van Slyke (Fig. 73), Drs. Gamble, Ross and Tisdall (Fig. 93), Messrs. Down Bros., Ltd. (Fig. 113), Messrs. Gallenkamp and Co. Ltd. (Fig. 120), the *Lancet* (Figs. 125, 147 and 152), Drs. Hawk and Bergeim (Fig. 132), Drs. Bennett and Dodds (Fig. 134), Mr. Kendrick (Fig. 142) and *The British Journal of Dermatology* (Fig. 149). Other acknowledgements are made in captions.

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G. A. H.

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## CHAPTER I

### SPECIAL APPARATUS

THESE are arranged alphabetically for convenience, and are put at the beginning to save repetition.

In every laboratory there should be a set of simple tools. Provision of more elaborate equipment, such as a lathe, is governed by demand and need for economy. A keen worker gradually collects his own tools, and this practice should be encouraged for many useful appliances can be made quite simply.

#### BENCH CLAMPS

A vertical clamp was introduced by the writer for assembly of cotton-mantle filters of transfusion sets (Fig. 1). It has several other applications, and is particularly useful when a vertical rod of a

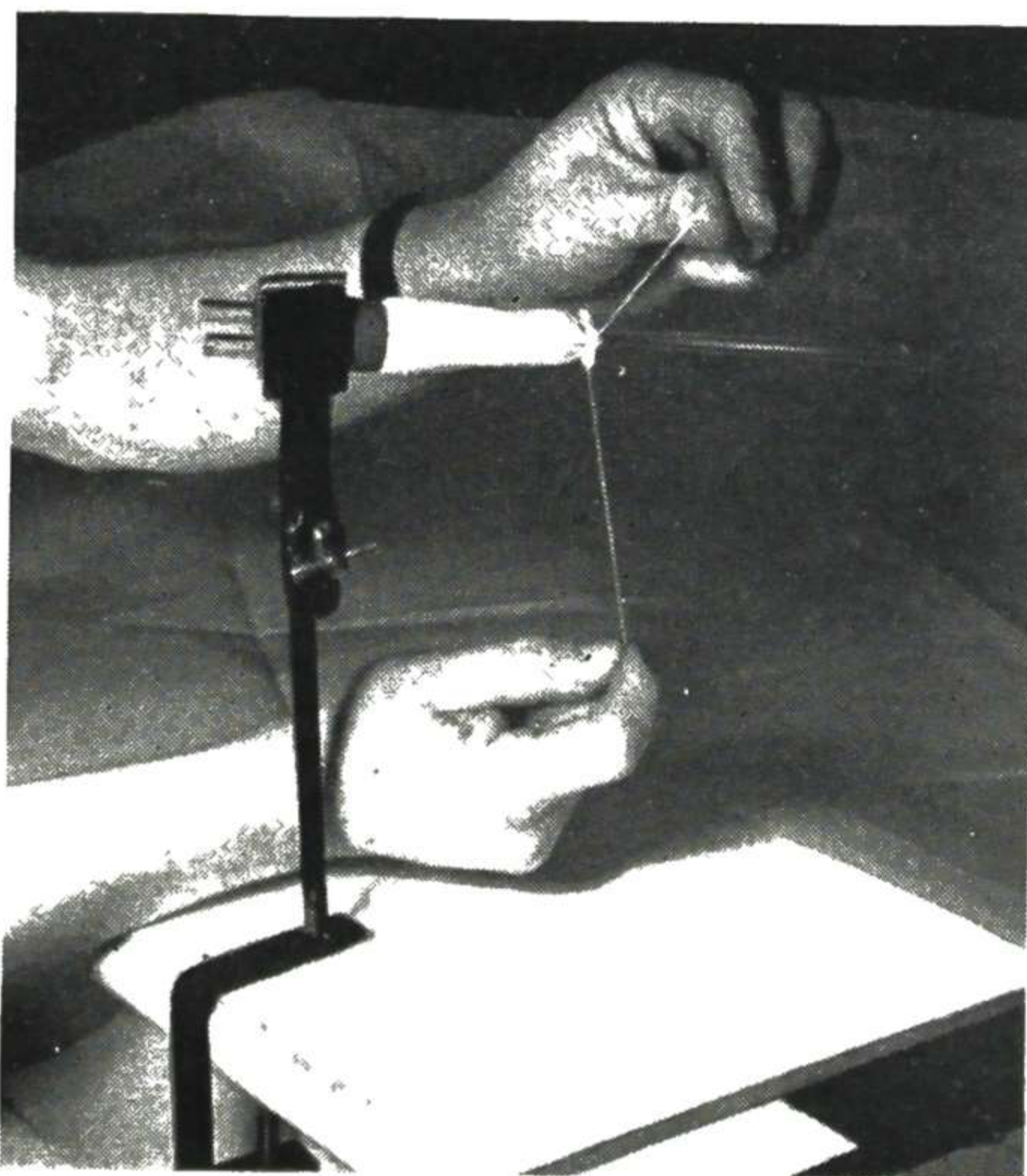


FIG. 1

Vertical clamp.

(*Photograph by W/Comdr.  
R. Thorpe R.A.F.*)

retort-stand would get in the way ; being attached to the bench it cannot be knocked over. The free end of a clamp is threaded ; a bench clamp is drilled and tapped. The two parts are easily separated and occupy less storage space than the more usual retort-stand, boss-head and clamp.

Bench clamps can be used for several purposes ; thus if the vertical clamp of Fig. 1 is replaced by a suitably tapped rod, the bench clamp becomes a retort-stand. Addition of two 4 in. paper-clips, one grip of each being drilled and bolted to its opposite number to form a twinned clip, makes a burette-stand of convenient design (one end grips the rod, the other a burette).