



# GYNECOLOGIC RADIOGRAPHY

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## With a Chapter on RADIOGRAPHY OF THE BREAST

by

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CASSELL AND COMPANY LIMITED

LONDON, TORONTO, MELBOURNE, SYDNEY AND WELLINGTON

GYNECOLOGIC RADIOGRAPHY

Published 1959 by Paul B. Hoeber, Inc.  
Medical Book Department of Harper & Brothers

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For information address Paul B. Hoeber, Inc.  
Medical Book Department of Harper & Brothers  
49 East 33rd Street, New York 16, N. Y.

*Library of Congress catalog card number: 57-10360*

Printed in Switzerland

Bound in Great Britain by Leighton Straker Bookbinding Company

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## Foreword

Translation into English of the French atlas on hysterosalpingography by Doctors Dalsace and Garcia-Caldéron is both timely and welcome. For, despite the passage of more than four decades since the method was devised independently in this country and in France, this is the first atlas of its kind to be made available to American readers.

Beginning in 1913 and 1914 with Collargol suspension as the contrast medium, Lipiodol was adopted in 1922 and followed by other iodized oils which had a long vogue. Hysterosalpingography has finally reached its present sphere of usefulness in gynecologic radiologic diagnosis through adoption of water soluble viscous iodide solutions. From the viewpoint of peritoneal resorption and tolerance, these solutions approximate the ideal radiopaque substance for radiography of the female genital tract.

As in all branches of roentgenology, interpretation of the films must be learned by comparing the shadowgraphs, their location, and configuration with the clinical and anatomic histologic findings. From an abundant number of cases thus studied, the authors have achieved an experience culminating in a high degree of diagnostic accuracy. This experience they have imparted to the reader of the atlas by presenting clear cut radiographs with terse descriptions implemented by the specific anatomic and pathologic findings to clarify the salient points.

It is gratifying to note that a definitive diagnosis of uterine and tubal lesions susceptible of radiologic study has been possible in the great majority of the illustrative cases. But no less noteworthy is the author's acknowledgment of moot points due for the most part to limitations of present-day knowledge. Perfection in diagnostic procedures is an ideal still to be realized, but insofar as they have gone, the authors have succeeded admirably. The translator and the publisher have performed a useful service thereby fulfilling a long-felt want.

I. C. RUBIN, M.D.

*New York*

## Translator's Foreword

A translator's job is full of problems: it means a constant compromise between the need for a precise version of the original text in idiomatic and clear language and the desirability of keeping an author's individual style and vernacular as intact as possible. In the case of this atlas, there were other difficulties of an etymological nature: it soon became apparent that clinical, embryologic and histologic terms of Latin or Greek origin, which have become part of the French and English medical vocabulary, do not always have the same meaning in the French and in the English language. Thus, for instance, the French *avortement* is used not only for abortion but for *stillbirth* and *miscarriage* as well; *hemi-uterus double* is the French term for *uterus unicornis*; *uterus didelphys* is used in French for various congenital malformations, whereas in English it applies exclusively to the double uterus with two cervixes and a double vagina; *neoplasm malpighien* is an epidermoid carcinoma and *epithelioma encephaloide* stands for *medullary epithelioma*.

The excellent illustrations were invaluable for the interpretation of the text and the translation of the captions. As an additional safeguard for accuracy, the chosen terms were often checked against x-ray and other textbooks.

In instances of doubt, Dr. Jean Dalsace rendered substantial assistance. The translator was fortunate to have at his side the pioneer in gynecologic radiology: Dr. I. C. Rubin's scientific advice and editorial assistance, freely and generously given, were deeply appreciated.

Personal ties connect the translator of this atlas with its senior author, Jean Dalsace, as well as with Broca hospital from which many of the book's beautiful illustrations originate. The translation was undertaken in a spirit

of friendship and gratitude, without previous realization of the wealth of knowledge and experience that the translator was to derive from such work. He considers it a privilege to have been entrusted with this translation, thus contributing his modest share in making the atlas available to the American medical profession.

HANS LEHFELDT, M.D.

*New York*

## Preface

In gynecology the same trend is manifest as in the other medical disciplines. Diagnostic methods are becoming increasingly specialized; they are combined with clinical observation which is of prime importance in the development and achievement of increasingly accurate diagnosis.

Whether the problem is the topographic diagnosis of tubal sterility or postmenopausal bleeding, radiography of the female genital organs should be a routine procedure, just as radiography of the intestinal tract is indicated in the cases of gastric bleeding or colic.

But whereas numerous atlases of x-ray studies of pulmonary, bone, digestive, urinary, cerebral, or vascular pathology are available, there has been no atlas illustrating gynecologic pathology by means of contrast roentgenograms.

In 1928, my teacher Raymond Grégoire prefaced Claude Béclère's beautiful book *Radiologic Exploration in Gynecology* as follows: "It is necessary to have complete knowledge of the normal human body in order to appreciate the changes produced by pathological conditions."

Similarly, one has to be thoroughly familiar with all the variations in the normal appearance of the uterine cavity and the lumina of the tubes before diagnosing pathologic conditions. Accordingly it seems appropriate to begin this atlas by demonstrating the normal appearance of the female organs, and the first among the three hundred x-ray pictures diligently collected by the authors of this volume represent the female organs in normal conditions.

The recognition of hystero-graphy and hysterosalpingography as legitimate diagnostic methods was not achieved without difficulty. Only a short while ago the value of the information obtained by these methods was held to be insufficient to justify the risks of infection incurred by the patient. However, improved contrast media and the use of antibiotics have helped to overcome this prejudice. Nevertheless, hysterosalpingography



is a procedure not to be entrusted to all and sundry. There are "sorcerers' apprentices", more dexterous than competent, who can create great havoc in the pelvic cavity.

It is proper and fitting that this atlas, with its abundance of valuable illustrations, should be the work of French physicians, since hysterosalpingography is the result of the ingenious discovery of two French authors, J. A. Sicard and J. Forestier, who, as long ago as 1922, advocated Lipiodol as a harmless contrast medium.

It should be noted that in 1914, before Sicard, the Americans W. H. Cary and I. C. Rubin had achieved radiographic visualization with Collargol. At the same time, however, Dimier, a French gynecologist, employed Collargol hysterography,<sup>1</sup> so that France is entitled to credit for this new development. Dartigues was one of the participants in this work. In 1924, Portret was the first to use Lipiodol for hysterosalpingography. My venerable predecessor, Professor P. Mocquot, also contributed excellent shadowgraphs of the uterus in the thesis of his pupil Oumansky. Claude Bécèle, originally taught by his father, published in 1926 and 1929 two outstanding books on a subject then new to the entire world. In 1926, G. Cotte, in Lyon, became an ardent promoter of the radiologic method of exploration. In 1928, Mme. M. Francillon-Lobre and Jean Dalsace demonstrated an apparatus for the injection of Lipiodol. They produced the first French statistical report on pregnancies following hysterosalpingography.

What astounding progress in this past quarter of a century! It is fortunate that one of the authors of this atlas should be the very same person whose name we just mentioned in this brief historical review. No one is better qualified than Jean Dalsace to appraise the development of the method and to guide us through this new field. He takes his place among the French authors who, after Dartigues and Dimier, have contributed so much to the worldwide acceptance of the value of this method.

No better collaborator than Jean Garcia-Caldéron could have been found for this atlas. His remarkable qualities as a radiologist had long ago been highly appreciated by my teacher A. Gosset, who was not one to bestow admiration freely. During my twelve years' association with the Salpêtrière, as assistant to the great Gosset, I was in a position to judge the value of Jean Dalsace and of Jean Garcia-Caldéron. It was not surprising to me to see their prolonged efforts, which have led to this atlas, succeed so completely.

<sup>1</sup> At Broca hospital, in the same department that I have the honor to head at present.

In addition to the uterotubal and pelvic pictures in this atlas, Gros, professor of the medical faculty of Strasbourg, and Sigrist, give us still more recent roentgenograms, obtained with mammography. These additions demonstrate, in a literal sense, the fact, physiologically and pathologically evident, that the breast is an auxiliary of the female genital organs.

I wish this first French atlas of gynecologic radiology the wide circulation it deserves.

PAUL FUNCK-BRENTANO

*Paris*

## Introduction

For over a quarter of a century, since our first hysterosalpingographies in January, 1927, we have collected thousands of gynecologic radiograms. In reviewing them, we noticed numerous errors of interpretation that had occurred during the first years. Being too preoccupied in the beginning with the examination of the tubes, we sometimes failed to attach enough importance to the many variations in the uterine cavity, nor did we always draw the right conclusions from abnormalities in the form or position of the uterus. For we were self-taught students, as were practically all gynecologists attracted by this new method. Little by little, books and articles appeared, including our own and those of Mme. Francillon-Lobre, Bécère, Cotte, Portret, and many others, constituting a reference library. Yet, the material was scattered. What was missing was an atlas of the kind extant for other systems or regions.

Any abnormal condition requires considerable research in the literature. The need for an atlas, therefore, became evident. Our purpose is to provide a large number of radiographic illustrations for gynecologists, for radiologists, and for practitioners. The greater part of these x-rays derives from our personal collection, accumulated over more than 26 years. The diagnoses advanced have been verified clinically, and we submit only cases with definitely established diagnoses.

This achievement we owe, first and foremost, to the support given us by R. Gosset, who put his department at our disposal, and to the confidence shown us by his assistants. We would like to mention our friends: Jean Charrier, Petit Dutailis, and especially P. Funck-Brentano, whose direct assistant one of us became, and whom we thank for his friendly and encouraging foreword.

This considerable documentation would not have been possible without the guidance and help of eminent radiologists, particularly R. Ledoux-Lebard and his son, our friend Guy Ledoux-Lebard and his assistant,

Mlle. S. Croizé. Dr. C. Frain, Broca radiologist, and our friend J. Puisseford have put their experience at our disposal ever since one of us became head of the Sterility Clinic of Broca hospital.

But in several fields our collection was incomplete. We express our gratitude to those who helped us fill the gaps. Foremost we thank Olof Norman (Lund), who kindly contributed excellent radiograms of cancer of the cervix and of the corpus uteri, and of uterine perforations; Karina Ekengren (Stockholm), who contributed part of her outstanding work on tuberculosis of the uterus and the adnexa; and Dr. J. G. Asherman (Tel Aviv), who gave us the original radiograms which enabled him to discover a syndrome, that should be named after him, establishing the presence of intrauterine synechiae following curettage. Several other fine radiograms were contributed by our friends A. Netter and R. Palmer and by Drs. F. Rouquet and A. Lombard.

Finally, Professor Gros of Strasbourg has honored us by writing the chapter on radiography of the breast. We must apologize to him for being unable to give more prominent space to his important contribution.

Due to certain circumstances it was necessary to limit the size of this atlas. Nevertheless we managed to include a sizable number of illustrations. We thank Mlle. A. Delachaux and Mr. Niestlé for helping us to achieve this task.

For many years we used only Lipiodol as a contrast medium. In this book, however, the reader will find roentgenograms made not only with Lipiodol but also those obtained with water-soluble organic iodide preparations. The respective merits of the two methods will be discussed later, but we have felt that it is in the reader's best interest to familiarize himself with the interpretation of x-ray pictures obtained by quite different means.

It was also thought advisable to present in this atlas both positive and negative x-ray prints, the former being usually seen in France, and the latter more common in Anglo-Saxon and Scandinavian countries. This joint presentation has seemed necessary for those whose work necessitates consulting international references.

No x-ray reproduced here has been retouched. This may account for a certain inadequacy in some illustrations, but it has seemed to us more honest to present x-rays in an unaltered state and without artefact.

The drastic reduction in the scale of the reproductions, which was forced upon us by the size of this atlas, may possibly render the reading of certain x-rays somewhat difficult. However, we hope that their abundance and selective presentation will compensate for this shortcoming.

We have endeavored to reduce the text to essentials namely, to explanation of the reproductions and the reasons they were selected and also to some indispensable generalities and a few case histories.

For the sake of conciseness we have intentionally omitted details concerning technique which we assume are well known. To keep the volume to a handy size we have also excluded the extensive bibliography that has accumulated throughout the past forty or more years.

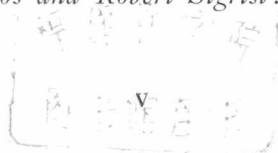
Our purpose will be accomplished if our book can assist in making diagnosis more accurate and help the reader to overcome the difficulties of interpretation that we ourselves have so frequently encountered.

J. D. and J. G.-C.

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## CHAPTER I

# General Observations

In this atlas we have deliberately limited ourselves to the radiology of the female genital organs and of the breast, in accordance with Prof. P. Funck-Brentano who recently reemphasized the French concept of gynecology as a discipline distinct from that of obstetrics.

Although we have not included obstetric radiology we are not unmindful that Carlos Heuser was the first to diagnose early pregnancy by means of x-rays. Biologic pregnancy tests have superseded x-ray diagnosis, but we have found that, because of clinical or laboratory errors sometimes still encountered, radiologic examination may be useful, enabling us to detect an early pregnancy, a missed abortion, or an ectopic pregnancy. For this reason we have included such roentgenograms as an aid to accurate diagnosis in exceptional cases.

For a long time pelvic radiology was limited to the detection of calcified tumors and to indirect exploration by such procedures as opacification of the colon (as in colonic displacement by large ovarian tumors). H. Wintz and Dyroff achieved "visualization" of the pelvic organs by means of pneumoperitoneum.

Later, various authors attempted intrauterine injection of contrast media and obtained pictures of the uterus and the fallopian tubes (Cary, Rubin, Dartigues, and Dimier). But these contrast media in the early experience often proved to be irritating and sometimes fatal. Not before Lipiodol was introduced by Sicard and Forestier in 1922 was it possible to obtain radiographic pictures of the uterotubal cavities without risk (Portret, C. Heuser, Carelli), efficiently and innocuously.

The pictures thus obtained were very fine. They were even said to be too fine, and Lipiodol was accused of giving a phantasmagoric quality to the uterotubal cavities. The opacity of this medium is, in fact, such, that many details are missed if one limits oneself to one or two roentgenograms of the



uterine cavity filled with Lipiodol. For this reason we have, together with Ledoux-Lebard, stressed the *absolute necessity* of taking serial roentgenograms of the filling and of the evacuation of the uterine cavity. To accomplish this we have introduced a lead cassette, furnished with a central  $12 \times 15$ -cm. opening, that makes it possible to take four successive pictures on one single  $24 \times 30$ -cm. film. We have also stressed the necessity that pictures be taken if not exactly laterally then at least from a three-quarter oblique angle, in order to get different exposures of the surface and of the borders of the uterus. In this way errors that occur when too few x-rays are taken may be avoided.

As the Lipiodol originally used was too viscous, it sometimes occurred that the tubes did not fill, even though a previous insufflation had revealed them to be patent. We have observed pregnancies to follow hysterosalpingography whose interpretation suggested tubal obstruction. J. Seguy has recently shown this in some cases.

This shortcoming has to a certain extent been remedied by the use of a more fluid Lipiodol.

Certain authors (H. Guthmann and A. Hamant) have suggested the use of contrast media that adhere to the mucous membrane and, according to our own experience with these media, even appear to impregnate it. We have abandoned this method because of the errors which it entails and because of its dangers. In this connection it is well to keep in mind that the uterine cavity is a virtual cavity.

The use of water-soluble organic iodide contrast media, the viscosity of which can be modified at will, has the effect of changing even the appearance of the roentgenograms. These media facilitated the tubal passage, but the following points should be noted:

1. Water-soluble media require an essentially different technique of injection. It is necessary to work faster, to maintain the injection pressure even while taking the x-rays, especially if the uterus and the tubes are hyperkinetic. As the medium is rapidly absorbed and excreted through the kidney, control pictures must be taken not 24 hours later, but within 30 minutes after the injection.

2. The roentgenograms are quite different from the ones obtained with Lipiodol, and one must know how to interpret them. The frequent differences in opacity must be carefully studied, for an accumulation of intestinal gas might be mistaken for a tumor. A mere air bubble should be viewed with suspicion. On the other hand, the mucous membrane reveals details undiscernible with Lipiodol. Normal tubes present in the ampullary