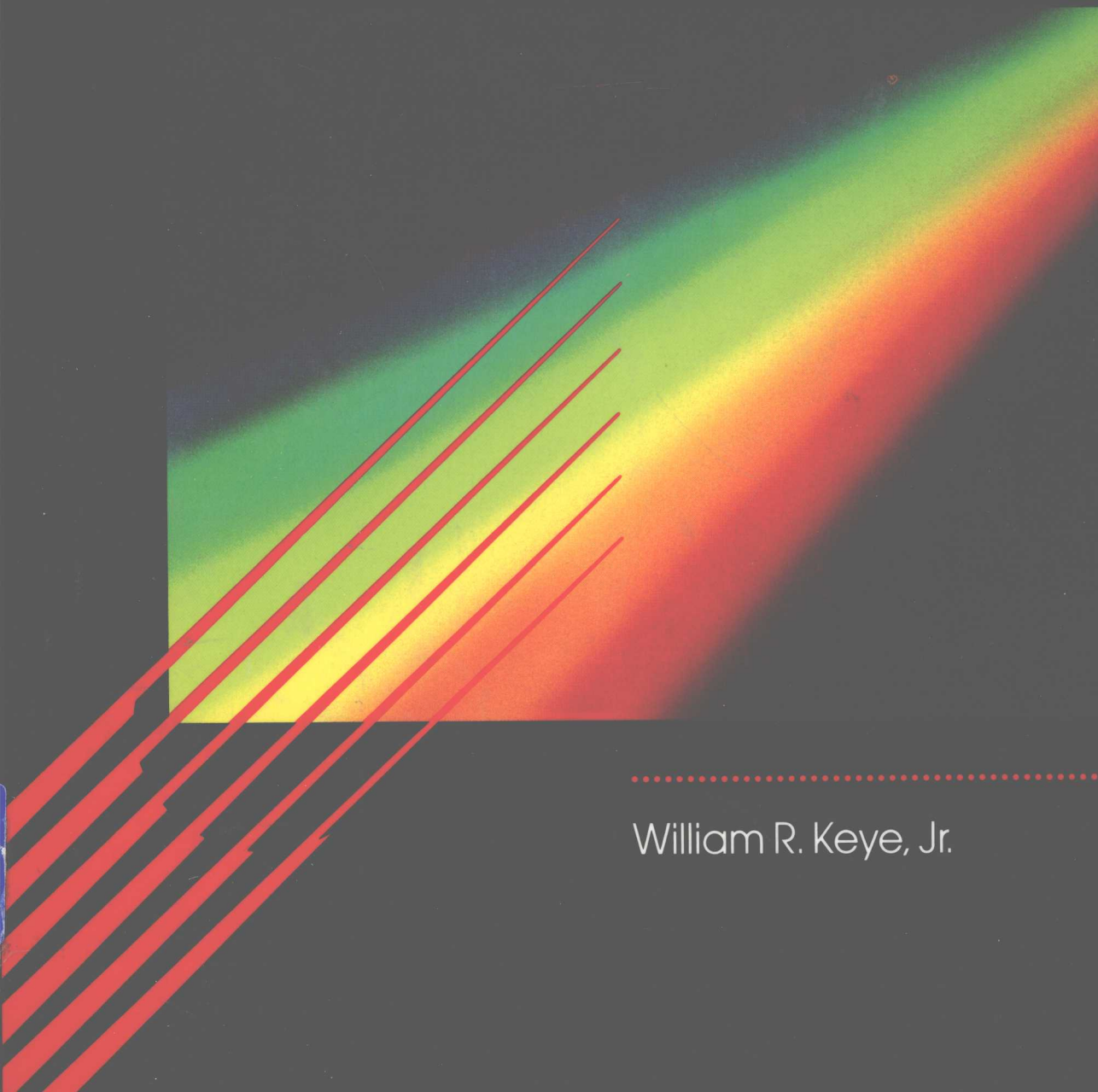
Laser Surgery in Gynecology and Obstetrics

Second Edition



William R. Keye, Jr.

Laser Surgery in Gynecology and Obstetrics

Second Edition

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YEAR BOOK MEDICAL PUBLISHERS, INC.
CHICAGO • LONDON • BOCA RATON • LITTLETON, MASS.

2 3 4 5 6 7 8 9 0 YC 94 93 92 91 90

Library of Congress Cataloging-in-Publication Data
Laser surgery in gynecology and obstetrics / [edited by] William R. Keye, Jr.—2nd ed.
p. cm.
Includes bibliographical references.
ISBN 0-8151-5033-4
1. Gynecology, Operative. 2. Obstetrics—Surgery. 3. Lasers in surgery. I. Keye, William R., 1943-
[DNLM: 1. Genitalia, Female—surgery. 2. Laser Surgery. 3. Pregnancy Complications—surgery. WP 660 L343]
RG104.L37 1990
618'.0459—dc20
DNLM/DLC
for Library of Congress
89-22408
CIP

Sponsoring Editor: Kevin M. Kelly
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To my wife, Sue, and my children, Debbie and Jeff, for their support and encouragement.

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ACKNOWLEDGMENTS

I wish to thank my contributors for their scholarly, caring, and serious efforts; Carol Peck for her tireless typing and secretarial skills; Ruth Henson for her editorial advice and assistance; and Kevin Kelly at Year Book Medical Publishers.

William R. Keye, Jr.

PREFACE

The revision of this text occurs in response to an increased interest in lasers by gynecologists and obstetricians and to the emergence of new experts in the field of laser surgery. It also reflects the greater acceptance of lasers in our specialty.

In the 4 years since the publication of the first edition of this text, laser surgical techniques have been refined, new delivery systems have been introduced, and the indications for lasers in obstetrics and gynecology have expanded. As a result, new chapters have been added describing the administrative aspects of establishing a laser unit, the application of lasers to the treatment of viral infections of the genital tract, the use of the frequency-doubled Nd:YAG laser, and the future of photodynamic therapy in gynecology.

While it is not yet imperative that every gynecologist be a laser surgeon, it is becoming more evident that the gynecolgist should be familiar with the physics, technology, and applications of lasers. Just as computers have become a routine part of our everyday lives, the laser will play an increasing role in patient care as we develop second- and third-generation lasers. The physician who becomes familiar with the lasers of the 1980s will be in a better position to respond to and take advantage of the developments in laser technology in the 1990s.

William R. Keye, Jr , M.D.

Color Plates

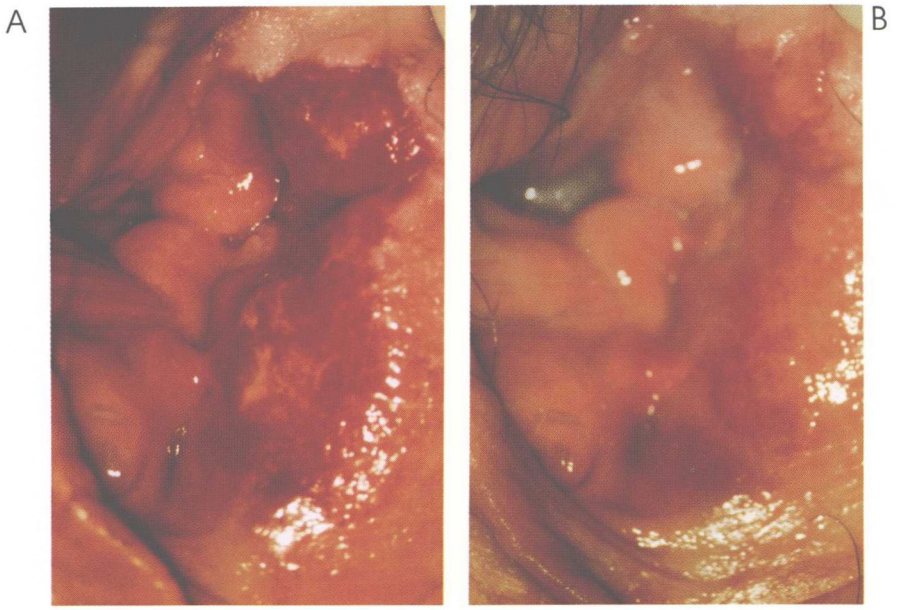

PLATE 1.—Intensely painful focus of vestibular erythema arising adjacent to the hymenal resection scar. **A,** after initial surgery. **B,** 2 months after argon-laser photocoagulation. (From Reid R, Greenberg M, Daoud Y, et al: *J Reprod Med* 1988; 33:523–532. Used by permission.)

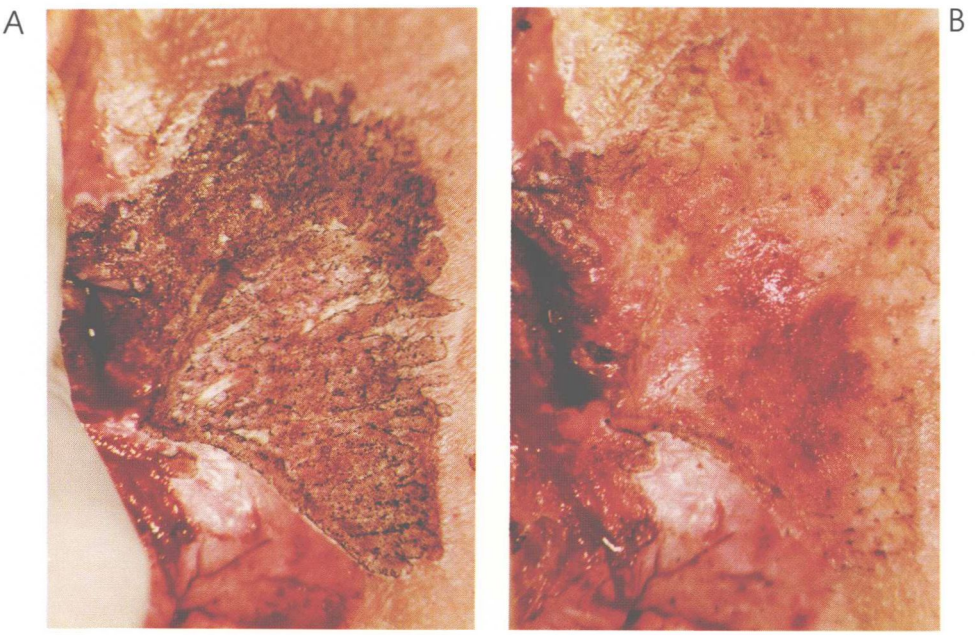

PLATE 2.—**A,** first surgical plane. A view through the operating microscope after initial "brushing" with the laser. Beneath the charred remnants of the surface sqaumes, the refractile remnants of plump keratinocytes in the proliferating zone of the epidermis can be seen. **B,** first surgical plane, after the epithelial debris has been wiped away with the moist gauze. This maneuver exposes the intact surface of the underlying corium. (From Reid R, Elfont E, Zirkin R, et al: *Am J Obstet Gynecol* 1984; 152:268. Used by permission.)

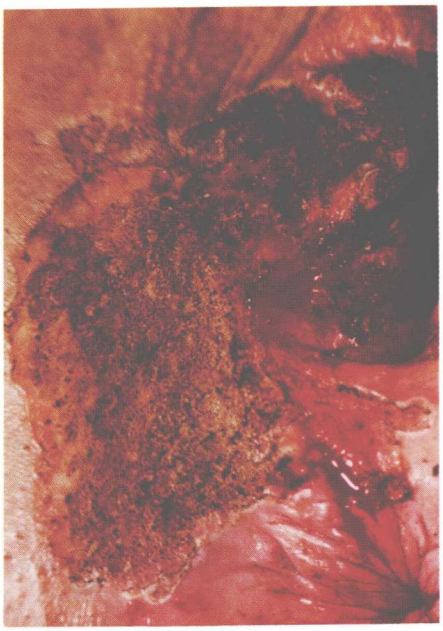

PLATE 3.—The second surgical plane. The exposed papillary dermis has been gently relased, sufficient to scorch (but not cut) the dermal surface. (From Reid R, Elfont E, Zirkin R, et al: *Am J Obstet Gynecol* 1984; 152:268. Used by permission.)

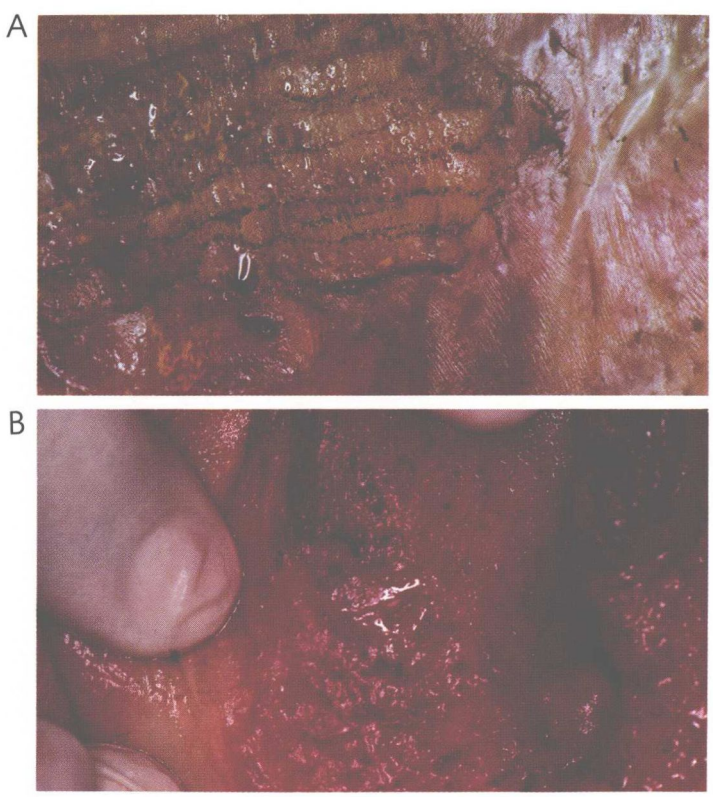

PLATE 4.—**A,** the third surgical plane. A slower, more deliberate movement of the laser beam has vaporized the upper half of the dermis, revealing a vertical pattern of fibers (the coarse collagen bundles of the reticular dermis). **B,** the deep collagen plates with attendant accurate blood vessels seen at the base of the third plane.

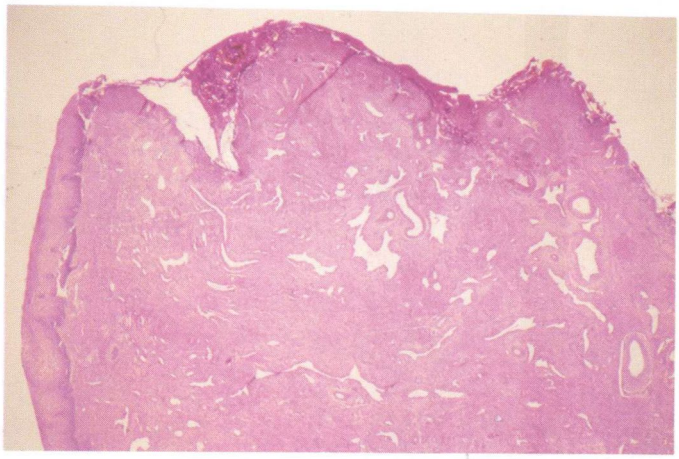

PLATE 5.—Carbon dioxide laser cone performed at the very low power density of 2,000 W/cm^2 in an effort to avoid excessive bleeding. Depth of coagulation necrosis is 400 microns (normal range is 50 to 100 microns).

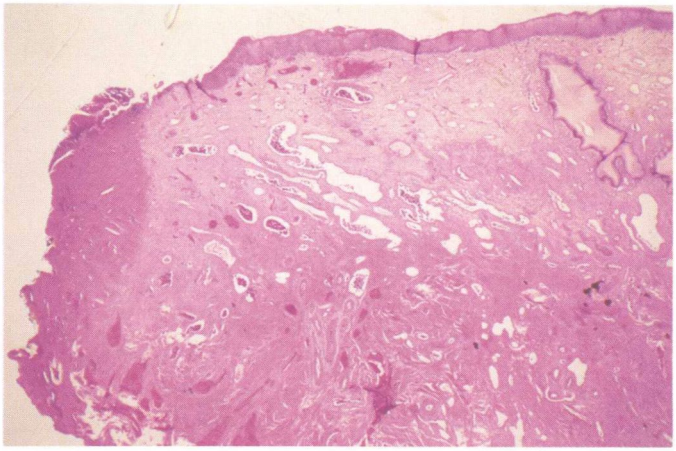

PLATE 6.—KTP-532 laser cone performed at less than optimal power of 8 watts. Depth of coagulation necrosis is 920 microns (range is 480 to 1,360 microns). Although this specimen is acceptable, new instrumentation allows power settings of 15 to 20 watts with a corresponding coagulation necrosis of 400 to 700 microns.

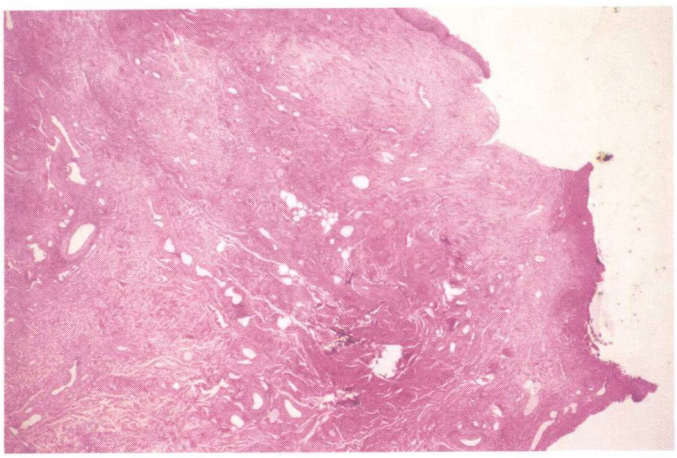

PLATE 7.—Nd:YAG laser cone. Depth of coagulation necrosis is 480 microns (range is 280 to 680 microns).

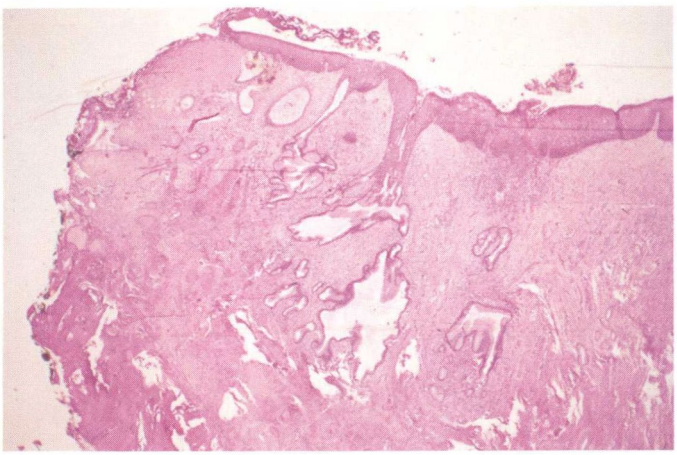

PLATE 8.—Argon laser cone. Depth of coagulation necrosis is 640 microns (range is 500 to 720 microns).

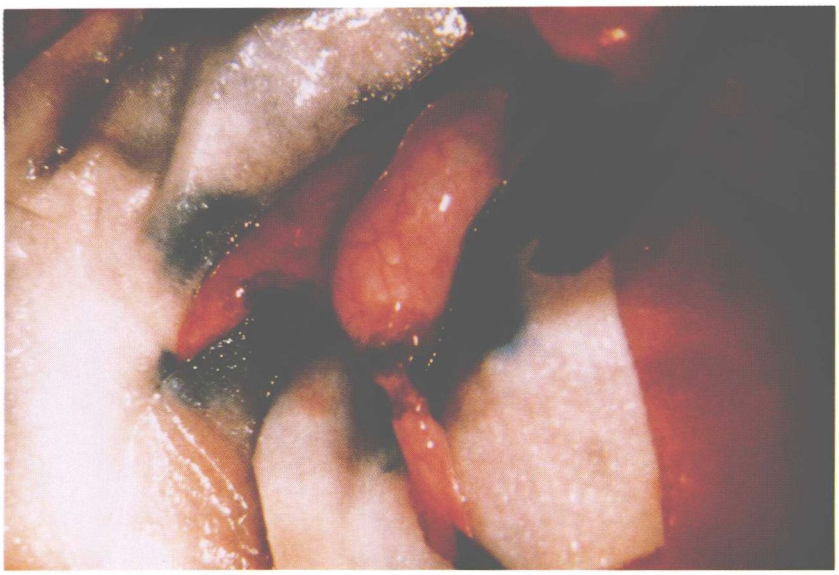

PLATE 9.—Preparation of the distal portion of the fallopian tube with the CO_2 laser prior to reanastomosis.

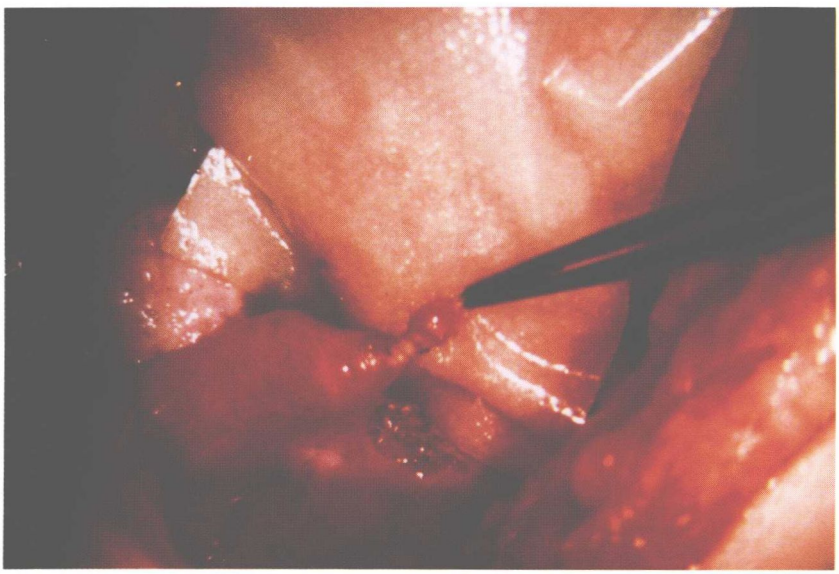

PLATE 10.—Preparation of the proximal portion of the fallopian tube with the CO_2 laser prior to reanastomosis.

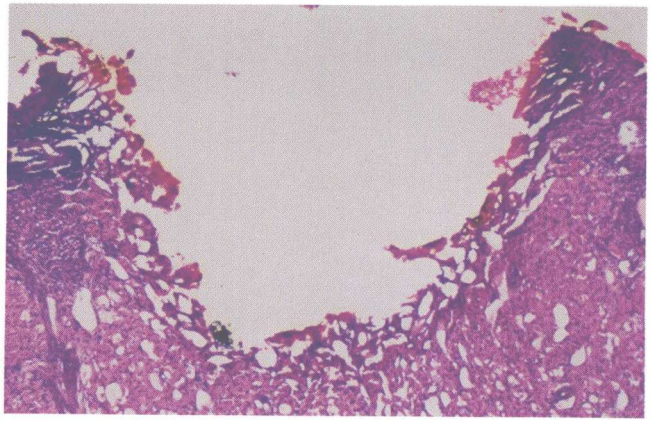

PLATE 11.—Immediate uterine lesion (rabbit) with 2 seconds at 20 watts with chisel probe (400×).

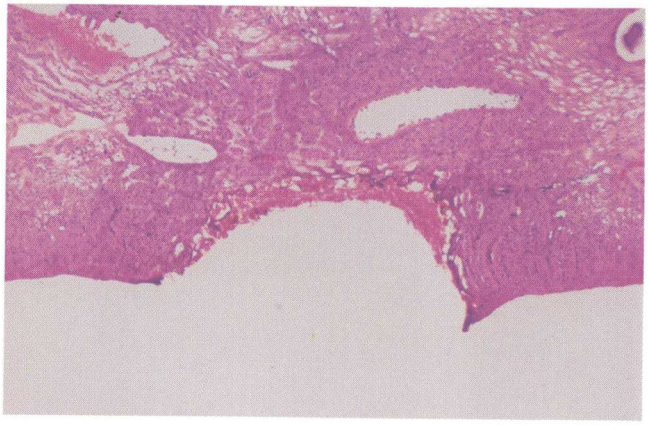

PLATE 12.—Acute ovarian lesion (rabbit) with 2 seconds at 20 watts with chisel probe (400×).

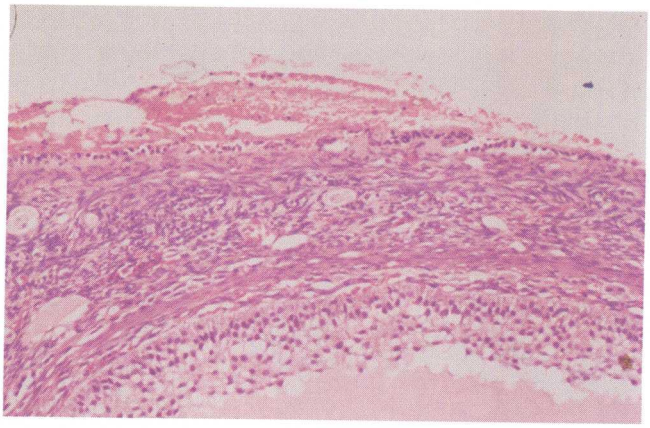

PLATE 13.—Rabbit ovary showing epithelial healing at 3 weeks (450×).

PLATE 14.—Red-light fluorescence of porphyrins localized in mouse S180 tumor and surrounding tissue involved in the host (Swiss-Webster) response to the growing tumor at 5 days after subcutaneous *(SC)* implant of 5×10^6 S180 cells. The host mouse was injected 24 hours earlier, intraperitoneally, with 20 mg/kg hematoporphyrin derivative (Photofrin I). The red fluorescence was produced by exciting the retained porphyrin with a broad-band black light (390 to 430 nm). The host response to tumor implant subcutaneously is similar to a wound repair response and includes neovascularization, deposition of fibrin and extracellular matrix components, and encapsulation of the growing tumor mass.