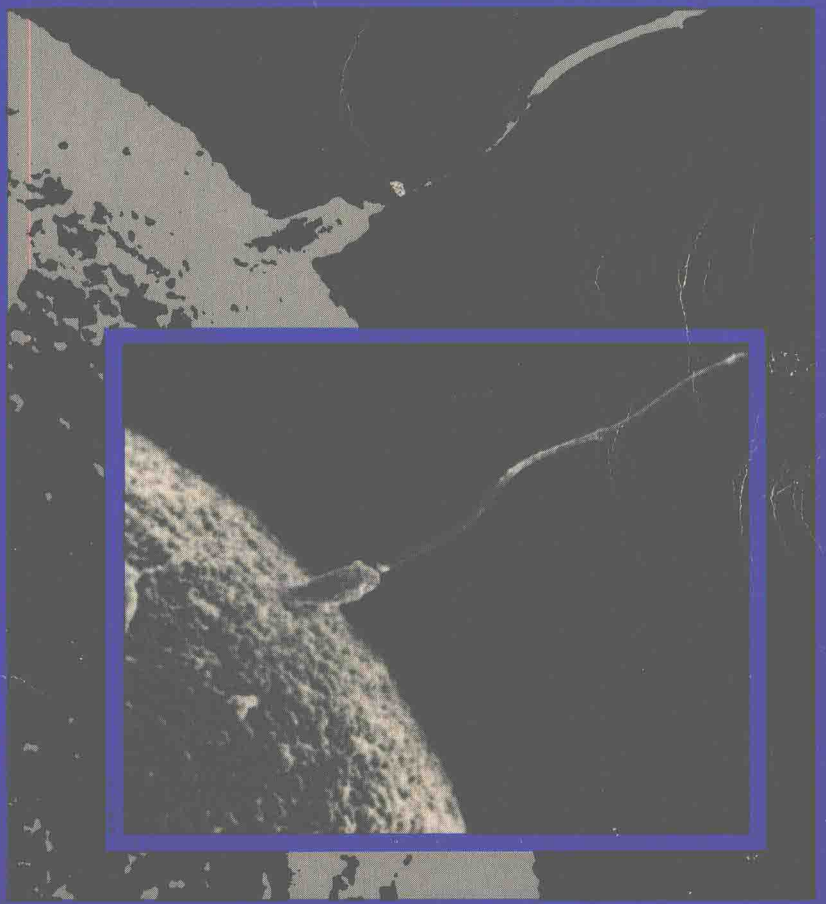


J715-28

Human Reproduction and Development

Casimer T. Grabowski



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University of Miami



SAUNDERS COLLEGE PUBLISHING

Philadelphia New York Chicago
San Francisco Montreal Toronto
London Sydney Tokyo Mexico City
Rio de Janeiro Madrid

Address orders to:
383 Madison Avenue
New York, NY 10017

Address editorial correspondence to:
West Washington Square
Philadelphia, PA 19105

Text Typeface: Souvenir
Compositor: The Clarinda Company
Acquisitions Editor: Michael Brown
Project Editor: Janis Moore
Copy Editor: Bonnie Boehme
Managing Editor and Art Director: Richard L. Moore
Design Assistant: Virginia A. Bollard
Text Design: Caliber Design Planning, Inc.
Cover Design: Caliber Design Planning, Inc.
Text Artwork: Vantage Art, Inc.
Production Manager: Tim Frelick
Assistant Production Manager: Maureen Read

Cover: Scanning electron micrograph of the sperm of a sea urchin (*Arbacia punctulata*) penetrating the egg. (Courtesy of Dr. Don W. Fawcett and Dr. Everett Anderson.)

Library of Congress Cataloging in Publication Data

Grabowski, Casimer T.
Human reproduction and development.

Bibliography: p.
Includes index.

1. Human reproduction. I. Title. [DNLM:
1. Reproduction. 2. Embryo. WQ 205 G728h]
QP251.G8 1983 612'.6 82-60501

ISBN 0-03-061534-8

HUMAN REPRODUCTION AND DEVELOPMENT

ISBN 0-03-061534-8

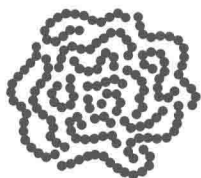
© 1983 by CBS College Publishing. All rights reserved. Printed in the United States of America.
Library of Congress catalog card number 82-60501.

3456 090 987654321

CBS COLLEGE PUBLISHING
Saunders College Publishing
Holt, Rinehart and Winston
The Dryden Press

Human Reproduction and Development

Saunders Modern Biology Series



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To
Doris

Preface

The primary aim of this textbook is to present an elementary but comprehensive survey of the many biological aspects of reproduction for students with little or no background in biology. I have made no assumptions other than that the student knows what a cell is and has some rudimentary concept of bodily functions. A working vocabulary of words and concepts is carefully developed as the text progresses. All significant technical terms are printed in **boldface** the first time they are introduced. These and other words are also defined in an extensive glossary.

This book is based on the lectures I give in a course of the same name for nonscience majors that I have taught at Miami and Nassau. The student population has varied in these classes from freshman to senior to postgraduate and from business, music, and education majors to psychology, sociology, and pre-nursing students. Though it is not an easy course, most students find it more interesting than they expected, and very few drop out. In addition to nonscience majors, paramedical students and those wishing to read on their own will find the book useful.

The book is divided into three parts. Unit One, Anatomy and Physiology of the Reproductive System, presents in moderate depth the structure and function of the human reproductive organs. Basic concepts of cell biology, organ architecture, and physiological control mechanisms are introduced and applied to the study of the reproductive organs. The complexities of the female cycle, in particular, are gradually but thoroughly developed. The emphasis both in this section and throughout the text is on normal structure and function, but discussions of common problems and disorders, particularly those that young people are likely to encounter, are also included.

Unit Two, Development of the Human Body, is a unique feature of this book. Most presentations of human development fall into two categories. The

first is a relatively superficial type, dealing mainly with the way the embryo looks at two weeks, two months, and so on. At the other extreme are the textbooks of development used in advanced college courses and in medical schools. There is very little in between. I have bridged this gap by presenting an elementary description of the way the body is sculpted from simple rudiments and how adult relationships of organs are achieved. I have also incorporated information on the dynamics of development and on the mechanisms that shape and control the complex process of development.

The basic knowledge presented in the first two units is applied to some more pragmatic aspects of reproductive biology in Unit Three. The essential features of human heredity are presented along with a discussion of genetic problems and what can be done about them. Another chapter is devoted to a subject of considerable current interest—birth defects, the agents that can induce them, the research that is helping to delineate the problem, and a rational approach to prevention. The various phases of family planning are discussed in detail, again utilizing the basic background that has been acquired. A chapter on sexuality, emphasizing psychosocial aspects, is included for perspective. The final chapter looks at probable future developments in reproductive biology.

The emphasis in this book is on basic biology as it relates to reproduction. Only a limited amount of material on the psychological, sociological, and ethical aspects of sexuality and reproduction is included, but I have not ignored these considerations when writing any of the chapters. Many of the topics were chosen because of their relevance to these areas of concern. Insofar as possible, I have tried to maintain throughout an objective, nonjudgmental presentation of facts, for I believe that this is the best preparation for making ethical personal decisions in this area.

I wish to acknowledge the assistance of the many individuals who helped me make this book a reality: my wife, Doris, who consulted, edited, typed, and provided generous doses of encouragement; my colleagues Bruce Grayson and John Rogers, who edited the manuscript; reviewers whose editorial comments were very valuable, including J. L. Hart (George Mason University), H. Duane Heath (California State University at Hayward), and H. Rauch (University of Massachusetts); my typists Marysse Lobean, Jennie Myers, and Jorge Lopez; the publishers and authors who have allowed me to use their illustrations; and the editors at Saunders College Publishing, especially Michael Brown, Biology Editor, for his persistence and encouragement, and Project Editor Janis Moore and her staff. I would also like to thank the many students I have had in "Human Reproduction and Development" for their enthusiasm and the feedback that helped me develop the format for these chapters.

C. T. GRABOWSKI
Miami, Florida
January 1982

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CHAPTER 1

Introduction: Reproductive Biology Yesterday and Today

Prehistoric Attitudes Toward Reproduction

Presumably you are reading this book because you are interested in reproductive biology. The current interest in and open discussion of sex and sexual problems are relatively new aspects of our contemporary Western culture, but the enthusiasm this generation displays is not a new phenomenon. The earliest evidence we have of human thought in prehistoric times shows that early people were strongly interested in the reproduction of the human species as well as that of animals and plants. Their interest did not stem merely from a desire for sexual gratification; reproduction was important for the survival of the family and the tribe. Reproduction of the animals and plants they ate was also important for their survival. The very earliest human artifacts that have been found clearly indicate that early people were not simply interested in reproduction but, in the opinion of prehistory experts, were also obsessed with animal and human fertility.

The fertility figurines they left behind were of several types. Drawings and sculptures of copulating and pregnant animals were not uncommon (Fig. 1–1). The earliest known carvings of human figures are females with enlarged breasts, abdomens, and genitalia. These are the so-called Venuses of Europe, carved about 20,000 years ago and found in caves from France to Siberia (Fig. 1–2). Some were fashioned from limestone, others from mammoth tusks. From their appearance, it is apparent that these figures were undoubtedly created for ritual or magic purposes associated with fertility rites. This conclusion is supported by the fact that they were often created in deep underground grottoes, which could have been reached by primitive people only with arduous effort and significant peril.

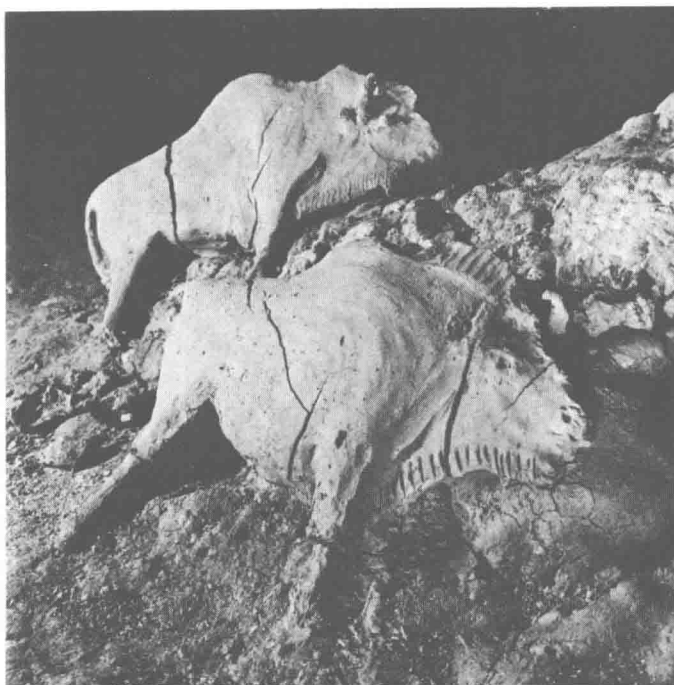
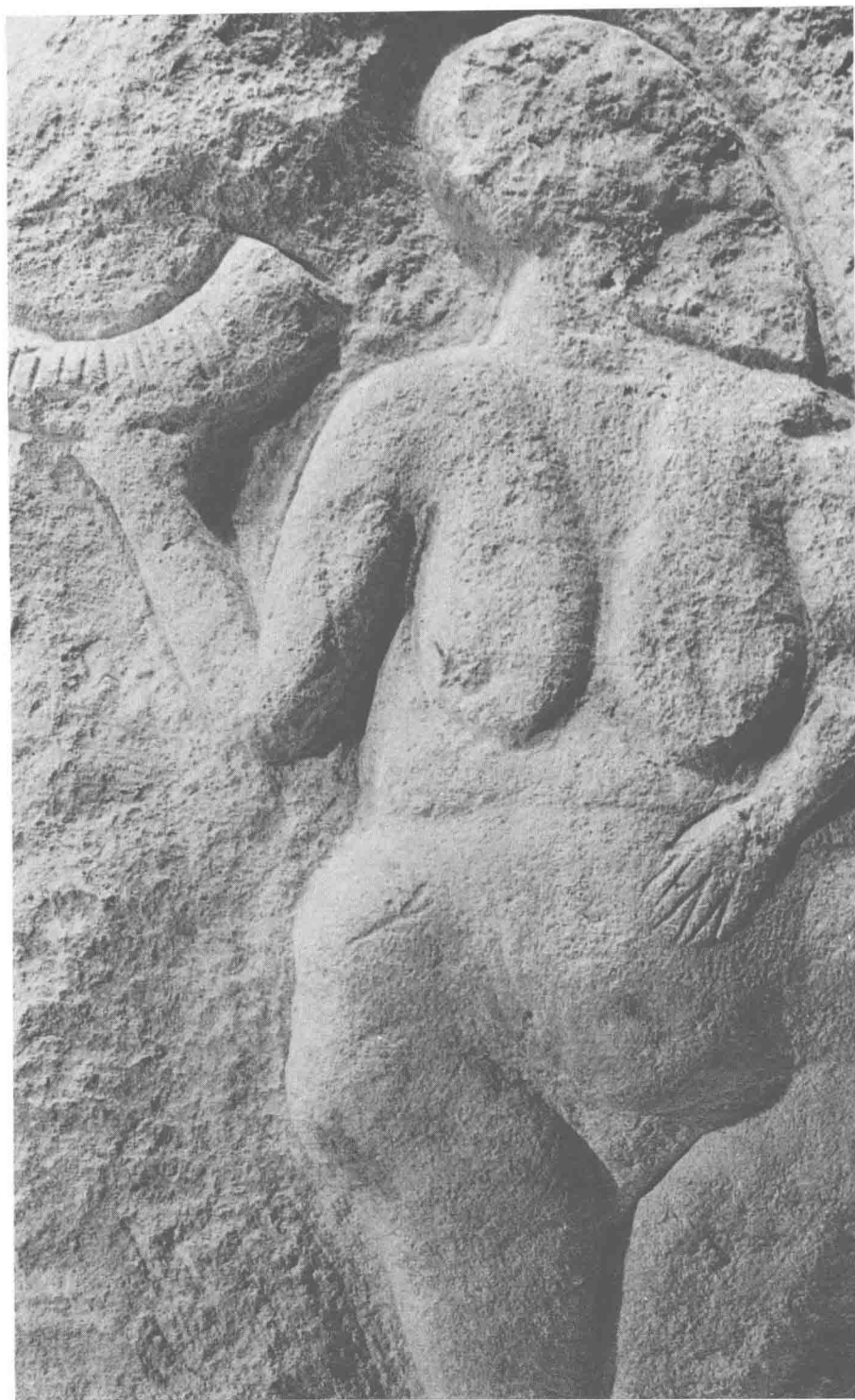


Figure 1–1 The mating bison of the cave of Le Tuc d'Audoubert. The figures, molded from clay, were found in a high-ceilinged grotto 2 treacherous miles below the ground. Ca 20,000 BC. (Photo by Achille Weider, Zurich, Switzerland.)

Although the history of people in the New World does not date back as far as in the Old World, it is interesting to note that the oldest sculptures found in the Americas are obviously fertility figures. These are the Venuses of Valdivia, from coastal Ecuador, and they date back to approximately 7000 years BC. (Fig. 1–3). The typical Venus is sculptured of ceramic material and ranges from 3 to 6 inches in height. The breasts and genitalia are emphasized, but the faces, arms, and legs are relatively insignificant. These Venuses appear to have been gently broken, as if in ceremonial fashion.

Another type of figurine common in many prehistoric cultures is the ithyphallic male figure (with a huge penis), which obviously symbolizes male fertility magic (Fig. 1–4). Disembodied phalluses and phalluses incorporated into ceremonial urns and maces are also very common. Other figurines and draw-

Figure 1–2 The Venus of Lausanne. She is holding a ram's horn in a seemingly ceremonial fashion. Ca 20,000 years BC. (From Bazin: *The History of World Sculpture*. Lamplight Publishing, Weert, Netherlands, 1968.)



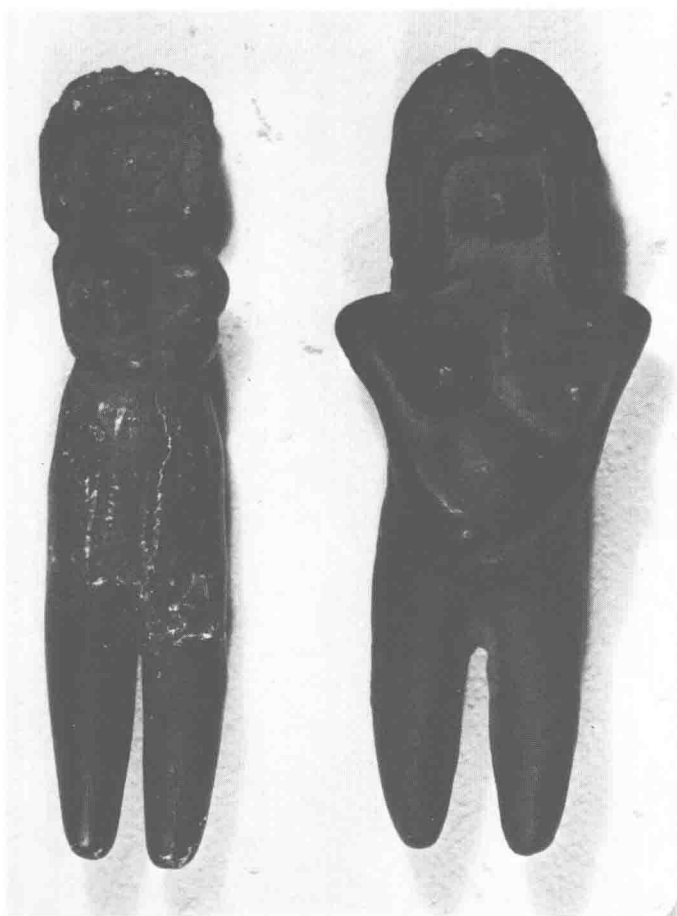


Figure 1-3 Two Venuses of Valdivia, one of them pregnant. These ceramic figurines were crafted about 5000 BC.

ings from prehistoric cultures all over the world illustrate pregnancy, labor, and intercourse.

You might think these sculptures and drawings are examples of primitive pornography, but remember that the concept of pornography is really an invention of civilized people. Reproduction was very important to primitive people, and these artifacts are generally believed to be evidence of the deep significance they attached to the process. Sex and reproduction were obviously associated intimately with our ancestors' concepts of life, death, religion, and a mystical relationship to "Mother Earth." The preponderance of such illustrations and figurines with obvious reference to fertility unquestionably illustrates