Special Guests, Fellow Endocrinologists, Ladies and Gentlemen: This is the 25th Annual Meeting of The Endocrine Society that I have been able to attend. Each one that I have attended has been better than the previous one, and provided me with new and important information which excited interesting and sometimes valid new and challenging ideas and concepts. I believe that this year, which marks our Golden Anniversary, our members and their associates, with the organizational assistance of a most able Program Committee, have outdone themselves. They have provided us with opportunities to listen to a great many reports of imaginative and exciting new studies covering the entire spectrum of endocrinology, studies which had been executed with a variety of new investigative methods and tools. It is most appropriate that our Society should present such an excellent scientific program in observance of its Fiftieth Anniversary. It is also fitting that at this Golden Anniversary meeting one of our Society’s six Nobel Prize laureates should present the first Eli Lilly Lectureship in Endocrinology. Dr. du Vigneaud, in your Eli Lilly lecture this afternoon, by recounting for us your own studies of certain polypeptide hormones, you demonstrated how the dedication of men trained in the physical sciences can play a major role in solving complex biological problems observed in health and in disease. You reviewed the evolution of endocrinology from an era of inexact studies with tissue extracts lacking in homogeneity to an exciting period of research with synthetically pure hormone products. Such pure hormones, or their chemical analogues, have been of great value in defining certain biochemical and physiological systems. Furthermore, research with such chemically pure products has been of great practical importance in defining the physiological defects and the treatment of certain human and veterinary diseases. I believe that we can, and should, extrapolate from your review of the impressive evolution of one facet of endocrinology to tell the public that this is one example of the evolution of modern basic biomedical science as we are observing it today, and to predict that continued support of comparable basic research will provide tools of practical value in controlling other diseases. Dr. du Vigneaud, we thank you and Mrs. du Vigneaud for joining us on this special occasion.

Tonight, on the occasion of our Fiftieth Anniversary, I believe it is our privilege and responsibility to recognize the growth of endocrinology over the past 50 years, and the important role played by our Society, and its many imaginative and productive members, in the development and growth of this unique multidisciplinary field of biomedical science.

If one considers the state of knowledge in endocrinology which existed when our Society was incorporated in 1917, one can better appreciate the many important
advances which have been made in our understanding of the glands of internal secretion, their hormone products and actions.

During the 19th Century, and the early years of this century, students of clinical medicine and of morbid anatomy, who were well endowed with natural curiosity, keen powers of observation and serendipity, had related several disease syndromes to an overproduction or to an absence of secretory products of certain glands of internal secretion.

Myxedema and cretinism had been clearly related to a deficiency of a product of the thyroid, while the hypermetabolism and tachycardia of exophthalmic goiter had been appropriately attributed to an increased secretory function of the thyroid gland. A cachectic state with impaired function of several endocrine organs had been attributed to destruction of the pituitary gland, whereas acromegaly and giantism had been related to tumors of the pituitary. Whereas diabetes insipidus had been attributed to destruction of the posterior lobe of the pituitary, diabetes mellitus had been related to the absence of a product presumed to be elaborated by the islets of Langerhans of the pancreas.

Atrophy, or destruction of the adrenals, had been accepted as the cause of Addison's disease, whereas hyperplasia, or adenomas of the adrenal cortex in children, had been recognized as having an association with hirsutism and masculinization.

Adenomas of the parathyroids had been associated with a fibrous and cystic reaction of the bones, and the gonads in both sexes had been associated with secondary sex characteristics.

If one reads either Pottenger's (1) or Lisser's (2) accounts of the Society's founding, one is impressed by the dedication of a small group of stalwarts who had unusual vision and great faith in the newly and rapidly developing scientific approach to biology and medicine. The isolation from the adrenal glands and synthesis of epi-nephrine, and the isolation of thyroxine from the thyroid, had given biomedical scientists, who were interested in endocrinology, reasons to expect similar accomplishments by physiologists and biochemists who were looking for the active factors in other glands of internal secretion. The demonstration that myxedematous patients could be restored to a euthyroid state by administering extracts of thyroid or thyroxine, no doubt provided a great stimulus to this group of dedicated scientists who were interested in clarifying the physiological mechanisms of endocrinology, and in finding physiologically sound treatments of various maladies which had been correlated with diseased glands of internal secretion. These same observations may well have been responsible for some early endocrinologists with uncritical enthusiasm for organotherapy engaging in the practice of what was called by some polyglandular charlatanism, and causing harsh criticism of themselves and of endocrinology.

However, within a few years of the Society's founding, exciting discoveries were made which provided tools for studying important actions of certain glands of internal secretion, and very importantly for treating certain crippling or life-threatening diseases. The isolation of insulin from the pancreas and the development of methods for providing this important hormone agent on a commercial basis restored thousands of diabetics to health and promised a normal life span for these people who otherwise could not have survived. The isolation of the parathyroid hormone, and the demonstration that this hormone exerts profound effects on the skeleton, on the metabolism of calcium and phosphorus, and on the kidneys, led to extensive studies on the metabolism of bones in health and disease.

The successful extraction of androgenic substances from bulls' testes opened new frontiers of research for a number of investigators, whose efforts resulted in the isolation of androsterone from the urine, of
pure testosterone from the male gonads, and finally, the synthesis of testosterone.

The isolation of estrone from pregnancy urine not only provided clinicians with a valuable therapeutic agent, but it set off a chain reaction among chemists, who were developing an interest and "know-how" in steroid chemistry. They isolated, and later synthesized estriol, estradiol and progesterone.

The imaginative research efforts of several pioneer members of our Society, who developed methods of removing the pituitary without damaging the brain, and demonstrated that the pituitary is capable of supporting growth and function of several target organs, opened entirely new vistas of research in pituitary physiology and protein hormone chemistry. This afternoon, it was our privilege to hear Dr. du Vigneaud recount his studies, which extended over a 30-year period. These brilliant studies led not only to the separation and isolation of the posterior pituitary hormones, but also to the successful synthesis of both of these polypeptide hormone molecules. Other talented and dedicated hormone chemists have succeeded in isolating and determining the chemical structure of ACTH, the melanophore stimulating hormone and human growth hormone. More recently, ACTH and the melanophore stimulating hormone have also been synthesized. Physiological studies done with some of these pure hormone preparations suggest that these and other pure pituitary hormone preparations may have important therapeutic effects in a variety of disease states. Other chemists have succeeded in defining the chemical structure of parathormone, insulin, gastrin and secretin. Insulin, gastrin and secretin have also been synthesized.

The recognition and description of a disease syndrome, now recognized as Cushing's disease, provided a great stimulus to the study of adrenal physiology. Careful investigations into structural and physiological abnormalities associated with this disease, which were complemented by imaginatively designed studies done in man and laboratory animals with various compounds isolated from the adrenal cortex, served to clarify some of the functions of the adrenal cortex, and to encourage the development of pharmacologic and therapeutic approaches to certain endocrine and nonendocrine diseases with some of the synthetically pure adrenal hormones.

The isolation from the thyroid of 3:5:3'-triiodothyronine, a product which is several times more active than thyroxine, and of thyrocalcitonin, a hormone product which alters certain actions of the parathyroid hormone, has provided us with exciting new frontiers for research in thyroidology and on the actions of the parathyroid hormone.

The demonstrations that the growth and/or function of certain cancers can be stimulated or retarded by altering the internal hormonal environment has provided physicians and patients with practical therapeutic agents capable of transiently controlling the growth of selected cancers, and has opened new areas for studying the mechanisms of action of certain hormones and their effects on normal and abnormal growth.

At this time it is important to note the significance of a study published the year of our Society's founding, demonstrating that the status of ovarian structure and function could be correlated with the structure of cells in the vaginal secretions of laboratory animals. This cytological technique has been an important tool in studying female gonadal physiology. When applied to studies of humans, it was noted that neoplastic cells could be identified in the vaginal secretions of women with uterine cancer. By applying this cytologic technique to the early detection of asymptomatic cancers of the uterus, the cure rate of cervical cancer has been greatly increased.

Recent studies with newly developed cytogenetic methods have made it possible
to partially explain several examples of
gonadal dysgenesis which had been recog-
nized as abnormalities of sex differentia-
tion by keen clinical observers, who had
first seen such patients because they com-
plained of dwarfism, amenorrhea, infertility,
or gynecomastia.

I regret that we don't have time to con-
sider in detail all the exciting advances in
dermatology made during the past 50
years. However, this evening the mem-
bership of our Society can take great pride
in recognizing that many members of The
Endocrine Society have played important
roles in advancing the knowledge and prac-
tical applications of endocrinology.

These important advances can, no doubt,
be attributed to many factors, the most
important of which, I believe, were the
men and women involved. These students
of endocrinology, who were endowed with a
high degree of intelligence and an intense
desire for understanding physiology and
the related sciences, had an unselfish dedi-
cation to the pursuit of knowledge and to
the ultimate objectives of correcting many
endocrine abnormalities.

It must also be recognized that, without
the generous financial support provided
by many agencies, it would have been
impossible to realize most of the accom-
plishments of which we are so very proud.
Prior to World War II our understanding
friends in the pharmaceutical industry
gave generous financial support, and in
many instances the only support, to im-
portant research programs in many labora-
tories. Many important research efforts
today are still to a major degree dependent
on support from the pharmaceutical in-
dustry. Oftentimes such funds are given
generously, even though the protocols are
not designed to search for marketable prod-
ucts. The National Research Council
for many years provided funds for endo-
ocrinological studies, and fellowship funds
for promising young men to prepare them-
selves for careers in biomedical research,
including endocrinology. Several philan-
thropic foundations and individual donors
contributed importantly to the develop-
ment of research programs in endocrinol-
ology.

However, since World War II, generous
support by the public has made it possible
to expand and accelerate our research to
levels of activity which, prior to 1945, were
inconceivable. On a purely voluntary basis,
the public has contributed generously to
our research activities through several
voluntary health agencies, such as the
American Cancer Society, the American
Heart Association, the Damon Runyan
Fund, the National Foundation, and other
research oriented agencies.

During the past two decades the greatest
sums for biomedical research at basic
and applied levels have come from the
taxpayers through the National Institutes
of Health of the United States Public
Health Service, the Atomic Energy
Commission, the Department of Defense, and
the National Science Foundation. It must
be noted that several well-informed and
farsighted congressmen and senators have
recognized the importance of basic and
applied research and have demonstrated
vision, wisdom and statesmanship as they
have worked with their colleagues in ap-
propriating adequate funds for vigorous
programs of biomedical research. To these
very wise men we and society are greatly
indebted. We are also greatly indebted to
the staffs of the National Institutes of
Health for the tremendous assistance they
have given to all the biomedical sciences
and especially to our own multidisciplinary
field of endocrinology. Our colleagues in the
National Institute of Arthritis and Meta-
bolic Diseases, the National Cancer Insti-
tute, the National Heart Institute, and the
Institute of Child Health and Human
Development have demonstrated wisdom,
vision, a unique open-mindedness and
objectivity as they have discharged their
responsibilities in supervising the alloca-
tion of appropriate funds to the support of well-conceived programs of research in endocrinology.

We must also recognize that the trainee and pre- and post-doctoral fellowship programs provided by voluntary health agencies and the National Institutes of Health have been extremely important in preparing many men and women for productive research careers in endocrinology.

One very important reason for many major advances made by those engaged in endocrinological research is the fact that endocrinology is a unique multidisciplinary biomedical field of study. From time to time, we hear complaints that endocrinology does not have departmental status in medical or other graduate schools. On the contrary, I would like to observe that many of the advances made in endocrinology have occurred because it has been possible to bring to the challenges presented by the glands of internal secretion the talents and tools of students with a wide variety of scientific disciplines, such as zoology, anatomy, physiology, biochemistry, organic chemistry, biophysics, genetics, pathology, internal medicine, pediatrics, immunology, surgery, and of veterinary medicine. More recently, the molecular biologists have introduced some of their newly developed techniques to clarify the actions of certain hormones at the subcellular level. The success of this multidisciplinary approach to endocrinology might be used as an argument for abandoning the existing and traditional departmental structures, which, too frequently, serve as barriers in our schools of biomedical science.

It has been most satisfying to look back over the past 50 years, and reflect upon the many important contributions made by members of our Society and by other endocrinologists. However, at the beginning of the second half of our first century, it is most important that we recognize some of the challenges and responsibilities that we, as members of The Endocrine Society, now face.

One very important frontier of endocrinology, which had, until quite recently, frustrated some of our most able colleagues, is the chemistry of pituitary and other protein hormones. Clarification of chemical structure and synthesis of the posterior pituitary hormones of insulin, ACTH, MSH, parathormone, gastrin and secretin gives us reason to believe that within the foreseeable future we should hear reports before our annual meetings describing the synthesis of other protein hormones and of the physiological effects of such pure hormones or of certain chemical analogues of the primary hormones. Having been able to participate in studies which demonstrated that the physiological effects of thyroxine can be dissociated by modifying the chemical structure of the hormone molecule, I would predict it will be possible to dissociate many of the actions of these various hormones by altering the structure of such synthetically pure hormones as they become available.

During the past decade the neuroendocrinologists have made important contributions toward a better understanding of basic neurological controls of the pituitary's release and possibly synthesis of certain of its hormones. An isolation and chemical identification of these releasing factors should provide us with therapeutic agents for use in patients with problems, such as anorexia nervosa, or even schizophrenia, which may be associated with an inability to respond to stress.

Having been greatly impressed, and even frightened, by aberrations in mentation, or the frank psychoses, which I have observed in patients with marked endocrine abnormalities, such as myxedema, hyperadrenocorticism, hypercalcemia, hypoglycemia, or with pheochromocytomas, I suggest it would be most desirable to evaluate psychiatrically, whenever possible, patients with such endocrine abnor-
malities before and after correction of the endocrine problems, and to investigate with today's modern biochemical and biophysical tools the effects of altered hormone states on brain metabolism. I would, also, suggest that it might be very rewarding to investigate with modern tools of endocrine research the production and metabolism of the adrenal cortical and medullary hormones, of thyroxine and triiodothyronine, and those glandular products known to influence calcium and carbohydrate metabolism in patients with various types of psychopathology.

Recently, we have become much more aware of the fact that several diseases of the endocrine system, such as myxedema, Cushing's disease, hyperaldosteronism, and hyperparathyroidism, may be associated with reversible hypertension. I would suggest that studies on the mechanisms by which these metabolic abnormalities, or the increased hormone levels associated with these maladies, influence the dynamics of the cardiovascular system should provide stimulating and satisfying frontiers for research. Such studies might also eventually result in methods of preventing or reversing hypertensive heart disease.

Recently, I have been impressed by certain statistical studies on mortality from two quite dissimilar diseases, thyroid cancer and pneumonia, which suggest that man's tolerance for these diseases is maximum between the ages of seven and 45, but poor prior to the age of seven, and progressively poorer after the fifth decade. Studies on urinary estrogens and ketosteroids suggest that gonadal function begins between the seventh and eighth years, and decreases sharply after the fifth decade. I would suggest that it might be most rewarding to investigate possible endocrinologic controls of immunocompetence, or the endocrinology of immunology.

The molecular biologists, some of whom are now becoming interested in endocrinology, will find many exciting frontiers for study with their versatile tools, which can be applied at the subcellular level. It seems to me that the mechanisms of action of many hormones may very well be answered by those investigators who are disciplined to approach such problems at the molecular level.

One of the most fascinating biological phenomena described is the observation that certain cancers arising in non-endocrine organs, such as the lung or kidney, are capable of producing hormone substances which are similar to and possibly identical with certain hormones produced by the pituitary, such as ACTH, the antidiuretic hormone, the gonadotrophic hormones, the exophthalmos producing substance, or the hormone produced by the parathyroids. Clarification of the mechanisms by which a tumor arising in a lung or other non-endocrine organs can acquire selected functions of the pituitary gland is a major challenge which may yield to investigations by the molecular biologists.

We, as members of the biomedical fraternity, must accept some of the responsibility for one of the world's most serious social problems—the population explosion. By the development of good public health practices, perfection of methods of immunizing against many infectious diseases, and discovery of effective antimicrobial agents, many infectious diseases which previously had accounted for high death rates in all parts of the world are now controlled or preventable. Thus, we have made it possible for a large proportion of the population to live to old age. With the advent of penicillin, gonorrhea and syphilis, which had been major causes of infertility and habitual abortions, have been controlled to a significant degree. I consider it a major responsibility of The Endocrine Society, and its members, to assist in controlling this explosive growth of the population. Some of our members will, through their research on hormone production or mechanisms of hormone action, be able to make important con-
tributions to the world-wide efforts to control the population explosion. Others should be able and willing to assist by instructing individual patients or groups in methods of family planning.

The members of The Endocrine Society, with other biological and physical scientists, have for more than 20 years enjoyed the generous support of the public through tax dollars and voluntary contributions made through various health agencies. The public, probably with some justification, is now asking what we have done with the large amounts of money that have been poured into research since World War II. The public wants to know if our efforts in the laboratories or on the clinical research wards have resulted in anything of practical value. There is no doubt that we can answer such questions without any hesitation in the affirmative. But to describe the results of these studies, and how they may be of practical value, usually requires time and a thoughtful, clear presentation which the layman, without any scientific training, can understand. We must recognize that, notwithstanding the fact that the interested layman reads almost gullibly the science and medicine sections of the daily newspapers and weekly magazines, usually he neither understands our technical jargon nor is he prepared to grasp the reasoning upon which some of our studies are based. Taking the time to clarify these points may well result in a well-informed public giving even more intelligent and understanding support to our research efforts. I feel very strongly that we have a responsibility to interpret to the public the rationale and objectives of our studies.

I feel we are on firm ground when we say at this time of our Golden Anniversary, "We have lived and are living in the golden age of endocrinology." If I had one wish that could be granted, it would be that I might stand off in the wings with some of you at the One Hundredth Anniversary meeting of The Endocrine Society; that we would be able to understand the scientific papers presented at that meeting; and that we could say to ourselves, "Their greatly advanced knowledge of endocrinology is based upon sound foundations which were built during the first 50 years by students of endocrinology who were our good friends."

I thank you for granting me the privilege of serving you as President of The Endocrine Society during this important Golden Anniversary year. It has been a most satisfying experience, which I shall cherish. I thank Dr. Richard Payne and Mrs. Nona Lee Mattox for the tremendous service that they render to the Society. And for their unselfish efforts exerted on behalf of the Society, I thank all the Society's officers, Council members, and members of standing and ad hoc committees. To the Society's members and their associates, I express my gratitude for the important contributions they are making to our knowledge of endocrinology. To my secretary, Mrs. Edith Testa, I express my thanks, for the great assistance that she has given me during this year in discharging my responsibilities to the Society. Finally, I thank my wife and our children for the patience and understanding they have spent with them to serve the Society.

I salute you and wish you health, happiness and success in your studies and practice of endocrinology.

References