

# the NIH Record

U. S. DEPARTMENT OF  
HEALTH, EDUCATION, AND WELFARE

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PUBLIC HEALTH SERVICE

## Efforts of Many Bring Christmas Spirit to NIH

NIH Christmas Season programs, both sacred and secular, will be increasingly centered this pre-Christmas week in the 14-story Clinical Center.

NIH employees, although participating in their own observances, will join with representatives of many Washington area groups in bringing the spirit of Christmas to Clinical Center patients obliged to spend the holiday season away from home and family.

### Many Are Children

Many of these are children, for whom Christmas presents and special entertainments have been planned.

Patients' Christmas programs, arranged by the CC Patient Activities Section, will begin this (Wednesday) evening with the annual Christmas party for patients and their guests in the 14th floor assembly hall.

Dr. Clifton K. Himmelsbach, CC Associate Director, will present greetings from the staff. Music will be provided by the U. S. Air Force "Strolling Strings." Chaplain William R. Andrew will deliver the

(See CHRISTMAS, Page 3)

## Pacific Office of OIR Will Open January 1

The Pacific Office of the NIH Office of International Research is scheduled to begin operation in Tokyo January 1, following the arrival of its Chief, Dr. Heinz Specht, and the Administrative Officer, M. James Peters. Dr. Alfred A. Lazarus, Scientific Representative of the Pacific Office in New Delhi, is also scheduled to arrive at his new post shortly.

Dr. Specht is scheduled to depart with his family on December 23 and is due in Tokyo December 27. Mr. Peters will depart with his family on December 27, arriving in Tokyo December 30.

### Near American Embassy

Located in the KBK Building, the Pacific Office will be among other government buildings near the American Embassy in Tokyo. The building is leased by the State Department.

Correspondence for the Pacific Office should be addressed to The American Embassy, APO 94, San Francisco, Calif., or care of the Office of International Research here at NIH.

Correspondence for Dr. Lazarus in New Delhi should be addressed to The American Embassy, APO 959, Box ND, San Francisco, Calif.

The January activation of the Pacific Office rounds out OIR's

## Kennedy Foundation Presents Awards; Dr. Tjio Honored; Symposium at NIH

By Mary-Helen Emmons

A National Institutes of Health Visiting Scientist was one of six winners of the first International Prize Awards of the Joseph P. Kennedy, Jr. Foundation, presented by President John F. Kennedy December 6 at a celebrity-studded banquet at the Statler Hilton Hotel in Washington.

The awards ceremony was the climax of a day of scientific recognition of the achievements of medical research in the field of mental retardation.

### Shares Award

Dr. J. H. Tjio of the Laboratory of Experimental Pathology, National Institute of Arthritis and Metabolic Diseases, who was honored for his discovery of the exact number of chromosomes in man, shared an award of \$25,000 with Drs. Murray L. Barr, Head of the Department of Microscopic Anatomy, University of Ontario; and Jerome Lejeune, Director of the Department of Genetics, University of Paris.

Earlier in the day, the award winners participated with NIH and other distinguished scientists in a symposium at the NIH Clinical Center, "Research Approaches to the Problem of Mental Retardation," held in cooperation with the Kennedy Foundation.

### Medical Students Attend

In addition to scientists from NIH, PHS, and other Government and private research institutions, guests included 120 medical students from 38 Eastern colleges who were selected to attend because of their outstanding scholastic records.

The symposium guests were greeted by Dr. James A. Shannon,

(See FOUNDATION, Page 4)



Dr. J. H. Tjio receives award trophy from the President at the Joseph P. Kennedy, Jr. Foundation dinner.—Photo by Sam Silverman.

planned tri-continent program. Its European Office, in Paris, has been in operation since December 1961, and the Latin American Office, in Rio de Janeiro, has been functioning since last July 1.

## 7,000 Attend the Research Exhibit and Symposium

An analysis of attendance at the 12th Annual Research Equipment and Instrument Symposium, held here October 8-12, reveals that nearly 7,000 persons visited NIH for the dual event, including 64 from foreign countries.

The report was prepared and distributed by the Supply Management Branch, OD.

The Symposium and Instrumentation sessions were held in the Clinical Center auditorium. The Research Equipment Exhibit was displayed in Building 22. It in-

cluded exhibits by 68 of the leading manufacturers of instruments for laboratory and clinical research.

Altogether 4,516 persons visited the exhibit, 2,109 attended the symposium, and 227 attended the instrumentation sessions.

The SMB breakdown of attendance at the exhibit was as follows:

Representatives of hospitals, 320; colleges and universities, 630; foreign institutions, 56; NIH, 1,166; other Government agencies, 1,261; publications, 10; and miscellaneous, 1,073.



Trimming the tree is part of the Christmas fun. The tree is in the Clinical Center lobby. The tree-trimmer is Shelby Phillips of the CC Pharmacy Department.

### Yule, New Year Issues Combined

This issue of the *Record* combines the pre-Christmas and New Year's issues, as in prior years. Date of the next issue will be January 15.

To each of our readers, a Merry Christmas and a Happy New Year!

# the NIH Record

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NIH Record Office.....Bldg. 31, Rm. 5B41. Phone: 496-2125

Editor ..... E. K. Stabler

## Staff Correspondents

Elizabeth Clare, NCI; Tony Anastasi, NHI; Kathryn Mains, NIAID; Mary Henley, NIAMD; Marie Norris, NIDR; Lillie Theobald, NIMH; Bob Walters, NINDB; Elsie Farenthold, CC; Faye Heil, DBS; Mike Canning, DGMS; Helene Doying, DRFR; Dick Turlington, DRG; Robert Handy, DRS; Marianne Scoville, OAM.

## NEWS from PERSONNEL

### TEACHING MACHINE

A teaching machine with the capability of presenting training programs covering a range of diversified subjects has been used on an experimental basis by the Employee Development Section, PMB.

The machine was used because of a growing conviction among learning theorists that subject matter is learned more rapidly and completely when presented in "programmed" sequence.

### Majority Are Supervisors

The first demonstrations, held during November, attracted 30 NIH staff members, a majority of whom hold supervisory positions in grades GS-11 through Section 208 (g).

The subject of the first program was "Effective Management Practices." It was designed to demonstrate methods of saving time and reducing chances of error in many phases of the supervisor's work.

Advice was given on such topics as scheduling appointments, conducting meetings, handling reports, training subordinates, organizing for planning, defining problems and checking results.

### Accommodates One Person

The teaching machine, accommodating one person at a time, was located in a different building each week. Approximately 8 persons completed the course at each location by spending one hour per day on the machine.

The Employee Development section is now evaluating the usefulness of this machine and other vehicles for presenting subject matter in "programmed" form.

### CHRISTMAS HOLIDAY

Many NIH employees will enjoy the benefit of a two-day holiday for Christmas since the President des-

## DHEW Announces New WB Grade Pay Scales

New regular and laundry wage board pay scales have been announced by DHEW, effective January 9, for NIH employees in the Washington area. The new hourly rates for the Regular Wage Schedule are shown in the following table.

WB Grades	Step 1	Step 2	Step 3
1. ....	\$1.37	\$1.44	\$1.51
2. ....	1.60	1.68	1.76
3. ....	1.81	1.91	2.01
4. ....	2.04	2.15	2.26
5. ....	2.26	2.38	2.50
6. ....	2.38	2.50	2.63
7. ....	2.48	2.61	2.74
8. ....	2.59	2.73	2.87
9. ....	2.70	2.84	2.98
10. ....	2.81	2.96	3.11
11. ....	2.92	3.07	3.22
12. ....	3.12	3.28	3.44
13. ....	3.32	3.49	3.66
14. ....	3.54	3.73	3.92
15. ....	3.78	3.98	4.18
16. ....	4.03	4.24	4.45
17. ....	4.29	4.52	4.75

ignated Monday, December 24, as a holiday.

Employees who are directed to work on either or both days in order to maintain necessary services will be paid at the holiday rate which is twice the basic rate of compensation.

Employees who have Monday and/or Tuesday as scheduled days off will not lose the benefit of an extra holiday, as alternate holidays preceding and/or following their days off will be designated in accordance with regulations and HEW Personnel policies.

Individuals who are directed to work on days scheduled as their alternate holidays will be paid at the holiday rate.

You may call your I/D Personnel Officer for further information. Supervisors should refer to Chapter IV, Guide 4 of the Personnel Guide for Supervisors to answer specific questions on holiday leave.

## Special Job Opportunities

Medical Officer, (General Internal Medicine), GS-12 or 13, Clinical Center.

Secretary (Steno), GS-5 for position in New Delhi, India.

Guards, GS-3, are needed. The NIH Board of Examiners is now accepting applications for this position from non-veterans.

Secretary (Steno), GS-6, for position in Tokyo, Japan.

There are a number of Clerk-Typist and Clerk-Stenographer openings with the new Division of Research Facilities and Resources, located in the North Bethesda Office Center, 11420 Rockville Pike.

Further information is available from the Recruitment and Placement Section, Bldg. 1, Rm. 7. Phone, 496-6056.

## Carelessness Causes Xmas Fire Deaths; Precautions Listed

In the three days beginning at 6 p. m. Christmas Eve there were 77 fire deaths in this country last year, and 66 persons died in fires during a 3-day period last New Year's according to the National Board of Fire Underwriters. The 6-day total exceeded that of the previous year by 37.

For a Christmas season free from the tragedy of homes fires this year, NIH Fire Marshal Kenneth W. Gettings offers these 10 safety suggestions:

- When you choose your Christmas tree, select one which appears freshly cut. Feel the needles to make sure they are firmly attached.
- When you put the tree up, place it in the coolest part of the room. It should be as far as possible from radiators, heaters, and the fireplace.
- Use a tree stand which has a water container in which the trunk can rest. Most trees "drink" water fairly fast, so fill the water container daily.
- Christmas tree decorations should be flameproof. Use only decorations made of glass, metal or fire-resistant material.
- Electric trains should be set up away from the tree. A spark from the train could ignite dry pine needles.
- Use only electric lights to decorate the tree—never candles. Be sure to check lighting sets before placing them on the tree. Those with frayed wires should be discarded. When you buy a new set look for the UL tag or label of Underwriters' Laboratories, Inc.
- When you open presents on Christmas morning; put away gift

## Dr. Joseph Rall Named Intramural Research Director of NIAMD

Dr. Joseph E. Rall, Chief of the Clinical Endocrinology Branch of the National Institute of Arthritis and Metabolic Diseases since 1955, has been appointed NIAMD Director of Intramural Research. He succeeds Dr. DeWitt Stetten, Jr., who now heads the new Rutgers University Medical School.

In his new post Dr. Rall will direct the Institute's extensive program of fundamental research in the basic biomedical sciences and clinical investigations in arthritis, diabetes, gastrointestinal and endocrine disorders, obesity, disorders of the blood, bones, and liver, and other metabolic and inherited diseases.

Dr. Rall came to NIH in 1955 to be in charge of clinical research dealing with diabetes and diseases of the thyroid, pituitary, and other endocrine glands.

Previously he served for several years in various capacities at the Memorial Sloan-Kettering Institute for Cancer Research and the James Ewing Hospital, both in New York City.

### Research Is Recognized

A prominent endocrinologist, Dr. Rall has won wide recognition for his scientific accomplishments, including the Van Meter Prize Award in 1950 and the Flemming Award in 1958 for his contributions to the understanding of thyroid physiology and the treatment of thyroid diseases.

He is a member of the National Research Council, the American Society for Clinical Investigation, American Thyroid Association, the American Physiological Society, the Endocrine Society and the Association of American Physicians.

Born in Naperville, Ill., Dr. Rall received his B. A. at North Central College, his M. S. and M. D. degrees at Northwestern University Medical School, and his Ph. D. at the University of Minnesota. He served in the U. S. Army Medical Corps from 1946-1948.

wrappings you intend to keep. Gather up other wrappings and throw them away immediately after the presents are opened.

• The lights on Christmas trees should be turned off when everyone is away from home.

• When the needles start falling, take the tree down immediately and discard it outdoors.

• Even if the tree is still fresh, plan now to dismantle it the day after New Year's.



Dr. Rall

## CHRISTMAS

(Continued from Page 1)

invocation and Father Francis Veith will give the benediction.

Dr. James A. Shannon, Director of NIH, and Dr. Jack Masur, Director of the Clinical Center, will extend greetings to employees at a Christmas gathering in the Clinical Center auditorium tomorrow morning at 11:30.

The program will include audience participation in carol singing, "The Meaning of Christmas," narrated by Daniel G. Rice, ORI; and choral singing by a group of NIH employees.

Tomorrow evening topnotch professionals from the American Guild of Variety Artists will entertain the patients at a Holiday Extravaganza, with music ranging from special Christmas numbers to jazz.

### Open House Scheduled

The Patients' Open House Christmas Party is scheduled for Friday afternoon. Friends and relatives, as well as members of the patient-care staff, are invited to join the patients in the 14th floor assembly hall to celebrate with music, punch, and cookies. During the evening, caroling groups from nearby churches and schools will visit all nursing units.

On Saturday afternoon, Santa Claus himself, accompanied by Mrs. Santa Claus, will delight CC children patients with gifts and refreshments at a special party in the solarium.

Santa will visit the rooms of children who are not able to attend. Mr. and Mrs. Santa Claus are being sponsored by the Clifton Park Citizens' Association.

In addition to Hanukkah, the Festival of Lights, on Friday, and the regular Christmas services on Sunday, there will be Christmas Eve Protestant carol and worship services at 6:30 p.m. in the Chapel and Catholic carol services at 11:45 p.m. to be followed by midnight mass. There will also be two masses in the Chapel Christmas morning.

### Children to Celebrate

New Year's celebrations will begin Friday, December 28, with the Children's New Year's Party, sponsored this year by the Veterans of Foreign Wars from College Park, Md. On New Year's Eve there will be a Kaffee Klatsch for all CC patients featuring a community sing, games, eggnog, and coffee.

New Year's Day the patients will view the Rose Bowl Parade and the Sugar Bowl Game in the 14th floor solarium.

An enlarged color-TV screen is being provided for these events by the Television Engineering Unit of the CC Clinical and Professional Education Branch, with the cooperation of Willard Whitehouse.

# Renovated Print Plant Offers Efficient, Time-Saving Service

By George J. Mannina

In its enlarged and newly remodeled quarters in Building 31, the Printing and Reproduction Section, OSB-OD, is now equipped and staffed to meet all but the most specialized printing needs of NIH—and at a considerable saving of time and money.

NIH employees interested in seeing the new equipment in operation are invited to an open house tomorrow (Thursday) in the basement level of the A wing, between 1 and 4 p. m.

Visitors are requested by Fred Caponiti, Chief of the P and R Section, to come to Rm. B1A-47. From this point they will be conducted, in groups, on tours of the Printing Plant area. Refreshments will be served.

The expanded Section, Mr. Caponiti said, will be able to handle all NIH printing requirements except those which by their nature must still be procured from the Government Printing Office or commercial sources. These include letterpress and other specialty printing, informational material requiring sales copies and depository library distribution, and long-run work which would exceed the economical maximum of the new equipment.

### Capacity Stepped Up

The new presses and other new equipment will permit the Section to make as many as 56,000 production units of any single requirement (a production unit is one 8 x 10½ page).

To operate the new equipment and meet the increasing demands for its services—already up 35 percent—the Printing and Reproduction Section staff has been increased from 29 to 53—almost all

of whom are directly involved in production.

By virtue of its new facilities, P and R is now able to provide, rapidly and efficiently, a much greater variety of printing and reproduction services.

### Production Speeded

Among these is a photo-copying service, using a Copyflo continuous printer. Its time-saving capability is indicated by the fact that it can print or run off in a comparatively short time two or three copies of, say, an urgently needed 500-page document.

Other equipment includes facilities for making metal printing plates for work requiring quality not attainable with paper masters, equipment for the reproduction of half-tones (photographs), new offset printing presses, including one capable of printing four pages at a time; a collator that permits saddle-stitch work; a folding machine, and other miscellaneous equipment.

To accommodate the new facilities considerably more space was essential. In its old location, P and R occupied 2,199 square feet of space. Its present plant utilizes 6,395 square feet, almost all of which is used in actual production, with practically no room for storage.

(See PRINT PLANT, Page 8)

# Evelyn L. Attix Elected President Of R&W for '63

Evelyn L. Attix, Administrative Officer for Research, National Heart Institute, has been elected President of the Recreation and Welfare Association of NIH. Miss Attix, who succeeds James B. Davis, Chief of the Supply Management Branch, OD, was elected by mail ballot following the annual R&W meeting December 4 in Wilson Hall.

Other officers elected for the coming year are Clair Lacey, Assistant Executive Officer, NIAMD, 1st Vice President; Richard Snyder, Head of the Administrative Services Section, Operations Branch, NHI, 2nd Vice President; Nellie McLeish, Employee Relations Officer, PMB, Secretary; and Gerald Osborne, Budget Analyst, NCI, Treasurer.

### Nominated by Committee

The newly elected officers were chosen from a slate presented to the members of the Association by the Nominating Committee composed of John H. Reeder, NHI, Chairman; Dorothy Horlander, CC; Philip Janus, NHI; Dr. Walter Newton, NIAID; and Eckart Wipf, NINDB.

Mr. Davis presided at the meeting and presented the annual report. He pointed out that the Association is continuing to grow along with NIH and that during the past year has adjusted and augmented its program to meet the needs of members, NIH employees, and NIH management within the R&W area of responsibility.

Mr. Davis also reported that the by-laws are constantly under review to determine their adequacy and that no changes were considered necessary this year.

Laurence E. Ring, R&W General Manager, reported receipts of \$44,666.43 for the 12-month period ending September 30, 1962, and disbursements of \$38,118.52, resulting in a net profit to the Association of \$6,547.91. A total of \$6,983.69 was transferred to the Patient Welfare Fund.

Several members won door prizes.

# Dr. Irving Wright Named To NHI Advisory Council

Dr. Irving S. Wright, Professor of Clinical Medicine at Cornell University Medical College, New York City, has been appointed to fill a vacancy on the National Advisory Heart Council.

The appointment is Dr. Wright's second to the Heart Council. He previously served from 1954 to 1958.



Families and friends of a number of NIH employees are going to find those too-pretty-to-open gifts under their Christmas trees as a result of gift-wrapping instruction received from Linda-Ann Jenks of NHI (right). Miss Jenks, a former gift-wrapping demonstrator, has been conducting classes Monday and Wednesday evenings.—Photo by Lou Cook.

# Research at NIH Contributes To Knowledge of Retardation

Following are brief summaries of papers presented at the Scientific Meeting on Mental Retardation held here December 6 with the cooperation of the Joseph P. Kennedy, Jr. Foundation. The paper presented by Dr. J. H. Tjio, Kennedy Foundation award-winner, appears on Pages 5 and 6 of this issue.

**The Role of Lipids in the Central Nervous System**, by Dr. Roscoe O. Brady, Head of the Section on Lipid Chemistry, NINDB.

Dr. Brady outlined the role of some of the complex lipids in the central nervous system. Of particular interest in current research are the glycolipids which are important units of nerve cell structure and are involved in a number of diseases of the nervous system—such as some of the demyelinating diseases.

Dr. Brady told of studies on the immunochemical properties of one group of glycolipids, the gangliosides, in which the investigators were able to produce specific antibodies against gangliosides. These studies, he indicated, add evidence to the theory that multiple sclerosis may be an auto-immune disease in which the afflicted are sensitive to their own gangliosides.

**Congenital Galactosemia**, by Dr. Stanton Segal of the Clinical Endocrinology Branch, NIAMD.

Dr. Segal spoke on his recent study of the formation of cataracts—one of the signs of human congenital galactosemia—in offspring of rats fed a high galactose diet. His finding of a high degree of cataract formation supports previous suggestions of placental transfer of galactose, and also suggests the importance of a galactose-free diet for the pregnant woman carrying a probable galactosemic fetus.

Dr. Segal also reported on recent studies of several patients who had the characteristic syndrome of con-



Sargent Shriver, Director of the Peace Corps and Executive Director of the Kennedy Foundation, stands beside the First Lady at the head table. He gave the welcoming address.

genital galactosemia as infants but who were capable of oxidizing radioactively-labeled galactose to carbon dioxide *in vivo* in a near-normal fashion.

**Studies on the Mechanism of the Enzymatic Conversion of Phenylalanine to Tyrosine**, by Dr. Seymour Kaufman, Chief of the Section on Cellular Regulatory Mechanisms, NIMH.

Dr. Kaufman discussed a hydroxylation reaction, the enzymatic oxidation of the aromatic amino acid phenylalanine to tyrosine, which fails to take place in the liver of phenylketonuria victims.

NIMH studies have confirmed previous reports that an enzyme is missing in the liver of PKU victims; further research into the role played by enzymes in this hydroxy-

(See RETARDATION, Page 7)



Caught by the camera in friendly conference between sessions of the symposium at NIH are (left to right) Dr. James A. Shannon, Director of NIH; Dr. Luther L. Terry, PHS Surgeon General; and Dr. Seymour Kety, Chief of the Laboratory of Clinical Science, NIMH.

## FOUNDATION

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Director of NIH; Dr. Luther L. Terry, PHS Surgeon General; Dr. Richard L. Masland, Director of the National Institute of Neurological Diseases and Blindness; and Dr. Robert H. Felix, Director of the National Institute of Mental Health.

Presiding officer at the scientific meeting was Dr. Seymour Kety, Chief of the Laboratory of Clinical Science, NIMH.

Dr. Tjio's paper, "Chromosomes in Congenital Disorders," was one of seven presented at the symposium. It is reproduced on Pages 5 and 6 of this issue.

### Other Papers Listed

Other papers and their authors were "The Role of Lipids in the Central Nervous System," Dr. Roscoe O. Brady, Head of the Section on Lipid Chemistry, NINDB; "Congenital Galactosemia," Dr. Stanton Segal, Clinical Endocrinology Branch, NIAMD; and "Studies on the Mechanism of the Enzymatic Conversion of Phenylalanine to Tyrosine," Dr. Seymour Kaufman, Chief of the Section on Cellular Regulatory Mechanisms, NIMH.

Also, "Mental Incompetence in Children with Temporal Lobe Disease," Dr. Maitland Baldwin, Clinical Director, NINDB; "Some Neuropsychological Studies of Significance to Problems of Mental Retardation," Dr. H. Enger Rosvold, Chief of the Section on Animal Behavior, NIMH; and "Mental Retardation: Concept and Certain Clinical Aspects," Dr. Anatole S. Dekaban, Chief of the Section on Developmental Neurology, NINDB.

Following the symposium, Dr. Tjio and other Foundation award winners met with Mr. Kennedy at the White House prior to the awards banquet at the Statler Hilton.

### Stevenson Presides

Since four of the winners were foreign scientists, Adlai E. Stevenson, United States Ambassador to the United Nations, was invited to be master of ceremonies at the banquet.

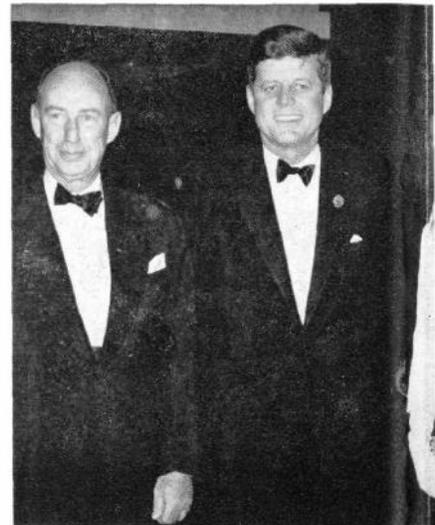
The welcoming address was delivered by Sargent Shriver, Director of the Peace Corps and Executive Director of the Kennedy Foundation. Mrs. Shriver, the President's sister, is Executive Vice President of the Foundation.

In addition to monetary gifts presented by the President, each award winner received a special trophy—a 16-inch Gothic form executed in Steuben glass and mounted on an inscribed sterling silver base.

The crystal form is engraved with a figure of the Seraph Ra-

(See FOUNDATION, Page 7)

## 'AMONG THOSE



Arriving for the Kennedy Foundation awards, U.S. Ambassador to the United Nations, President Lyndon B. Johnson.—Dinner Photos



Attentive listeners at the symposium in progress (l. to r.): Dr. Richard L. Masland, Director of NIH; Dr. Luther L. Terry, PHS Surgeon General; and Dr. Seymour Kety, Chief of the Laboratory of Clinical Science, NIMH.—Symposium photos by Bob P.



In conversation at the head table (l. to r.): President Lyndon B. Johnson, movie star Burt Lancaster, and other dignitaries.—Symposium photos by Bob P.

**PRESENT WERE—'**



At dinner are (l. to r.): Adlai Stevenson, the President and Mrs. Kennedy, and Vice President Lyndon B. Johnson and Sam Silverman.



Seated in the NIH Clinical Center auditorium are (l. to r.): Dr. James A. Shannon, Director of the National Institute of Mental Health; Dr. Jack Masur, Director of the Laboratory of Clinical Neurophysiology; and Dr. Humphrey.



Ambassador Adlai Stevenson, Mrs. Lyndon B. Johnson, Mrs. Sargent Shriver, the President's special representative to the Kennedy Foundation.

**NIAMD Award Winner Renowned for Research On Cells, Chromosomes**

A renowned cytologist, Dr. J. H. Tjio, winner of one of the Kennedy Foundation awards, has been associated with the National Institute of Arthritis and Metabolic Diseases since 1959. As a Visiting Scientist he has continued his work on cytogenetics in NIAMD's Laboratory of Experimental Pathology, Section on Histochemistry.

Dr. Tjio has made significant contributions in the field of cell genetics and is especially well known for his work on human chromosomes.

It was in 1956, while collaborating with Dr. Albert Levan of the Institute of Genetics in Lund, Sweden, that he helped determine the correct chromosomal content of the normal human cell.

**Disproves Prior Theory**

Previously the number of chromosomes was believed to be 48, but Dr. Tjio's work showed that actually each cell contains 46 chromosomes. The chromosomes lie within the nucleus of the cell, and bear the genes which determine the basic processes of life.

Presently concerned with studies of many of the chromosomal abnormalities now associated with certain diseases, Dr. Tjio has worked on disorders such as Down's syndrome. Better known as mongolism, this disorder which is always accompanied by mental retardation, is characterized by the presence of an extra chromosome, in addition to the normal complement present in each body cell.

The extra chromosome is caused by some defect in the mechanism by which hereditary material is transmitted from parent to offspring.

**Other Syndromes Studied**

Other studies of this nature with which Dr. Tjio has been concerned include work on the chromosomal complement of patients with Marfan's syndrome, Klinefelter's syndrome and Turner's syndrome, which are usually accompanied by some evidence of mental retardation.

In collaboration with National Cancer Institute staff members, Dr. Tjio has also participated in studies on the chromosomal complement of patients with neoplastic diseases such as leukemia.

Since patients with Down's syndrome suffer from leukemia more often than the general population, studies have been undertaken to determine whether a common genetic denominator exists between chromosomal abnormality and susceptibility to leukemia.

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**Human Cytogenetics Research Expanded by Tjio Discovery**

Following is the paper, "Congenital Disorders and Chromosomes," presented by Dr. J. H. Tjio, NIAMD, at the Scientific Meeting on Mental Retardation held here December 6 in cooperation with the Joseph P. Kennedy, Jr. Foundation.

THE development of improved techniques in tissue culture, and in cytological investigation generally, resulted in the discovery in 1956 that the diploid human chromosome number was 46—and not 48, as had long been accepted. The field of human cytogenetics has since greatly expanded. Continued improvement in methodology has led to confirmation of the precise chromosome number, and reasonably accurate analysis of the human chromosome complement has now been accomplished.

A number of tissues, including skin, muscle, bone marrow, and peripheral leukocytes, can be used for studying the chromosomes of human cells. Accumulation of cells in metaphase is brought about by colchicine, and the cells are then swollen by hypotonic treatment to allow for chromosome spreading. Through photomicrography, the chromosomes may then be faithfully reproduced.

**Found in Pairs**

Twenty-two of the 23 pairs of human chromosomes are called autosomes, and can be distinguished from one another by their relative length, and by the position of their constriction, or centromere. By convention, they are arranged in approximately descending order of size, ranging from the larger chromosomes at the lower numbered position, to the smaller chromosomes at positions 21 and 22. Some of these chromosomes can be identified individually, as numbers 1, 2, and 3—also 16; while others can only be assigned to



Dr. Leonard A. Scheele, Surgeon General of the Public Health Service, 1948-52, chats with Dr. J. H. Tjio.

groups, as the 4-5 and 19-20 groups.

The 23rd pair of chromosomes are the sex chromosomes which are either alike, and termed XX in the female; or unlike, and termed XY in the male. The X chromosome is a medium-sized metacentric chromosome resembling members of the 6-12 group from which it is not easily distinguished by ordinary cytogenetic methods. However, recent autoradiographic studies have succeeded in demonstrating differential labeling of one of the X chromosomes in normal females and has enabled its more precise recognition. The Y chromosome is a small acrocentric that can be distinguished from pairs 21

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The Secretary of Health, Education, and Welfare and Mrs. Anthony J. Celebrezze are pictured at the awards dinner.

# Human Cytogenetics Research Expanded by Tjio Discovery

(Continued from Page 5)

and 22 by its size and appearance.

The normal diploid number of chromosomes is maintained in succeeding generations of somatic cells by the process of mitosis, while during maturation of the gametes the chromosome number is reduced by half of the process of meiosis. Fertilization restores the diploid number in the zygote, by the union of the male and female haploid gametes.

### 33 Aberrations Recognized

In addition to defining the normal chromosome complement in man, cytogenetic research workers have elucidated a host of abnormal chromosomal conditions. Since the first report on Down's syndrome, or mongolism, appeared in 1959, at least 33 distinct varieties of chromosomal aberrations have been recognized. These may involve only autosomes, only sex chromosomes, or both in combination.

At the present time, the activities of our laboratory are focused on the study of the chromosomal constitution of patients with developmental and congenital defects, in collaboration with investigators of the several Institutes of the National Institutes of Health and private clinicians. Also, with the National Cancer Institute, we are studying the chromosomes of malignant cells of patients with leukemia and related diseases.

Let us consider more specifically a few of the developmental defects which have been found to be related to chromosomal anomalies.

### Down's Syndrome Discussed

Down's syndrome, with its characteristic faces, associated cardiac defects, and severe mental retardation, involves an abnormality of the autosomes. Three, instead of two, chromosomes 21's are seen. This may be called simple trisomy 21.

It is generally accepted that the extra chromosome present in cases of Down's syndrome has arisen as a result of an error, known as nondisjunction, or nonseparation, of chromosomes. It may occur during gametogenesis and is characterized by the failure of the members of a pair of homologous chromosomes to separate during anaphase. It is possible for nondisjunction to occur at the first or second meiotic division, during gamete formation, or at both, and it could occur in either or both parents.

Data on maternal age of patients with Down's syndrome suggests that nondisjunction may be more common in females and that there may be factors operating in the aging ovary which lead to nondisjunction. As shown by Collman and Stoller in 1960, the incidence of the syndrome in the population-at-large of Victoria, Australia, is one

in 600. But for mothers over 45 years of age, the incidence is one in 46.

Another form of Down's syndrome occurs which seems to be familial in type. These cases have only 46 chromosomes, the normal number in the human cell. The extra chromosome seen in simple trisomy 21 is translocated onto another chromosome, usually to one of the 13-15 group, or of the 21-22 group. Either parent of such cases may carry the abnormal translocated chromosome and have 45 chromosomes including the translocated chromosome. While they are phenotypically normal, there is an unusual tendency for these parents to produce offspring with Down's syndrome.

### Precise Determination Important

Thus it is of considerable importance in a given case of Down's syndrome to determine the precise chromosomal abnormality, as the trisomic type is not familial, whereas the translocation type may be inherited.

In considering the abnormalities of the sex chromosomes in man we must first note that in normal females a large proportion of the nuclei from any tissue contain a small dark body called the nuclear chromatin body which lies applied against the nuclear membrane and stains specifically like DNA. These cells are said to be chromatin positive. Male cell nuclei do not usually contain the nuclear chromatin and are therefore chromatin negative. Yet nuclei of cells from males with Klinefelter's syndrome are found to be chromatin positive while females with Turner's syndrome are chromatin negative. There was therefore a discrepancy between nuclear sex and somatic appearance. What of the sex chromosome constitution of these patients?

### X Chromosomes Significant

Klinefelter's syndrome is characterized by atrophy of the testes, often accompanied by mental retardation, and sometimes by gynecomastia. In these individuals, in addition to the usual X and Y chromosomes an additional X chromosome was found. In the male population 1-2.5 per 1,000 were found to have this characteristic XXY constitution. Among mentally defective males the incidence has been found to be considerably higher—20 per 1,000. Patients with Klinefelter's syndrome have been discovered who have 3 and even 4X chromosomes and the degree of mental deficiency seems to increase as the number of X chromosomes increases.

Patients with Turner's syndrome are characterized by primary amenorrhea and short stature. In contrast to Klinefelter's syndrome where an extra X chromosome is

present these individuals lack an X chromosome, having an XO constitution instead of the normal female XX constitution. On laparotomy scant ovarian stroma is generally found and the syndrome has been named ovarian dysgenesis. Mental retardation is seldom found in these patients.

Another group of phenotypic females with menstrual irregularities have 47 chromosomes, and a triple-X constitution, or 48 chromosomes and a quadruple-X constitution. Many such females have been detected in institutions for mental defectives. Some menstruate normally and some have had normal children.

In most chromosomal abnormalities reported thus far, all of the cells of a given individual are of the same karyotype. But increasingly the phenomenon of mosaicism, or karyotypic variation from cell to cell in the same individual, is being found. For example, mosaic Klinefelter's with XXY/XXXY, and XXY/XXXXY karyotypes have been reported.

### Produces Mosaic Individuals

An error similar to nondisjunction during gametogenesis can occur at a mitotic division at any stage subsequent to fertilization. If the products of such an error in division are viable and are included in the embryo, this may lead to the production of a mosaic individual whose body is composed of two or more karyotypes, each with a different number of chromosomes.

If the error occurs at the first division of a normal zygote, a 45/47 chromosomal mosaic will be formed; but the same error at a subsequent division would lead to the production of a 45/46/47 chromosome mosaic. The degree of admixture of cells with different chromosome numbers will depend on the stage of development at which the error occurs, and it is conceivable that one cell line could be localized in a particular tissue or organ.

### Influences Clinical Condition

The composition of the zygote, the nature of the error, and the stage at which it occurs will also undoubtedly influence the clinical condition of the patient.

It must be stressed at this point that changes in chromosome number and morphology are by no means the only genetic factors involved in the production of congenital malformations.

Most human congenital disease is the result of gene mutations, or, in molecular terms, of the alteration of the normal base pair sequence of DNA. Because genes as such are beyond the resolving power of the light microscope, they cannot be studied through chromosomal visualization. In chromosome

## Dr. Israel Light Named DRG Projects Officer

Dr. Israel Light, Special Project Officer in the Office of Resource Development, Bureau of State Services, has been named a Special Projects Officer for the Division of Research Grants. Dr. Light will work under the direction of the Assistant Chief of the Division.

Dr. Light's previous experience includes eight years as publications writer or as information officer with NIH and BSS. He was originator of the National Cancer Institute conference series for science teachers on development of cancer research information.

He also served as Assistant Chief of Special Publications in the Bureau of Labor Statistics, Department of Labor.

Dr. Light attended Harvard and Columbia Universities, the University of Cincinnati, New York City College, and the American University. He holds a Ph. D. degree in education and is a member of the American Medical Writers Association and the Society of Technical Writers and Publishers.

analysis, we are dealing with groups of genes, and the clinical syndromes resulting from chromosomal alterations are doubtless caused by the effects of many genes functioning under abnormal conditions.

Since 1959, many syndromes have been described which were found to be associated with significant chromosomal abnormalities. We have mentioned only a few of these. But the description of abnormal chromosomal complements and their association with clinical pictures is only the beginning, for this chromosome description in no way tells us how the disease state was produced. How, for example, do we go from trisomy 21 to the complex signs and symptoms of Down's syndrome? It is clear that this is a new field of inquiry in developmental biology, and is one in which biochemical concepts and techniques will no doubt play a leading role.

### Potentialities Unknown

The cytogenetic study of man has now entered the state that *Drosophila* genetics entered 40 years ago. The specific potentialities inherent in man as material for cytologic investigations are not yet known. In some respects, the *Drosophila* geneticists were at an advantage; their organism had only four pairs of chromosomes, and a very rapid generation time. But man has his compensations. The possibility of explanting cells from the human soma into tissue culture and manipulating these cells *ad lib* is one such advantage. Others will undoubtedly be found, as the several lines of research now started are pursued.

## FOUNDATION

(Continued from Page 4)

phael holding a child in his arms. Raphael, whose name means "God Heals," is the patron angel of science and love. It was Raphael who stirred the waters of the Biblical Pool of Bethesda.

According to legend, the pool was visited by the sick, the blind, and the maimed, and the first person to bathe in the pool after the waters were stirred was cured of his malady. The two pools in the front of the Clinical Center appropriately bear the same name.

Presentation of each award by the President was preceded by a film vignette showing the scientific achievements of the winner.

### Cited for Achievements

Dr. Barr, one of the scientists who shared an award with Dr. Tjio, was cited for his discovery of the sex chromatin. The other scientist, Dr. Lejeune, was honored for his discovery of chromosomal abnormality in mongolism.

In addition to their personal awards, Drs. Barr and Lejeune each received \$25,000 to support their research programs. Dr. Tjio did not receive a similar grant because his work is supported by NIH.

Other winners were Dr. Samuel A. Kirk, Director of the Institute for Research on Exceptional Children, University of Illinois, who received \$25,000 for "his vision, inspiration, dedication, and outstanding services in mental retardation."

Another \$25,000 winner was Dr. Ivar Asbjorn Folling, retired Chief of the University Hospital Clinic, Oslo, Norway, who opened "a new era in the study of mental retardation with his discovery of the disease, phenylketonuria, or PKU."

### \$50,000 Award

An award of \$50,000 went to the National Association for Retarded Children for "its outstanding role in awakening the Nation to the problem of mental retardation and for proving in countless ways that the retarded can be helped."

Among the 750 guests at the banquet were Mrs. Kennedy, Vice President and Mrs. Lyndon B. Johnson, the President's mother, Mrs. Joseph P. Kennedy; Attorney General Robert F. Kennedy, Mrs. Shriver, and movie stars Judy Garland and Burt Lancaster.

Following the dinner, the guests previewed a new motion picture, "A Child Is Waiting," starring Miss Garland and Mr. Lancaster. Filmed with the cooperation of the California State Department of Mental Hygiene and the Pacific State Hospital in Pomona, Calif., the picture deals with the treat-

## SCIENTIFIC PRESENTATIONS ARE RECORDED



In a little room adjoining the Clinical Center auditorium, John T. Romine of the Photography Section, DRS, records portions of the scientific papers as presented at the symposium on mental retardation. The tape recordings will be synchronized with motion pictures taken of the speakers, for sound-film reproduction.—Photo by Bob Pumphrey.

## RETARDATION

(Continued from Page 4)

lation reaction has established with certainty that the missing enzyme is the hydroxylase itself.

**Mental Incompetence in Children with Temporal Lobe Disease**, by Dr. Maitland Baldwin, Clinical Director, NINDB.

Dr. Baldwin described some of the recent studies in the Surgical Neurology Branch.

He said that current animal and clinical research has shown that cooling the surface of the exposed brain with a low-temperature fluid appears to enable an anti-seizure control for long periods of time. So far only two human patients have been successfully treated and Dr. Baldwin cautioned that statistical significance cannot, as yet, be attached to the results. He emphasized that research continues in this field.

**Some Neuropsychological Studies of Significance to Problems of Mental Retardation**, by Dr. H. Enger Rosvold, Chief of the Section on Animal Behavior, NIMH.

Dr. Rosvold reported on a number of neuropsychological studies relevant to mental retardation. NIMH studies on monkeys have not

ment and training of retarded children.

The Joseph P. Kennedy, Jr. Foundation was established in 1946 by former Ambassador Joseph P. Kennedy as a memorial to his son, the President's older brother, who was killed on a mission against a V-2 rocket base during World War II.

revealed any one structure in the brain which, if removed, will produce the general dysfunction characteristic of mental retardation.

Investigators have found that removing tissue from various sections of the posterior association cortex can cause deficiencies in visual, auditory and tactile behavior, but the experimental animals seem to recover these abilities. Consequently, research is focusing on an attempt to discover where in the cortex such recovery takes place.

**Mental Retardation: Concept and Certain Clinical Aspects**, by Dr. Anatole S. Dekaban, Chief of the Section on Developmental Neurology, NINDB.

Following a series of talks that dealt largely with basic research developments that have been valuable, if unexpected, contributions to advancing the understanding of mental retardation, the paper by Dr. Dekaban was devoted to "an attempt to define more precisely some of the clinical problems in mental retardation."

As the final speaker presenting information on work in NIH laboratories, Dr. Dekaban reemphasized the underlying theme of the Scientific Meeting in remarks directed to the medical students in the audience. "Brain research in general and mental retardation in particular is a wide field in which many discoveries are well hidden, but many others are within easy reach," he said.

Dr. Dekaban concluded with expression of the hope that the younger population would be stimulated to enter the field and help elucidate these problems.

## Striking Abnormalities In Tooth Development Produced by Rat Virus

Abnormal tooth structure similar to those seen in human Mongoloid patients have been produced in hamsters by Dr. Paul N. Baer of the Clinical Investigations Branch, National Institute of Dental Research, and Dr. Lawrence Kilham of the Dartmouth University Medical School.

Following inoculation of Kilham rat virus (originally isolated by Dr. Kilham from spontaneous rat tumors) during the first week of life, Syrian hamsters developed periodontal lesions and other dental abnormalities.

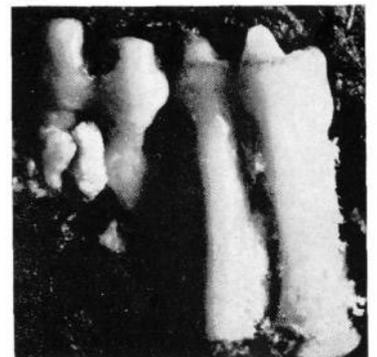
The study by these investigators demonstrated that in addition to severe alveolar bone loss and periodontal tissue destruction in hamsters infected with the Kilham rat virus, there occurred a striking abnormality of tooth development. This was characterized principally by small crowns and roots (microdontia) and frequent supernumerary formations.

### Further Study Justified

While the principal finding of an earlier study by Dr. Kilham was the demonstration of a relationship between the virus and a syndrome of abnormalities in hamsters that resembled Mongolism in man, the suggestive clinical evidence reported by an NIDR grantee last year that periodontal disease is prevalent in the Mongoloid child justified this further experimental investigation.

These more recent findings emphasize the importance of further clinical studies to clarify the etiologic relationship of Mongolism in man to oral-dental abnormalities.

A report on the study, "Rat Virus and Periodontal Diseases," by Drs. Baer and Kilham appears in a recent issue of "Oral Surgery, Oral Medicine, and Oral Pathology."



The tooth at left is a second molar from a hamster inoculated with Kilham rat virus, showing normal crown development but distorted roots. Tooth beside it is a normal second molar from a control animal.

## County Christmas Tree Pickup Set for Jan. 5

The Montgomery County Fire Marshal has announced a post-Christmas, County-wide round-up of discarded Christmas trees, to be undertaken this year with the cooperation of Boy Scouts in every community.

On Saturday morning, January 5, the Scouts will pick up any Christmas tree placed at the street side of residential properties, according to the announcement. The trees will be transported to a rural area near Rockville and burned in a mammoth bonfire that evening at 7 o'clock.

Home owners of the do-it-yourself school may take their old trees to the nearest Fire Station for disposal, prior to 2 p. m. of the same day.

Why are firemen and Scouts providing this service? Because cut Christmas trees increasingly become fire hazards in the home, that's why. And the Fire Marshal says he hopes you won't forget it.

## PRINT PLANT

(Continued from Page 3)

A major plant modification, essential to the efficient operation of the new equipment, required the installation of a special air-conditioning system for humidity control. This was necessary to avoid operational difficulties, since paper will not "feed" properly when the humidity is either too high or low.

Originally established in 1951 in the Division of Research Grants, the plant's primary responsibility was the reproduction of copies of the various grant and fellowship applications for the Division, and other work as time permitted.

This rarely occurred, however, as the work for DRG consumed most of the time and virtually all of the potential of the limited plant facilities.

### Extra Work 'Farmed Out'

As a result, work for Institutes and other Divisions had to be "farmed out" to the Departmental Printing Plant downtown, to the Printing Industry at the USPHS Hospital in Lexington, Ky., and the Government Printing Office—a costly procedure that seldom met the urgent needs of NIH research programs on a timely basis.

The expanded printing facilities now in operation not only will enable the Printing and Reproduction Section to handle all work formerly produced in the old plant, but also that formerly procured through the Departmental plant and the Lexington Hospital Printing Industry.

Mr. Caponiti estimates the new equipment will in the long run pay for itself many times over.

His office, Mr. Caponiti said, will

## A HARBINGER OF WHAT'S TO COME?



During the first real snow of the season, December 6, this car got stuck in the snow off Center Drive in the rear of Building 2. The driver, en route to a Civil Service exam, mistook the snow covered pedestrian walkway for the entrance to Parking Lot 4A. Pfc. Averitte H. Corley of the NIH Guard Force prepares to pull the car out.—Photo by Lou Cook.

### Cost of Haircuts Goes Up—5c

The increased cost of living has invaded the Clinical Center's barber shop—but not severely. Effective January 2, the price of haircuts will be stepped up from \$1.25 to \$1.30. Prices on all other services in the shop will not be changed.

distribute shortly a policy and procedures memorandum prescribing procedures to be followed in connection with printing services. This will provide for the use of two requisitions. One, PHS-3952, will be for use in ordering reproduction of all material required for the grant review processes. The other, PHS-3000, will be used for all other printing and related services.

The prime responsibility of his office, he pointed out, not only is to provide printing services here at NIH but also to offer advice and assistance in all programs requiring all types of printing, no matter where it is procured.

One final phase of the new operation, he added, should be accomplished in from five to six months. This is the installation of equipment, for which space is available, to provide a mechanical addressing and mailing service, now obtained from the Departmental plant.

Upon its installation, all NIH mailing keys will be transferred from the Departmental plant to NIH—again at a substantial saving in time, effort, and money.

*Pictures of the plant's remodeled quarters and new equipment will appear in a subsequent issue.*

## AWARD WINNER

(Continued from Page 5)

A Dutch citizen, Dr. Tjio was born in Soemedang, Java, now Indonesia, and educated in Dutch schools. He was on the Agronomic Faculty in Bogor, Indonesia, from which he graduated as an agronomist in 1941. As a cytologist at the Botanical Institute in Bogor, he worked on the cytogenetics of tuber-bearing *Solanum spp.* as part of a potato breeding program which resulted in the production of a fertile hybrid through chromosome doubling with colchicine.

### Works in Many Countries

With a fellowship from the Government of Holland, between 1946-48, Dr. Tjio devoted himself to advanced studies of cytogenetics at the Cytogenetics Laboratory of the Royal Veterinary and Agricultural College in Copenhagen, Denmark.

At the invitation of the Government of Spain, Dr. Tjio organized and directed the Cytogenetics Department of the Estacion Experimental de Aula Dei in Zaragoza from 1949-1959, where he was also engaged in studies of cytogenetic problems of plant breeding.

During this period he spent his summer leaves in studies at the Genetic Institute in Lund, where he worked on the chromosomes of barley mutants, chromosome cytology of healthy and malignant tissues of mouse, rat, and man, and of tissue cultures of man.

During the summer of 1957, Dr. Tjio was associated with Dr. T. T. Puck of the Department of Bio-

## Dental Institute Names Lillian A. Gluckman as Information Officer

Lillian A. Gluckman has been appointed Information Officer of the National Institute of Dental Research, Dr. Francis A. Arnold, Jr., Institute Director, announced recently.

Mrs. Gluckman joined NIH last May and was assigned initially to the Information Office of the Division of General Medical Sciences.

From 1957 until the spring of 1962, she was Director of the Medical News Bureau of the University of Miami School of Medicine, Coral Gables, Fla.

In this connection, Mrs. Gluckman was also for three years the writer and associate producer of a medical television series over the Miami station of the National Broadcasting Company.

More than 60 research scientists and medical school faculty members participated in these programs, discussing topics ranging from prematurity to gerontology.

### Edits Surgery Journal

Prior to her work in Miami, Mrs. Gluckman was managing editor of the American Journal of Surgery and copy editor and research associate with Thomas Nelson and Sons, New York medical publishers.

From 1949 to 1957 she directed the national hospital service and publication program for the Women's Division of the National Jewish Welfare Board in New York. She organized more than 10,000 women volunteers in 200 communities in a nation-wide program of service for members of the Armed Forces and for hospitalized patients.

A native of New York City, Mrs. Gluckman is an honor graduate of Barnard College, Columbia University, and had two years of post-graduate study at the Sorbonne and the Ecole des Sciences Politiques in Paris.

physics, in Denver, Colo., where he studied the chromosomal constitution of mammalian cells in tissue culture. In 1960 he received his Ph.D. from the University of Colorado, in Biophysics and Cytogenetics.

Before coming to NIH, Dr. Tjio was associated with the Argonne National Laboratory in Chicago, where he collaborated with Dr. Austin Brues. Dr. Tjio has contributed approximately 40 papers on his work in the field of cytogenetics.

In the early days of the United States, customs duties and the sale of public lands were the mainstays of Federal internal revenue.