

NIH/NICHD History: A Graphic Documentation

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James W. Prescott, Ph. D. 1966-80 Health Scientist Administrator, Developmental Behavioral Biology Program, National Institute of Child Health and Human Development, National Institutes of Health

the NIH Record

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NATIONAL INSTITUTES OF HEALTH

Dr. Law Appointed NCI's Cell Biology Lab Chief

Dr. Lloyd W. Law, National Cancer Institute, was recently appointed chief of the Laboratory of Cell Biology by Dr. Carl G. Baker, Institute Director. Dr. Law was formerly head of the Laboratory's Cellular and Tumor Immunology Section.

The Laboratory, organized last February, is concerned with the study of the mechanisms involving the transformation of normal cells to malignant cells.

Dr. Law will coordinate and guide the five-section Laboratory's research effort. Under his direction, techniques in the fields of immunology, biochemistry, cell hybridization, and virology will be used in studying the cell's growth and development processes.

Dr. Law is a graduate of the University of Illinois. He received both his M.A. and Ph.D. degrees in Biology from Harvard University. He joined NIH in 1947 as a geneticist with NCI.

He is the author of numerous publications, and has also been associated with various medical societies and advisory and directory boards, particularly in the field of cancer. He retired from the Public Health Service Commissioned Corps in July 1970.

Dr. Law has been recognized for his outstanding contributions in



Dr. Law will direct research into mechanisms involving transformation of normal cells to malignant cells.

cancer research. His most recent honors are the Alessandro Pascoli Prize from the University of Perugia, Italy, and his selection this year as a G. Burroughs Milder Lecturer.

Brain Function Studies Using Monkeys Increase Knowledge of Human Behavior



Pity the poor young rhesus monkey—deprived of maternal care and also isolated—all for the sake of science. But the monkey finds a friend in Janet Reeves of the Hazleton Laboratories. Dr. Prescott (l) and Dr. Symmes (r) and NICHD colleagues will conduct studies on the brain function and behavioral traits of these animals.

Twenty-two infant monkeys between ages 10 to 16 months have been donated to the National Institute of Child Health and Human Development for studies of their brain functions and behavior patterns.

The monkeys were reared without maternal care and have been in isolation since birth.

The primary objectives are to determine if there is abnormal brain function in the monkeys and if such dysfunction can be related to their abnormal behavior.

This research is intended to increase man's knowledge of his experiences in his early years that affect his development and behavior.

The monkeys were presented to Dr. James W. Prescott by Dr. O. E. Paynter, assistant manager, Hazleton Laboratories, Falls Church, Va. Dr. Prescott is health scientist administrator in the Growth and Development Branch, NICHD.

Some will be studied in NICHD's Section on Brain and Behavior, headed by Dr. David Symmes.

Others were given to investigators across the country who are doing brain and behavior studies.

The abnormal behavior of isolated and maternally deprived rhesus monkeys was described by Dr.

Harry Harlow and his colleagues of the University of Wisconsin.

Behavior patterns that were noted included autistic and withdrawn features, and hyperactivity which continued into adolescence and adulthood. Other patterns were self-destructive biting and unprovoked attacks upon other animals.

Several of the investigators presented the results of their research on the rhesus monkeys at the annual meeting of the American Psychological Association held early this month in Miami Beach, Fla.

Two Special 'Record' Issues To Celebrate Anniversaries

The next two issues of *The NIH Record* will feature special sections celebrating the 20th anniversaries of the National Institute of Arthritis and Metabolic Diseases (Sept. 29) and the National Institute of Neurological Diseases and Stroke (Oct. 13).

Dr. Fouts Joins NIEHS Plans to Study Effect Of Toxicologic Hazards

Dr. James R. Fouts has been appointed chief of the Pharmacology and Toxicology Branch at the National Institute of Environmental Health Sciences in Research Triangle Park, N. C., Dr. Paul K. Hoar, Institute Director, announced.

Dr. Fouts will conduct studies on the adverse effects of environmental agents on living systems.

His branch will determine the effect of realistic concentrations of known or potential toxicologic hazards on man's health. Studies will be based on epidemiological observations as well as the chemical and physical properties of toxic environmental agents.

Dr. Fouts has received numerous awards and honors, among them the Marple Schweitzer Award in Chemistry from Northwestern University and the Abel Award in Pharmacology from the American Society for Pharmacology and Experimental Therapeutics.

Dr. Fouts received his B.S. in Chemistry in 1951 and his Ph.D. in Biochemistry and Pharmacology in 1954 from Northwestern University.

He worked in the Laboratory of Chemical Pharmacology of the University of Wisconsin.

(See DR. FOUTS, Page 4)

Dr. C. E. Morris Leaves Chapel Hill to Conduct NINDS Studies on Guam

An associate professor of Neurology has agreed to give up the comforts of home and accept a position with the National Institute of Neurological Diseases and Stroke Laboratory and Field Research Center in Agaña, Guam.

Dr. Charles E. Morris, University of North Carolina, will be a full-time officer-in-charge, replacing James A. Schnur, who has been there for the past year and is returning to this country.

The Center is run by the Center for Epidemiology Branch. Dr. Morris will head the research team which includes both Americans and Guamanians.

The Center was established in 1956 as part of the Institute of Neurological Diseases and Stroke.

(See DR. MORRIS, Page 3)

New Office to Recruit Minorities for Careers In Health Service Opens

In an effort to recruit members of minority groups into health careers, an Office of Health Manpower Opportunity has been set up as part of BHME. Dr. George Blue Spruce, the Nation's only full-blooded Indian dentist, will head the new office.

Last June, Dr. Blue Spruce was appointed special assistant to the BHME Director, Dr. Kenneth M. Endicott. Prior to that, he was with the Division of Dental Health.

According to Dr. Endicott, the new component "... will provide leadership in identifying disadvantaged young people with potential for health careers. ... And it will enable schools to offer special assistance to help increase the chances of success of these disadvantaged students."

Focus on 5 Groups

The Office will focus on five groups: black Americans, American Indians, Spanish-surnamed Americans, women, and students.

It will administer grant programs under Section B of the Health Manpower Education Initiative Awards, a part of the Comprehensive Health Manpower Training Act of 1971, which President Nixon signed on Nov. 18.

This section provides for grants to increase the enrollment of students in health training courses who are likely to practice in underserved areas.

It supports projects that help disadvantaged persons who have potential for health training to enroll in schools and complete their training.

Grants may be awarded to public or nonprofit private health or educational entities.



Dr. Daniel F. Whiteside, BHME associate director (r), has been appointed Assistant Surgeon General, U.S. Public Health Service. He joined PHS in 1957 and has served with the Indian Health Program and DDH. Dr. Whiteside receives the ASG Flag from Dr. Kenneth M. Endicott, BHME Director.

DR. SINSHEIMER

(Continued from Page 1)

porates a number of his major fields of interest, including the physical and chemical properties of nucleic acids, replication of nucleic acids, and bacterial viruses.

He also is interested in the biological effects of ultraviolet radiation, as well as biological applications of ultraviolet and infrared spectroscopy.

In 1967, following 11 years of research, Dr. Sinsheimer together with Nobelist Dr. Arthur Kornberg and Dr. Mehran Goulian announced the synthesis of a fully infectious DNA virus.

As a template, or model, for their synthetic virus, the scientists used the DNA of a dwarf virus which Dr. Sinsheimer had shown earlier to have only one strand instead of the usual two.

This work represents an important step forward in understanding how viruses are duplicated

Two Area Schools Announce Spring Registration Dates

Registration dates for the coming spring semester in two area schools have been announced.

The U. S. Department of Agriculture Graduate School spring semester schedule of classes for 1972 is now available.

A catalog and schedule may be obtained from USDA, Room 1031, South Agriculture Bldg., or by calling 388-4419 (Government code 111-4419).

Registration may be completed by mail until Jan. 14, or in person on the patio Administration Bldg., 14th and Independence Ave., S.W., between Jan. 22-29.

Tuition is \$22 per credit hour or \$20 if paid in full at the time of registration.

The Federal "After Hours" Education Program conducted by George Washington University will hold registration Thursday and Friday, Jan. 13-14, 10 a.m. to 3 p.m., in Conference Rooms A, B, and C, Department of Commerce Bldg., 14th and Constitution Ave., N.W.

Tuition is \$54 per credit hour. Classes will begin Jan. 24.

Graduate Program Supplements Available for Spring Semester

Catalog supplements for the spring semester of the Graduate Program at NIH, which begins Feb. 7, are now available.

They may be obtained from the Foundation for Advanced Education in the Sciences office, Bldg. 10, Room B1L-101, or by calling Ext. 65273.

Advance registration by mail is possible through Jan. 21.

when they enter cells and how DNA polymerase or similar enzymes make new DNA.

The following year, Dr. Sinsheimer was honored as California Scientist of the Year. One year later he was the recipient of the Beijerinck Virology Medal of the Royal Netherlands Academy of Sciences and Letters.

After receiving his Ph.D. in Biophysics from the Massachusetts Institute of Technology in 1948, Dr. Sinsheimer was an associate professor, and later professor of Biophysics at Iowa State College.

In 1957 he moved to the California Institute of Technology as professor of Biophysics and, in 1968, was named chairman of the Division of Biology.

Dr. Sinsheimer is a member of the Advisory Committee to the NIH Director.

Dr. Sinsheimer has served as President of the Biophysical Society, and is now editor of the Annual Reviews of Biochemistry, and a member of the Council, National Academy of Sciences.

Erika B. Love Appointed Deputy Associate Director of Library of Medicine

Erika B. Love has been appointed deputy associate director of Library Operations at the Library of Medicine.

Mrs. Love was formerly director of Libraries at Gray School of Medicine, Ston-Salem, N.C.

She attended Harvard University, and received her B.A. degree in 1958 and her M.A.L.S. degree in 1960 from Indiana University.

While medical librarian at the Larue D. Carter Medical Center in Indianapolis, she completed the course work



Mrs. Love has served as a number of Governmental groups.

year psychiatric residency program.

She later became director of the Indian for both the Department of Mental Health and the Larue D. Carter Hospital until she moved to Winston-Salem.

Mrs. Love has had teaching experience and has participated in numerous management workshops.

Government Operator's License SF-46--Not a License

A U.S. motor vehicle identification card (Form 46) is not a valid license to operate a Government vehicle on a public roadway, the U.S. Civil Service Commission says.

A current driver's license issued by the state or other jurisdiction where the operator resides or is principally employed must accompany the ID card.

Using the SF-46 when a valid license is suspended or revoked is illegal.

An employee must have a valid SF-46 card immediately if his license is revoked, arrested, or fails to do so if it is



Dr. James W. Prescott (r), of NICHD's Growth and Development Branch, receives the Council on International Nontheatrical Events' Golden Eagle Award from Dr. William G. Carr (l), president of CINE as L. Richard Ellison, producer, Time-Life Films Inc., looks on. Dr. Prescott was given the certificate for his scientific consultation during the filming of "Rock-a-Bye-Baby."

3. Violence Portrayed -- Prescott, 1977



Fig. 5. Self-biting and self-mutilation of an adult isolation reared rhesus.



Fig. 6. Motherless mother crushing 20 day old infant to the floor.

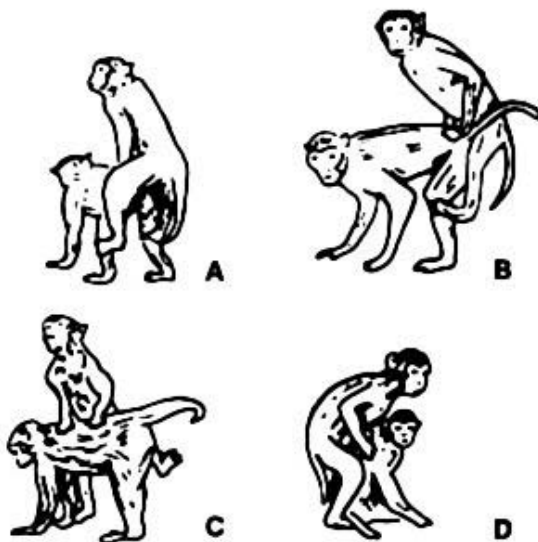


Fig. 7. Normal sexual posturing in the normal male & female rhesus (A, B). Abnormal sexual posturing in the isolation reared male & female rhesus (C, D).



Fig. 8. Physical pain in child abuse: 3 month old child with scaled milk thrown on its face.

4. Maternal Loss Portrayed -- Prescott, 1977



Fig. 1. "Swinging" surrogate reared monkey freely interacts with human attendant.



Fig. 2. "Stationary" surrogate reared monkey avoids interacting with human attendant.

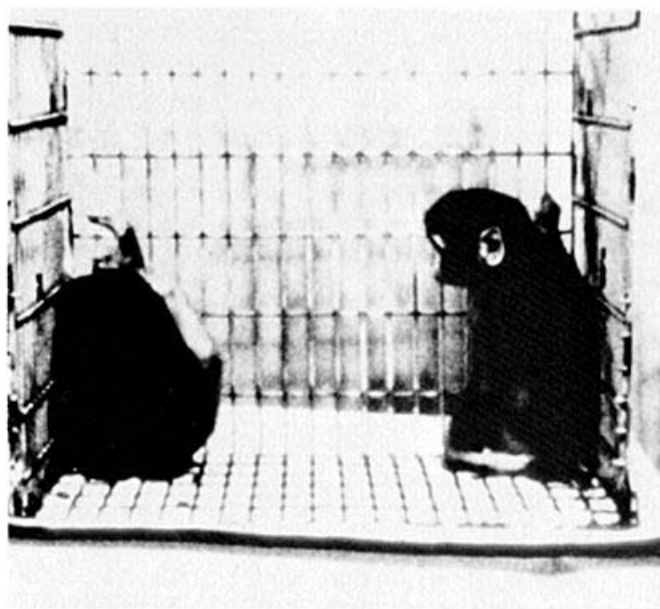


Fig. 3. Two 8 month old isolate reared monkeys who avoid touching and social interaction.



Fig. 4. Two normally reared monkeys touch and cuddle one another.

5. SSAD Neural Pathways Portrayed

Neural Pathways and Structures in SSAD Theory

The neural pathways and structures of SSAD theory are outlined in this section. Excerpts from the basic paper by Prescott (1970) are presented. The pioneering studies of Heath (1971) with his graphic model of neural pathways and brain structures are illustrated. <http://www.violence.de/prescott/mp/article.html>.

The comparative anatomy of frontal cortex and thalamofrontal connections provided by Akert (1964) document connections between Medialis Dorsalis (MD) and frontal cortex, specifically, the tri-partite structure of MD where *Pars Magnocellularis* thalamic projections defines the frontal orbital cortex

Berman, Berman and Prescott (1974) documented that paleocerebellar decortication but not neocerebellar decortication transformed an adult pathologically violent mother deprived monkey into a peaceful, social and inquisitive monkey. The paleocerebellum has primary connections with the brain stem and limbic system; the neocerebellum with the cerebral neocortex. <http://www.violence.de/berman/article.html>

Schwarz, Dietrich W.F. and Frederickson, John M. (1970) documented that there are minimal vestibular projection fields in the cerebral neocortex of the rhesus monkey. *Science*, 14 October 1970, Volume 172, p. 280f. <http://www.violence.de/others/sci71ac.html>

Prescott (1992) presents data that support sexual dimorphism in the developing human brain that shows differential coupling of frontal-cerebellar connectivity in male and female brains. These data are based upon NICHD supported research on cranial-facial growth and development, through lateral-skull X-rays, by the Krogman Growth Center, Children's Hospital, Philadelphia, PA. (Solomon Katz, PI and Geoffrey F. Walker, Biometrics Laboratory, University of Michigan). <http://www.violence.de/archive.shtml>

There are statistically significant differences between males and females where females show a greater neuronal interconnectivity between the cerebellum and frontal cortical areas throughout development. Males show no brain maturational frontal-cerebellar connectivity. These findings suggest a more neurointegrative brain in the female than the male; a greater neural integration between cortical and subcortical brain structures; and the observed greater nurturance and peaceful behaviors in the female than the male. The environment plays a major role in the structuring of these relationships and the underlying biology.

Modern MRI and fMRI are needed to confirm these growth pattern differences, their sexual dimorphism and the implications that these findings have for the emotional-social-sexual and mental development of the human male and female and the future of *Homo sapiens*.

- Akert, K. (1964). Comparative anatomy of frontal cortex and thalamofrontal connections. In: Warren and Akert, *The Frontal Granular Cortex and Behavior*. McGraw-Hill, New York.
- Berman, A.J., Berman, D. and Prescott, J.W. (1974). The Effect of Cerebellar Lesions on Emotional Behavior In The Rhesus Monkey. In *The Cerebellum, Epilepsy and Behavior* (Cooper, I.A., Riklan, M. and Snider, R.S., Eds). New York: Plenum Press, pp. 277-284.
- Heath, R.G. (1972). Physiologic Basis of Emotional Expression: Evoked Potential and Mirror Focus Studies in Rhesus Monkeys. *Biological Psychiatry* 5(1):15-31.
- Prescott, J.W. (1971). Early Somatosensory Deprivation As An Ontogenetic Process In The Abnormal Development of The Brain and Behavior. In *Medical Primatology 1970* (I.E. Goldsmith and J. Moor-Jankowski, Eds). S. Karger, Base, New York.
- Prescott, J.W. (1983). Invited Address: The Quadrune Brain: Cerebellar Regulation of Emotional Behaviors. *European Seminar on Developmental Neurology*. Institute fuer Kindesentwicklung, GmbH. Hamburg, Germany. February 14-17, 1983.
- Prescott, J.W. (1992). Sexual Dimorphism in the Developing Human Brain: Evidence from Lateral Skull X-Rays. Presented at the 35th Annual Meeting of the *Society for the Scientific Study of Sex*, November 12-15, 1992
- Schwarz, Dietrich W.F. and Frederickson, John M. (1970). Rhesus Monkey Vestibular Cortex: A Bimodal Primary Projection Field. *SCIENCE*, 14 October 1970, Volume 172, p. 280f

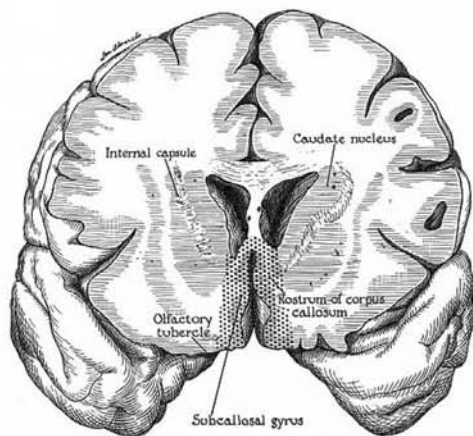


FIGURE 1. Outline drawing demarcating the septal region
(Heath 1954)

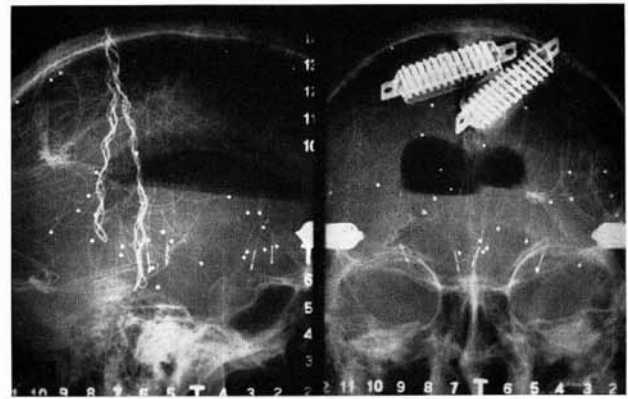


FIG. 1. Roentgenogram of Patient No. B-11 showing silver ball electrodes, stainless steel wires, and cannulae implanted into and over the surface of the brain. (Heath 1964)

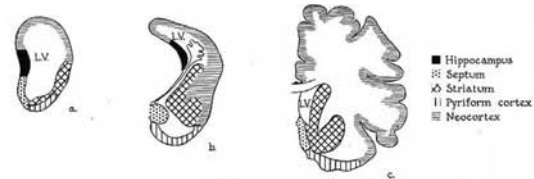


FIGURE 2. Diagrammatic representation of septal region in relation to other divisions of the cerebral hemispheres at various stages of development (a) embryo; (b) 50 mm. embryo; (c) adult. Adapted from Krieg

Physiologic Basis of Emotional Expression

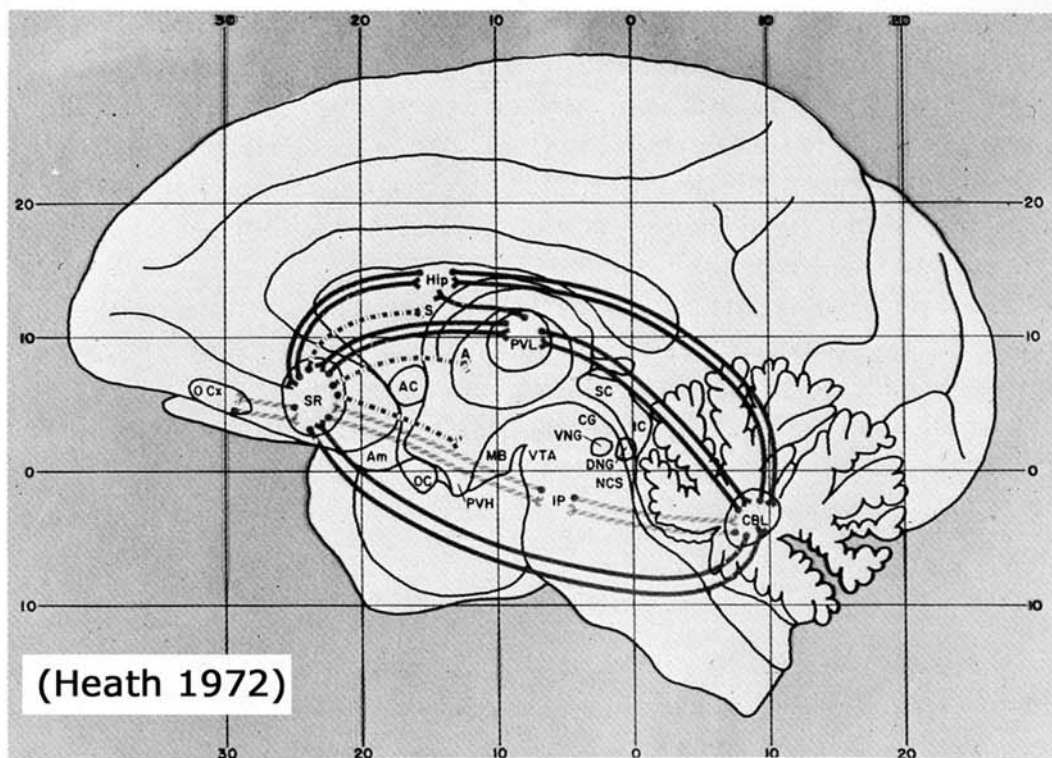


Fig. 11. Diagram of principal pathways of emotional expression based on Tulane studies. Those pathways considered most significant on the basis of our studies are shown as solid lines. (This diagram is not intended to show all pathways involved in emotional expression.) A, anterior thalamic nucleus; Am, amygdaloid nucleus; AC, anterior commissure; CBL, deep nuclei of the cerebellum, indicating fastigius and dentate; CG, central grey substance; DNG, dorsal tegmental nucleus of Guden; Hip, hippocampus; IC, inferior colliculus; IP, interpeduncular nucleus; MB, mammillary bodies; NCS, nucleus centralis superior; OC, optic chiasma; O Cx, orbital cortex; PVH, paraventricular hypothalamus; PVL, postero ventro lateral thalamus; S, septal nuclei; SC, superior colliculus; SR, septal region.

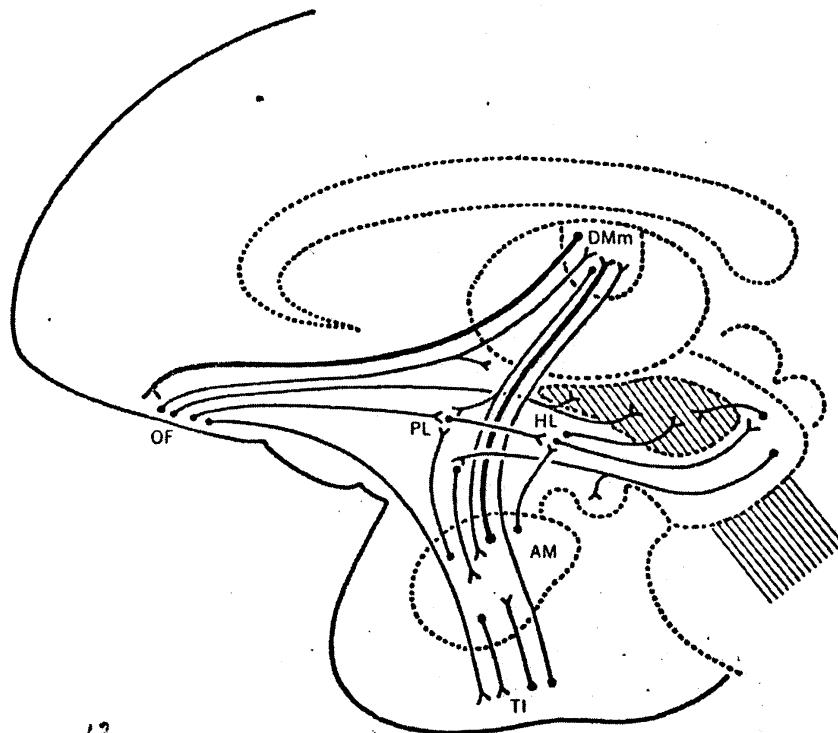


Figure 12 Diagram illustrating connections between amygdaloid complex (AM), medial part of dorsomedial thalamic nucleus (DMm), caudal orbitofrontal cortex (OF), and ventral regions of temporal lobe (TI). All except the last-mentioned project directly to the lateral preopticohypothalamic region (PL and HL), which in turn has efferent connections with the mesencephalic reticular formation. From *Brain*, 1962. (Courtesy of the Macmillan Company, New York.)

(From Akert, 1964)

Akert, K. (1964). Comparative anatomy of frontal cortex and thalamofrontal connections. In: Warren and Akert, *The Frontal Granular Cortex and Behavior*. McGraw-Hill, New York).

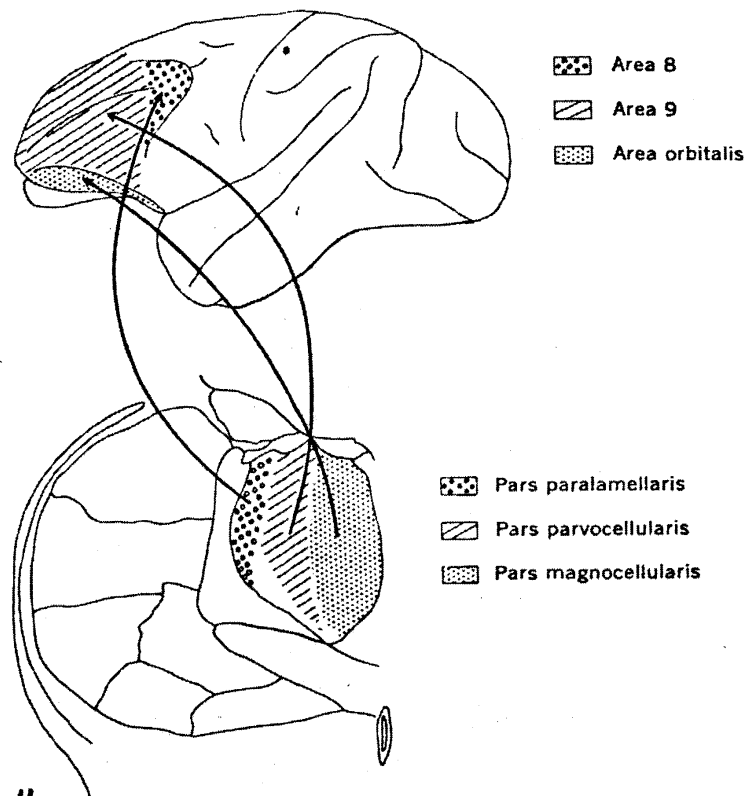


Figure 11 Cytoarchitectural map showing projections from zones of medialis dorsalis to subregions within frontal granular cortex. (From Akert, 1964)

Akert, K. (1964). Comparative anatomy of frontal cortex and thalamofrontal connections. In: Warren and Akert, *The Frontal Granular Cortex and Behavior*. McGraw-Hill, New York)