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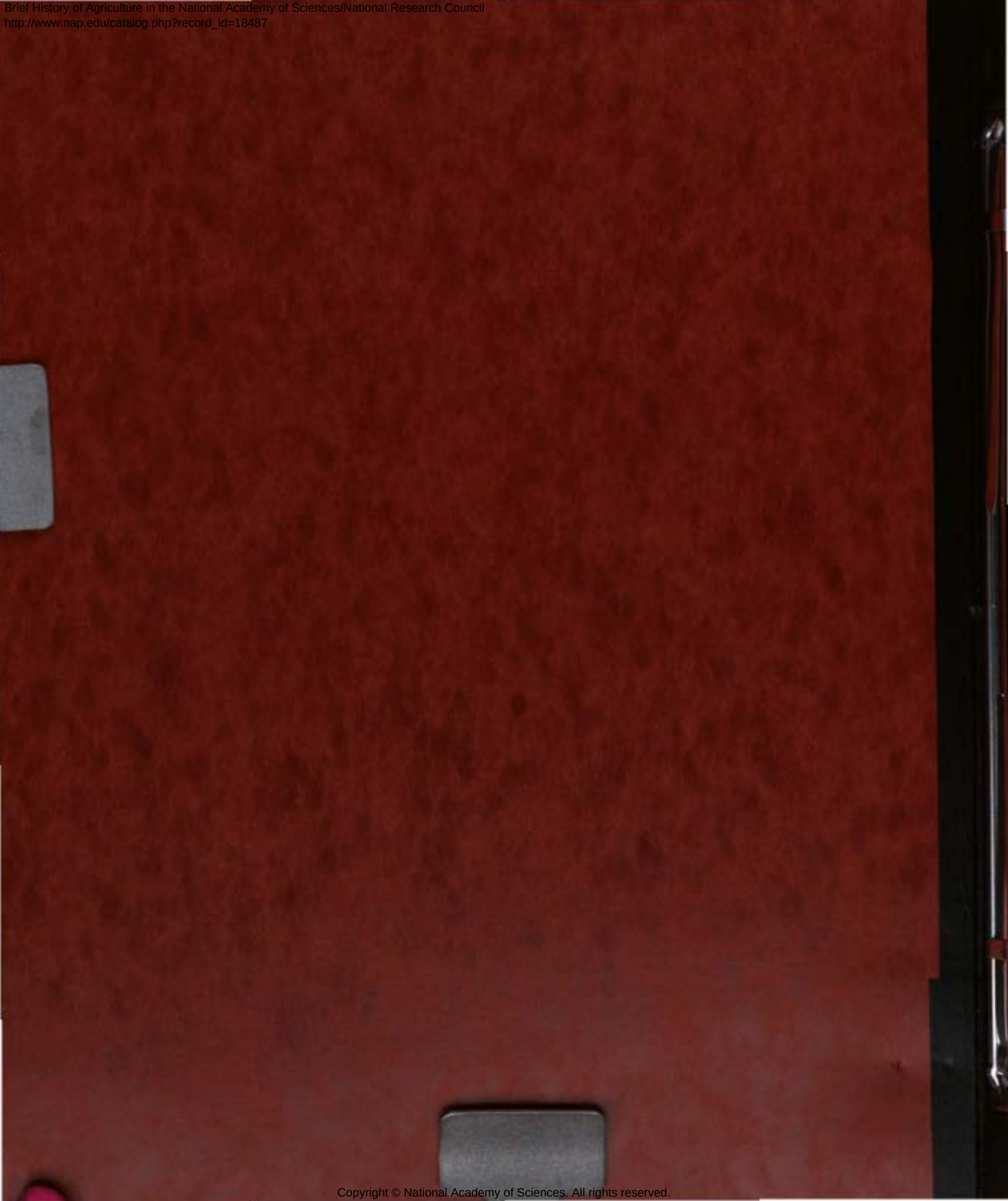

A Brief History of Agriculture in the National Academy of Sciences/ National Research Council

by

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The National Academy of Sciences

The Act of Incorporation that established the National Academy of Sciences and signed by President Abraham Lincoln on March 3, 1863, stated in part:

> ". . . the Academy shall, whenever called upon by any department of the Government, investigate, examine, experiment, and report upon any subject of science or art, ..."

In the ensuing years the Secretary of Agriculture requested studies of the scientific and economic relations of the sorghum sugar industry; silk culture in the United States, and the development of effective insecticides. The Secretary of Interior requested a study of forest policy for the forested lands of the United States. The recommendations from this report issued in 1897 played a leading role in the establishment of the U.S. Forest Service.

The National Research Council

The National Academy of Sciences (NAS) organized the National Research Council (NRC) during the first World War (1916) in response to a request from President Wilson for assistance in organizing the scientific resources of the country. At the close of the war, President Wilson, desiring to perpetuate the NRC, issued an Executive Order on May 11, 1918, which states in part that the duties of the NRC shall be

> "In general, to stimulate research in the mathematical, physical and biological sciences, and in the application of these sciences to engineering, agriculture, medicine and other useful arts, with the objective of increasing knowledge, of strengthening the national defense, and of contributing in other ways to the public welfare."

The Executive Order also laid upon the NAS the duties of surveying the larger possibilities of science and utilizing the scientific and technical resources of the country; promoting cooperation in research among private investigators and with the technical services of the Government; and making science available for the national defense (Krauss 1956).

[1982]

The Committee on Animal Nutrition

The Committee on Animal Nutrition, now under the Board on Agriculture and Renewable Resources, had its beginning in 1917 as a subcommittee of the Committee on Food and Nutrition. This committee planned and conducted experiments to determine the protein requirements for growth in cattle, and issued its first report in 1921, "Cooperative Experiments Upon Protein Requirements for the Growth of Cattle." Subsequent reports were "On Formulation of Methods of Experimentation in Animal Production" and "The Determination of the Protein Requirements of Animals and of the Protein Values of Farm Feeds and Ration" (Knapka 1980). The Committee on Food and Nutrition and its subcommittees including animal nutrition became a part of the Division of Biology and Agriculture when the Division was formed in 1919.

The present Committee on Animal Nutrition was formally established in 1928. Its report on "Mineral Nutrition in Domestic Animals" became a classic work and the foundation for mineral nutrition as it is known today. The first series of reports on nutrient requirements were issued in 1942. These reports suggested how swine, poultry, and calves or heifers could be fed to meet the war emergency. The present series of nutrient requirements started in 1944 with several revisions of older reports and the addition of new species. Presently the series of nutrient requirements of domestic animals include reports on poultry, swine, dairy cattle, sheep, horses, mink and fox, dogs, rabbits, laboratory animals, cats, nonhuman primates, trout, salmon and catfish, warm water fishes, cold water fishes, and goats. These reports are among the most sought after of NRC publications.

Division of Biology and Agriculture

After the United States entered World War I in 1917, the National Research Council grew rapidly and included the Agricultural Committee, the Botanical Raw Products Committee, and the Botany Committee. In 1918 a Division of Agriculture, Forestry, Botany and Fisheries was established. Zoology was placed under the medical division. Under the Articles of Organization of the National Research Council adopted in 1919 by the Council of the National Academy of Sciences, the Division of Agriculture, Forestry, Botany and Fisheries was formally renamed the Division of Biology and Agriculture (NAS 1969).

The Food and Nutrition Board (FNB) was formally established in 1940 as part of the Division of Biology and Agriculture, and served as an advisory body in the field of food and nutrition. During its early years the Board dealt with nutrient requirements; food composition; enrichment of cereal grain products; industrial feeding; nutrition survey techniques and their value; composition of milk; heat injury to protein; maternal and child nutrition; dental caries; sanitary control of milk; food specifications; and other matters of health importance related to foods and nutrition. In 1956 the Board broadened its scope to include international programs (NAS 1980).

The Institute of Laboratory Animal Resources (ILAR) was established in 1952 under the Division to serve as an advisory body in the field of laboratory animal supply and quality. ILAR has published reports among others on animal models, animal sources and facilities and standards and guidelines for breeding, care and management of laboratory animals including poultry, ruminants and swine.

The Agricultural Board

The Agricultural Board was established in 1944 following joint recommendation by the Executive Committee of the Division of Biology and Agriculture and the Association of Land-Grant Colleges and State Universities that such an organization was needed for evaluation of vital problems affecting American agriculture in the post-World War II period and to make recommendations for their solution. The purposes of the Agricultural Board were 1) to advance and interpret scientific knowledge pertaining to agriculture, 2) to initiate and provide upon request recommendations relative to agricultural programs based on objective analysis of the agricultural situation, and 3) to disseminate the technical and deliberative conclusions by publication or otherwise among those agencies and population groups where appropriate utilization and implementation can be effected.

The Agricultural Board started off with several committees already in operation. The Committee on Animal Health established in 1943 with subcommittees on calf losses, on losses of young pigs, on public health aspects of brucellosis became a part of the program. The Committee on Animal Nutrition with its subcommittees on beef cattle, dairy cattle, horses, poultry, sheep, and swine and the Committee on Feed Composition joined the Agricultural Board. Other committees included the Committee on Production and Distribution of Milk, Committee on Plant and Animal Stocks, Committee on Overall Agricultural Policy, and a Committee on Veterinary Services to Farm Animals. Also included were Subcommittees on Increasing Capacity of Veterinary Colleges, on Laws and Regulations for Animal Health, on Need for Veterinarians and on Training of Veterinarians.

The Committee on Animal Nutrition continued to be very active and prepare reports on the nutrient allowances of each class of livestock as well as other reports on Nutrition and Reproduction of Farm Animals, the Fluorine Problem in Livestock Feeding, Recommendations for Prevention of Bloat in Cattle and Sheep, Comparative Nutrition of Farm Animals. The Committee on Animal Health issued reports on Hog Cholera in the United States, Rabies and Its Control, the Intramammary Therapy of Bovine Mastitis. Other reports were issued on the Shortage of Professional Workers in Agriculture, Sanitary Milk and Ice Cream Legislation in the United States.

In 1959 the Agricultural Board in considering plans to enlarge the scope of its activities recommended that the following areas be studied (Krauss 1959):

1. Population trends, composition, and needs for agricultural products over the ensuing several decades;

2. Amounts, varieties, and qualities of agricultural products needed to achieve specified levels of human nutrition;

3. Dynamics of land use;

4. Agricultural products as a tool in America's foreign policy;

5. Human resources available for America's agricultural operations;

6. National resources needed to produce food and fiber at various production levels and with stated labor forces;

7. Long-term storage and prevention of food and fiber;

8. Contamination of food and water resulting from atomic and biological warfare and methods for decontaminating these materials;

9. Rate of resumption of agriculture following destruction due to war or some other major catastrophe;

10. Future productive capacity of foreign agriculture in relation to its needs, and the policy we should follow in assisting in increasing foreign agricultural output;

11. Education levels to be attained in order to meet the changing economy; and

12. Development of research programs to meed indicated needs.

Twenty-two years later these areas are still important topics in discussions at meetings of the BARR.

Agricultural Research Institute

The Agricultural Research Institute (ARI), established in 1951, was conceived by industrial scientists as a supporting organization for the Agricultural Board in promoting the kinds of research and policies needed to insure the best long-time utilization of agricultural resources for the national welfare. The ARI served well under the Agricultural Board until at its annual meeting in 1972 it voted to establish itself as a corporation that would be independent of the NRC effective in 1973, but to continue its association with the Agricultural Board. It has carried out its association with the present Board on Agriculture and Renewable Resources until the present time.

The Board on Agriculture and Renewable Resources

The Board on Agriculture and Renewable Resources (BARR) came into being in 1973 when the NRC was reorganized into Commissions and Assemblies. The agricultural components of the Division of Biology and Agriculture formed the nucleus of the BARR in the Commission on Natural Resources (CNR) and the biological components became the Division of Biology in the Assembly of Life Sciences. The Committees of Animal Nutrition and Animal Health are

are still active. Agricultural production, land use and soils, water, education and training, science and technology, forestry and wildlife issues are still on the agenda of BARR. However, new areas such as genetic engineering are constantly being explored. Thus the BARR is still making essential contributions toward the solution of vital problems of American agriculture. Appendix I lists the reports of BARR since its inception in 1973 until the present. Other studies on agricultural and food related issues have been prepared by the Assembly of Life Sciences and its Division of Biology, the Space Applications Board of the Assembly of Engineering, the Commission on International Relations and its Board on Science and Development for International Development, the Advisory Board on Military Personnel Supplies of the Commission on Sociotechnical Systems, the Climate Board of the Assembly of Mathematical and Physical Sciences, and the Environmental Studies Board of the Commission on Natural Resources.

References

Knapka, J.J. 1980. The History of the Lab Animal Estimated Nutrient Requirements. Lab Animals, November-December 1980.

Krauss, W.E. 1956. Activities of the Agricultural Board of the National Academy of Sciences. Paper delivered before Experiment Station Section of the American Association of Land-Grant Colleges and State Universities. Washington, D.C., November 13, 1956.

Krauss, E.E. 1959. Letter to J.G. Harrar, Director of Agriculture, the Rockefeller Foundation, New York, March 21, 1959.

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National Academy of Sciences. 1980. Food and Nutrition Board. National Academy of Sciences, Washington, D.C.

BOARD ON AGRICULTURE AND RENEWABLE RESOURCES

List of Reports and Studies

1974

- African Agricultural Research Capabilities
- Effect of Fluorides on Animals
- Feed Phosphorus Shortage
- Nationwide System for Animal Health Surveillance
- Nutrient Requirements of Dogs
- Nutrient and Toxic Substances in Water for Livestock and Poultry
- Productive Agriculture and a Quality Environment
- U.S. Component of the Argentine-U.S. Joint Commission on Foot-and-Mouth Disease

1975

- Agricultural Production Efficiency
- Effect of Genetic Variance on Nutritional Requirements of Animals
- Enhancement of Food Production for the United States
- Nutrient Requirements of Sheep
- Nutrition and Production of Fish

1976

- Climate and Food: Climatic Fluctuations and U.S. Agricultural Production
- Fat Content and Composition of Animal Products
- Genetic Improvement of Seed Proteins
- Nutrient Requirements of Beef Cattle
- Urea and Other Nonprotein Nitrogen Compounds in Animal Nutrition

1977

- Ad Hoc Dioxin Advisory Group
- Brucellosis Research: An Evaluation
- Guayule: An Alternative Source of Natural Rubber
- Jojoba: Feasibility for Cultivation on Indian Reservations in the Sonoran Desert Region
- Nutrient Requirements of Poultry
- Nutrient Requirements of Rabbits
- Nutrient Requirements of Warmwater Fishes
- Renewable Resources for Industrial Materials
  - Biological Productivity of Renewable Resources Used as Industrial Materials
  - Extractives as a Renewable Resource for Industrial Materials
  - Fibers as Renewable Resources for Industrial Materials
  - The Potential of Lignocellulosic Materials for the Production of Chemicals, Fuels, and Energy
  - Reference Materials System: A Source for Renewable Materials Assessment
  - Renewable Resources for Structural and Architectural Purposes
- Pesticide Decision Making
- A Report to Secretary of Agriculture on the Establishment of a Committee of Scientists as Specified in the National Forest Management Act of 1976
- World Food and Nutrition Studies

1978
Aquaculture in the United States: Constraints and Opportunities
Complementary Roles of Plant and Animal Products in the U.S. Food System
Manual of Standardized Methods for Veterinary Microbiology
Nutrient Requirements of Cats
Nutrient Requirements of Dairy Cattle
Nutrient Requirements of Horses
Nutrient Requirements of Laboratory Animals
Nutrient Requirements of Nonhuman Primates

1979
Agricultural Soils and Surface Mining
Antibiotics in Animal Feeds
Interactions of Mycotoxins in Animal Production
Nutrient Requirements of Swine
Psoroptic Cattle Scabies Research: An Evaluation
The Role of the U.S. Department of Agriculture in Aquaculture

1980
Mineral Tolerance of Domestic Animals
Phase I Final Report of Committee on Wild and Free-Roaming Horses and Burros
Weather-Information Systems for On-Farm Decision Making

1981
Atmosphere and Biosphere Interaction: Towards a Better Assessment of the Ecological Consequences of Fossil Fuel Combustion
Cotton Boll Weevil: An Evaluation of USDA Programs
Developing Strategies for Rangeland Management (Summary Report)
Effect of Environment on Nutrient Requirements of Domestic Animals
Ecological Classification System for Implementing Environmental Quality Evaluation Procedures
Feeding Value of Ethanol Production By-products
Nutrient Requirements of Coldwater Fishes
Nutrient Requirements of Goats
Nutritional Energetics of Domestic Animals and Glossary of Energy Terms
Research Issues Involving Fish and Wildlife Resources
Taurine Requirement of the Cat