

**The
Animal
Science
Department**

annual newsletter

1970

UNIVERSITY OF CALIFORNIA

DAVIS

As this is our first attempt to establish communications with our former students, we expect that our mailing list is grossly inadequate. Consequently, we request your cooperation in our effort to bring our mailing list up-to-date.

1. If this newsletter was incorrectly addressed, please send us your correct address.
2. If you encounter other former Animal Science students who did not receive a copy of this newsletter, please ask them to send us their current address so that we can put them on the mailing list for future issues.

Your cooperation in this regard will be appreciated!

January 1970

Dear Friends:

Publication of this first Animal Science Alumni Newsletter, which we hope will become an annual event, is one of our 1970 New Year's resolutions fulfilled. It is our hope that through this publication we can keep you informed about activities in the department. Those of us who plod in and out day by day often are not aware of the changes taking place continually, but step away for a time and one is amazed. After one year away from the campus it is advisable to stop by the information Kiosk and obtain a map to be sure to find one's way. Old landmarks have been torn down, remodeled, or hidden by new buildings and changes in landscaping.

One needs only to read the newspapers to realize that the University is in a state of metamorphosis. Budgetary problems and student involvement frequently make the news but we are also faced with many challenges seldom reported by the news media. Reports in this newsletter reflect some of these pressures.

The establishment of other colleges on the campus has created a need for this department to establish service courses for other majors in addition to maintaining the best possible curriculum for animal science majors. There is a terrific public demand for environmental improvement -- air and water pollution, solid waste disposal, etc. As these problems have serious agricultural implications the need for this department to be responsive to the solution of these problems is self-evident. Current demand for conservation of existing recreational areas and for the development of more, is a challenge to agriculture's current priority on land and water resources. It is not surprising, therefore, that we find ourselves involved in research concerning fish, wild life, and multiple land use.

We hope that this letter may be a means of keeping you in better contact with us, in addition to keeping you informed. We are always interested in knowing what you have been doing, about your families, and any other interesting facts about your life which you care to reveal. So please let us hear from you occasionally. Your comments may provide material for "Alumni Newsnotes" in future issues.

Finally, if you ever are in the vicinity of Davis we hope you can find time to stop by for at least a brief visit and share a cup of coffee and a bit of chatter. On behalf of everyone in the Department of Animal Science, best wishes, a bit late, for a happy and prosperous new year.

Sincerely,


Magnar Ronning
Chairman

MR:cec

CAMPUS CHANGES

There have been so many campus changes in recent years that one must be selective in listing them. Some of those listed below will not be news to A.S. grads in the area, but they are included for the benefit of our more distant alumni.

Perhaps the biggest change is in numbers of students on the campus: 12,583 registered for Fall Quarter 1969. Furthermore, in October, 1969, Davis had more applications for next fall than either Berkeley or UCLA. At Davis our feelings about this are not unmixed. Nevertheless, it clearly represents change.

Campus factors contributing to this change have included the establishment of a College of Engineering (1962), School of Law (1966), School of Medicine (1968), and a marked growth in the College of Letters and Science. The College of Agriculture is also making its contribution. Total undergraduate student enrollment has increased from 889 in 1962 to 1633 this fall. Graduate enrollment has increased from 434 to 725 during the same period. Interestingly, much of the increase has come in new areas. Most of you are no doubt aware that the College changed its name in 1967 to "Agricultural and Environmental Sciences". To fulfill the promise this implies, new programs have been developed in Resource Sciences and in Family and Consumer Sciences, and it is in these areas where most of the growth is occurring -- not surprisingly, perhaps, in view of the great concern today with environmental quality and social problems. Some of the traditional agriculture majors have actually decreased in numbers of students; Animal Science has increased from a low of about 60 undergraduates in the early '60's to around 100. Graduate enrollment in the Department is up to 46.

Jim Meyer moved from chairman of Animal Husbandry to become dean of the College in 1963, and then chancellor in 1969. Under Jim and our present dean, Chet McCorkle, the College has become a major focus on campus for educational innovation and experimentation. This is reflected not only in the enrollment increase already mentioned, but in a general feeling on campus that this is where the action is. The increase in applications to the campus suggests that students feel this way about the Davis Campus among U.C. campuses as a whole -- or it may be that we haven't had as much of some kinds of action!

Yes, we have had student and faculty problems of the nature that has characterized university life across the nation during recent years. But, in general, demonstrations have been orderly and outside influence (non-student) has been minimal. Our students have shown a greater sense of responsibility for their own affairs than have students at many other institutions.

In any case, if you returned to Davis now you would find many differences, physical and otherwise, from when you were here, even if you graduated not too long ago. We think you'd still find it a good place to learn.

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Dr. C. O. McCorkle, Jr., Dean of the College of Agricultural and Environmental Sciences, has been appointed by the Regents as Vice President of the University of California, effective July 1. In this, the University's second ranked administrative post, McCorkle will replace John W. Oswald, a former Davis professor, who is president designate of Pennsylvania State University. This news broke just as we went to press.

STAFF CHANGES

There have been a considerable number of staff changes during the last few years. Retirement took a heavy toll of men who contributed heavily to the status of the Department -- Harold Cole, Harold Goss, Paul Gregory, Carroll Howell, Max Kleiber, Tom Mead and Jim Wilson. Reuben Albaugh and Horace Strong, Extension Animal Scientists, also have retired. We have lost two staff members to other institutions and two have changed positions. Keen competition for good men, tighter budgets, and periodic frozen positions have made recruitment exceedingly difficult. In spite of these handicaps, we have been very fortunate thus far with our recruitment activities but staff vacancies have existed for long periods and have required considerable shifting of teaching and research responsibilities.

DR. H. F. HINTZ, who was teaching and doing research in non-ruminant nutrition, especially with swine and horses, resigned in June, 1967, to accept a position at Cornell University. Dr. D. W. Robinson has filled this position.

DR. M. T. CLEGG left Davis in June, 1968, to become Director of the Division of Developmental Biology at the Delta Regional Primate Center in Louisiana. We are still looking for a replacement for this position and have found very keen competition while recruiting in the area of reproductive physiology.

DR. R. D. APPLEMAN resigned from the Extension dairy staff August, 1968, to accept a position in the Department of Animal Science at the University of Nebraska.

DR. J. M. BODA resigned from our staff in July, 1968, to become Chairman of the Department of Animal Physiology. He still holds a courtesy title in the Department of Animal Science and collaborates quite closely with us.

DR. G. P. LOFGREEN transferred his full-time base of operation in early 1968 to the Imperial Valley Field Station at El Centro. Although no longer on the Davis campus, Glen remains a member of our staff, of course.

DR. C. ROBERT ASHMORE joined the staff in June of 1968 coming from the University of Connecticut where he completed his Ph.D. while studying the biology of genetic muscular dystrophy in chickens. He is developing a program in muscle biology utilizing both normal and abnormal muscles. Among other activities he is initiating work to define cellular and biochemical characteristics of muscle from cattle with muscular hypertrophy (double muscling). He is active in developing two courses in muscle biology which are being offered by a group of interested people from several areas including the School of Medicine. Bob, his wife Janet, and three children live at 727 Adeline Place in Davis.

DR. J. WARREN EVANS obtained his Ph.D. in physiology at Davis in 1968 under Dr. Boda whom he replaced. Warren is originally from Texas and did his undergraduate work at Colorado State University. He has assumed responsibility for the Horse Barn and the development of a teaching and research program with horses. He teaches Horse Production, has developed a course in Environmental Physiology, and is developing research procedures for adapting telemetric techniques for the study of physiological responses in animals. He, his wife Benita, and young son live on an acreage north of Davis where they keep a few horses of their own.

DR. GRAHAM A. E. GALL joined the staff as a geneticist in September of 1966. Dr. Gall is from Alberta, Canada, and obtained his Ph.D. degree in genetics at Purdue University. A unique aspect of his program at Davis is cooperative work with the California State Fish and Game Commission in applying animal breeding methods toward the improvement of rainbow trout broodstocks. He is developing a research program directed toward biochemical aspects of genetics and teaches in the general area of animal genetics and statistical applications in animal experimentation, utilizing computer techniques extensively in all areas. With his wife, Betty, and two children, he lives at 1402 Locust Lane in Davis.

DR. J. G. MORRIS was recruited to fill the vacancy created by Lofgreen's transfer and will serve as range nutritionist with a major research responsibility toward development of range utilization studies with beef cattle at the Sierra Foothill Range Research Station. He is interested in developing a program of mineral nutrition studies. He teaches Ruminant Nutrition, and Principles of Livestock Feeding, offered especially for students in Veterinary Medicine. Jim is from Australia and earned his Ph.D. degree at Utah State University in 1961 where he and his wife spent their honeymoon in a sheep wagon while he was conducting range nutrition studies for his thesis. He, his wife Jocelyn, and their three children live at 512 East 9th Street in Davis.

DR. DAVID W. ROBINSON in July, 1968, accepted an appointment to fill the vacancy created by the resignation of "Skip" Hintz. He teaches Principles of Nutrition and Nonruminant Nutrition, and his main line of research involves studies of the influence of nutritional stress upon tissue growth in developing animals. Professor Robinson is from England and obtained his training at the University of Nottingham. Just prior to coming to Davis he had worked for CSIRO in Australia as a Research Scientist studying the nature and degree of depletion in drought affected cattle. He, his wife Dorothy, and three boys live on an acreage just north of Davis.

W. JAMES CLAWSON returned to the Davis campus in October, 1968, to assume the role of Extension Animal Scientist, with special emphasis on livestock nutrition and feedlot management. Jim completed his undergraduate work at UCD in 1956 and came back to receive his M.S. in 1961. He served as livestock farm advisor for the U.C. Agricultural Extension Service in San Luis Obispo County until he was drafted for the position left vacant by the retirement of Horace Strong. He, his wife Karin, and three children live at 254 Cortez Avenue in a relatively new housing development, Gentry Greens, north of Road 31.

FRANK D. MURRILL was transferred to Davis in October, 1968, to fill the Extension Dairyman position left vacant by Appleman's resignation. His primary responsibility is dairy breeding, which includes the supervision of the record programs and sire evaluation statewide. Frank received his B.S. at UCD in 1958 and soon after joined the Extension staff as dairy farm advisor in Kern County. He returned to Davis on sabbatical leave and received his M.S. degree in 1965. Frank, his wife Ruth, and their three children live at 802 Acacia Lane in Davis. Their oldest boy, Steve, is a Sophomore at UCD.

CURRENT STAFF ALIGNMENT

Animal Science Staff

C. Robert Ashmore -- Biochemistry, Nutrition
R. Lee Baldwin -- Biochemistry, Nutrition
G. Eric Bradford -- Animal Breeding, Genetics
Floyd D. Carroll -- Nutrition
Perry T. Cupps -- Physiology
J. Warren Evans -- Environmental Physiology
Graham A. E. Gall -- Genetics, Animal Breeding
William N. Garrett -- Nutrition
Irving I. Geschwind -- Endocrinology, Protein Chemistry
Hubert Heitman, Jr. -- Nutrition, Environmental Physiology
J. L. (Roy) Hull -- Range Utilization, Recreation and Multiple Land Use
Robert C. Laben -- Animal Breeding, Genetics
Glen P. Lofgreen -- Nutrition (El Centro)
Verne E. Mendel -- Physiology, Nutrition
James G. Morris -- Nutrition
David W. Robinson -- Nutrition
Wade C. Rollins -- Animal Breeding, Genetics
Magnar Ronning -- Nutrition
Donald T. Torell -- Range Utilization, Sheep Management (Hopland)
Kenneth A. Wagnon -- Range Utilization, Beef Cattle Behavior and Reproduction
William C. Weir -- Nutrition

Agricultural Extension Specialists

Donald L. Bath -- Extension Dairy Nutritionist (sabbatical leave, Cornell)
W. James Clawson -- Extension Animal Scientist
James T. Elings -- Extension Animal Scientist
Glenn S. Goble -- Extension Dairy Technologist
Frank D. Murrill -- Extension Dairyman
C. L. Pelissier -- Extension Dairyman
Glenwood Spurlock -- Extension Animal Scientist

WHAT THE EMERITI ARE DOING

REUBEN ALBAUGH, Extension Animal Scientist. Rube retired in 1968 but some of us don't believe it. He spends about half his time in the office and doing Extension business in the field for play. His consulting activities at home and abroad are more lucrative -- Spain, Oregon, California, with Hawaii and Australia under consideration for early 1970. Some of these consulting contacts have also provided interesting hunting opportunities -- ducks, pheasants, deer, etc. Rube may well be the Department's uncrowned king of golf; he developed that natural swing during his youth in the Modoc territory killing snakes and roping slick-eared calves. Rube and Vira live at 302 West 8th Street. Son Glen is currently pursuing his Ph.D degree at the University of Utah and assisting with coaching basketball. Daughter Barbara is teaching P.E. in San Jose and her husband, Bill Kraus, is English curriculum counselor for 15 high schools in the San Jose area.

DR. H. H. COLE. Harold hasn't really retired, he's just no longer on the payroll. Although he does slip out now and then for a bit of golf, he is just as prolific as ever. He is heavily involved in research under a Population Council grant on the control of reproductive activity by the use of antibodies against the gonadotropins. The 1969 revision of the book, *Reproduction in Domestic Animals*, edited with P. T. Cupps, has been published by Academic Press. He is currently planning the second revision of the text, *Introduction of Livestock Production*, which was written for students with a minimum of college training in biology, published by the W. A. Freeman Co., San Francisco. He was appointed editor of the new journal, *Biology of Reproduction*, which is the official publication of the Society for the Study of Reproduction. Harold and Cynthia and their 13 year old daughter, Nancy, reside at 528 Miller Drive. "When in Davis stop by, we will be delighted to see you," says Harold.

DR. HAROLD GOSS. Harold and Hilda Goss still live in the house they built 39 years ago at 33 College Park -- a popular "port of call" for former students, sons, daughters, and even grandchildren. In typical Goss fashion, Harold makes no claim to notable activities, instead he says he could recite a long list of things he is not doing. Since retiring, he and Hilda have spent considerable time traveling in the U.S. and Europe. They have also spent many leisure hours cruising the rivers and delta estuaries in their little cabin cruiser. Harold says he has but one aim and that is to get the best of the Retirement and Annuities System by sticking around for a while.

DR. P. W. GREGORY. Dr. Gregory sold his house at 26 College Park after the passing of his wife and is now living in a duplex at 715 Hawthorne Lane. Although it is a long slow process, Paul has recovered from his automobile accident and is once again spending considerable time at the office preparing several manuscripts covering some of the data gathered over a period of nearly 20 years. Much of this data concerns the morphology and genetics of several forms of achondroplastic dwarfs occurring in beef cattle during the past 50 years or more. Paul has joined the Davis Camera Club and has become a shutterbug. Paul's older son, Dean, lives in Sacramento and is head librarian at the Folsom Prison. Milton, the younger boy, and his wife Judy, are living in Corvallis, Oregon, where he is teaching. Milton and Judy just completed building their home in Corvallis and Dr. Gregory was a surprise participant at their housewarming. Paul spent the recent holiday season with them.

PROF. C. E. HOWELL. We missed Carroll at the Department Christmas party this year -- one of the few times he has failed to contribute to the entertainment at this annual affair since his retirement in 1958. Carroll lives in the Rossmore Retirement Park, 2308 Tice Creek Drive, Walnut Creek. This makes it a bit difficult for us to keep an eye on him. Daughter, Jo Ann, also lives in Walnut Creek; Carolyn and son-in-law, Ross Sanborn (Farm Advisor), live in Lafayette.

DR. MAX KLEIBER. The demands on Dr. Kleiber are just as widespread and varied as ever, as some of his 1969 activities indicate.

Jan. 10 Lecture at NASA, Moffet Field - Energy Requirements of Man in Space.
Feb. - May Visiting Professor, Zoophysiology Institute of Arctic Biology, University of Alaska, where he taught a graduate course on animal energetics.
April 30 Dinner talk to Sigma Xi at Fairbanks - Are Scientists Human?
Aug. 29 Energy Metabolism Symposium. American Physiology Society Meetings, Davis.
Sept. 19 International Meeting on Nutrition, Tegernsee (near Munich) - Neue Wege der Ernährungs Forschung mit Hilfe von Isotopen Als Tracer.
Oct. 15 Univ. of Göttingen, Inst. of An. Nut. - Ernährungs forschung mit tracern.
Oct. 20 Danish Agr. Exp. Sta., Dept. of Physiol. - Tracers from Black Sheep to Isotopes.
Nov. 20 Univ. of Illinois Medical School, Chicago - Similarity in Build and Function of Mice and Men.
Nov. 21 Northwestern Univ. Med. School, Chicago - Tracers from Black Sheep to Isotopes.

Just in case this travel schedule leaves you with the opinion that Max has given up skiing (more lecturing and less yodeling), please note the 4 months in Alaska. Max and Margaret still live at 34 College Park but spend some of their leisure at their Dillon's Beach cottage. Their daughter, Joy, is attending the University at Basel, Switzerland. Son Pierre is working on his Ph.D. in ecology at Davis but is presently doing field research in British Columbia for his thesis.

PROF. S. W. MEAD. Tom has been in ill health for the last 3 years and stays pretty close to home. For several years after his retirement in 1962, he remained quite active in academic affairs but his illness gradually curtailed his campus appearances. Tom and Marge still live at 64 College Park; son Warren is a senior physicist at the U.C. Lawrence Radiation Laboratory at Livermore; Dick is assistant to the vice president of administrative affairs, University of Maryland, and John is a specialist with an electronics corporation near Redwood City.

HORACE T. STRONG, Extension Animal Scientist. Horace retired in 1967 but may be burning more rubber tread than ever. Horace and Beryl have traveled extensively visiting their son Bob, who is a physical chemist at Rensselaer Polytechnic Institute in Troy, New York, or in just plain vacationing with their trailer house in various parts of the U.S. and Canada. Daughter Betty lives in nearby Carmichael where her husband, Phil, is school principal. When not on wheels Horace spends a little time on the golf course learning a new language, but he does better at grinding out sawdust and noise in his home shop at 861 A Street. He is active in Boy Scout work and Community Church affairs and still manages to maintain his contacts with the livestock industry and the University.

DR. J. F. WILSON. Jim still drops in to see us occasionally but you are more likely to encounter him at the bank, at Rotary Club, or at J. F. Wilson Associates Ltd. Jim and Peg spent considerable time in Europe traveling, enjoying French cuisine, and visiting their daughter, Elizabeth, and son-in-law, Jim Knott, while Knott was with the American Embassy in Paris. More recently, the Wilsons have been spending more time around their home base at 600 Miller Drive. They celebrated their golden wedding anniversary in August, 1969 with the entire clan present including a fair-sized flock of grandchildren. Son John is associated with his dad in Davis and Mary Margaret (McCollum) lives in Ann Arbor, Michigan, where her husband is on the staff of the Music Department at the University of Michigan. The Knotts are now in Washington, D.C.

HAROLD H. COLE FACILITY

Another dream became a reality in December, 1968, with the completion of our new research facility for the study of the biology of large animals. On September 11, 1969, in ceremonies consistent with the occasion, this research facility was dedicated to Harold H. Cole, as a salute to Professor Cole's "outstanding contributions to the biology of large animals and to his leadership in the University, the state, and the nation".

The facility is a complex composed of four buildings situated in a triangle near the old steer shed. Building A is designed for experiments in the physiology, metabolism, and nutrition of the large domestic animals. It includes physiological and biochemical laboratories adapted for the analytical determinations related to the experiments planned with the different species. Building B is designed for housing small animals which will be used for pilot and supplementary studies for the investigations conducted with the larger species. Building C is a specialized structure designed to study body composition in live animals and carcasses as related to the production of meat in the meat animal industry. In addition, the building contains a specialized laboratory for fundamental studies and the biology of muscle. Building D is being used to house and hold animals that will be used for the experiments conducted in Building A.

The completion of the Harold H. Cole Facility greatly improves our research capabilities and more than offsets the loss of facilities that resulted from the construction of Robbins Hall several years ago.

TEACHING ACTIVITIES

Thirty-five courses are offered by the Animal Science Department exclusive of seminar, research, and special study courses. Of these, 3 are lower division courses, 28 are upper division courses, and 4 are graduate courses.

A.S. 1 and 2, our introductory courses, are given special attention in our teaching program. They are courses that emphasize the role of domestic animals in our environment and the application of the sciences to the husbandry of our animals. These courses are taken by our animal science and pre-vet majors, and an increasing number of students from the College of Letters and Science.

A.S. 21 and 111 are judging courses. We have not fielded judging teams in recent years because it is nearly impossible to take students away from the campus a sufficient amount of time to gain the proficiency needed in competition. We do feel that the ability to recognize and evaluate sound animals of desirable type is important and these courses are designed to provide this training.

Advanced Dairy and Meat Animal Production courses retain most of their original objectives. The application of the basic sciences to meet the rapidly changing problems in milk and meat production is emphasized. A.S. 115, our Horse Production course, has received new life. Dr. Evans, who teaches this course, is an experienced horseman and his course has been enthusiastically accepted. This advanced course draws heavily upon a sound background in genetics, nutrition, and physiology.

Statistical Inference in Animal Experimentation is a new graduate level course emphasizing sound decision making in large animal research. This is a subject of increasing importance to a large group of people serving the animal industry who are often confronted with data of varying quality and quantity on which to make decisions. Course additions and revisions have strengthened the series of Animal Genetics courses. Students are offered both theory and laboratory experience in animal breeding.

Animal Biochemistry 102 is designed to educate students in the procedures used in present physiological and biochemical laboratories. Graduate courses in this field are designed primarily to prepare students for advanced research.

The nutrition courses taught by the department offer excellent training in this field. A student may continue from the Principles of Nutrition, course 110, to study metabolism and good utilization in course 125. Courses 122 and 123 offer in-depth consideration of the nutrition of both ruminant and non-ruminant animals.

Physiology 110, well-known to former students, continues as a very strong course. Special efforts to improve instruction methods in this course have been highly successful. Teaching Assistants are given training in instruction methods. Well-equipped teaching carrels are made available to students for study and review. The Physiology of Reproduction course confronts very practical problems of the animal industry. It is elected by most Animal Science students as well as a large number of others with the necessary background in physiology.

Enrollment in scheduled Animal Science courses ranges from 16 students in some of the specialized courses to over 200 in introductory courses. A number of professors have additional teaching responsibilities in other departments and most have several students to guide in research projects. Additional courses for lower division, upper division or graduate credit in Animal Science may be requested by students or offered by a professor. Such special courses are occasionally initiated by a professor who wishes to present new or special subject matter, or develop a course that may later appear in the catalog.

FALL QUARTER

Animal Science 1 -- Domestic Animals and Man.
Animal Science 111 -- Type Evaluation in Livestock and Dairy Cattle.
Animal Genetics 107 -- Animal Breeding and Genetics.
Animal Genetics 107A -- Mammalian Genetics Laboratory.
Nutrition 103 -- Animal Nutrition and Feeding.
Nutrition 109 -- Nutritional Principles of Livestock Feeding.
Nutrition 125 -- Metabolism and Food Utilization.
Physiology 110A -- Mammalian Physiology.
Physiology 111A -- Mammalian Physiology Laboratory.
Physiology 220 -- General and Comparative Physiology of Reproduction.

WINTER QUARTER

Animal Science 114A -- Advanced Dairy Cattle Production.
Animal Science 116A -- Meat Animal Production.
Animal Science 118A -- Range Livestock Production.
Animal Biochemistry 102 -- Animal Biochemistry Laboratory.
Animal Biochemistry 201 -- Protein Biochemistry.
Animal Genetics 107B -- Animal Breeding Laboratory.
Animal Genetics 108 -- Methods in Quantitative Animal Breeding.
Animal Genetics 108L -- Animal Breeding Laboratory.
Nutrition 110 -- Principles of Nutrition.
Physiology 110B -- Mammalian Physiology.
Physiology 111B -- Mammalian Physiology Laboratory.

SPRING QUARTER

Animal Science 2 -- Introductory Animal Science.
Animal Science 21 -- Livestock and Dairy Cattle Judging.
Animal Science 114B -- Advanced Dairy Cattle Production.
Animal Science 115 -- Horse Production.
Animal Science 116B -- Meat Animal Production.
Animal Science 118B -- Intensive Livestock Production.
Animal Science 240 -- Statistical Inference in Animal Experimentation.
Animal Biochemistry 230 -- Biochemical Aspects of Endocrinology.
Animal Genetics 107C -- Discussion of Animal Breeding Experiments and Methods.
Nutrition 121 -- Animal Nutrition Laboratory.
Nutrition 122 -- Ruminant Nutrition.
Nutrition 123 -- Nutrition of Non-ruminant Animals.
Physiology 121 -- Physiology of Reproduction.
Physiology 225 -- Physiology of Lactation.

SUMMARY OF RESEARCH

Department research can be summarized under four general programs; bioenergetics, growth and development, reproduction, and range utilization. Bioenergetics includes such major projects as; utilization efficiency determinations of pressure-processed wheat and milo, net energy value of dehydrated and pelleted alfalfa as compared to that of ground or cubed sun-cured hay, and urea and biuret supplementation of low quality roughage and by-product feeds. One interesting conclusion from this research is that both barley and rice straw contain factors which inhibit cellulose digestion. A new experimental technique has emerged from these studies. A feed sample, the digestion of which is to be studied, is placed in a nylon bag and incubated in the rumen. The bag is recovered and, by means of a fistula, placed into the abomasum from which point it travels through the digestive tract and is eliminated. This technique will permit an estimation of the extent of digestion which takes place in various parts of the tract.

It may surprise old-timers that chickens and cattle with muscular hypertrophy (double muscled) are used extensively for studies in bioenergetics. Chickens are frequently used to study the metabolic effect of gravity stress while double-muscled cattle are useful for studies on the regulation of muscle protein synthesis.

Growth and development covers a wide range of research -- from the identification of quantifiable traits of double muscling (which would be useful in selection) to a study of hormonal control of coat color in mice. Other studies have indicated heterosis for milk yield and calf vigor. Sheep selected on the basis of weaning weights in a favorable environment showed substantial increases in weaning weights and mature ewe weights even in an unfavorable environment. Young calves fed relatively small amounts of fish oil developed moderate to severe dystrophic lesions in heart and skeletal muscles and this condition was prevented by Vitamin E supplementation. It has also been found that horses and other non-ruminant herbivores are strongly dependent upon bacterial synthesis in the cecum for their utilization of low-quality protein and non-protein nitrogen.

Double-muscled cattle, calves with muscular dystrophy caused by diets rich in unsaturated fatty acids (fish oils) and chicks with inherited muscular dystrophy, have provided an abundance of material for basic research. Growth and lactation studies are two other processes being intensively examined. Mice have now been selected over 20 generations for rapid post-weaning weights. Rainbow trout in studies of relatively short duration have already shown a substantial hybrid response in growth rates; and the flour beetle Tribolium castaneum is being used as a model to evaluate biochemical responses characteristic of growth and development. The lactation investigations have been at a cellular level (e.g., effects of hormones on enzyme systems and DNA and RNA synthesis), but are progressing to the level of tissue and animal systems.

Projects in reproduction range from a study of gonadotropin antibodies in the ewe to the effect of hot-iron branding on estrus cycles. In between we find the identification of adrenal factors involved in sterility in dairy cattle; measurements of circulating LH levels in the ewe during its cycle; increased twinning frequency in sheep selected either for multiple births or, in one line, for weaning weight; and the demonstration in mice that ovulation rate and embryo survival are controlled by different genetic systems.

FIELD STATIONS

The department has research in progress at three field stations; Hopland in Mendocino County, Imperial Valley Field Station, and at the Sierra Foothill Range Station in the foothills east of Marysville.

Most of the work at Hopland is on sheep under the supervision of Don Torell. Eric Bradford, Glen Spurlock and Bill Weir are actively involved with the research program there. The genetic work under Dr. Bradford is aimed at increasing sheep productivity through selection for multiple births and for rapid growth rate. He plans to test the Finnish-Landrace and crossbred rams at Hopland during the coming lambing season. Dr. Spurlock has led some of the work on reproduction. Currently the use of vaginal sponges combined with injections of pregnant mare serum is being tested as a means of reducing the number of dry ewes.

Weir and Torell are studying the nutrients required immediately before and at breeding time to increase lamb production. They are also participating with the Departments of Agricultural Zoology, Agronomy and Range Science, Range Management from Berkeley, and Water Science and Engineering on cooperative trials.

Glen Lofgreen is leader of the Animal Science program at the Imperial Valley Station having transferred from Davis in 1967. He has an ambitious program underway involving comparative tests with the Agricultural Extension Service and cattle feeders of that area. They are studying such things as the influence of processing on the value of milo, feeding value of wheat, slotted floors and manure disposal.

The university purchased the Sierra Station in the early 1960's to replace the San Joaquin range operation. Facilities and fencing are now such that a more effective research program is being organized. Dr. Morris, our new staff member from Australia, Ken Wagnon, and Roy Hull are planning an overall program. Morris is starting his work by determining the carrying capacity of an 800-acre area from which the trees have been cleared and which was fenced into pastures this past year. The intention is that this will become a major research area on the station.

Roy Hull and Warren Evans are developing an interdisciplinary study on the effect of recreationists on cattle production. An area above Englebright Reservoir is being calibrated now for cattle production and it is planned to bring summer recreationists in to study the interaction between the people and cattle in a few years. When the Marysville Dam is built across the Yuba an additional area of the station will be flooded and more recreational opportunities will be presented. Roy Hull and Charles Raguse from Agronomy are cooperating with Bill Hart from Irrigation in developing irrigated pastures as a supplement for dry range. The station offers an opportunity to study the combination of a limited amount of irrigated land in a large area of dry range.

UNIVERSITY OF CHILE PROGRAM

Since 1966 the Department has participated in the cooperative program between the Universities of Chile and California -- a program supported entirely by the Ford Foundation. The Animal Science Program, one of the 5 active programs in agriculture and veterinary medicine receiving support, has involved sending staff members from Davis to Santiago, Chile, and vice versa. This exchange of personnel between the two universities allows Chilean participants to pursue graduate work toward higher degrees in Davis, and California participants to work cooperatively on problems facing the livestock industry in Chile.

To date, 11 Chileans have come to Davis and 5 California participants have gone to Santiago. Of the Chilean participants, 6 came for graduate work and 5 of these have earned the Master's degree, one laboratory technician came for 6 months for further training in the nutritional laboratories, one came to Hopland to replace Don Torell who is now in Santiago, and 3 came for short periods (3-4 months) to study, observe and learn more about their own special livestock fields. California participants include Magnar Ronning, Jim Robb, Hubert Heitman, Floyd Carroll and Don Torell. Bill Weir will replace Torell in August or September.

Magnar Ronning, first UCD Animal Science participant, helped initiate a broad project, "Efficiency of Utilization of Land and Feed Resources for Livestock Production in Chile". That nearly half of Chile's import expenditures are for food -- half of which are beef and dairy products -- seemed clear justification for developing the potential Chile has for producing ample supplies of meat and dairy products. It seems doubtful that Chile will ever produce enough grain for extensive use with beef and dairy cattle in addition to her needs for human consumption, poultry, and other livestock. Therefore, more efficient use must be made of improved pastures, natural range lands, and by-product feeds. Efforts toward our objectives involve wintering trials with weaner steers supplemented so as to fatten efficiently in drylot, digestion trials on alfalfa cut at different stages of maturity, digestion trials with Tamarugo leaves and fruit, nationwide survey of forages and their nutritive composition, and testing emergency feeds, such as wheat straw, for drought stricken cattle and sheep.

Floyd Carroll, who followed Ronning, continued the work in progress and taught some of the principles of live animal and carcass evaluation. He also worked with a committee appointed to establish a simple grading system for market cattle which may result in developing a grading system for carcasses. Jim Robb, whose tour of participation overlapped Ronning's and Carroll's made an important contribution to the overall success of the program. He supervised installation of equipment, advised technicians in developing standard procedures for chemical analyses, instructed technicians and students in laboratory techniques, and worked with the staff in using the laboratory most effectively for their research. Don Torell, who followed Carroll, continued research in progress but also initiated work with sheep such as barn lambing to save more lambs, the use of better nutrition and hormone sponges for increasing number of lambs born, and the use of esophageal-fistulated sheep in range evaluation work.

Dr. Heitman made two short visits to review the progress of work in animal production with investigators concerned, discuss future plans, talk with former students, and meet with participants planning to go to Davis. Our participants also were involved in many other activities such as presenting seminars and course lectures, and providing students guidance with manuscripts and thesis research.